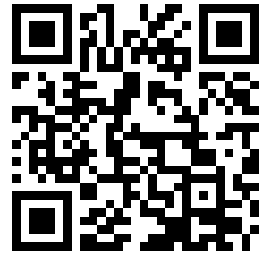

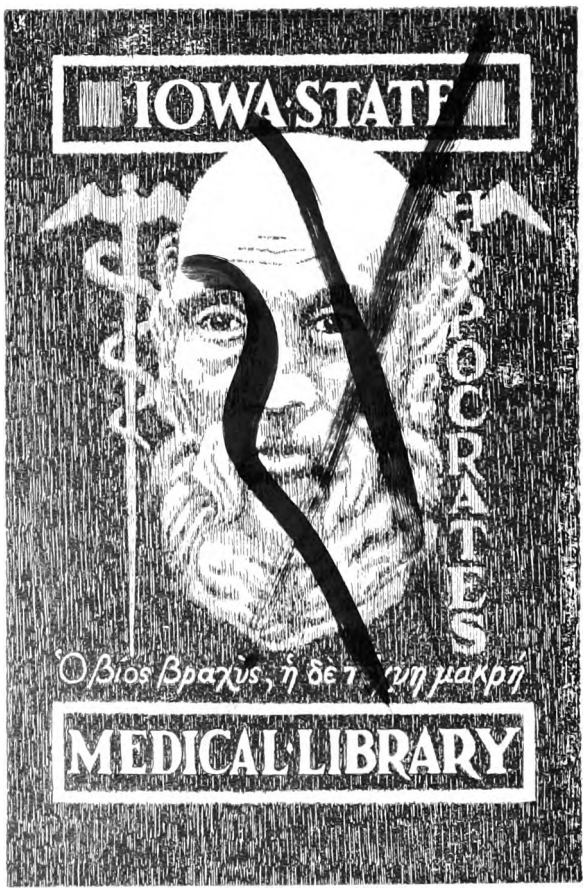

SEPT. 7, 1946

THE LANCET

A JOURNAL OF BRITISH AND FOREIGN MEDICINE, SURGERY, OBSTETRICS, PHYSIOLOGY, PATHOLOGY, PHARMACOLOGY, PUBLIC HEALTH, AND NEWS

No. 6419 LONDON: SATURDAY, SEPTEMBER 7, 1946 CCLI

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SEPT. 14, 1946

THE LANCET

A JOURNAL OF BRITISH AND FOREIGN MEDICINE, SURGERY, OBSTETRICS, PHYSIOLOGY, PATHOLOGY, PHARMACOLOGY, PUBLIC HEALTH, AND NEWS

No. 6420 LONDON: SATURDAY, SEPTEMBER 14, 1946 CCLI

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A JOURNAL OF BRITISH AND FOREIGN MEDICINE, SURGERY, OBSTETRICS, PHYSIOLOGY, PATHOLOGY, PHARMACOLOGY, PUBLIC HEALTH, AND NEWS

No. 6421 LONDON: SATURDAY, SEPTEMBER 21, 1946 CCLI

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THE LANCET

A JOURNAL OF BRITISH AND FOREIGN MEDICINE, SURGERY, OBSTETRICS, PHYSIOLOGY, PATHOLOGY, PHARMACOLOGY, PUBLIC HEALTH, AND NEWS

No. 6422 LONDON: SATURDAY, SEPTEMBER 28, 1946 CCLI

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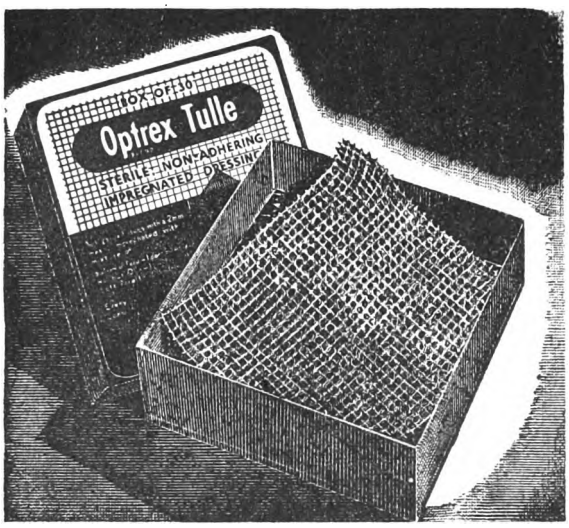

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No. 6423 LONDON: SATURDAY, OCTOBER 5, 1946 CCLI

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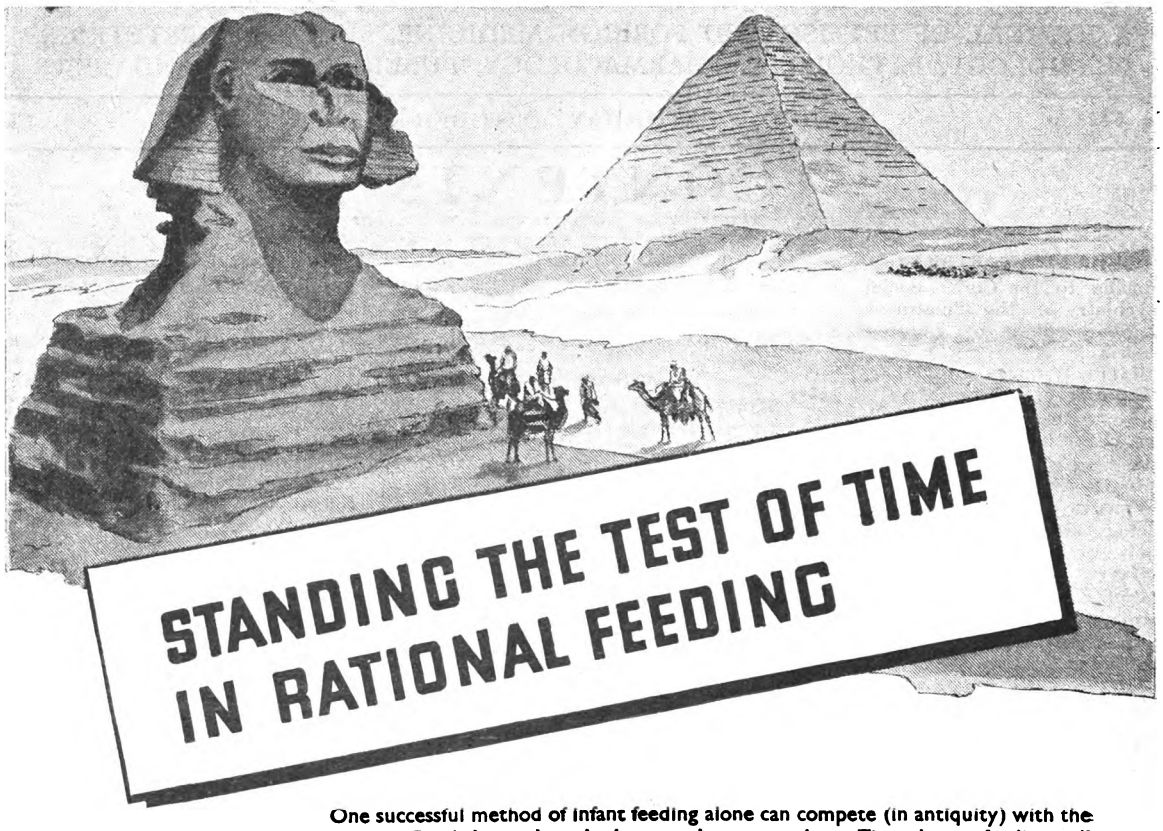

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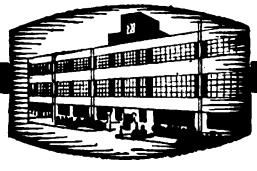

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OCT. 12, 1946

THE LANCET

A JOURNAL OF BRITISH AND FOREIGN MEDICINE, SURGERY, OBSTETRICS, PHYSIOLOGY, PATHOLOGY, PHARMACOLOGY, PUBLIC HEALTH, AND NEWS

No. 6424 LONDON: SATURDAY, OCTOBER 12, 1946 CCLI

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THE LANCET

A JOURNAL OF BRITISH AND FOREIGN MEDICINE, SURGERY, OBSTETRICS, PHYSIOLOGY, PATHOLOGY, PHARMACOLOGY, PUBLIC HEALTH, AND NEWS

No. 6425 LONDON: SATURDAY, OCTOBER 19, 1946 CCLI

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A JOURNAL OF BRITISH AND FOREIGN MEDICINE, SURGERY, OBSTETRICS, PHYSIOLOGY, PATHOLOGY, PHARMACOLOGY, PUBLIC HEALTH, AND NEWS

No. 6426 LONDON: SATURDAY, OCTOBER 26, 1946 CCLI

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EPIDEMIC THROMBOPHLEBITIS
IN THE EAST AFRICA COMMAND

P. E. C. MANSON-BAHR
M.B. Camb., M.R.C.P., D.T.M. & H.
LIEUT.-COLONEL R.A.M.C., LATE MEDICAL ADVISER TO EAST AFRICA COMMAND

A. D. CHARTERS
M.D. Camb., D.T.M. & H.
LATE MAJOR R.A.M.C., MEDICAL SPECIALIST

NON-SUPPURATIVE thrombophlebitis may be primary or secondary. Secondary thrombophlebitis may be the result of trauma, local infection, general debilitating diseases, or fevers, such as typhoid, pneumonia, and influenza, or may follow operation or childbirth.

Primary thrombophlebitis, or thrombophlebitis migrans, is relatively uncommon. Its cause is unknown, although Boyd (1938) regards it as a type of thromboangiitis obliterans involving only the veins. Widely separate regions of the body are affected. There is no relation to pre-existing disease or trauma of the vessels. Pulmonary embolism often occurs, and complete recovery is usual (Swirsky and Cassano 1943). Gelfand (1943) describes a condition of thick leg among Africans of Southern Rhodesia, the result of previous attacks of thrombophlebitis of the femoral vein, which he states is not uncommon.

A syndrome of recurrent thrombophlebitis accompanied by pyrexia, often relapsing and sometimes associated with stiff neck, occurred among askaris of the East Africa Command during 1944.

No previous record of such a condition has been found. The outstanding nature of the disease is indicated by the fact that the same clinical features have been independently noted by several other medical officers: Majors Campbell and Wright, and Captains L. E. Burkeman, A. W. Pringle, S. M. Pruss, G. M. T. Tate, M. Slade, J. C. Enterican, and E. Taube.

EPIDEMIOLOGY

Occasional sporadic cases of thrombophlebitis, involving one or more limbs, were observed in the command during 1941 and 1942. In 1943 several patients were admitted to hospital with œdema of unknown origin, probably the result of phlebitis, but it was not until January, 1944, that the disease began to assume epidemic proportions.

The syndrome first appeared in a localised area of the command among patients who had recently received treatment at a special treatment centre for venereal disease at Thika, near Nairobi. In April, 1944, cases of pyrexia with stiff neck were described by Captain A. W. Pringle at Au Barre, in British Somaliland; in August the disease broke out among patients who had been treated at another special treatment centre for venereal diseases, this time at Mandera, British Somaliland, some 1500 miles away from Thika. The outbreak reached its peak during the third quarter of 1944 and then rapidly declined. By the end of 1945 most of the recorded cases were relapses.

The cases admitted to No. 1 (E.A.) General Hospital and No. 3 (E.A.) General Hospital were as follows:

Quarter	*No. of cases*	*Quarter*	*No. of cases*
Jan.–March, 1944 ..	34	Jan.–March, 1945 ..	69
April–June, 1944 ..	81	April–June, 1945 ..	40
July–Sept., 1944 ..	204	July–Sept., 1945 ..	19
Oct.–Dec., 1944 ..	175	Oct.–Dec., 1945 ..	5
			627

These two hospitals eventually received all the cases occurring in Thika district. No accurate figures are obtainable for the region of Mandera, British Somaliland, but the peak figures coincided with those in Kenya.

VARIETIES

The following account is drawn from the clinical features of 145 cases among East African soldiers resident in British Somaliland and Kenya during the period January, 1944–June, 1945. Three varieties of the syndrome were seen: (1) short-term fever with stiff neck often followed by relapses; (2) thrombophlebitis affecting one or more limbs, with a tendency to relapse; and (3) pyrexia, usually relapsing, without evident phlebitis. The same patient might show one or more of these varieties during the course of his disease. Thus a bout of pyrexia with stiff neck might be followed by an attack of thrombophlebitis, which in its turn might be succeeded by pyrexia without evident phlebitis.

History of the Disease.—The vast majority of the patients gave a history of having received treatment in one or other of the two special treatment centres for venereal diseases in the command. Of 83 cases in British Somaliland 58 had been admitted for syphilis and 4 for gonorrhœa. The remaining 21 cases gave no history of venereal disease and had not been resident in a special treatment centre.

History of Previous Injections.—Most of the patients had received a previous venepuncture for neoarsphenamine therapy, artificial pyrotherapy with typhoid-paratyphoid vaccine (T.A.B.), or diagnostic purposes. Of 143 cases questioned, 111 had been injected with neoarsphenamine intravenously and bismuth intramuscularly, and 9 had received either intravenous T.A.B. with intramuscular sulphapyridine or a diagnostic venepuncture. The remaining 23 gave no history of injection. The interval between the last injection and the onset of symptoms varied from three days to seven months. Of 100 cases receiving neoarsphenamine therapy, 79 developed symptoms within six weeks of the last injection. The total dosage of arsenicals administered varied from 1·65 to 6·6 g., the average being 4·4 g.

SHORT-TERM FEVER WITH STIFF NECK

This form developed either as the first phase of the syndrome or as a sequel to previous attacks of phlebitis. The onset was abrupt, though there was usually no rigor. Severe pain in the neck came on with the general symptoms of fever. On examination the patient had a raised temperature with stiffness of the neck (but no head-retraction) and tenderness of one or more muscles, most commonly the sternomastoid or the trapezius. If only one side was affected, torticollis was a common sign.

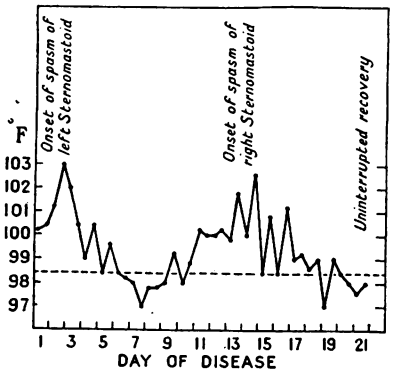

Fig. 1—Short-term fever with stiff neck, followed by stiff neck involving a different muscle.

The duration of pyrexia varied from two to thirty days, the usual course being about four days, and the temperature falling by lysis (fig. 1). The fever was commonly relapsing, the relapse being accompanied either by another bout of stiff neck, or by an attack of thrombophlebitis, or occasionally without either. Of 62 cases of short-term fever with muscle stiffness, the sternomastoids were involved in 25, trapezius 21, infrahyoid muscles 3, posterior cervical 3, neck muscles unspecified 5, erector spinæ 4 cases, and masseters 1 case.

No significant enlargement of the cervical glands was noted; neither was any evidence of cervical thrombo-

phlebitis detected. There was no sign of meningitis, Kernig's sign being invariably negative and cerebral irritation consistently absent.

Laboratory Investigations.

Frequent examination of *blood smears* did not show either spirochætes of relapsing fever or any other parasite.

Leucocyte counts were performed in 11 cases: the total count was below 8000 per c.mm. in all cases, and a relative lymphocytosis was found in 7 of them.

The *cerebrospinal fluid* was examined in 12 cases, in 3 of which there was a cell-count of over 8 per c.mm. (all lymphocytes), the remaining 9 showing no abnormality.

THROMBOPHLEBITIS AFFECTING ONE OR MORE LIMBS

This variety was usually acute, less commonly subacute, and occasionally assumed unusual features.

(*a*) *Acute Thrombophlebitis.*—Symptoms developed either as a sequel to an afebrile period following an attack of stiff neck, or as the first incident in the course of the disease. There was an acute onset of fever, with severe pain in one limb over the site of a vein, and examination revealed severe tenderness over the affected vessel, the limb being held in protective flexion when a popliteal or antecubital vein was affected. In the event of a superficial vein being involved—e.g., the cephalic or the internal saphenous vein—the vessel could be palpated as a thickened tender cord throughout its length, it being, not uncommonly, possible to palpate a thrombosed internal saphenous vein for the whole of its course from ankle to groin. Pitting œdema was present and was particularly severe when a deep vessel, such as the femoral vein, was attacked. After an afebrile period a relapse of fever often occurred, accompanied by thrombophlebitis in another limb (fig. 2), or by stiff neck,

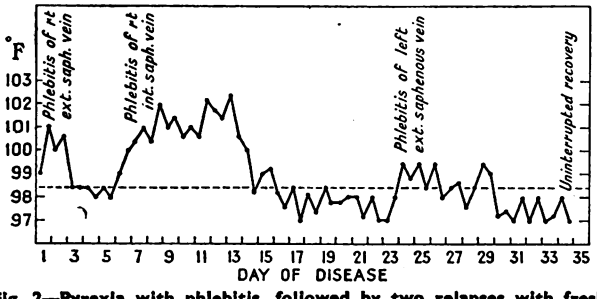

Fig. 2—Pyrexia with phlebitis, followed by two relapses with fresh phlebitis.

or without any localising signs. The thrombosed vein, if superficial, sometimes persisted as a thickened hard fibrosed cord for many months, and was still palpable on discharge of the patient from the Army or the hospital.

Special Investigations

White-cell count was performed in 26 cases. In 22 the total count was below 10,000 per c.mm., and in 4 higher. Most showed a relative lymphocytosis.

Blood-culture was performed in 6 cases, in 5 of which cultures were sterile. *B. fœcalis alkaligenes* was recovered twice from one patient's blood-culture but was almost certainly a contaminant.

Biopsy of an affected vein was carried out on 6 occasions. Some of the cases were acute and others chronic. On exposure of the affected vein under local anæsthesia it was seen to be greatly swollen, but not adherent to surrounding tissues. On section, the vein was found to be completely thrombosed in early cases; it was white and fibrous, sometimes with signs of recanalisation, in later stages. On microscopical examination no specific changes could be found. Examination of sections in acute cases revealed a simple thrombus occupying the vein, with no evidence of inflammation either of the vein wall or of the surrounding tissues. In more chronic cases organisation and recanalisation of the thrombus could be observed; one very chronic case showed foreign-body giant-cells in the almost completely organised thrombus. Suppuration was never observed; nor could any organisms be seen.

Culture of a vein at biopsy was performed on three occasions, a contaminant being grown in one case, the other two being sterile.

In 99 cases the following veins were involved:

One internal saphenous	15
Both saphenous	4
One femoral	22
Both femorals	21
One popliteal	21
One superficial arm vein	16
Superficial arm veins right and left	4
? Portal vein	2
	105

Of these patients 6 had phlebitis of both arm and leg.

(*b*) *Subacute Thrombophlebitis.*—Some patients were admitted with no other symptoms than œdema of one or both legs, with irregular pyrexia, pain being often absent and no thrombosed vein being palpable. The urine was free from albumin, and blood examination did not reveal anæmia. Recovery often took place without further complication, but in some cases a subsequent attack of stiff neck or of acute thrombophlebitis indicated the nature of the syndrome.

(*c*) Three *unusual varieties* may be mentioned:

(i) *Chronic.*—Two cases developed recurrent bouts of localised venous thrombosis every three weeks for five months. During each attack, which was accompanied by two or three days of pyrexia, a small tender nodule could be palpated along the course of a superficial vein. One of the patients had a typical attack of pyrexia with stiff neck, and the other developed an acute thrombophlebitis of his popliteal vein during the course of the disease. Biopsy of a nodule in each case showed an organising thrombus in a vein.

(ii) *Portal Vein Involvement* (probable).—Two patients developed ascites within a month of the termination of a course of neoarsphenamine and bismuth. Fluid thrill and shifting dullness were elicited. Œdema of the lumbar spine and legs was present in one case. There was no jaundice or albuminuria. No ova were found in stools or urine. The blood-pressure was normal. No hepatic abnormality could be discovered clinically. The ascites disappeared completely in both cases, within three months and one month. Both patients completely recovered and returned to their units fit for duty. Neither of these patients had stiff neck or thrombophlebitis of the limbs.

(iii) *Association with Arteritis.*—Two patients, admitted to hospital with phlebitis, developed thrombosis of their femoral arteries, with resultant foot gangrene. Each case required amputation of the leg above the knee, after which recovery took place.

(*d*) *Complications and Sequelæ.*—A notable feature was the complete absence of embolism. A common sequela was persistent œdema of one leg; because of this many patients had to be invalided out of the Army. No death resulted from this disease in these 145 cases.

PYREXIA, USUALLY RELAPSING, WITHOUT EVIDENT PHLEBITIS

This variety was characterised by irregular pyrexia lasting from three days to three weeks, without evident phlebitis. In some cases the pyrexia ensued as a sequel to an attack of stiff neck or phlebitis; in other cases one or other of these syndromes developed as a complication after the termination of the fever. But many cases displayed no localising signs, the diagnosis being suggested by a history of recent antisyphilitic therapy, and by the coexistence in the same area of more typical cases of the disease.

DIFFERENTIAL DIAGNOSIS

Pyrexia with Stiff Neck.—The differential diagnosis from relapsing fever, cerebrospinal meningitis, and malaria was readily settled by the repeated absence of spirochætes and malaria parasites from the blood, and by the normal cerebrospinal fluid. Acute myalgia of neck and shoulders in epidemic form has been described by Beeson and Scott (1942), and cases of persistent myalgia following sore throat have been recorded by

Houghton and Jones (1942), but in neither instance was any association with thrombophlebitis or injections mentioned.

Thrombophlebitis.—The acute form had to be diagnosed from pyomyositis, which was differentiated by the more marked local swelling, the absence of signs over the site of a vein, the absence of peripheral œdema, and the tendency to pus formation.

Subacute bilateral thrombophlebitis of the legs had to be distinguished from other causes of œdema, such as nephritis, anæmia, cardiac failure, vitamin-B_1 or protein deficiency, and epidemic dropsy. The differentiation from these diseases only arose in those cases where no area of thrombophlebitis was evident. Examination of urine, blood, and cardiovascular system readily excluded renal, blood, and cardiac disease. Beriberi was eliminated by the absence of neurological or of cardiac abnormality, and protein deficiency was excluded by the normal plasma-protein level (estimations in 3 cases were 8·95 mg., 8·83 mg., and 8·36 mg. per 100 c.cm.). The residual swelling was distinguished from filariasis by the pitting character of the œdema.

Relapsing Pyrexia without Evident Phlebitis.—When of over two weeks' duration this pyrexia had to be distinguished from other long-term fevers, such as typhoid, kala-azar, undulant fever, and miliary tuberculosis. Negative cultural and serological reactions, negative sternal puncture, and normal chest radiograms excluded these diseases. The history of recent treatment at a special treatment centre for venereal diseases, the coexistence of more typical cases of the disease in the same area, and in some cases the supervention of an attack of acute phlebitis or stiff neck clinched the diagnosis.

DISCUSSION

It might be thought that the description which has been given is not that of a syndrome, but of a mixture of short-term fevers, unrelated cases of thrombophlebitis, and long-term undiagnosed pyrexias. They have been described together as a syndrome for the following reasons:

(1) A sudden outbreak of thrombophlebitis, with subsequent decline in numbers of cases, occurred in two widely separated areas of the command. Previous cases could scarcely have been missed, as reliable observers were present before the outbreak in these areas.

(2) Several observers, who had had no previous information on the subject, made simultaneously and independently the observation of the association of the short-term fever with stiff neck, often followed by relapses, with thrombophlebitis affecting one or more limbs, and later with the pyrexia without evident phlebitis.

(3) The association of these three manifestations is shown below:

	Cases
Short-term fever with stiff neck alone	8
Thrombophlebitis alone	23
Pyrexia without evident phlebitis alone	3
Short-term fever with stiff neck and thrombophlebitis	13
Short-term fever with stiff neck and pyrexia without evident phlebitis	5
Thrombophlebitis and pyrexia without evident phlebitis	3
Short-term fever with stiff neck, thrombophlebitis, and pyrexia without evident phlebitis	7
	62

In searching for the cause of this peculiar syndrome three possibilities were entertained: (1) that it was a virus disease like infective hepatitis; (2) that it was due to the local effect of neoarsphenamine or other antisyphilitic drug on the vein; and (3) that it was allied to marantic thrombosis.

Virus Disease.—The points in favour of a virus origin are the relative lymphocytosis, the negative bacteriological findings, and its possible ætiological and epidemiological relationship to infective hepatitis in this command. The admissions for infective hepatitis to two general hospitals at the time of this outbreak are shown in fig. 3. The similarity between the two curves will be noted. Most of the cases of infective hepatitis were so-called postarsphenamine jaundice in patients undergoing antisyphilitic treatment. That infective hepatitis can be transmitted by syringes has strong support. Of 62 patients developing this syndrome, 5 had previously had jaundice, and 2 developed thrombophlebitis while still undergoing treatment in hospital for jaundice. The theory that the present syndrome may be caused by a virus transmitted chiefly by needle puncture, but also by other means, such as droplet, urine, or fæces, is attractive.

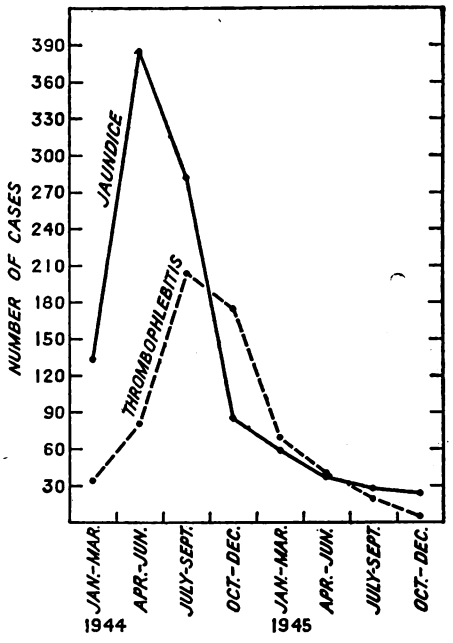

Fig. 3—Admissions to No. 1 and No. 3 (E.A.) General Hospitals of cases of jaundice and of thrombophlebitis from January, 1944, to December, 1945.

Rift Valley fever, a virus disease, is endemic in East Africa. The sera of two patients, taken in each case on the second and twenty-first days, were examined by Dr. K. C. Smithburn, of the Yellow Fever Research Institute, Entebbe, but no antibodies to the virus of Rift Valley fever were found.

Local Effect of Drugs on Veins.—The prolonged course of the pyrexia suggests that the cause of the phlebitis is an infection rather than a chemical irritation of the veins by antisyphilitic drugs. The predisposing effect of arsenic or bismuth cannot be doubted. It is possible that one or other of these drugs so damages the veins as to make them susceptible to infection. It will, however, have been noted that some of the patients had received no previous antisyphilitic therapy.

Marantic Thrombosis.—Thrombosis of limb veins occurs in severely malnourished persons, but most of these patients were healthy African soldiers of category A, who were better nourished than their civilian compatriots, among whom thrombophlebitis is unusual.

SUMMARY

A syndrome occurring in East African soldiers is described. The main features were pyrexia associated with stiff neck or thrombophlebitis, and usually accompanied by relative lymphocytosis. There is a great tendency to relapse.

The association with antisyphilitic treatment is emphasised.

The possible causes are discussed.

We are grateful to Brigadier R. P. Cormack, O.B.E., director of medical services, East Africa Command, for permission to publish this article, and to Major J. E. McClemont, R.A.M.C., for some of the pathological investigations.

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NAUSEA AND VOMITING OF PREGNANCY

A STUDY IN PSYCHOSOMATIC AND SOCIAL MEDICINE

G. GLADSTONE ROBERTSON
M.D. Glasg.

MY interest in the nausea and vomiting of pregnancy originated in some observations I made, in general practice, on dyspepsia in non-pregnant women. I had noted that a particular dyspeptic syndrome, usually attributed by its sufferers to "a weak stomach," was not uncommon in married women who were sexually frigid. A short account of this syndrome is as follows.

The symptoms usually began soon after marriage, or, if later, with the cessation of sexual interest. In its initial phases the syndrome usually appeared at times of the day which could be related to the impending threat of coitus—i.e., in the late evening—or at the week-end.

The earliest and most constant symptoms were abdominal distension, eructation of wind and of small quantities of gastric juice (usually termed "acidity"), and an increasing distaste for fats, with a decreased ability to digest them. Attacks of nausea appeared later, with or without vomiting, which was often described as "biliousness." Pain was present only in long-standing and severe cases, in which discomfort was almost constantly present. The condition was liable to persist indefinitely but with little or no deterioration in general health.

Some of the patients were known to me before marriage, when there was nothing to indicate that they were abnormal. As a whole they did not lean towards any personality group—e.g., hysterical or obsessional—or towards any special psychiatrical category, such as anxiety state. On the other hand, if the illness had lasted for years, it was the exception to find a patient who did not exhibit signs of anxiety.

A study of the emotional state of these patients at the time of the onset of symptoms revealed a common feature—i.e., sexual relationship with the husband gave rise to disgust. The digestive disorder appeared to be a physiological response to the repetitive effect of this emotion. Further, most of the patients came to dread coitus and to develop signs of anxiety. The subsequent nervous element was as clearly a response to fear as the digestive disorder was to disgust. Neither disorder was causally related to a primary psychoneurosis.

When I first recognised this syndrome in 1938 I named it "rejection dyspepsia" (unpublished). During the succeeding years I have confirmed the findings in many hundreds of women. In doing so I noted that a high proportion of them at marriage were unduly attached to their mothers. The syndrome is common and includes, almost without exception, married women labelled as having visceroptosis and the great majority diagnosed as cases of nervous dyspepsia. Towards the end of 1943 I became impressed with the observation that women with this syndrome invariably had a history of protracted or severe nausea and vomiting during their pregnancies.

These and other observations suggested the possibility that the nausea and vomiting of pregnancy might also be related to frigidity. Accordingly I began to investigate my pregnant patients and the histories of their past pregnancies from this point of view. It appeared that frigidity in the strict sense—i.e., the experiencing of coitus as an act undesired in itself and unaccompanied by the attainment of orgasm—did not inevitably cause nausea and vomiting during pregnancy; but severe or long-continued vomiting in a frigid woman during pregnancy was related directly to the frequency of undesired and unappreciated coitus. A further characteristic associated with nausea and vomiting was that the woman was excessively attached to or dependent on her mother. This personality trait appeared to be relevant to nausea and vomiting even when the sexual functioning of the woman was "normal." Another characteristic which seemed to be ætiologically associated was a history of previous dyspepsia.

Serial Investigation of Pregnant Women

To evaluate the relevance of previous dyspepsia, excessive attachment to the mother, and disturbed sexual functioning in the ætiology of the nausea and vomiting of pregnancy, I investigated 100 consecutive pregnant women. The results are analysed in table I, which shows that 57 had nausea or vomiting and 43 had none. The latter group can therefore be regarded as controls. The table shows that 6 out of 57 cases had a history of previous dyspepsia, against none of the controls; 20 out of 57 cases showed undue mother attachment, against 4 out of 43 controls; and 40 out of 57 cases showed disturbed sexual functioning, against 4 out of 43 controls.

These findings confirmed that a history of previous dyspepsia, mother attachment, and disturbed sexual functioning were ætiologically significant in the nausea and vomiting of pregnancy.

TABLE I—DETAILED ANALYSIS OF CONTROLS AND CASES

—	Cases	Previous dyspepsia	Mother attachment			Disturbed sexual functioning		
			1	*2*	Total	*1*	*2*	Total
Controls ..	43	0	4	0	4	4	0	4
Nausea and vomiting:								
Minor ..	31	5	6	0	6	14	4	18
Moderate ..	17	1	5	3	8	6	7	13
Severe ..	9	0	3	3	6	0	9	9

DEFINITION OF TERMS AND STANDARDS OF ASSESSMENT

Previous Dyspepsia.—This term refers to those patients who had had recurrent attacks of dyspepsia for some years *before marriage.* These comprise 6 cases only—a number too small for further subdivision. The disorder in 3 of these was said to have dated from "acidosis" in childhood. All 6 had nausea and vomiting in pregnancy.

Mother Attachment.—The trend of development in the growing girl is towards an increasing freedom from her earlier dependence on the mother. On marriage, more especially when she herself becomes a mother, a woman should be able to behave as an independent adult mother. In some women, however, the infantile and childish relationship with the mother persists, and they remain enclosed within the orbit of the mother's influence, injunctions, and prohibitions. In other women the extreme devotion expressed for the mother is (to the appreciative observer) seen to be a compensation for repressed aggressive tendencies directed against her. Such tendencies are often found in a woman who is forced by circumstances to care for an invalid mother besides attending to her own household duties during the early years of marriage. If the young married woman has to live with her mother or a mother substitute—e.g., mother-in-law—the conflict between outward duty (devotion) and inward resentment (hate) is exaggerated as a result of propinquity.

Mother attachment varies from woman to woman, varies in its predisposing conditions, and varies in the same woman at different times. Its importance in the nausea and vomiting of pregnancy is usually greatest during the earlier pregnancies. With the passage of years it tends to wear off and its ætiological influence tends to decrease.

For the purpose of this inquiry I have used the numerals 1 and 2 to indicate the degrees of undue mother attachment estimated to prevail at and immediately before onset of the pregnancies studied. Thus, if after marriage the woman continues to visit her mother daily and

indicates her dependence on her by making no decision of importance without consulting her the degree of mother attachment was assessed as 1. When dependence in this sense is very pronounced, or when the patient described her interest in her mother as being greater than her interest in her husband, the degree of mother attachment was assessed as 2.

Why should undue mother attachment be the equivalent of a disgust factor in the subconscious? A psychiatrical interpretation might infer that the first aggressive feelings of the baby are directed towards the mother and are associated with anal activity. When in later life, as a result of cultural influences, bodily excretions become linked to dirtiness and filth, any aggressive feeling towards the mother becomes likewise associated with filth. The psychiatrist tells us that over-devotion to the mother is a disguise or compensation for aggressive tendencies.

Another and less complex explanation may be given which has the advantage of being more easily grasped by the patient. At various periods in the growth of the normal child he takes or steals what he desires, lies to escape punishment, and later becomes interested in his body and genital functions. These impulses are controlled and corrected chiefly by the mother, and as he acquires cultural education he tends to become ashamed of his past behaviour. This is shown by the inability of the average person, of any age, to discuss without embarrassment certain subjects, particularly of a sexual nature, in the mother's presence. It can even be said that for the remainder of his life the very sight of his mother induces in him subconscious shame.

Disturbed Sexual Functioning.—An obvious form of disturbed sexual functioning is frigidity in the sense that the woman has no interest in coitus, never experiences orgasm, and may have vaginismus. My own observations indicate that about 10% of married women fall into this category of complete frigidity throughout the whole of their married lives, and that many others, especially overworked women with large families, ultimately reach such a state. Most women with this characteristic were noted to have undue mother attachment before and during the early years of marriage. It seems that well-marked emotional entanglement with the mother tends to inhibit the normal expression of the woman's love for her husband. That the public mind is aware of the discomfiture experienced by the husband through undue interest on the part of his wife in her mother is shown by the popularity of mother-in-law jokes (invariably the wife's mother). Other forms of disturbed sexual functioning related ætiologically to the nausea and vomiting of pregnancy are continuous loss of sexual interest and inability to attain orgasm. Among the factors associated with and precipitating these are (on the part of the woman) ill-health, frequent childbearing, and fear of pregnancy.

Understanding of these conditions is, however, incomplete unless account is also taken of the sexual functioning of the husband, which may show either inexpertness or disturbance. For example, excessive coital demands made by the husband may, if long repeated, induce in the woman feelings of revolt and disgust, attended by loss of sexual interest. Infrequent intercourse, on the other hand, is not so likely to build up a massive reaction of disgust. This is illustrated by the absence of sickness in the strictly frigid married woman who has intercourse on relatively infrequent occasions and in the unmarried woman who has intercourse only once or twice in the absence of orgasm and even in the presence of painful discomfort. Continued ejaculatio præcox in the husband during early married life may also lead to the growth of disgust in connexion with coitus, because it prevents the wife from realising completed orgasm and the sexual act becomes associated with mere messiness. The inability of the woman to attain orgasm may also be determined by the repeated practice of coitus interruptus.

Inquiry was also made into the proportion of coital acts undesired by the wife and the proportion of coital acts in which she did not attain orgasm during the months preceding conception. Sexual functioning was regarded as reasonably normal when the proportion of undesired coitus and absence of orgasm did not exceed 20%. When either proportion exceeded 20% but was less than 60%, the disturbance of sexual functioning was assessed as 1; when the proportion exceeded 60%, the disturbance was assessed as 2.

Coital Infrequency.—As the theme of this discourse implies that pregnancy sickness is caused by a massive "disgust" factor in the subconscious, some method had to be devised to exclude from the disturbed sexual functioning category those patients who had experienced coitus on relatively infrequent occasions. Accordingly, no patient was included in this category in table I if coitus took place less frequently than once a month or six times in all.

Thus, disturbed sexual functioning was not taken into account in 6 controls, although all were frigid in the sense of the definition given above: 2 were unmarried and had experienced coitus on three and four occasions; 2 had married soldiers towards the expiry of embarkation leave; and 2 had been married for some years but asserted definitely that coitus had not taken place oftener than eight or nine times a year.

Though undesired coitus during pregnancy might well have a bearing on the severity of sickness, it was found expedient to limit the inquiry to a period of a few months before the beginning of pregnancy. Many of the women had not experienced coitus during pregnancy, notably the wives of men serving with H.M. Forces.

Degree of Nausea and Vomiting.—The cases were divided into three groups: minor, moderate, and severe. In the minor group nausea, retching, or vomiting lasted less than six weeks; in the severe group those symptoms were prolonged beyond five months, or, if of shorter duration, were of such severity as to be classified as true hyperemesis gravidarum—i.e., the fluid output exceeded fluid intake. The moderate group lay between the minor and severe groups.

DETAILED ANALYSIS

Detailed analysis of controls and cases is given in table I which shows that minor cases (31) were almost twice as common as moderate cases (17), and these in turn almost twice as common as severe cases (9). This table also indicates clearly that the ætiological significance of mother attachment and disturbed sexual functioning is higher in severe than in moderate cases; higher in these than in minor cases, and higher in minor cases than in controls. Thus the percentage with mother attachment in controls was 9; in minor cases 19; in moderate cases 47; and in severe cases 66. The percentage with disturbed sexual functioning in controls was 9; in minor cases 58; in moderate cases 76; and in severe cases 100. The greater significance of both mother attachment and disturbed sexual functioning in severe than in minor cases is also indicated by the progressive percentage increase in degree-2 cases compared to degree-1 cases as we pass from the minor through the moderate to the severe group.

Variations of Nausea and Vomiting in Successive Pregnancies in the same Woman.—The series of 100 pregnant women comprised both primiparæ and multiparæ. The multiparæ numbered 63 and between them gave a history of 175 previous pregnancies. The syndrome of nausea and vomiting was not necessarily a constant feature for successive pregnancies in the same woman. Some of the controls in this series were "cases" in their previous pregnancies, and vice versa. The presence or absence of vomiting in any single sequence of pregnancies in the same woman could usually be related to the life situation prevailing before conception—e.g., the relationship to

the mother, the attitude towards the husband as a person, and the behaviour of the husband as a lover. An analysis of the 175 previous pregnancies gave results which corresponded to those obtained in the present series of 100 pregnancies.

Table II shows, in six illustrative cases, the sickness variability in a succession of pregnancies in the same woman and the significance of previous dyspepsia, mother attachment, disturbed sexual functioning, and coital infrequence. Though these cases were selected they are typical of the entire series comprising 275 pregnancies.

CASE 1.—A sequence of five pregnancies free from nausea or vomiting in the absence of the factors previous dyspepsia, mother attachment, and disturbed sexual functioning. She desired the first, was resigned to the following three, and averse to the last. In no patient does conscious attitude to pregnancy bear any relationship to sickness.

CASE 2.—Occasional attacks of biliousness dating from school days. When previous dyspepsia is the only factor, the degree of sickness is usually constant in all pregnancies in the same woman.

CASE 3.—Devoted to and nursed mother with pernicious anæmia. Mother died shortly after pregnancy 5. Disturbed sexual functioning throughout the years of marriage was 25%.

CASE 4.—Lived next door to and assisted her mother, to whom she was much attached until after pregnancy 3. On removing to another district she became detached from her mother. After pregnancy 4 her sex interest began to wane. After pregnancy 5 she became completely frigid.

CASE 5.—This woman was completely frigid. Her husband, like many married to such women, became a drunkard and later unfaithful. He contracted syphilis after pregnancy 7, and they separated. Before conceptions 8, 9, 10, and 11 he broke into the house (on the evidence of a neighbour and her own testimony) and intercourse took place on only one occasion before each pregnancy.

CASE 6.—She illustrates the effect of a combination of the factors mother attachment (to a marked degree) and complete frigidity. All pregnancies were complicated by hyperemesis gravidarum. The first two terminated in stillbirth at the 29th and 31st week respectively. The third continued to the 35th week with survival of the child.

TABLE II—SICKNESS VARIABILITY IN SUCCESSIVE PREGNANCIES IN 6 TYPICAL CASES, SHOWING SIGNIFICANCE OF PERSONALITY FACTORS

Case	Pregnancy	Age (year)	CAP	PD	MA	DSF	CI	Total points	Nausea and vomiting
1	1	20	D	0	0	0	—	0	0
	2	21	R	0	0	0	—	0	0
	3	24	R	0	0	0	—	0	0
	4	27	R	0	0	0	—	0	0
	5	31	A	0	0	0	—	0	0
2	1	27	D	1	0	0	—	1	1
	2	31	D	1	0	0	—	1	1
	3	40	R	1	0	0	—	1	1
3	1	20	D	0	2	1	—	3	3
	2	22	D	0	2	1	—	3	3
	3	24	D	0	2	1	—	3	3
	4	26	D	0	2	1	—	3	3
	5	28	D	0	2	1	—	3	3
	6	33	A	0	0	1	—	1	0
4	1	18	D	0	1	0	—	1	1
	2	19	D	0	1	0	—	1	1
	3	21	A	0	1	0	—	1	1
	4	23	A	0	0	0	—	0	0
	5	25	A	0	0	1	—	1	1
	6	27	A	0	0	2	—	2	3
	7	28	A	0	0	2	—	2	3
5	1	20	D	0	0	2	—	2	1
	2	22	D	0	0	2	—	2	1
	3	24	D	0	0	2	—	2	1
	4	26	A	0	0	2	—	2	1
	5	27	A	0	0	2	—	2	1
	6	29	A	0	0	2	—	2	1
	7	30	A	0	0	2	—	2	1
	8	39	A	0	0	2	+	0	0
	9	40	A	0	0	2	+	0	0
	10	43	A	0	0	2	+	0	0
	11	44	A	0	0	2	+	0	0
6	1	31	D	0	2	2	—	4	3
	2	34	D	0	2	2	—	4	3
	3	36	D	0	2	2	—	4	3

The last pregnancy in each patient was one of the 100 consecutive pregnancies.
CAP, conscious attitude to pregnancy: D, desire for the pregnancy; R, resigned to being pregnant; A, averse to the pregnancy.
PD, previous dyspepsia.
MA, mother attachment.
DSF, disturbed sexual functioning.
CI, coital infrequency. A plus sign indicates the presence of this factor, when the DSF factor loses significance as an agent capable of causing sickness.
Total points are obtained by adding together degrees of PD, MA, and DSF. (DSF points not included if CI present.)
Degree of nausea and vomiting: minor 1, moderate 2, severe 3.

Vomiting and Miscarriage in the Wives of Returned Service Men.—Although as has been indicated the nausea and vomiting of pregnancy may be ætiologically complex, the practical considerations become narrowed down when a previous pregnancy was free from sickness. During recent months, in the course of general practice, I have encountered an unusually high proportion of miscarriages preceded by severe vomiting among the wives of ex-Service men who had been absent for two or more years. Many of the wives had undergone one or more previous pregnancies without sickness. In such cases one would expect, in view of the findings recorded in this paper, that frequent undesired coitus had occurred before the recent pregnancy; inquiry showed that this was so.

Many men, returning home after an absence of years, seem to be unaware that their wives have adjusted themselves to a different mode of life and may in fact have ceased to be in love with them in the physical sense. The vigour, physical fitness, and sexual hunger of these men contrasts with the war-worn condition of the harassed housewife. If regular coitus is not preceded by a preliminary courtship there is grave danger not only of severe vomiting during an ensuing pregnancy, with an apparent increased risk of miscarriage, but also of alienation of the affection of the wife.

These and similar aspects of human contact and relationship, with their unlimited potential for unhappiness and ill-health are the true kernel of Social Medicine. The inception of university chairs of social medicine led one to believe that an endeavour was about to be made to equip the doctor of the future to grapple with such problems, but apparently the subjects for research are to be well-worn topics like vital statistics, drainage, and impurities in food and milk.

ADDITIONAL FINDINGS

The compilation of this series of patients began on April 1, 1944, and was complete in ten weeks. With the exception of three women who miscarried on the occasion of the first attendance, every pregnant woman treated in the course of practice was included in the series. Whether the pregnancy was at an early or at a late stage during this period, recorded data were available from the first examination, and the inquiry was not finally concluded until after the delivery of the last patient.

The blood-pressure curve tended to rise more steeply in patients who suffered from severe and protracted vomiting.

Four patients had pyelitis during some stage of the pregnancy, and 2 had albuminuria. All 6 had nausea and vomiting. In all these cases nausea and vomiting preceded the rise in blood-pressure, pyelitis, or albuminuria.

Most textbooks comment on the higher incidence of pregnancy sickness among "nervous" or "neurotic" women. Most of the 100 patients were known to me during previous pregnancies and often before marriage. Nervous or neurotic trends were apparent in some before marriage, but in others not until some time after marriage. The impression gathered was that the incidence of sickness was definitely higher in the latter group. This finding is consistent with the view that the sickness of pregnancy is not due to "nervousness."

Ætiology

The ætiology of the nausea and vomiting of pregnancy has received considerable attention, but no definite conclusion has been reached. An excellent review of the subject was provided by Hall (1943). No toxin has been discovered. Willis et al. (1942) and Weinstein et al. (1943) consider deficiency of components of the vitamin-B complex, notably vitamin B_6, to be a factor of importance, whereas Kemp (1933), Bandstrup (1939), and Kotz and Kaufman (1940) emphasise abnormal changes in the maternal adrenal cortex. Shute (1941) and Schoeneck (1942) observed changes in the quantity of gonadotropic hormone in the urine and blood of patients suffering from nausea and vomiting. No specific pathological lesion has been noted, and the post-mortem findings (associated with hyperemesis gravidarum) are consistent with what might be expected as the end-result of protracted vomiting and lack of food and fluid (Sheehan 1939). Psychological factors have also been considered, and Weiss and English (1943) express the following view:

"A conscious or unconscious wish not to become pregnant: if the unconscious aversion is masked by a conscious desire to become pregnant, sickness is likely to be severe: an unconscious belief that a sin has been committed: childhood fantasies suggest that the pregnancy has taken place by way of the gastro-intestinal tract and the unconscious desire to be rid of the fœtus conceives its expulsion in the same way."

This opinion, however, was not borne out by statistical analysis of the conscious wish to be pregnant or not pregnant in my series of 100 patients; nor does it explain the sickness variation in a sequence of pregnancies in the same woman. It savours more of armchair deduction in the abstract than of clinical observation (see table II).

A discussion of the ætiology of the nausea and vomiting of pregnancy may most conveniently be arranged in terms of Halliday's (1943) formulation of ætiological principles.

ÆTIOLOGY OF ONSET

The Person.—What kind of woman on becoming pregnant develops nausea and vomiting? Relevant personality characteristics are disturbed coital functioning (acquired in adult life, often short-acting, may vary from pregnancy to pregnancy); undue mother attachment (usually acquired in adolescence, tends to decrease); and, less often, previous dyspepsia (usually dates from childhood and remains fixed).

Environment.—Why does a pregnant woman develop vomiting when she does? Among relevant environmental factors are the physical propinquity of the mother and husband, the husband's behaviour as a lover, and the frequency of his coital demands.

Mechanism.—Why does a pregnant woman's ailment take the form of nausea and vomiting? A psychosomatic approach suggests that the nausea and vomiting may represent the physical expression of an emotional constellation in which disgust is predominant. It also suggests that the biochemical changes associated with pregnancy probably lower the threshold of the physical expression of a latent or subconscious disgust; hence, when the ovum dies or the fœtus is removed, the threshold to physical expression is again raised and vomiting ceases. In other words, pregnancy serves as a trigger. These suggestions are consistent with the absence of any proved toxin, the probable change of hormonal secretions accompanying subconscious emotional activity (as well as pregnancy), and the absence of any specific pathological lesion.

ÆTIOLOGY OF NATURAL RECOVERY

Why does the patient recover without treatment? Women with nausea and vomiting of pregnancy may recover spontaneously in a few weeks when the illness is mild. In more severe cases removal from the proximity of the mother or the husband is often followed by rapid improvement. A study of successive pregnancies in the same woman shows how the presence or absence of vomiting in the various pregnancies is usually governed by the presence or absence of the operative environmental factors already described.

ÆTIOLOGICAL PRINCIPLE OF THE PREVALENCE

The theory that nausea and vomiting is an expression of the emotional life, especially of a heightened sense of disgust, covers the known facts in terms of person and environment (biological ætiology), the known facts in terms of the bodily organs and functions involved (ætiology of mechanism), and the known facts of the ætiology of natural recovery. Further, it can be shown that it does not conflict with the principle of "prevalence," which is that if the incidence of a disease does not conform with what we have inferred concerning its ætiology, then our inferences are faulty, partial, or erroneous (Halliday 1943).

The published work shows that the incidence of the syndrome is not primarily related to physical factors of environment, such as climate or diet, but is clearly associated with the psychosocial set-up sometimes called western civilisation. Thus the incidence is low among Eskimos and native African tribes (Dieckmann 1938). In oriental countries, except industrialised Japan (Hall 1943), hyperemesis gravidarum is practically unknown. It is common in modern capitalist industrial countries, such as western Europe and America, and is more prevalent in urban than in rural areas. Dieckmann, investigating the incidence of hyperemesis in various climates, also notes that it was relatively rare in Germany during the war of 1914–18, but that a well-marked increase took place in the following years. The ætiology of this change in prevalence is complex, but it could be attributed to the different psychosocial environment prevailing in the war years contrasted with the post-war years, notably the separation of husband and wife during the years of combat (see above).

A further interesting fact, remarked on by veterinary surgeons and farmers, is the absence of vomiting in pregnant animals. Though the physical accompaniments of pregnancy in many animals closely parallel those in woman, the female animal is free from a sense of shame in the presence of the mother, nor does she submit to coitus from a sense of duty to the male.

Therapeutic Inferences

As in most illnesses, ætiological insight emphasises the importance of prevention rather than cure—e.g., the need for more knowledgeable upbringing of the young, reasons why a woman should marry in accordance with her instincts rather than to attain social position, and the necessity for marital education in the newly married. Nevertheless the results of this inquiry into ætiology have definite therapeutic implications. Knowledge of the ætiological importance of mother attachment, disturbed coital functioning, and the frequency of undesired coitus enables the doctor to focus his inquiries on those characteristics of the patient's personality and her life situation which are of ætiological relevance. Patients with severe nausea and vomiting in pregnancy have usually endured a good deal of mental anguish, and, because of the delicacy of the problems involved, rarely make confidants spontaneously. There are few of them who cannot be materially helped by bringing to light their particular difficulties.

When a history of previous dyspepsia was the only factor present, the degree of sickness was usually a constant in all pregnancies in the same woman. Though it might persist for a few months, it was rarely severe. On only two occasions, where the onset was traced to events at the unusually late age of between 12 and 14

years, was I able to discover significant factors or to influence the normal course of the illness. Where a strong mother tie exists, this can easily be discussed freely, provided a reasonable amount of tact is used. Most women are not upset to learn that it is neither virtuous nor wise to be bound indefinitely by their mother's apron-strings. Where previous undesired coitus is realised to be a factor, this can be discussed with both husband and wife, He is inevitably unaware of the possible significance this may have in relation to the sickness of his wife.

Although many of these talks were instigated by me in pursuance of an idea and to obtain statistical data, the underlying and inspiring purpose was to bring about cessation of sickness, and, through change of habit in the life situation, to prevent sickness in future pregnancies. Each patient should be studied as an individual. Treatment in any particular case depends on the particular findings. The approach must be sympathetic, tactful, unrushed, and in privacy. If success is to be achieved, the patient, besides replying to question and unburdening herself of her affairs, should receive an acceptable explanation capable of convincing her that the factors discovered by inquiry were really the cause of her vomiting. The second interpretation given above on the significance of mother attachment as a sickness-producing factor is much more readily understood than the first. In my experience no woman, however dull, has the slightest difficulty in believing that the effect of frequent undesired intercourse is cumulative in the subconscious and leads to a personality change which manifests itself as an increased tendency to vomit. It may be necessary to remove the patient from the propinquity of the mother or husband. She may be benefited by the knowledge that the question is being taken up with her husband. As a general rule several factors—e.g., mother attachment and frigidity—are found in the more severe cases of vomiting.

After such discussions the improvement is often dramatic, especially among recently married women. An older woman, however, who has been frigid from the beginning—e.g., a multipara, perhaps pregnant for the twelfth time—may present more difficulty. In such a woman the disgust may be so chronic and deep-seated that it finds physical expression even between her pregnancies in the syndrome of "rejection dyspepsia," as already described.

It is not easy to detail statistically the results of treatment in a condition so variable as the sickness of pregnancy; hence only 4 of the more severe cases will be considered, 3 of them briefly. All 4 women were completely frigid—i.e., at no time in their lives had there been sex interest—and all showed also mother attachment: 3 of them of the second degree and 1 of the first degree. When first attended 2 of the patients, besides being violently sick, were bleeding slightly from the uterus and having mild pains. Both were between seven and nine weeks' pregnant, both improved much in two days, and both stopped vomiting within two weeks. One remained well, but the second, who was living with her mother, had two severe recurrences, one accompanied by an attack of pyelitis, in the later months of pregnancy. Each recurrence had followed a domestic crisis which required further investigation and treatment. The third (table II, case 6) continued to have nausea and vomiting until she entered labour at the 35th week. Although vomiting appeared to diminish in intensity, treatment was less successful than in any other case in the series, and she was the only patient in whom pregnancy did not reach full term. The fourth patient, aged 27, in her second pregnancy (one of the 2 cases of albuminuria), is described in greater detail.

Her mother approached me through a neighbour whom I had treated during pregnancy. The patient was in hospital with the diagnosis of toxæmia of pregnancy. Next day she was conveyed home by ambulance against stern advice. She was visited once only. Half an hour was occupied in obtaining the following story and in making the psychopathological interpretations and suggestions thought necessary.

Life Situation and Emotions.—Her husband served in the merchant navy. The marriage took place during a period of leave, eighteen months previously. Conception took place during his fourth spell ashore. She was devoted to and dependent on her mother, with whom she lived when her husband was at sea and whom she visited, forenoon and evening, during his periods of leave. She said she was very fond of her husband but felt revolted and disgusted when physical relationship took place, which was frequently when he was at home. Each time he left her to resume his hazardous duty she was filled with remorse and guilt because she had so little of herself to give him and a sensation of horror lest, as a result of a torpedo, she might never have another chance of seeing him. About two weeks after conception, and before she was aware of pregnancy, her doctor advised a rest from her work in a munitions factory and certified her as unfit owing to hyperthyroidism. Two weeks later vomiting began. When three months' pregnant, she was admitted to the maternity hospital, in which she was detained for four months. During this period there was daily vomiting, intermittent albuminuria, and a moderate rise in blood-pressure.

Progress.—After a discussion of the relevant problems, vomiting ceased in 24 hours. Appetite returned. She was out of bed in a few days, and out of doors a week later. When the hospital almoner called at the end of the second week, she was out shopping, having gained a stone in weight. When the patient called at my consulting-rooms three weeks after her homecoming, her urine was free from albumin and her blood-pressure was 125/80, at which level it remained until her uneventful delivery.

"Psychosomatic" and "Psychoneurotic"

The psychosomatic concept has been the subject of much confused thinking, and perhaps in no field of medicine is there a greater need for the "integration of medicine," advocated with enviable artistry by Walshe (1945). The psyche-soma interrelationship has been influenced by Freudian beliefs and analogy, and indeed many writers apply the same principles to "psychogenic" somatic disorders as were found useful in the study of psychoneurosis. Briefly, these principles suppose that it is determined either genetically or in babyhood or in childhood *how* the patient will break down in health, should his later life stresses be too great. Adult difficulties are lumped together as "anxiety" and are regarded merely as the factors which precipitate the breakdown in point of time. In other words, whether the stress is caused by flying a bomber over enemy territory or by marrying a frigid wife, the form taken by the resulting illness will be the same unless experiences before or shortly after birth determined otherwise. Others again still speak of an illness as being either physical or psychogenic. For them "psychosomatic" is a euphemism for psychoneurotic. Thus, though they have come to use new words, they continue to think in terms of the outmoded classification of functional or organic.

Such views are alien to those expressed in this paper, which postulate a psychosomatic disease or disorder to be a specific physiological response to a particular type of emotion capable of being incorporated into the personality at any age. The persistence of the disorder is determined by the intensity and frequency of the causal emotion and the age when it is experienced. For example:

(1) *Coronary thrombosis* has been called by some the doctors' disease. The high incidence of this disorder among doctors is surely not because they are the subject of any special hereditary traits, or suffered from particular psychological traumata in childhood, or because they feed on an imperfect diet or live in damp houses, or because their physical or even intellectual output is unduly high, but rather because of the emotional accompaniments

of their duties—factors such as hurry and tension, undue responsibility, and fear of a diagnostic error or unkindly judgment, with possible repercussions on their means of livelihood.

(2) *Enlarged Prostate.*—The prostate is normally activated by erotic emotions mediated by endocrine, notably gonadal, activity. Few would deny that some form of over- or mal-activity is responsible for the ultimate enlargement, a view supported by the freedom of the eunuch from both the predominant emotion and hormone and from enlarged prostate.

These two diseases, unquestionably physical, and resulting from the repetitive effect of specific emotional constellations in adult life, appear to fall into the psychosomatic category. Neither need be associated with psychoneurosis.

It is certain that "disgust-shame" factors may find their way into the subconscious through life experiences other than those expressed by the conceptions "previous dyspepsia," "mother attachment," and "disturbed sexual functioning." For instance, it is probable that a woman who was an inhabitant of a besieged city and was so unfortunate as to be reduced to a diet of cats, rats, and mice, would suffer from vomiting if she became pregnant soon afterwards. On the other hand, there was no evidence of a rise in either the prevalence or the severity of the nausea and vomiting of pregnancy among the blitzed citizens of London and such intensely bombed areas, although there was an increase in the incidence of psychoneurosis. Some of the most highly neurotic women in the series were free from nausea and vomiting, in the absence of the described causal factors. The sickness of pregnancy can be defined as a psychosomatic reaction. This behaviour pattern is separate and distinct from the emotional quality popularly conceived by the expression "psychoneurotic."

From a survey of a very much larger series than the 100 women who form the basis of this paper, other factors appeared to be ætiologically relevant in a small percentage of cases. Thus, the syndrome developed in women with strong aggressive feelings towards the father; in women born in humble circumstances whose life was dominated by an attempt to compensate in appropriate social aspirations; in women whose early life had been marred by lack of love and affection, and whose sexual needs after marriage seemed insatiable; and in women with an inability to accept the animal functions of the body, including secretions and excretions, birth, love, and death.

FINAL NOTE

Although the importance of sex as a factor in the nausea and vomiting of pregnancy has hitherto escaped the attention of clinical and scientific workers, it has been sensed by non-medical observers. Two fictional works written by well-known lady novelists were recently brought to my notice. In the first (Seymour 1928) the absence of sickness in a pregnancy following an ideal love union was strongly emphasised, while in the second (Ertz 1943) equal emphasis was laid on the persistence of sickness throughout a pregnancy where the wife was not in love with the husband.

Summary

A clinical and statistical investigation of the nausea and vomiting of pregnancy shows that the syndrome may be the physiological expression of an underlying emotional state which may be equated with that of disgust. This view has the merit of covering all the known facts, including those relating to the prevalence of the disorder.

Relevant ætiological characteristics of the personality are disturbed coital functioning, undue mother attachment, and, to a lesser extent, a history of previous dyspepsia.

Relevant factors in the life situation are the frequency of undesired coitus and the physical propinquity of the mother.

These conclusions have important implications for therapy. They indicate the need to supplement physical examination of the patient with investigation into her emotions and life situation.

This investigation owes much to the inspiration and illumination provided by the papers of Dr. J. L. Halliday on psychosomatic medicine. During its preparation I was personally indebted to Dr. G. R. Anderson for useful suggestions and to Mr. J. M. Ross for inquiring into the incidence of sickness in pregnant animals.

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CALF PLASMA OR SERUM FOR TRANSFUSION

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THE costly business of collecting human blood for transfusion, the difficulties of storing whole blood, and various disadvantages (such as time lost in grouping) in blood-transfusion have led many researchers to seek a substitute for blood. But all have had serious drawbacks.

Various attempts have been made to remove the anaphylactogenic properties of animal plasma or serum so as to make it safe for transfusion.

Rosenau and Anderson (1906) used heat and chemical agents, and Doladilhe (1937) tried eliminating a globulin fraction by dialysis. Brodin and Saint-Girons in 1918 successfully injected 500 c.cm. of horse serum into a man, and later (Brodin and Saint-Girons 1939) suggested that transfusion with horse serum might be useful. Kremen et al. (1942) concluded after many attempts that the use of calf plasma was contra-indicated. The use of blood of a lower animal for transfusion in man goes back to 1662 (*Lancet* 1939).

I thought that formol might act on serum anaphylactogens as it did on bacterial toxins and animal venoms, and I found that horse serum treated with formol lost its anaphylactogenic properties after being incubated for some days at 40–45° C (104–113° F) or for a shorter time at a higher temperature. Moreover, formol, in the necessary concentration, at 80–100° C (176–212° F) acted as an antiseptic.

Several workers had already reported the anti-anaphylactic properties of formol. Kendall (cited by Re 1940) and others had shown its inhibiting effect on uterine and intestinal contractions with the Schultz-Dale technique.

The action of formol on amino-acids and proteins has long been known, and Sörensen (1908), using the reaction described by Schiff (1899, 1901)—

$$\begin{matrix} R \\ | \\ CH.NH_2 \end{matrix} + H.CHO = \begin{matrix} R \\ | \\ CH.N.CH_2 \end{matrix} + H_2O$$
$$\begin{matrix} | \\ COOH \end{matrix} \qquad \begin{matrix} | \\ COOH \end{matrix}$$

—was able to determine the amino-acids, reckoning on pH deviation resulting from the neutralisation of the amino groups. It is probably this reaction that is responsible for the removal of the anaphylactogenic properties of the proteins, although other substances—e.g., ketene (CH=C=O)—which react with the proteins and block the amino groups, destroy the anaphylactogenic power of animal sera (Goldie and Sandor 1937).

Likewise Zipf and Bartscher (cited by Otto et al. 1938) and Platonov (1940) believe that formol suppresses anaphylaxis by neutralising the biogen amines, especially histamine.

PREPARATION AND PROPERTIES OF CALF PLASMA

To the citrated bovine plasma separated by centrifugation—for large amounts I use a De Laval blood-separator—formol is added until a concentration of 0·35% is reached. Five minutes later, to correct the acid deviation resulting from the neutralisation of the amino groups, ammonia is added until a concentration of 0·01% is reached. To avoid further gelification, 0·9% saline or 5% dextrose or doubly distilled water is added until a concentration of proteins 3·7–4·0% is reached. The plasma is then heated over steam and, when it begins to boil at 100° C (212° F), is left to cool to 50° C (122° F). It is filtered to get rid of little clots and small fibrin particles and then put into glass ampoules and tyndallised.

The plasma so treated undergoes slight discoloration and acquires a certain opalescence when viewed against a dark background.

This procedure causes a slight increase in the freezing-point (from −0·48 to −0·56° C) and an important increase in the viscosity. No noteworthy variation is found in the albumin-globulin ratio and in the non-protein nitrogen. Studies are in progress to explain these apparently contradictory changes.

The plasma can be preserved indefinitely at ordinary temperature; already I have samples three years old. It does not agglutinate or hæmolyse human red blood corpuscles. I have never seen any toxic effects due to an excess of formol, probably because part of it combines with the proteins, part with ammonia, and part evaporates on boiling.

The action of formol is the important factor in my method; the heat is only a means to accelerate the reaction and to ensure perfect sterilisation. The truth of this seems to be supported by my above-mentioned experience with the action of formol at 40–45° C and by the fact that in those cases in which the anaphylactogens are destroyed by heat, as in the method of Lenggenhager (1940), new antigenic properties are acquired which produce anaphylaxis in previously sensitised animals according to Frimberger (cited by Lang and Schwiegk 1943).

The ammonia is not absolutely necessary; but, if it is not added, the plasma becomes cloudy and its injection is painful. Sodium hydroxide can be used instead of ammonia.

The plasma must be free from hæmoglobin, and as far as possible from lipoids.

By this method the anaphylactogenic properties of the calf plasma are destroyed by physicochemical means whereby the antigens are altered without destroying the physicochemical properties of the plasma.

Studies still unfinished suggest that the degree of destruction of the antigenic power varies according to the level of temperature and the time the formol is acting. Thus at 80° C the formolated plasma changes its colour, as already stated, but retains slight antigenic properties: when repeatedly injected into a rabbit it induces a low titre of precipitins, and it will kill a guineapig with an anaphylactic shock. On the other hand, heated to 100° C, or better to 110° C, it will no longer produce precipitins or anaphylaxis.

EXPERIMENTS

My experiments were done on 70 guineapigs, 40 rabbits, and 2 dogs. I chose young males because Duran-Reynals (1919), Lumière (1933), and Moreira (1925) have shown that pregnant females are resistant towards experimental anaphylaxis.

In an attempt to sensitise the animals, preliminary injections were given to the guineapigs subcutaneously on three successive days or else on alternate days and the test injection intraperitoneally on 10 guineapigs and intracardially in the remaining 40. In the rabbits the preliminary injections were given in the same way as in the guineapigs in 10 cases, but in the remaining 20 I used Grove's technique (Sanchez-Cuenca 1942): first injection intravenous, second subcutaneous 4–5 days later, and test injection intravenous 21 days after the initial dose.

To make sure that the prepared calf plasma (P.C.P.) contained neither complete nor incomplete antigen I carried out the following experiments.

In 40 guineapigs, 10 rabbits, and 2 dogs I gave preliminary injections of P.C.P. followed by a test injection of P.C.P. In 10 other guineapigs and 10 other rabbits I gave preliminary injections of P.C.P. followed by a test injection of fresh plasma. In neither of these sets of experiments was any anaphylaxis observed. Therefore the P.C.P. contained no antigen.

I next gave 20 other guineapigs and 20 other rabbits preliminary injections of fresh plasma, and in order to be sure of their sensitisation state I produced in 2 animals a typical anaphylactic shock by injecting them with fresh plasma. The rest of the animals were treated with a test injection of P.C.P.; no anaphylactic shock was observed.

In the next experiment I gave preliminary injections of P.C.P. to 8 virgin doe guineapigs and perfused the uterus of each. When P.C.P. was added to the perfusing liquid, no alteration of uterine contractions was observed; but, when antigen was added, the uterus developed tetany.

My next step proved that P.C.P. 10–20 c.cm. injected intravenously in rabbits had no effect equivalent to that of protein shock.

There followed the investigation of the supposed toxicity of serum proteins by injecting rabbits and dogs, without any harmful result, with quantities of P.C.P. equivalent to a transfusion of 3–5 litres in an adult man weighing 65 kg. (about 143 lb.).

To test how long P.C.P. remained in the circulation I bled dogs and measured the blood-pressure (B.P.) and the amount of hæmoglobin, having first taken special precautions to discount the contraction of liver and spleen by which dogs (but not man) react to hæmorrhage. Obviously the injection of liquid into the circulation of a dog with low B.P. will raise the B.P. and reduce the level of hæmoglobin. Conversely, when such injected liquid leaves the circulation, the B.P. will fall again and the hæmoglobin become more concentrated.

In contrast to an injection of saline, which produces a merely temporary effect, an injection of P.C.P. maintained its effect for twelve hours in spite of long-continued anæsthesia and small repeated bleedings to determine the amount of hæmoglobin.

I was now ready to experiment on man. I began by giving gradually increasing doses of P.C.P. intravenously to 25 sick or convalescent typhus patients. The initial dose was 10 c.cm., and subsequent doses were worked up to 300 c.cm. In no case was there any pyrogenic reaction or the slightest sign of intolerance. In a thousand injections of 100–1000 c.cm., there was never any suspicion of urticaria, which is the most constant sign of serum sickness, appearing in 90% of patients submitted to large doses of serum given intravenously (Sanchez-Cuenca 1942).

Further experiments led me to conclude that my patients did not become sensitised to calf serum, a matter of importance in obviating future allergy to veal or beef as a food.

THERAPY WITH CALF PLASMA

P.C.P. is given intravenously, somewhat tepid, and preferably slowly; but there is no objection to giving it, if necessary, in the same way as a blood-transfusion. A few patients complained of transient pain in the vein during the injection of the first 50 c.cm. or so. Apart from that, the only thing to be feared is a rigor after the injection (I had 30 cases in 1000 injections), but with

the improved technique which is being introduced even that risk should disappear.

I treated these groups of cases :

1. Post-hæmorrhagic anæmia, shock from wounds or ileus—i.e., cases of surgical urgency.
2. Hypoproteinæmias—e.g., lipoid nephrosis, famine œdema, hepatic cirrhosis.
3. Dehydrated infants, alimentary toxæmia, and wasting.

In about 200 cases of surgical urgency the results were remarkably good, especially as a prophylactic against shock. For hypoproteinæmia 8 cases of hepatic cirrhosis have been treated with P.C.P. with results equal to those obtained with human plasma. In the third group of cases Professor Ramos and his co-workers have treated 100 cases of alimentary toxæmia and a few cases of wasting with P.C.P. with excellent results.

ADVANTAGES OF USING CALF PLASMA

The following are the chief advantages of using P.C.P. as compared with human plasma :

(1) The preparation and storage are more economical.
(2) The plasma can be stored for over a year without deteriorating.
(3) There is no need for refrigeration or any other special conditioning of the plasma.
(4) Ease of transport.
(5) P.C.P. can be stored in shops, or in regimental casualty posts in war-time.
(6) No loss of time in grouping the blood of a wounded man.
(7) P.C.P. can be injected without any risk. Even in heart-failure it can be given safely, provided that the rate of 2 g. per kg. of body-weight per hour is not exceeded. The only doubt may concern the content of sodium citrate used as an anticoagulant ; but this danger has been exaggerated in the past, and the greatest amount given in large doses of P.C.P. never exceeded 2 g.
(8) No specialist expert is required to give the transfusion. Anybody who can give an intravenous injection can administer P.C.P. If intravenous injection is impracticable—e.g., in obesity, peripheral vasoconstriction of shock, previous amputation, extensive burns, and in infants—the plasma can be given by sternal puncture. The sternal marrow can easily absorb large quantities of fluid. In infants the head of the tibia can be used instead of the sternum. This plasma does not harm bone-marrow. Thus, in a moribund infant it was injected to test its effects, if any, on bone-marrow, and at the autopsy a day later no alteration of the bone-marrow was found at the site of injection.
(9) Its action most nearly approaches that of blood.

SUMMARY

A description is given of the preparation and properties of calf plasma as a substitute for human plasma in blood-transfusion.

Experiments are described which showed that calf plasma so prepared contained no antigens, and that its effect was not merely temporary like that of saline.

Prepared calf plasma has been used successfully in the treatment of three types of case : hæmorrhage and shock, hypoproteinæmia, and dehydration.

I wish to thank Prof. F. Garcia-Valdecasas for his friendly aid and helpful criticism during my research.

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TYPHOID CARRIERS
TREATED WITH PENICILLIN AND SULPHATHIAZOLE

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BIGGER,[1] in reporting his observations on the synergic action of penicillin and sulphathiazole on *Bact. typhosum* in vitro, made suggestions for treating typhoid fever with these drugs.

In February, 1946, a patient in Bexley Hospital contracted typhoid fever. *Bact. typhosum*, phage type D_1, was isolated from blood culture on the seventh day of the disease. Sulphathiazole 1 g. four-hourly was ineffective. On the twenty-eighth day of the disease the patient's condition was critical ; her temperature was 103·4° F and her pulse-rate 110 per min. A limited amount of penicillin was then available, and treatment with this combined with sulphathiazole was begun. Sulphathiazole 1 g. orally, and about 16,000 units of penicillin intramuscularly, were given every four hours, a total of 387,000 units of penicillin being given in four days. On the thirty-second day of the disease, when this treatment ceased, the temperature had become normal, and remained so except for rises to 99° F on three days. The pulse-rate also fell. At no time was *Bact. typhosum* isolated from the urine or fæces. The impressive clinical improvement coinciding with the administration of so small an amount of penicillin decided us to try the full doses suggested by Bigger, in the treatment of typhoid carriers. An account is now given of the results obtained in two well-established carriers, both of whom regularly excreted *Bact. typhosum*, phage type D_1, in their fæces.

Dosage.—An initial dose of sulphathiazole 2 g. by mouth was followed by 1 g. four-hourly. Penicillin, in doses of approximately 500,000 units dissolved in 10 c.cm. of sterile water, was given intramuscularly at the same time. Treatment continued for eight days in the first case, and seven days in the second.

Bacteriological Investigations.—For a month before treatment and ever since treatment, six samples of every stool passed have been examined, usually one sample in the Bexley laboratory and five at the Epsom Pathological Laboratory. Direct plating was carried out on MacConkey and Wilson and Blair plates, and portions of each sample were passed through enrichment media, either brilliant green in peptone water in three concentrations (1/145,000, 1/250,000, and 1/400,000) and tetrathionate broth followed by plating on MacConkey, or selenite F followed by plating on Wilson and Blair and desoxycholate agar. Magnesium sulphate was given every second or third night to secure regular evacuations. Two samples of a morning specimen of urine were examined by direct plating, one in each laboratory.

Serological Investigations.—Agglutinations to typhoid O and Vi were carried out before treatment and at monthly intervals thereafter.

CASE-RECORDS

CASE 1.—A woman, aged 50, admitted to Bexley Hospital on May 17, 1932, had two prophylactic inoculations of T.A.B. vaccine in December, 1940.

1. Bigger, J. W. *Lancet*, 1946, i, 81.

TABLE I—TYPHOID-VI AGGLUTINATION TITRES

Date	Case 1 (treatment ended April 23, 1946)						Case 2 (treatment ended May 6, 1946)					
	1/5	1/10	1/20	1/40	1/80	1/160	1/5	1/10	1/20	1/40	1/80	1/160
April 4, 1946 ..	+++±	++	+	±	−	−	+++	+++	++	++±	−	−
May 2, „ ..	+++	+++±	++±	+	±	−	+++	+++	+++±	++±	(±)	−
June 3, „ ..	+++	+++	+	±	−	−	+++	+++	+++±	±	−	−
July 4, „ ..	+	±	±	−	−	−	+++	++	+	−	−	−
Aug. 8, „ ..	+	(±)	−	−	−	−	±	−	−	−	−	−

−, no agglutination. (±), ±, +, ++±, ++, +++±, +++, increasing degrees of agglutination.

In September, 1943, in the course of a survey for carriers, her serum gave the following agglutinations (North-western Group Laboratory, L.C.C.): *Bact. typhosum* H 1/320; *Bact. typhosum* O 1/160; and *Bact. typhosum* Vi 1/40.

Typhoid bacilli were isolated from the fæces on four occasions in September and October. Agglutination tests, repeated in August, 1944, gave the following results: *Bact. typhosum* H 1/125; *Bact. typhosum* O 1/125; *Bact. typhosum* Vi 1/2; and against her own organism 1/250. *Bact. typhosum*, phage type D_1, was isolated frequently in February, March, April, and May, 1945.

Cholecystectomy was performed in June, 1945, the patient making a good recovery. Typhoid bacilli were grown from the gall-bladder removed at operation, and after operation the organism was again isolated from the fæces on six occasions in June and July, with one negative result intervening.

During the month's observation before treatment with penicillin and sulphathiazole the patient ran an irregular temperature ranging between 100° and 97° F. This subsided on the third day of treatment, since when the temperature has remained normal. Typhoid bacilli were isolated from the stools passed on thirteen occasions (March 18, 19, 20, April 1, 2, 3, 4, 5, 8, 9, 11, 12, and 15), but not from the five stools passed on March 21, 22, 25 (2 stools), and April 10. Stools were not passed on the days not mentioned.

Treatment was started at 6 P.M. on April 15 and continued for eight complete days, a total of 24,800,000 units of penicillin and 49 g. of sulphathiazole being given. No local or constitutional ill effects attended the treatment. After the second day of treatment typhoid bacilli ceased to be isolated from the stools, and for over 130 days bacteriological examinations of both stools and urine for this organism have been consistently negative.

CASE 2.—A woman, aged 69, admitted to Bexley Hospital on transfer from Canterbury Mental Hospital in April, 1941, had no history of typhoid infection or T.A.B. inoculation, but in April and May, 1945, she had a mild pyrexia for twenty-eight days, which began seven days after being in contact with case 1. In retrospect it now appears that this may have been a mild attack of typhoid fever. On March 26, 1946, on bacteriological examination of the fæces following a serological survey, *Bact. typhosum*, phage type D_1, was isolated.

During the month's observation before treatment *Bact. typhosum* was isolated from the fæces passed on twenty occasions (March 31, April 1, 3, 4, 5, 9, 11, 12, 15, 16, 17, 18, 20, 23, 24, 25, 26, 27, 28, and 29). Stools were not passed on the intervening days. Thus, every stool passed gave a growth of *Bact. typhosum*. *Bact. typhosum* was not isolated on any occasion from the urine.

Treatment with penicillin and sulphathiazole was started on April 29 and continued until the morning of the fifth day, when sulphathiazole by mouth was stopped owing to persistent vomiting and 1 g. of sulphapyridine was given intramuscularly for six successive doses. As the vomiting then ceased, sulphathiazole was resumed orally without further ill effect. A total of 21,420,000 units of penicillin, 36 g. of sulphathiazole, and 6 g. of sulphapyridine were given.

Apart from the bout of vomiting, presumably due to the sulphathiazole, the treatment had no constitutional ill effect, nor was there any local irritation at the site of the injections. *Bact. typhosum* was isolated from the fæces on the second day of treatment, since when for over 116 days intensive bacteriological examination of the morning urine and of every stool passed has failed to isolate the organism.

Agglutination Reactions.—Neither patient showed any fall in the agglutination titres for typhoid H and O, but 8–10 weeks after treatment both showed a definite reduction in typhoid-Vi agglutination titres and a further reduction after another four weeks (see table I).

DISCUSSION

It is noteworthy that, in both cases reported, *Bact. typhosum* was not isolated from the fæces after the second day of treatment, with the same intensive bacteriological methods as gave positive results on almost every stool before treatment. It seems reasonable to infer that the synergic action of penicillin and sulphathiazole has at least inhibited the growth of *Bact. typhosum* in the alimentary tracts of both these patients, though a much more extended period of observation is necessary before a safe conclusion can be reached that their carrier state has been cured. Case 1 continued to excrete typhoid organisms after cholecystectomy, a not unusual occurrence.

The typhoid H and O agglutination titres after treatment showed no reduction. A much longer interval, however, is required before they can reasonably be expected to show a diminution associated with the disappearance of the typhoid organism from the body of the patient. Nevertheless the reduction of the Vi titre two months after treatment may be interpreted as indicating that the activity of the organism has ceased in these two patients.

In both cases the organism belonged to phage type D_1, a type not included in those investigated by Bigger.[1]

TABLE II—APPEARANCE OF BROTH CULTURES OF *Bact. typhosum*, PHAGE TYPE D_1, AFTER 48 HOURS' INCUBATION (STANDARD INOCULUM)

Tube no.	Penicillin (units per ml.)	Sulphathiazole (mg. per 100 ml.)	Case 1	Case 2
1	8	0	(±)	(±)
2	4	0	±	±
3	2	0	+	±
4	1	0	++	++
5	0	0	++	++
6	8	10	−	−
7	4	10	(±)	±
8	2	10	±	±
9	1	10	±	±
10	0	10	±	±
11	0	5	±	±
12	0	2·5	+	+
13	0	1·25	++	++

−, broth clear. (±), ±, +, ++, ++, increasing degrees of turbidity. Both tubes 6 remained clear after 96 hours' incubation.

In the laboratory the organisms were tested for penicillin and sulphathiazole sensitivity by the methods described in Bigger's paper, and the results are given in table II.

It is evident, then, that our organisms of phage type D_1 exhibit in-vitro sensitivity to sulphathiazole and penicillin mixtures similar to those of Bigger's series, and it seems reasonable to infer that this sensitivity is also found in the living patient in the two cases investigated.

The bacteriological results obtained in these cases raise the question of treating other bacillary infestations of the alimentary tract by this method. Should the synergic action of penicillin and sulphathiazole, or other sulphonamide, be as effective in treating dysentery carriers as it appears to be in typhoid carriers, the problem of dysentery, in mental hospitals in particular, should be brought much nearer to an adequate solution.

Our experience with these patients shows that the treatment can be carried out in relatively non-coöperative mental patients, even in those showing, as one of ours did, much wasting besides profound mental deterioration.

SUMMARY

Two typhoid carriers, one of whom continued to excrete *Bact. typhosum* after cholecystectomy, have been treated with penicillin and sulphathiazole on the lines suggested by Bigger [1] for typhoid fever.

Intensive bacteriological examination of every stool after treatment failed to reveal the presence of *Bact. typhosum* in them for periods of over 130 days in the one case, and over 116 in the other.

Two months after treatment both patients showed reduced agglutination titres to typhoid-Vi antigen.

These results encourage the application of this method of treatment in a larger number of typhoid carriers to test its effectiveness.

We wish to thank Dr. R. Cruickshank for the early work carried out at the North-western Group Laboratory; Dr. A. Felix for the phage typing; Prof. J. W. Bigger for much helpful information; Surgeon Captain R. G. Henderson, medical superintendent of the Southern Hospital, Dartford, for supplying the penicillin; Dr. L. C. Cook, medical superintendent of Bexley Hospital, for his interest; and our technical staffs, in particular Mr. C. R. Wright and Miss S. Ball, for much painstaking coöperation.

PYRIDOXINE (VITAMIN B_6) IN EPILEPSY

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LINGFIELD EPILEPTIC COLONY, SURREY

Harriette Chick and her colleagues (1938) observed that pigs deprived of pyridoxine (vitamin B_6) developed typical epileptic fits, and further (1940) that similar fits occurred in rats which had been maintained for long periods on a purified synthetic diet supplemented with cod-liver oil, pure vitamin B_1, riboflavine, and purified yeast-filtrate factor. In either case the fits could be prevented or stopped by the addition of pure pyridoxine to the diet, and the authors concluded that they were due to deprivation of this vitamin.

There seemed, therefore, to be some justification for a clinical trial of pyridoxine in epilepsy. Eight schoolboys, aged 14–15 years and living in the same home, were selected: 2 of them had petit mal only; 2 had petit mal with occasional grand mal; 2 petit mal with more frequent grand mal; and 2 more numerous fits of varying type. The cases were selected because of the regularity of the fits, and previous anticonvulsant medication, whether bromide, phenobarbitone, or phenytoin, was continued throughout the experiment.

Our intention was to give one member of each pair 20 mg. of pyridoxine daily for eight weeks, and then the second member of each pair a similar dose in the following eight weeks. When, however, it became apparent that there was no change in incidence of the fits, the daily dose was increased to 100 mg. and the experiment shortened. In the end, 4 boys had received 100 mg. a day for three weeks, 2 had received 20 mg. a day for four weeks and then 100 mg. a day for four weeks, and 2 only 20 mg. a day for eight weeks. There was no evidence of increase or decrease of fits in any case, nor was any other change, mental or physical, noted in any of the boys. So far as this short series of cases is a guide, it seems unlikely that pyridoxine, even in large doses, would be of value in epilepsy.

We are grateful to Messrs. Vitamins Ltd. for supplying us with large quantities of the vitamin, and to Dr. Audrey Baker, of their research laboratory, for her coöperation and suggestions.

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PRIMARY DIPHTHERIA OF THE CONJUNCTIVA

REPORT OF TWO CASES

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Two cases of diphtheria affecting the eye only are recorded here, not so much because of the rarity of the condition (Medical Research Council 1930) as because of the rarity of finding the disease being passed from one person to another and affecting the same unusual site in both.

CASE 1.—A girl, aged 3 years, sickened of what was at first thought to be a cold, characterised by nasal discharge and injection of the conjunctivæ. When she was seen by the family doctor four days later the nasal discharge still persisted, and one eye was much inflamed, with very congested conjunctiva, much swollen eyelids, especially the upper one, and a profuse purulent discharge. The child did not appear particularly ill apart from the local condition, and there was no obvious toxicity.

At this stage she was referred to the outpatient department of the Glasgow Eye Infirmary for advice, and there the tentative diagnosis of a diphtheritic infection was made, a swab being taken for bacteriological examination. This was subsequently found to contain corynebacteria, and the child was admitted to a fever hospital while further investigations of the organism were undertaken. These were eventually found to be *C. diphtheriæ* and to be virulent. Although a membrane was reported as being present on the inner aspect of the upper lid its presence was not demonstrated at the fever hospital.

The girl made an uneventful recovery, treatment consisting of antidiphtheritic serum 4000 units and local applications of 'Argyrol' and saline. Repeated cultures from the nasal discharge did not reveal any diphtheritic organisms.

CASE 2.—Four days after the admission of case 1 her brother, aged 5 years, developed a similar condition. The mother, profiting by her previous experience, took him to the doctor at once. The conjunctiva was congested, and the lids were swollen, especially the upper one, but the discharge, though copious, was watery and not purulent. There appeared to be little or no general upset. There was no sign of any discharge or infection elsewhere.

As a precaution, pending further investigation, 4000 units of antidiphtheritic serum was given intramuscularly, and a swab was taken from the eye. The boy was confined to bed. Cultures from the swab revealed the presence of corynebacteria. The patient's local condition appeared now to be improving and his general condition was good. As there

were no other children in the house, it was decided to keep him at home. In due course the bacteriologist reported that these organisms too were *C. diphtheriæ* and were virulent on biological test. By this time the eye had returned to normal and the patient seemed well.

There seems to be little doubt that the second patient was infected from his sister. There were no other cases of diphtheria of any kind at that address, and the patients did not attend any school or day-nursery. There was remarkably little toxic absorption from the conjunctiva. Neither child had any complications, and there was only a moderate rise in temperature. In case 1 the temperature was 100·2° F on admission to hospital and normal by the next day, and in case 2 no rise of temperature was found.

Harries and Mitman (1940) point out that the toxicity of non-respiratory diphtheria, though variable, is usually slight, and that diphtheria of the conjunctiva may be followed by rapid destruction of the globe. No suggestion of this was seen in either of these cases, but both were relatively quickly brought under treatment. We have not been able to find in the literature any record of the disease spreading from one patient's eye to that of another. The Medical Research Council (1923) reported that, though diphtheritic conjunctivitis was formerly considered fairly common, most modern writers agreed that conjunctivitis caused by true virulent diphtheria bacilli was rare.

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PERITONEAL NODULES OF UNKNOWN ÆTIOLOGY

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MILIARY nodules of the peritoneum are sufficiently rare to be worth recording.

A married woman, aged 29, with no children, had had frequent attacks of tonsillitis up to the age of 8 years, once complicated by quinsy. She had never had acute rheumatism, chorea, or any other rheumatic manifestation. She had had an attack of gastric pain accompanied by vomiting and hæmatemesis, lasting twenty-four hours, at the age of 8 years, and a similar but milder attack two years later. At the age of 19 she had sciatica.

Two years ago she began to have epigastric pain, occasional vomiting, constipation, and lassitude. She had periodic exacerbations of the pain lasting 2–4 days, alternating with periods of relative freedom. Continuous slight fever, ranging from 99° F to 102° F, persisted throughout. The symptoms were worse during the summer and tended to improve during the winter. She had always been thin, and lost 8 kg. during the illness.

Various conditions had been suspected and treated—e.g., gall-bladder disease, liver disease, renal colic, spastic colitis, and appendicitis—but none had been confirmed. In the spring of 1943 she had two severe attacks of generalised abdominal pain accompanied by high fever, up to 103° F, and aching in the limbs.

On examination, the heart and lungs were normal. A definite tenderness over McBurney's point and over the whole right iliac fossa led to a diagnosis of appendicitis and operation.

Operation.—The abdomen was opened through a low right paramedian incision. The terminal coils of the ileum, especially along its mesenteric attachment, were studded all over with hundreds of white nodules, about 2 mm. in diameter. There were also nodules on both aspects of the mesentery. The condition stopped just short of the cæcum, which was normal. The nodules were scattered singly and in bunches of 10 or more, resembling collections of small pearls. Though sessile, they were only slightly adherent to the intestine and could easily be picked off with forceps leaving no bleeding points behind. The parietal peritoneum appeared to be quite free from nodules, and neither fluid nor congestion was present. No other abnormality was found, and the stomach, duodenum, gall-bladder, bile-ducts, and liver appeared normal. The appendix was removed, and some of the nodules were taken for biopsy.

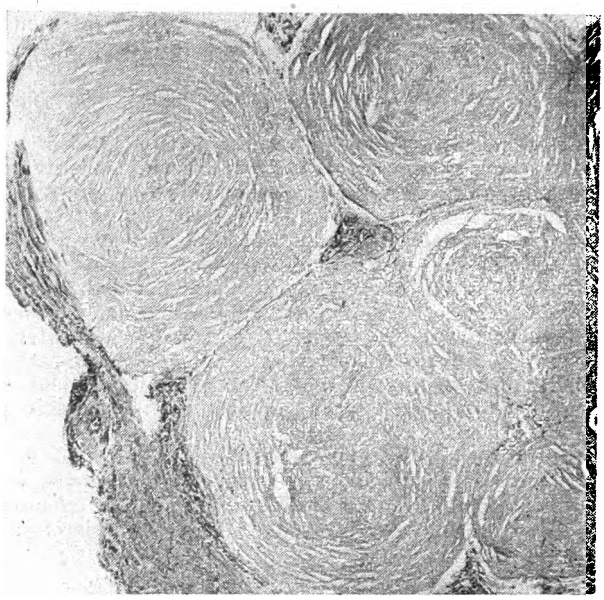

Fig. 1—Conglomerate mass of nodules with vascular fibrous tissue in between. (Low power.)

Histological Examination.—The first sections showed conglomerate nodules of whorled fibrous tissue (fig. 1). One of the larger nodules was fibrous, its centre consisting of hyaloid fibroid tissue in concentric layers with empty fusiform spaces between the fasciculi (fig. 2). The periphery of the nodule consisted of fibrous tissue which was fairly vascular, sometimes hæmorrhagic, and moderately cellular. A peripheral round-cell infiltration of chronic inflammatory type was also seen (fig. 3). A single group of endothelioid cells, similar to an Aschoff body, was present in the outer cortex of one nodule, embedded in vascular fibrous tissue (fig. 4) and closely related to blood-vessels. Smaller fibrous nodules were lying close together, with delicate cellular fibrous tissue between

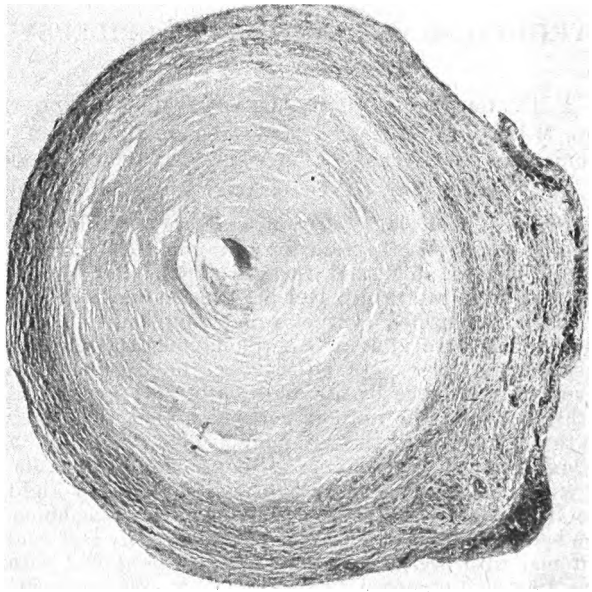

Fig. 2—Section of nodule, showing hyaloid fibrous tissue in concentric layers near the centre, whereas the periphery is more cellular. (Low power.)

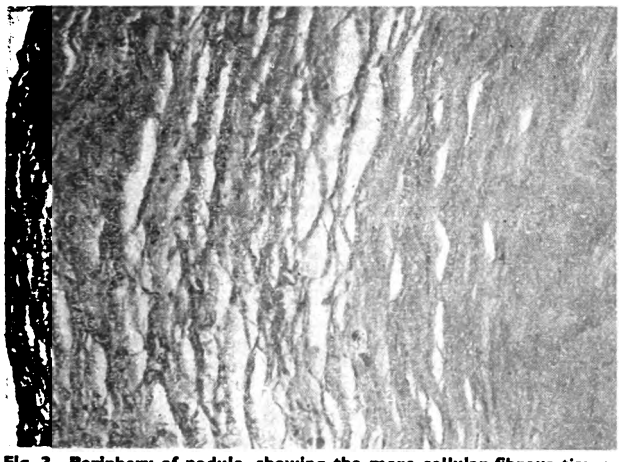

Fig. 3—Periphery of nodule, showing the more cellular fibrous tissue. (High power.)

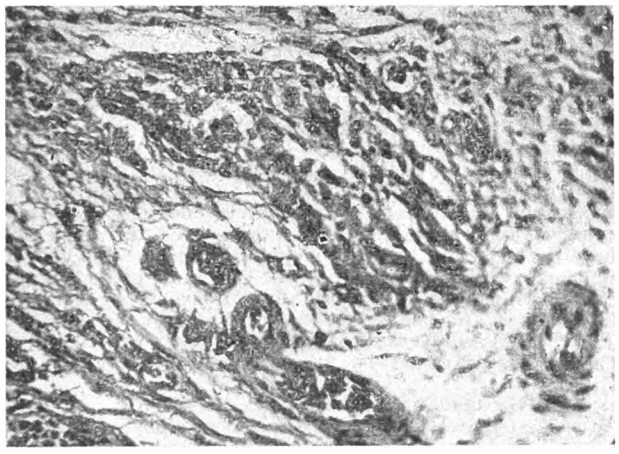

Fig. 4—Aschoff's nodule found in cellular periphery of a fibrous nodule. (High power.)

thera. The nodules were covered with a single layer of flat serosa cells. Careful search failed to reveal any bilharzia ova or remnants of ova in any of the many sections examined. As a whole, the histological appearance suggested a chronic non-pyogenic inflammatory condition.

DISCUSSION

Only scanty references to nodular lesions of the peritoneum have been published. Haythorn (1933) classifies nodular lesions of the peritoneum as:

(1) Tuberculous.
(2) Pseudotuberculous (due to various bacilli).
(3) Syphilitic.
(4) Due to fungus infections.
(5) Foreign-body granulomas due to (*a*) animal parasites, such as bilharzia, *Entamœba histolytica*, or *Oxyuris vermicularis*; (*b*) extravasated blood; (*c*) gelatinous substances, including ruptured pseudomucinous cysts and extraneous substances; (*d*) oils and free fats; (*e*) extruded gastric and intestinal contents; (*f*) extraneous foreign bodies, such as sutures, &c.
(6) Neoplasms, such as carcinoma, sarcoma, melanosarcoma, Hodgkin's disease, &c.

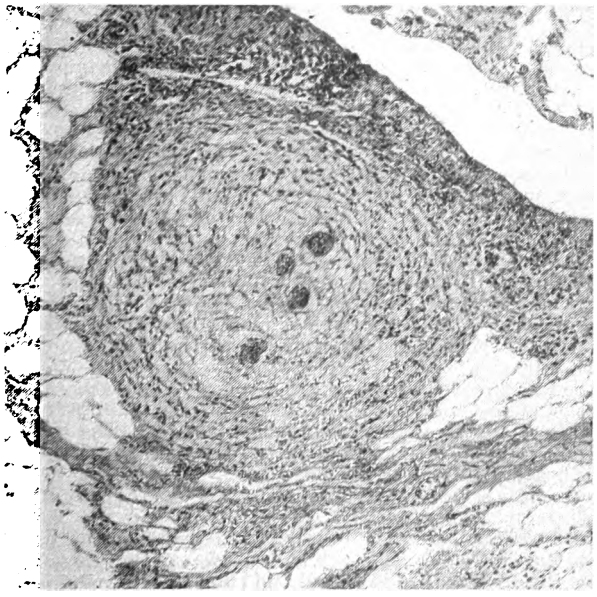

Fig. 5—Section of bilharzial subperitoneal nodule of appendix, for comparison, showing four bilharzia ova in the centre surrounded by several layers of endothelioid cells and a peripheral lymphocytic and fibroblastic reaction.

Except bilharziasis, none of these conditions resembles the present findings, either macroscopically or microscopically. Even bilharziasis can probably be excluded. Bilharzial nodules are usually firmly adherent and resist stripping when picked up with the forceps. They affect the large intestine rather than the small, and are accompanied by signs of bilharzial infection of the mucosa. Bilharzial dysentery, with diarrhœa, tenesmus, the passage of blood and mucus, and with ova in the stools, is usual in such cases. All these features were absent in the present case.

The strongest evidence against bilharziasis is the fact that no trace of ova or remnants of ova were found in any of the serial sections examined. Remnants of ova —i.e., the chitinous capsule and spine—are very persistent and are always found in bilharzial lesions, however old they may be (fig. 5). The Aschoff bodies found in this case have never been seen in bilharzial conditions.

Bilharziasis is only accompanied by fever for a short time after the initial stage of infection and never causes continuous fever lasting for years. Careful inquiry failed to reveal any exposure to bilharzial infection in this case.

The similarity of the lesions to Aschoff's nodules suggested the possibility of a rheumatic ætiology. Rheumatic peritonitis has often been described, usually in association with arthritis and carditis, and the subject has recently been discussed by Berger (1945). In the present case the absence of all other rheumatic manifestations, the fact that the lesions were limited to the peritoneum, and the doubtful interpretation of the histological findings, do not justify the condition being definitely designated as rheumatic.

SUMMARY

In a woman of 29 years with recurrent abdominal pain and fever for two years operation revealed an unusual miliary nodular condition of the peritoneum especially over the terminal ileum.

The nodules consisted of whorls of fibrous tissue, and some contained collections of endothelioid cells resembling Aschoff bodies. No bilharzia ova were found.

The findings pointed to a chronic non-pyogenic inflammatory condition, but no cause could be determined.

I am indebted to Dr. M. Sorour, professor of pathology in the Fouad 1st University of Cairo, for his full report on the histological sections; Major G. D. Morgan, R.A.M.C., for similar assistance; and Brigadier Evan Bedford for his guidance in reporting the case.

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Reviews of Books

A Textbook of Forensic Pharmacy

THOMAS DEWAR, PH.D., B.PHARM. Lond., PH.C., barrister-at-law, examiner to the Pharmaceutical Society of Great Britain. London: Edward Arnold. Pp. 253. 10*s*. 6*d*.

SUCH a book as this has for long been urgently needed, for no-one could pretend that the laws controlling the preparation, sale, and use of poisons are concise or readily accessible. Yet the pharmaceutical chemist, the toxicologist, and the barrister all need more detail than can be obtained from the textbooks of forensic medicine or pharmacy. In this book every conceivable detail has been handled by an expert who knows its significance in practice, and the text defies criticism in this respect. The dullness which is inevitable in any long statement of the law is leavened by such charming quotations as these:

> Here phials in nice discipline are set,
> There galleypots are rang'd in alphabet,
> In this place, magazines of pills you spy;
> In that, like forage, herbs in bundles lie.
> GARTH, *The Dispensary*, Canto 1.

> Don't rely too much on labels,
> For too often they are fables.
> SPURGEON, *Salt Cellars*.

Extensive footnote references to law and free use of practical examples make this a real yet easily handled compendium of reference. Its field embraces the forensic aspects of such widely diverse subjects as pure pharmacy, institutional dispensing, the Shop Acts, the Food and Drugs Act, and the Venereal Disease Act. Though intended primarily for the pharmaceutical student, the book is certain to have a wide circulation in both medical and legal circles.

The Physiological Basis of Medical Practice

(4th ed.) C. H. BEST, C.B.E., M.D., D.SC., F.R.S.; N. B. TAYLOR, M.D., University of Toronto. London: Baillière. Pp. 1169. 55*s*.

THE doctor—whether houseman, practitioner, consultant, or teacher—as well as the student, will continue to be attracted by this magnificent work. Best and Taylor has become a classic, providing a link between the laboratory and the wards. The authors animate the relatively dry bones of preclinical studies by emphasising their practical application to future clinical work; they bridge the gap when the student enters the wards; and for the houseman too, acutely aware of his lack of understanding, they explain the disorders of function which are perplexing him. Even the teacher at the bedside will find here a better way of giving the answer to many an anticipated question, and the sections on morbid physiology offer the basis for much intelligent research. Clinically the book is accurate and up to date and conforms to modern teaching. The extensive bibliography and the references are conveniently grouped under chapter headings at the end of the book. This edition appears in new form: double columns are said not only to save space but to make easier reading; but this seems doubtful.

A Complete Outline of Fractures, including Fractures of the Skull

(2nd ed.) J. GRANT BONNIN, M.B. Melb., F.R.C.S., late first assistant to the Injury Clinic, West London Hospital; recently surgeon in charge, fracture "A" centre, E.M.S.; major R.A.M.C. London: W. Heinemann. Pp. 658. 30*s*.

UNDER this promising title, Mr. Bonnin has really written a comprehensive textbook of fracture surgery. Almost 200 pages are given to general considerations, and the remainder to descriptions of the fractures of the various bones, including a brief but satisfactory chapter on those of the face and jaw by Mr. J. H. Barron. Writing primarily for students, Mr. Bonnin has selected carefully the material needing specially detailed description, and so has been able—in his chapters on ankle fractures, for instance—to expand and elaborate many of the principles applicable to fractures in general. Simple and complex methods of treatment are detailed, and no examiner could cavil at the methods recommended. Moreover, by indicating and giving the reasons for his preferred methods, the author sets a personal stamp on his work: the book is no "rehash" of more extensive works on the subject. He says in his introduction that he writes with memories of the inadequacy of his student textbooks. This book is certainly not inadequate: in an age of dehydrated textbooks his full description is refreshing, and the reasonable student will not grudge the few extra hours its reading entails.

Dr. J. Ross Mackenzie's little handbook, *Practical Anæsthetics* (2nd ed., Baillière, Pp. 172, 10*s*. 6*d*.), for students and hospital residents, has been revised throughout. As in the first edition, teaching is primarily given in the fundamentals of practical anæsthesia. Many matters of no direct practical interest to the beginner are reviewed, but junior anæsthetists will find the book useful.

New Inventions

SIMPLE APPARATUS FOR MICRO-SUBLIMATION

THE apparatus here described was introduced by us in the chemical investigation of cases of toxæmia. Developments of micro-chemistry, in which the unit is a millionth of a gramme, suggested that it might be possible to identify some of the toxins which are present in such minute quantities that they have defied analysis. Many such substances are adsorbed by fine activated charcoal, and if this is given by the mouth and subsequently recovered the substances can be extracted from the charcoal. But included with the toxins are various alkaloidal and resinous substances, which the patient may have taken medicinally. It is in the separation of these fractions that this apparatus is so useful.

In general the micro-oven follows the form of the apparatus of Kempf. It consists of a brass block (see

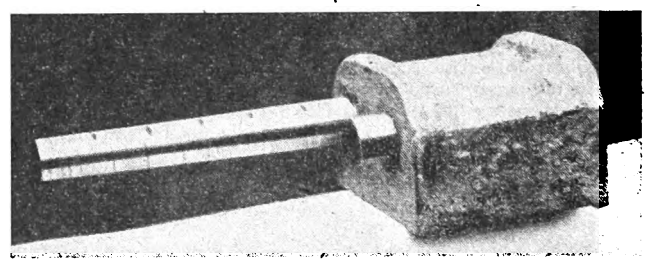

figure), which was a model engine casting. Two tubes of copper were turned to a driving fit, and driven into the cylinder cavities. At the suggestion of my assistant, Mr. W. G. King, one tube was made to project three inches, and was tapered in the part outside the brass block. This part of the tube was marked off at half-inch intervals. A thermometer is fitted in the second bore-hole. The block was heated on an asbestos mat over a gas flame. A graph was made showing the temperature at each mark corresponding to standard temperatures of the block—say 200°, 250°, and 300° C. The temperature will decline from the block to the end of the long tube, so that different parts of the tube will be at different temperatures. The graph was made on half-inch paper, and thus the graph corresponded to the three inches of the tube.

A mixture to be separated is placed in a glass tube, closed at one end, and this is inserted into the graduated copper tube, so that the closed end of the glass tube is at the middle of the block, and it is marked at the exit. On heating, sublimation will occur at intervals along the glass tube; and by laying the tube on the graph the approximate sublimation temperature can be found. The fractions can then be separated by the scratch and hot wire method. A scratch is made on the glass tube and the fracture is led round the tube by applying a hot bent-iron wire. Each fraction, so cut off, is then examined separately.

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THE LANCET

LONDON: SATURDAY, SEPT. 7, 1946

Medicine, Population, and Food

IN the past, populations have been held in check by disease, famine, and war, and to a lesser extent by contraception and infanticide. Of these factors disease has probably been the most important. Pestilences, such as the plague of Justinian (of which PROCOPIUS [1] has left so accurate a record), the Black Death, cholera, and influenza have slain their millions; and of even greater importance have been the ever-present diseases, such as pneumonia, gonorrhœa, and malaria. There is evidence that the decline and fall of Greece and Rome were accelerated, even if they were not initiated, by malaria: the sequence of events is familiar to everyone who has lived in the tropics—deforestation by man and his goats, soil erosion, swampy valleys, and mosquito breeding. Today, in Africa, India, and the Far East, malaria rivals and possibly outstrips malnutrition as a cause of mortality among young children, while in adults it lowers resistance to other infections: an estimate on the conservative side suggests that every year at least 5 million persons are killed by the various species of plasmodium. Pneumonia, too, is an important cause of death among primitive peoples and especially among negroes in Africa: it appears in epidemic form almost every year, with the advent of the cooler weather. Gonorrhœa, by causing sterility in both sexes, has been one of the primary causes of a low birth-rate. Even in war, despite the growing deadliness of offensive weapons and the increasing effectiveness of preventive measures, deaths from disease have always exceeded those from enemy action, while the results of disease far outlast those of bullet and bomb. Germany and the whole world are still suffering, as ALDOUS HUXLEY [2] has pointed out, from the disease and devastation wrought by the Thirty Years War (1618–48). Only the atom bomb seems comparable in its lethal effects to that of pathogenic parasites.

If we wish, we can now do much to decrease the infections which have hindered increase of population. For the first time in the world's history we possess remedies capable of reducing malaria, pneumonia, and gonorrhœa. In 'Paludrine,' it is said, we have at last a true causal prophylactic for both malignant and benign tertian malaria, as well as a curative agent in advance of any previously known: it is cheap, easy to make in large quantities, and of very low toxicity, and to the feminine half of the world it offers the huge advantage of leaving the complexion unaffected. By means of penicillin and the sulphonamides we can now reduce the death-rate from pneumonia and can go far to prevent sterility from gonorrhœa. Even some of the most primitive races are already asking for large supplies of these remedies as a panacea, while the sulphonamides have become so popular in West Africa that a profitable trade has developed in substitute tablets made from such unpromising materials as chalk, clay, or plaster-of-paris. Penicillin has the additional advantage that it is (in proper dosage) effective against syphilis, yaws, and tropical ulcer; and even localised causes of mortality, like typhus and trypanosomiasis, can now be controlled, either by chemotherapy or by using the newer insecticides. We still lack effective remedies against virus diseases and tuberculosis, but the progress of the last ten years encourages hope for the next ten.

There remains, in the form of malnutrition, one check to human life which could be even more deadly in the future than it has been in the past. Before the war we were already all too familiar in western civilisation with the huge sprawling city which, in the words of LEWIS MUMFORD,[3] had ceased to be a metropolis and had become a megalopolis and a parasitopolis: but most of us were less well aware that in parts of China, India, and Africa population was also, as in Europe, far in excess of indigenous food. Though local famines were sometimes reported, less was heard about the fact that even before the war 90% of people in the tropics were living on a diet which, though it might be adequate in calories for most of the year, was almost always deficient in proteins and vitamins of the B complex, while for some months, during what was euphemistically called "the hungry season," it was deficient in everything. Over 1000 million people were getting, on the average, less than 2250 calories daily.[4] Today, nobody in these islands is likely to forget that the shadow of a hungry season has spread from the tropics to the whole of the old world. If all the peoples of the world are to be properly fed, and if we add annually to their number all those who would previously have died from malaria, pneumonia, typhus, or trypanosomiasis, and all those who would never have been born if their parents had still been suffering from gonorrhœa or malnutrition, we shall need tremendous increases in the production and transport of essential foodstuffs. Such changes can be ensured only by a world authority empowered, if need be, to adjust national interests to international needs. Meanwhile, would it not be well for working parties, each consisting of a doctor, an agriculturist, a food technologist, a nutritionist, and a welfare worker, to visit not only the West Indies (as proposed by PLATT [5]) but every region in the world to report precisely on the prevailing conditions? Even on the most casual survey it is obvious that there are many areas where new and useful crops might be cultivated if only local governments and their agricultural departments could be stimulated to turn official memoranda into positive action. Similarly the example of the "food-yeast" factory, established for the benefit of the Caribbean zone, might be copied elsewhere. The whole question, in fact, of the synthesis of vitamins and essential amino-acids by laboratory methods on a manufacturing scale demands immediate attention.

Sir JOHN ORR'S report to the conference which opened at Copenhagen on Sept. 2 proposes the establishment of a World Food Board. In the task

1. Procopius (A.D. 449–565). Historiae (ed. Dindorff 1833–38).
2. Huxley, A. Grey Eminence, London, 1941.
3. Mumford, L. City Development, London, 1946.
4. See *Times*, August 21, p. 2.
5. Platt, B. S. Report on Nutrition in the British West Indies. Colonial no. 195. H.M. Stationery Office. 1946.

of feeding people better, the limiting factor at present is, he believes, not the physical capacity to produce enough food but the ability of nations to bring about the complex economic adjustments necessary to make adequate production and distribution possible.[4] To this the board would devote its efforts; and, given enough good will, the results might prove astonishing within our lifetime.

Activation of Skin Grafts

MODERN plastic surgery has firmly upheld THIERSCH's dictum that a skin graft takes better on an active or "excited" raw area than on one freshly prepared from normal quiescent tissue. Freshly cut tissue normally has to pass through a latent period of several days before proliferation becomes really active, and this latent period is eliminated when grafts are transplanted to (for example) healthy granulations. "When a surgeon takes up his knife to cut into normal tissues," says PEYTON ROUS,[1] "everything has been prepared for operation except the structures immediately concerned." If graft beds are the better for being in an active state, is it not likely that the grafts themselves would benefit by activation?

ROUS has investigated this problem. Clipped rabbits' skin was painted with a mixture of turpentine and acetone to induce epidermal proliferation; and after a few days the epidermis, normally one or two cell-layers deep, had thickened five- or six-fold and was vigorously dividing. Grafts so activated were compared with those cut from normal quiescent skin, by grafting both simultaneously in patchwork arrangement to rather poorly vascular beds freshly cut down to the deep corium of the skin in the lumbar region. Histological analysis revealed the following credit and debit accounts. Activated grafts are easier to cut and handle and are less inclined to fold and contract. When they heal, they do so more rapidly and securely than normal skin; the donor areas are more quickly resurfaced and, if need be, yield more promptly a second crop of grafts. But there are grave disadvantages. The demands of hyperplastic skin for nourishment are naturally greater than those of normal quiescent skin, and a number of hyperplastic grafts promptly die when transplanted to poorly vascular beds, while their normal neighbours quietly "sit out time." Sometimes the hyperplasia itself is troublesome, since the deep follicle epithelium of an activated graft sometimes creeps between graft and bed and begins to infiltrate the underlying tissue.

ROUS's observation of the necrosis of activated grafts on poorly vascular beds is interesting in the light of MEDAWAR's guess[2] that a really thick graft should be deliberately deactivated, in order to lower its metabolic demands during the critical stage of vascularisation. The deactivation is simply a matter of allowing the graft surface to remain at room temperature instead of at body temperature, as when thick gauze or cotton-wool pads are put over it to maintain pressure. In plastic surgery uses may be found for both activation and deactivation. The former might fill the bill for pinch grafts transplanted to highly active granulations, for pinch grafts are never used unless speedy epithelial spread is needed. Deactivation might be the rule when full thickness grafts are to be transplanted to poorly vascular, freshly cut, beds—for example, on the back of the hand. But for the ordinary run of skin-grafting there can be no question of adopting either activation or deactivation as a routine.

1. Rous, P. *J. exp. Med.* 1946, **83**, 383.
2. Medawar, P. B. *Brit. med. Bull.* 1945, **3**, 79.

How to Vaccinate

INFANT vaccination against smallpox will soon become voluntary, and opinions are divided about the probable result of this change. Some think that the vaccination of about a third of the population during the first year of life, achieved under the existing laws, will be maintained or even increased when medical services are extended under the new Bill. Others hold that hardly any infants will be vaccinated when compulsion is removed. Much will depend on the approach to the parents. Officially sponsored health education has already had considerable success with immunisation against diphtheria; but the case for vaccinating infants against smallpox, though a good one, will be harder to present attractively through the poster, the press, and the cinema. Probably the family doctor will have to do most of the persuasion.

The chief bugbears of vaccination are the bad arm and postvaccinal encephalomyelitis. The latter, a rare complication, seems very rare indeed when primary vaccination is not performed at school age or during adolescence—a fact which forms a substantial though somewhat awkward argument in favour of vaccination during infancy. The bad arm is a different and in some ways more important matter. A severe local reaction, with or without a mild general reaction, is fairly common, especially in adults, and though its consequences are rarely serious it can cause a good deal of pain and temporary disability. Much parental opposition to infant vaccination probably comes from a personal experience of this sort, perhaps after joining the Forces.

There is some reason to believe that the technique of vaccination can influence the incidence and severity of local reactions. In this country a single insertion, through a scratch not more than a quarter of an inch long, has been recommended[1] to public vaccinators since 1930 for ordinary civilian vaccination; and the Service departments have mostly followed suit. In the United States another method known as "multiple pressure" has been officially recommended[2] for over twenty years. In this method the skin over an area about an eighth of an inch in diameter is subjected merely to a number of "pressures" with a horizontally held needle, and there is no scratch nor even pricking of the skin as in another method described by PEIRCE[3] in 1937. Intracutaneous or subcutaneous injection of ordinary vaccine lymph has never been advocated, but these methods of insertion have been tried with bacteria-free suspensions of vaccinia virus obtained by egg culture and other means. When HENDERSON and MCCLEAN[4] inoculated a suspension of the elementary bodies of vaccinia

1. Statutory Rules and Orders 1930, no. 2, p. 16.
2. Leake, J. P. *Publ. Hlth Rep., Wash.* 1927, **42**, 221.
3. Peirce, E. R. *Brit. med. J.* 1937, i, 1066.
4. Henderson, R. G., McClean, D. *J. Hyg., Camb.* 1939, **39**, 689.

subcutaneously and intradermally, using hollow needles, they reached the interesting conclusion that immunity to vaccinia resulted only when there was a local reaction which included the formation of a vesicle, the latter being due presumably to back leakage of the inoculum along the needle track.

Very little has been recorded in this country about vaccination by multiple pressure or intracutaneous prick, although both these methods are older than the scratch technique, and one of them was probably used by JENNER. Most of the published papers deal with the vaccination or revaccination of adults, and as regards infant vaccination there is but little in print about any of the techniques. DUDLEY [5] found that substitution of multiple pressure for the scratch method reduced sickness and disability due to vaccination and revaccination among the adolescent entrants to a naval school. PARISH,[6] however, noted that when it was used for the primary vaccination of a group of adults nearly a quarter of them had severe local reactions. It has been stated [3] that the results of revaccination by intracutaneous prick are easier to read because local reaction due to trauma does not obscure the so-called immune and vaccinoid types of response. Another advantage attributed to vaccination by prick or pressure instead of by scratch is that no dressing is required; but this has not been the experience of at least one observer.[6]

It is by no means certain that trauma of the skin during insertion is the only cause, or indeed the chief cause, of severe local reactions. Although the bacterial content of vaccine lymph can be reduced to a low level by proper methods of manufacture, it remains a more or less unknown factor in any given vaccination; moreover observations with purified preparations of vaccinia virus suggest that local reactions still occur when bacteria are absent. Other factors of undetermined importance in this respect are the concentration of virus in the lymph and the immunity response of the individual. Touching on this there are the remarks of CRAIGIE as quoted by TULLOCH [7] in 1934: "the magnitude and endurance of the immunity response is primarily a question of the individual and his capacity to respond—not of vaccination technique. The amount of seed and the area of skin involved would seem to be of minor importance as regards immunity, so that nothing is to be gained by making either too great. If they are reduced to a minimum the developing immunity will be better able to overtake the proliferating virus, thus minimising reaction and the risk of sequelæ." This implies that minimal trauma during insertion may shorten the duration of the reaction and thus lessen its severity.

It would be well worth making some practical comparative studies of the three main methods of vaccination—dermal scratch, multiple pressure, and intracutaneous prick—on a scale big enough to give the results statistical significance. Teachers of vaccination at the medical schools might be able to undertake such studies in connexion with the vaccination of infants. For an investigation of the vaccination and revaccination of adults Service medical departments would be better placed.

5. Dudley, S. F., May, P.M. *J. Hyg., Camb.* 1932, **32**, 25.
6. Parish, H. J. *Brit. med. J.* 1944, ii, 781.
7. Tulloch, W. J. *J. State Med.* 1934, **42**, 683.

Standards and Stampedes

THE victims of the housing shortage have reached the stage of exasperation. Squatters are moving into military camps in many parts of the country and taking joyful possession. It will be hard for the authorities to sort out those deserving priority, but the movement as a whole must command sympathy and understanding, in spite of the obvious embarrassments it creates. There is one risk, however, which needs to be watched with great care: that the shortage will lead to a lowering of accepted standards in housing, especially standards of amenity and hygiene. To meet emergency conditions minimum sanitation may do well enough for a time, but it is fatally easy to slide downwards, by allowing the temporary to become permanent and even to be slipshod about permanent building. The London County Council have set themselves high standards of amenity in the homes they propose to build. They have determined to keep abreast with modern developments in construction and fittings. Other areas would do well to follow this lead.

The question of accommodation is more serious and difficult. Both the Dudley Report and the Housing Manual of the Ministry of Health, while urging local authorities to study the actual needs of families in their areas, recommend that, for the time being at least, they should continue to provide three-bedroom houses as their main programme. Some doubt has been cast on the wisdom of this policy. Thus in the *Times* a correspondent asks, "Do we want tens of thousands of three-bedroomed houses? A three-bedroomed house is too big for a newly married couple;" and he goes on to speak of the "amount of waste space that is being built with our hard-pressed building resources." If we leave aside the special requirements of single persons and the aged, we can concentrate attention on the family. It is estimated that about 80% of families have no more than two children, and the "average" three-child family is represented by about 10%. On the face of it the *Times* correspondent seems right in saying that "continued overproduction of standard-sized houses is wasteful of resources," but he is on less solid ground in adding that "this must seriously retard the economic possibilities of any increase in the child population." The suggestion that the child population might be increased by reducing the number of bedrooms in the family house might be true, if family limitation were merely a matter of economics, but it is possible that other factors, including lack of bedrooms, act as a more direct brake on size of family. At any rate houses with only one or two bedrooms offer no encouragement to young married couples to be fruitful and multiply.

The story is not so simple as this. Indeed, it is doubtful whether the talk about waste space is well founded. Between 1919 and 1934 some 42% of the houses built were within the range of workers' incomes; a further 40% might, at some sacrifice, have been bought by the better off artisans; and the remainder were beyond their reach. Between 1934 and 1939 only 41% of the houses built (apart from slum clearance) were genuine working-class houses. In other words, a great host of three-bedroomed houses built between the wars were not for

the workers, but for comparatively well-to-do families. Further, just before the outbreak of the late war at least 225,000 houses were needed to complete outstanding slum-clearance schemes, quite apart from the vastly greater number of substandard houses which were sliding into slumhood in 1939. Nearly 300,000 houses were required to deal with overcrowding schemes at the exceedingly low standard set up for this purpose. About 150,000 houses were damaged beyond repair by enemy action. At least another 300,000 are needed to provide for the increase in the number of families since 1939. Miss MARIAN BOWLEY, PH.D.,[1] whose illuminating researches have produced a wealth of figures on the housing situation, estimates in addition that nearly four million workers' houses built before the 1914–18 war are so far below the lean standard of the three-bedroom, non-parlour house built by local authorities between the wars that they require replacement.

All the available evidence points to the conclusion that there is a great dearth of three-bedroom houses within the income range of working people, but this does not of itself prove that three-bedroom homes are desirable for the majority of families. We are confronted here with questions of opinion. In the Housing Manual of 1944 the Ministry of Health recommend the provision of three bedrooms of the following dimensions: first, 135–150 sq. ft.; second, 110–120; and third, 70–80. It is true that the young married couple do not require two and a half bedrooms until they have a child; but it is good for them to be able to contemplate the possibility of having a child without worrying about the accommodation, even for the confinement. People who are aghast at the thought of three bedrooms for working folk seem to have no idea how small the space really is, or what a blessing the little third room is for a variety of domestic purposes. They forget that such families may want visitors; that, like the rest of us, they often have to provide for aged relatives; and that there is sometimes sickness in the family. If we really mean to pursue a population policy, we ought to encourage families to have children. It is mere humbug to pretend that they will get larger houses when they have three children. In matters of this kind the stimulus should come before the event, and not as a lollipop promised for good conduct. In building houses to last sixty years we have no right to assume that the downward trend in family size will continue; even if it were to do so, the present area of a three-bedroomed house is nothing to be alarmed about—800–900 sq. ft.! As MUMFORD[2] says: "It is a false solution to build a dwelling so small that the psychological harmony of family life is sacrificed to economy of space."

1. Bowley, M. Housing and the State, London, 1945.
2. Mumford, L. The Culture of Cities, London, 1938.

THE INDEX and title-page to Vol. I, 1946, which was completed with THE LANCET of June 29, is published with our present issue. A copy will be sent gratis to subscribers on receipt of a postcard addressed to the Manager of THE LANCET, 7, Adam Street, Adelphi, W.C.2. Subscribers who have not already indicated their desire to receive indexes regularly as published should do so now.

Annotations

AN INTERNATIONAL GATHERING

THIS year's conferences, after the lapse since 1939, have all the savour of long-deferred family reunions. The international meeting under the chairmanship of Sir Hugh Lett, which, as announced in our news columns, is to be held towards the end of this month in London, will be attended with peculiar zest; for it is to be a world-wide gathering. Invitations have been sent to organisations in 42 nations, and the majority have already accepted. The principal business will be consideration of means to promote international liaison in medicine. This has hitherto been the aim of the Association Professionnelle Internationale des Médecins; but the A.P.I.M. has been concerned solely with professional and social medicine. The time has come for a wider range of international coöperation.

It is especially to be hoped that the new organisation foreshadowed in the agenda will sponsor an improved exchange of information, particularly on medical research. Rumour has it that several of the world's leading nuclear physicists are actively discouraging young men of promise from pursuing their specialty because they believe that the free exchange of information essential to progress in this field will never be resumed. No similar embargo threatens medicine; but some of its branches are rapidly becoming almost equally complex, demanding, no less than nuclear physics, the benefit of world-wide consultation. It is true that the main course of research in other countries is known to most in the top flight of their specialties; it is true also that the results of research are more or less easily available to all countries, through the medium of the *Quarterly Cumulative Index Medicus*, published in the United States. But to announce results is not enough: the time for the sharing of information is before research is initiated. Many forms of investigation must be planned and integrated globally if overlapping and needless reduplication are to be reduced and if each country's facilities and aptitudes are to be used to the best advantage.

HYBRID VIGOUR IN SWEET CORN

IN Britain the word "corn" denotes all kinds of cereal grains, whereas in America it refers exclusively to Indian corn or maize. This often caused confusion with our American friends during the war. Most people in this country understand, however, what is meant by the term "sweet corn"—the type of *Zea mays* characterised by a higher sugar content than the "field" corn used for animal feeding. Before 1939 sweet corn was not widely grown in this country, owing partly to unfamiliarity with methods of preparation and partly to the uncertainty of yield in our capricious climate; but interest was stimulated by the influx of American soldiers during the war and the call for vegetables to replace those normally imported. In the subsequent search for early varieties that might ripen successfully in this country, interest centred on the "hybrid" corns.

To most people a hybrid is a cross between two unlike parents, whether of different species or of different varieties; but with maize it has come to have the restricted connotation of a controlled cross between two or more inbred "pure lines," each with definite characteristics. Prof. George Shull, of Princeton University, was the first to show that by the crossing of two pure lines, each of which might be of very low yield, a hybrid of much greater vigour than either parent could be produced; he introduced the word "heterosis" to define this phenomenon of hybrid vigour. He began work as long ago as 1905, and by 1914 he had formulated all the principles for the commercial production of hybrid corns; it was not until 1924 that these valuable types began to be used in the United States, but by

1937 80% of the sweet corn for canning was grown from hybrid seed.

Maize is a dicœcious plant—that is, it produces male and female flowers on the same plant. The male flowers, or "tassels," at the top of the plant shed their pollen in the slightest wind on to the stigmas or "silks" of the female flowers lower down. By growing two inbred pure lines side by side and removing the "tassels" from one variety as soon as they appear, the fertilisation of the cobs with pollen from the other variety is assured, and a "single-cross" hybrid, with the characteristic hybrid vigour, is obtained. If seed from self-fertilisation by such a hybrid is grown, the next generation shows segregation and loss of the hybrid vigour. To maintain the vigour and uniformity of the cross, new hybrid seed must be produced in the same way every year—a costly process and one which can only be undertaken on a large scale by commercial seed-growers. Nevertheless, it pays the grower to purchase this seed rather than to grow the ordinary varieties. Other types of hybrid than the "single-cross" are now sometimes used, because they can be produced more economically, without loss of the hybrid vigour. Thus, "top-cross" hybrids (crosses between an inbred line and an ordinary variety), "double-crosses" (two different single-crosses hybridised), and "three-way crosses" (with the seed parent a single-cross and the pollen parent a third inbred line) are now in regular production. If only more of our food plants were dicœcious, their cultivation might, with heterosis, be revolutionised in the same way as the American corn-growing industry.

PENICILLIN AND SULPHATHIAZOLE IN TYPHOID FEVER

SINCE Bigger's report[1] on the apparently synergic action of penicillin and sulphathiazole on strains of *Bacterium typhosum* in the test-tube, clinicians have been interested in the possibility of using this combined chemotherapy against an infection which regularly takes its toll of 10 to 20 patients in every 100 cases. As Bigger showed, penicillin in a concentration of 2 units per c.cm. in vitro has an inhibitory but not bactericidal action on some strains of the typhoid bacillus, and when this level of penicillin is combined with 10 mg. of sulphathiazole per 100 c.cm., most strains of *Bact. typhosum* are killed or effectively inhibited. With the recommended dosage of 2 mega units a day for the treatment of typhoid cases a level of 2 units per c.cm. of penicillin in the blood can usually be surpassed although levels of 10 mg. of sulphathiazole per c.cm. are rarely obtained with the usual dosage of 6–8 g. per day. However, *Bact. typhosum* in moderate numbers can be inhibited in vitro by lower concentrations of sulphathiazole (1–5 mg. per 100 c.cm) so that the combined therapy should theoretically be effective. As a rule the best results with chemotherapy are obtained in the early stages of an infection, when the pathogen is actually multiplying in the tissues, and on this basis the penicillin-sulphathiazole treatment of typhoid should be most successful before the end of the first week when the organism is still presumably proliferating in such foci as lymphoid tissue, bone-marrow, and the gall-bladder. Less striking results would be expected with treatment begun after the end of the second week, when typhoid toxæmia and ulceration of the bowel with its attendant risks of hæmorrhage and perforation are the main features of the disease. Unfortunately few cases of typhoid fever are diagnosed in the first week of infection but penicillin-sulphathiazole may be exhibited in the early stages of the not infrequent relapses, while McSweeney[2] has claimed good results in a few cases treated in the second and third weeks.

When treatment is begun late useful objective criteria of the severity of the disease may be a positive blood-culture and low titre of O antibody. Blood should therefore be taken immediately before treatment is begun; the clot is cultured in bile or bile-broth and the serum examined for agglutinins. Besides its effect on the clinical infection careful observations should be made to find whether penicillin-sulphathiazole therapy will eliminate the infecting organism and thus secure early bacteriological cure. After an attack of typhoid fever, patients may continue to excrete the organism for many weeks in convalescence and it is estimated that some 2% of affected patients become chronic typhoid carriers. In the convalescent stage the organism persists mainly in the gall-bladder and bone-marrow; in the chronic carrier the usual focus is the gall-bladder, although, as the recent Aberystwyth outbreak exemplified, the possibility of urinary carriage must not be forgotten. Penicillin is concentrated in the bile as well as in urine and with massive doses effective levels may be obtained. McSweeney reported early negative fæcal cultures in 3 of his 5 treated cases (he does not say whether selective culture media were used) and in this issue (p. 343) Comerford, Richmond, and Kay record apparent success in the treatment of 2 typhoid carriers. In the past medical treatment of the chronic typhoid carrier has been uniformly disappointing, though cures have lately been claimed in individual cases with sulphaguanidine and succinyl sulphathiazole. In some of these cases chemotherapy has followed apparent failure of cholecystectomy—as happened with one of the 2 carriers now reported—and it is only fair to point out that cholecystectomy rarely leads to bacteriological cure before several weeks and occasionally months have elapsed after operation. Because of the possibility of intermittency of excretion it is wise also to continue laboratory examinations of fæces and blood (for Vi antibody) for at least a year after apparent cure. However, the results reported by Comerford and his colleagues will encourage others to try the effect of penicillin-sulphathiazole in chronic typhoid carriers, many of whom are known and kept under supervision.

A complicating factor that deserves attention when large doses of penicillin are being used for the elimination of relatively resistant organisms is that commercial preparations may contain 3 or 4 different penicillins[3] the activity of which vary in vitro and in vivo against different bacteria. Thus penicillin III (X) has been shown[4] to be more active than penicillin II (G) against pneumococci, hæmolytic streptococci, *Bact. coli*, and possibly gonococci, although in the usual standardisation tests the two penicillins are equally active against *Staph. aureus*. American workers[5] have also found that penicillin IV (K) although highly active in vitro against *Staph. aureus* and also against *Treponema pallidum* is relatively ineffective in the treatment of experimental rabbit syphilis, a phenomenon that has been correlated with its rapid disappearance from the blood. The poor results, compared with early successes, that have lately been reported[6] in the penicillin treatment of syphilis are also blamed on the high content of penicillin IV in commercial penicillin. Whether the increasing use of *Penicillium chrysogenum* and the deep tank aeration methods of production favour a greater yield of this biologically inert penicillin are matters for further investigation. Meanwhile these disturbing findings may largely invalidate the internationally accepted method of penicillin standardisation, the full report[7] on which was lately published as a special *Bulletin* of the Health Organisation. Obviously the manufacturer must take

1. Bigger, J. W. *Lancet*, 1946, i, 81.
2. McSweeney, C. J. *Ibid*, July 27, p. 114.
3. See Leading article, *Ibid*, 1946, i, 539.
4. Libby, R. L., Holmberg, N. L. *Science*, 1945, **102**, 303.
5. Eagle, H., Musselman, A. *Ibid*, 1946, **103**, 618.
6. *J. Amer. med. Ass.*, 1946, **131**, 265, 271.
7. *Bull. Hlth Org. L. o. N.*, 1945–46, **12**, no. 2.

steps to avoid producing penicillin with a high content of penicillin IV or alternatively must use methods for its elimination from the finished product. Failing the production of specific penicillins such as II or III, it would also seem desirable to supplement the in-vitro tests for penicillin standardisation by methods that have more direct relationship to therapeutic efficiency—e.g., the determination of residual penicillin levels in the blood of suitable animals.

DEATH AFTER SERUM

A DOMESTIC tragedy in Ireland, lately reported in the daily press, underlines the possible dangers of antitoxin, which were discussed in these columns a few months ago.[1] Having good reason to believe that one member of a household had contracted diphtheria, a doctor decided to protect the seven contacts by giving each a dose of antitoxin. The last to receive the injection, a girl of 14, complained a few minutes later that she had had an attack of asthma. Administration of a cardiac stimulant was of no avail, and the child died with acute heart-failure soon afterwards. The extreme rarity of such occurrences —perhaps 1 in 80,000 injections—is no reason for underrating their seriousness. Children are more liable than adults; crude serum is more likely than refined antitoxin to cause disaster; no intradermal or other test of sensitivity is entirely reliable; a history of asthma is a warning of the gravest significance; a bottle of adrenaline should be at hand, ready for immediate use, whenever an injection of serum is given. Such in brief is the extent of our knowledge. The induction of passive immunity, perhaps combined with active immunisation as suggested by Fulton and his colleagues,[2] is not only justifiable but also highly desirable on many occasions, but it must never be forgotten that it carries a small but definite risk.

A SCHOOL FOR DIPLEGICS

FEW conditions give such a false impression to the onlooker as cerebral palsy. A child moving with great difficulty, his knees rubbing together or crossing, his arms bent stiffly on his breast or sweeping about in athetosis, his lips dribbling, makes a picture which to the inexperienced means idiocy. Yet many such children are normal mentally, two-thirds of them are educable, and even those who reach colonies for mental defectives are usually among the higher grades. They may achieve much success in managing their disabilities, sometimes with little training or encouragement; it is remarkable to see how a boy learning weaving, for example, will wait for the exact moment when his athetosis will allow him to throw the shuttle. In the United States, where there are said to be some 200,000 cases, considerable advances have been made by Dr. Phelps, of Baltimore, among others, in the training and education of children with cerebral palsy. Now, thanks to the generosity and enthusiasm of Mr. Leslie Williams, who has subscribed a large sum of money and given much of his time to fostering the scheme, and of Colonel and Mrs. Garwood, who have lent their house at Croydon rent-free for seven years and contributed to the fund, a school for British children with this disability is to be founded.

At a luncheon to launch the scheme, held at the Trocadero Restaurant on August 26, Dr. Earl Carlson,[3] himself a diplegic, spoke of the school he has established in New York for 75 palsied children, aged from 2 years upwards. Of his staff of 30, 5 are trained teachers, and others are being trained for this work. Calling cerebral palsy the most neglected condition of childhood, he described the case of a young man who at 20 could not read and could scarcely talk; after 10 years of proper teaching he was admitted to a university and took a PH.D. He is now head of the high-school department of Dr. Carlson's school. Children attending the school for mental and physical training usually need stay only a few months. Dr. Carlson can estimate their intelligence, he finds, whatever their physical state, and can judge whether any child over the age of 3 years is educable. Some return to the school for a few months at the age of 18 years before going on to a university. St. Margaret's, the new school at Croydon, will begin on a small scale, but this short-stay plan will make it possible to deal with relatively large numbers of children. At first preference will be given to children who can feed themselves, are not incontinent or mentally defective, and who show a good promise of improvement.

The incidence of cerebral palsy is unknown—one estimate is 5–6 per 100,000 population. The cause is still doubtful, for though the theory of birth-injury long held the field (and the mothers often give a history of difficult labour), the pathological findings suggest rather a blight falling on the brain earlier in fœtal life, destroying some developing cells and allowing others, perhaps more mature, to escape; in the light of recent work infective or dietetic factors will no doubt be inquired into. Whether the case is predominantly spastic, athetoid, or ataxic depends on the sites of the damage. The Rh factor probably has some part in the ætiology, for half Dr. Carlson's patients give a history of jaundice in infancy.

The house at Croydon is already being adapted to its new purpose. The board of management consists of Mr. Williams, Prof. J. M. Mackintosh, Sir Ernest Cowell, and Dr. William Moodie, and the medical advisers to the school will include a neurologist-pædiatrician, an orthopædic surgeon, and a specialist in physical medicine, all of whom will also be on the staff of Queen Mary's L.C.C. Hospital for Children at Carshalton. The board are looking for a hostel where the parents of those entering the school can stay for a time to learn how to help their children. Miss Kathleen Wood has been appointed headmistress of the school. Two physiotherapists on the staff have completed a three months' course in Dr. Phelps's clinic, and an educational psychologist, sent out by the Foundation for Educational Research, who has studied the work being done in a large number of the clinics in America, will make St. Margaret's her headquarters for research and for developments of the movement. It is hoped that the school will be in operation by the end of October.[4] The Ministries of Health and Education, the Foundation for Educational Research, the National Council for the Care of Cripples, and Parents' Associations all favour this new development, and it is planned to make St. Margaret's the forerunner of similar schools in different parts of the country, giving education and care to such unfortunate children within the means of all their parents.

TUBERCULOUS ENDOMETRITIS AND STERILITY

THE association between sterility and tuberculous endometritis has been recognised only in the last few years, but Halbrecht,[5] in reviewing 820 cases of sterility in women who were subjected to curettage in Tel-Aviv, has found that 45 had tuberculous endometritis. The diagnosis was confirmed by positive culture in 4 cases and by animal inoculation in 3. Unfortunately, no account is given of the histological criteria for the diagnosis, but he suggests that the number of positive findings would have been greater if all patients had been submitted to a total curettage rather than to a partial or diagnostic endometrial biopsy. As a corollary he investigated 54 women in whom salpingography showed the tubes to be partially or completely blocked; the findings on curettage demonstrated that 18 of these had tuberculous endometritis.

1. *Lancet*, 1946, i, 694.
2. Fulton, F., Taylor, J., Wells, A. Q., Wilson, G. S. *Brit. med. J.* 1941, ii, 759.
3. As announced in these columns last week (p. 332) Dr. Carlson is lecturing at the London School of Hygiene on Sept. 9, at 4 P.M.
4. In the meantime inquiries should be addressed to Miss Kathleen Wood, Coombe House, Croydon.
5. Halbrecht, I. *Schweiz. med. Wschr.* 1946, **76**, 708.

This poses a triple problem: first, the relationship between sterility and tuberculous endometritis; secondly, the situation of the original tuberculous focus, which may, or may not, have been genital; and thirdly, the significance and prognosis of the uterine disease. In a previous article [6] Halbrecht outlined the past history of 18 cases of tuberculous endometritis; of these, 2 had had pleurisy in youth, 2 had had tuberculous peritonitis, and 3 others showed signs of other tuberculous affections—persistent pararectal fistula, tuberculous adenitis, or hip disease. It therefore appears that the endometrium provides a long-term sanctuary for the tubercle bacillus, in the same way that the gall-bladder harbours the typhoid bacillus. The sequence is probably this: primary focus in lung or abdominal glands, systemic tuberculosis or dissemination to the pelvic peritoneum, exosalpingitis or endosalpingitis with tubal occlusion, and finally residual tuberculous endometritis.

In a final word of reassurance, Halbrecht says that apart from the endometritis his patients were all fit by external standards, and that, except for obliterating the tubes, the disease remained stationary and untroublesome. For treatment he advises absolute conservatism with complete abstention from surgical intervention. His conclusion that occult, subclinical tuberculous endometritis is one of the cardinal causes of sterility in general and of tubal occlusion in particular may have come as something of a shock to English workers; and it will be interesting to see whether, with further experience, similar reports appear in this country.

BOVINE PLASMA AGAIN

DURING the war there were several reports [7 8] on the use of bovine plasma or serum, and bovine albumin, as blood-volume-restoring agents in man; but none of the authors felt justified in proposing their unrestricted use.

Any protein-containing substitute for human plasma must obviously be non-antigenic, non-toxic, and free from agglutinins, and it should have at least the same osmotic pressure as human citrated plasma. None of the workers who have reported so far have been willing to state unequivocally that the first condition has been fulfilled, while the solutions of highly purified ox-albumin prepared in Cohn's laboratory at Harvard and used by Heyl et al.[8] alone appear to fulfil the second. Of the bovine material used, the ox-albumin seems least open to criticism, and publication of the final conclusions drawn from its trials—if in fact trials have been continued—will be very valuable. Meanwhile a report from Barcelona on the preparation of bovine plasma and its use in man is published on another page of this issue. Dr. Massons has subjected his material to rigorous treatment to make it sterile and non-antigenic, but before the adoption of his bovine plasma can be recommended his claims must be substantiated by careful repetition of his work, followed by controlled clinical trial. It is unlikely that the osmotic pressure of Massons' material is equivalent to that of human plasma; indeed it is probably much less. His method of preparation is simple compared with Cohn's elaborate and expensive fractionation, but its extreme simplicity will itself evoke criticism.

The chief advantages of using a substitute for human plasma are that it will remove the danger of transmitting hepatitis, and will lighten the burden of the many blood-donors who have given so faithfully. Unfortunately much work still remains to be done before this can happen. No protein-containing substitute for human plasma can be employed until it has been clearly shown to be not only harmless but also as effective as human plasma.

6. *Lancet*, 1946, i, 235.
7. Edwards, F. R. *Brit. med. J.* 1944, i, 73.
8. Heyl, J. T., Gibson, J. G., Janeway, C. A. *J. clin. Invest.* 1943, **22**, 763.

CURARE IN NEUROLOGY

APART from anæsthesia, there are two outstanding uses for curare in medicine which may deserve more attention. There is mounting evidence that it can be used with reasonable safety by intravenous injection to minimise the chances of fracture in convulsion therapy, especially in the elderly. Palmer [1] has summarised the technique required. What may finally prove to be a much wider field is in spastic or dystonic neurological conditions, where no radical treatment is possible, and spasm limits the value of all forms of physiotherapy. Results have been published, for example, in tetanus, status epilepticus, infantile spastic paralysis of several kinds, parkinsonism, paralysis agitans, and Huntington's chorea. They have been dubious so far, for two reasons. There have invariably been troublesome side effects—blurred vision, diplopia, general weakness, and dizziness—and the effect has been transient, and not sufficiently definite in proportion to the severity of the symptoms to justify its routine use. Schlesinger [2] has now introduced a new factor by injecting the curare intramuscularly in a mixture of peanut oil and white wax, and so obtaining slow absorption. He finds that its action is thus prolonged up to three days, and that the unpleasant side effects do not develop. Confirmation is required, but it may be that this modification in technique will lead to welcome, although probably partial, relief for many patients who at present live many months functionally helpless. It should not be forgotten that a number of drugs, such as quinine methochloride, magnesium sulphate, and erythrine, are believed to have pharmacological effects similar to curare. There might be an advantage in achieving the same end with some such physiological analogue.

FOR AULD LANG SYNE

THERE can be few who served in the Forces during the war years who do not find some pleasure in the recollection. Perhaps memory is happily selective; perhaps, again, the rigours of present-day civilian life lend fictitious charm to any alternative. Whatever the reason, the tedium, the irritations, the occasional danger, and the frustration that largely compounded the life of the amateur soldier usually defer to happier memories. The life, though physically dangerous, was otherwise secure, with food and pay assured without special endeavour; many had the chance to see countries they would otherwise never have visited; and the return to the schoolboy community way of living fostered friendships which, but for the common share of discomfort and danger, would never have been sealed. The value attached to these ties has been shown by letters in our columns in the last few months: for the Army, a medical society has been proposed, and an airborne medical society is being formed. Mr. T. J. Daly, a former major and quartermaster, R.A.M.C., now writes to suggest an Army medical association to hold reunion dinners throughout the country; he offers fuller particulars of a tentative scheme to anyone writing to 1, Lancashire Road, Bishopston, Bristol. Ideas of this sort will be warmly supported by those who seek to preserve the little good that has emerged from the lost years.

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2. Schlesinger, E. B. *Arch. Neurol. Psychiat.* 1946, **55**, 530.

SYSTEMATIC research into the common cold is to be undertaken in the United States, as well as in Great Britain (see *Lancet*, 1946, i, 822). In America, the investigation will be made by the National Institute of Health (the research division of the United States Public Health Service), directed by Dr. R. E. Dyer. Like the British workers, Dr. Dyer emphasises that it may be five or more years before substantial progress can be recorded, even allowing for the better understanding of viruses in the last decade.

Special Articles

FRACTIONAL TEST-MEALS ON STUDENTS AWAITING EXAMINATION RESULTS

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THE association between disturbance of the guts and emotional tension has been recognised since the beginnings of literature. Older authors attributed emotional instability to weak guts. The pendulum has now swung over, and gastroduodenal and colonic disorders, both functional and organic, are popularly ascribed either to excessive mental strain or to a temperament badly adjusted to normal strains.

Typical evidence for this change of view is the alleged frequency of gut disorder following mental tension. A good example is Stewart and Winser's (1942) paper on the increase in perforated peptic ulcer during air-raid periods. There are many other lines of evidence, such as the undue frequency of certain temperamental types among ulcer patients (Davies and Wilson 1937), observations on the effect of emotion on quite a large number of patients with gastric fistulæ, ranging from Beaumont (1833) to Wolf and Wolff (1942), observations on experimental animals with fistulæ or with transparent abdominal windows, X-ray observations on experimental animals and on normal and psychotic human subjects, and finally test-meal observations on mental patients and on subjects suffering from emotional stress or in whom stress is induced under hypnosis. Alvarez (1929) has written a very readable review, and Dunbar (1946) gives a modern bibliography.

Various mechanisms for the production of peptic ulcers by emotion have been suggested. The idea that interruption of normal impulses from the brain, or the production of abnormal ones, may be responsible dates back to Kammerer (1818), who tried to explain the association between brain lesions and gastric ulcers. The theory of hypothalamic stimulation in its modern form was favoured by Stewart and Winser (1942) and severely criticised by Jennings (1942). Selye (1943) reaffirmed the claims of his "alarm" reaction of ischæmia followed by dilatation of capillaries and stasis. Cannon's (1909) view of stasis and fermentation of food producing irritation, gastritis, and duodenitis is a possibility, and so is the idea of retrograde intestinal movements associated with colonic irritability.

As pointed out by Jennings (1942), the difficulty of the theory of hypothalamic stimulation is that, with rare

RESULTS OF FRACTIONAL TEST-MEALS IN SIXTEEN STUDENTS WHO PASSED AND FOUR WHO FAILED IN THEIR EXAMINATIONS (17–20)

A.—PASSED

No.	Fasting and initial samples				Time relationship of samples to announcement of results: Minutes before 15	10	5	Minutes after 5	10	15	Final samples	
1	F	70	72	75	..	75	..	..	80	..	60	..
	T	120	114	115	..	110	..	..	100	..	82	..
	S	+	+	+	..	+	..	..	+	..	+	..
	B	tr	tr	−	..	−	..	..	−	..	−	..
2	F	0	20	25	..	..	48	..	..	52	48	..
	T	20	40	48	..	..	65	..	..	65	65	..
	S	tr	+	+	..	..	+	..	..	+	−	..
	B	−	−	−	..	..	−	..	..	−	−	..
3	F	0	12	32	..	..	28	..	..	22	22	..
	T	10	30	52	..	..	42	..	..	38	38	..
	S	−	+	+	..	..	+	..	..	tr	tr	..
	B	−	tr	−	..	..	−	..	..	−	−	..
4	F	0	0	25	..	..	33	..	..	22	22	..
	T	10	18	45	..	..	54	..	..	47	43	..
	S	−	+	+	..	..	+	..	..	−	−	..
	B	−	−	−	..	..	−	..	..	−	−	..
5	F	18	12	36	..	..	17	..	..	30	15	..
	T	38	30	58	..	..	32	..	..	52	30	..
	S	−	+	+	..	..	+	..	..	+	−	..
	B	−	−	−	..	..	−	..	..	−	−	..
6	F	..	48	17	0	..	..	0	..	..	0	0
	T	..	70	35	20	..	..	25	..	..	30	20
	S	..	+	+	−	..	..	−	..	..	−	−
	B	..	+	+	+	..	..	+	..	..	+	+
7	F	..	38	20	45	..	..	50	..	..	41	38
	T	..	58	35	70	..	..	72	..	..	60	50
	S	..	−	+	+	..	..	+	..	..	−	−
	B	..	−	−	−	..	..	−	..	..	−	−
8	F	..	0	0	22	..	..	10	..	..	12	..
	T	..	8	24	40	..	..	27	..	..	28	..
	S	..	−	+	+	..	..	−	..	..	−	..
	B	..	−	−	−	..	..	−	..	..	−	..
9	F	..	37	18	..	33	..	..	37	..	9	..
	T	..	70	52	..	65	..	..	61	..	30	..
	S	..	+	+	..	+	..	..	+	..	+	..
	B	..	−	−	..	−	..	..	tr	..	+	..
10	F	..	0	0	..	25	..	..	35	..	32	..
	T	..	15	17	..	48	..	..	52	..	40	..
	S	..	−	+	..	+	..	..	+	..	+	..
	B	..	−	−	..	−	..	..	−	..	−	..
11	F	..	40	48	..	50	..	..	55	..	52	..
	T	..	58	65	..	70	..	..	72	..	68	..
	S	..	−	−	..	+	..	..	−	..	−	..
	B	..	−	−	..	−	..	..	−	..	−	..

A.—PASSED (*continued*)

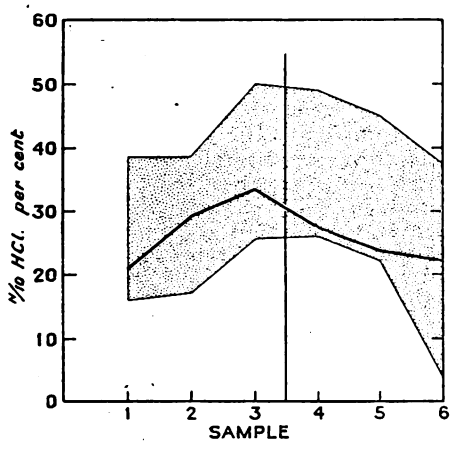
No.	Fasting and initial samples				Time relationship of samples to announcement of results: Minutes before 15	10	5	Minutes after 5	10	15	Final samples	
12	F	..	10	6	..	25	..	..	22	..	18	..
	T	..	42	27	..	50	..	..	50	..	42	..
	S	..	−	+	..	+	..	..	+	..	+	..
	B	..	−	+	..	+	..	..	−	..	−	..
13	F	..	18	12	..	45	..	..	42	..	60	..
	T	..	30	30	..	60	..	..	58	..	80	..
	S	..	−	+	..	+	..	..	+	..	+	..
	B	..	−	−	..	−	..	..	−	..	−	..
14	F	..	35	64	..	58	..	..	72	..	78	..
	T	..	58	82	..	80	..	..	88	..	90	..
	S	..	+	+	..	+	..	..	−	..	−	..
	B	..	+	−	..	−	..	..	−	..	−	..
15	F	..	42	25	..	..	50	..	..	60	52	..
	T	..	67	48	..	..	28	..	..	85	76	..
	S	..	−	+	..	..	+	..	..	−	−	..
	B	..	+	+	..	..	−	..	..	−	−	..
16	F	..	60	38	..	..	48	..	..	20	16	..
	T	..	80	52	..	..	64	..	..	60	30	..
	S	..	−	+	..	..	+	..	..	+	−	..
	B	..	−	+	..	..	+	..	..	−	−	..
Arithmetic mean of free HCl					37·6			38				
Standard error of mean					6·2			5·6				

B.—FAILED

No.	Fasting and initial samples				Time relationship of samples to announcement of results: Minutes before 15	10	5	Minutes after 5	10	15	Final samples	
17	F	..	0	0	22	..	..	0	..	..	0	0
	T	..	8	8	40	..	..	25	..	..	20	15
	S	..	−	−	+	..	..	−	..	..	−	−
	B	..	−	−	−	..	..	+	..	..	−	−
18	F	..	..	35	34	..	..	50	..	..	50	28
	T	..	..	52	44	..	..	65	..	..	65	48
	S	..	..	+	+	..	..	+	..	..	−	−
	B	..	..	−	+	..	..	+	..	..	+	+
19	F	..	32	48	..	−	..	..	22	..	22	36
	T	..	50	68	..	20	..	..	37	..	42	55
	S	..	−	+	..	+	..	..	−	..	−	−
	B	..	−	−	..	−	..	..	−	..	−	−
20	F	..	30	32	..	42	..	..	37	..	25	..
	T	..	50	55	..	62	..	..	58	..	40	..
	S	..	−	+	..	+	..	..	−	..	−	..
	B	..	+	+	..	−	..	..	−	..	−	..

F, free HCl; T, total acidity; S, starch; B, bile.

exceptions (Hoelzel 1942), many workers support the idea that stress causes reduced secretion and delayed emptying. Wolf and Wolff (1942), in their observations on "Tom," and Wolff and Mittelman (1942), in further observations on cases of gastritis, duodenitis, and peptic ulcer, distinguish between anxiety associated with hostility, resentment, or aggression, which causes hyperfunction of the stomach, and anxiety associated with depression, which causes hypofunction. They note the parallel between gastric secretion and salivary secretion. The mouth dries up with fear, but people spit with rage.



Graph showing mean free HCl of 16 students who passed and 4 who failed in their examinations. Shaded area gives range of mean ±2 S.E. in the 16 who passed; black line gives mean of 4 who failed; vertical line gives time of announcement of examination results.

Hinds Howell (1941) found that test-meal curves during air-raids were so irregular as to be useless, but unfortunately details were not published. Since no unselected samples could be found in the literature, it occurred to one of us to do fractional test-meals on students awaiting the results of the M.B. examination, to give the results after the first hour and to follow the curves for a further hour to see if passing or failing had any influence. Twenty students volunteered, of whom sixteen passed and four failed. The technique used was to draw off as much of the fasting secretion as possible and then to give a gruel meal. All the subjects either went without lunch or had an early light carbohydrate meal. The tubes were passed between 4 and 4.30 P.M., samples were removed at 20-min. intervals, and the examination results were announced at 5.15 P.M.

The accompanying table and figure show the exact time relationship of the samples to the announcement of the results. There is no evidence of hypersecretion and no significant departure from expectation. It might be argued that the tension was not great enough. We do not believe this is valid, as during the first hour there was a definite tense atmosphere in the room, and it was deliberately increased by sending messengers out to inquire if all the results were yet ready, and by consulting sheets of foolscap. Possibly a larger sample might pick out the occasional abnormal case, but evaluation would then be difficult.

SUMMARY

Fractional test-meal curves on twenty normal medical students for an hour preceding and an hour following the declaration of examination results showed no abnormality which could be ascribed to anxiety, depression, or elation.

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In England Now

A Running Commentary by Peripatetic Correspondents

ONE of your correspondents has urged a more careful estimate of the results of surgery by following up the later histories of patients. Then your leading article of August 17 has drawn attention to the grisly state of some of the chronic sick, as discovered by a survey undertaken by the Institute of Almoners, and among these "chronic sick" were men and women dying of carcinoma in varying degrees of misery. The surgery of carcinoma has to some extent already been checked by follow-up, and judging by the number of forms now filled in about these patients the follow-up will be more accurate and detailed and more widespread than heretofore. I have however an uneasy feeling that the form of the accepted carcinoma follow-up leads to surgery which often adds to the unhappiness of our patients instead of alleviating it.

The accepted criterion of success in the treatment of carcinoma is the survival of the patient for an arbitrary period of years. Whether the patient is happy and comfortable or in misery and pain is not recorded: his mere existence alive is regarded as proof of success. Because "survival" is an unpleasant word, hinting that life may be present but not necessarily very enjoyable, it is not used in this connexion; the fallacious but comforting word "cure" is used in its place. A surgeon will blithely record in public the results of his treatment of carcinomatous patients as a three, four, or five year "cure," lumping together the remainder as "recurrences" and therefore failures. Yet the end of a patient with a recurrence may be a good deal pleasanter than that of a patient "cured." The comfort of the patient has become obscured by the attempt to eradicate a disease, an attempt based on pathology and checked by statistics, both of which ignore the happiness of the sufferer who dies in a different institution from that which treats him at first. The introduction of beds for the chronic sick and dying in the same building where primary treatment is undertaken will go some way to humanising the statistics: till then it might be a good idea to record the results of the treatment of carcinoma as "alive," "with or without recurrence," "comfortable or miserable."

* * *

Almost certainly I qualify by residence and occupation to write as a practitioner in a Medically Overcrowded Area (M.O.A.). There is in London one indubitable M.O.A., the one near Cavendish Square; but in present controversy it does not seem to count, and a substantial park and famous wood separate mine from it. Mine is not what it was. There are many more people to the house and perhaps fewer doctors to the street than there were, but I know of six G.P.s and as many dentists within 200 yards of me—there may be more; houses are not thick on the ground so the proportion must be fairly high; and besides we have been "spoken of," mentioned in the same breath with such hotbeds as Bournemouth.

And that brings me to the point. It is time, I think, that someone in one of these strange places spoke up, for nowhere does experience more belie repute; and repute so readily assumes the voice of authority. The whole country now knows our reputed habits. "Wheresoever the carcass is there shall the vultures be gathered together" puts them in a nutshell. Spying from afar the congregation of the wealthy we buy ourselves into a practice on borrowed thousands and have then no choice but to get our money back by prostituting our science and art. Well may we yearn for a Charter of Liberty to deliver us from this bondage! Well may the country's awakening social conscience move it to arise and cleanse the Augean stable! And if Augean stables have parasites, and parasites have socks, well may they be compelled to pull them up and do a bit of honest work elsewhere!

So much for repute. Now for experience. Twenty-five years ago your present peripatetic—no, the third person is impossible. Once upon a time I, being young, eager, married and offspringing, but slightly mellowed by over four years of war, looked about for somewhere to live. We had sampled the M.O.A. as a living-place and

liked it. It was a fit place for bringing up a family, not too far from our own parents and from my hospital job, and there was a house going reasonably cheap. There were shoals of doctors about, so one more could matter little to them; and just possibly I should make a living.

We bought the house. We let the top half to friends and I put a plate on the door. I never sat there like a hungry spider twitching the threads of the web. I went out and did jobs—paid and unpaid, hospital, welfare-centre, pensions-board, and the like—and slowly friendly doctors put me in the way of making a practice. Some of the friendly ones were consultants a few years my senior living in or near the M.O.A. and needing a "real doctor" for their children; others were "real doctors" themselves, living farther off. The patients were almost always immigrants—almost never from that day to this the ex-patients of a local fellow-vulture. They were very often interesting and pleasant people, very seldom rich.

The fellow-vultures, after surveying the new bird for a suitable time, actually invited it to join the Vulturine Society—a very friendly gesture when you think what predatory brutes they must really be. "The Vulturine" meets monthly in the winter season in the actual eyries of its members. The eyries turn out to be quite ordinary nests, the hen-vultures who receive us seem quiet, domesticated fowls enough; and where are the tell-tale fragments of bone, fur, or feather that should reveal to a quick eye the horrid hidden sources of their daily meat? How inconspicuous are our host's beak and talons! One might almost believe that even he—and if one almost did one would be right because of course (to quit fooling) neither he nor the other members of the "Vulturine" are any more predatory than I am myself. They are decent ordinary practising doctors, not perhaps without certain qualities of mind and outlook which have drawn them to practise in the M.O.A., but quite obviously neither parasites, charlatans, go-getters, nor prostitutors of their art and science.

* * *

When I die I shall leave an annual prize to the graduate who can give the most bizarre reason for taking up medicine. I might have been a pretty good starter myself. The week before I began at college I filled in a curriculum form for some distance before I discovered that it wasn't the one for arts after all. Somewhere in the college files there is a curriculum form for medicine (1939–40) with a teeny tear at one edge to show how far I got before it struck me that it might be a better stunt after all; whereafter I went straight to a second-hand book shop and bought a textbook of pathology by Lazarus-Barlow (1902 edition) for 1*s.* 6*d.* and read it!

The closest rival in my year would be the anatomy medallist, who, during his school years, saw a woman have hysterics in the street when a forearm and head were thrown at her from the upper floors of the medical school. This incident greatly impressed on him the power of the healers over the laity and fired him with the ambition to emulate this feat. Runner-up would be the old sea captain who had been left a substantial legacy on condition that he embarked on the study of medicine. Since the legacy was to stop when he qualified, the old boy spun out his course to 14 years until he accidentally gave three right answers running in his finals and was passed. By the time he had decided to get himself struck off the Register to be able to start again, he found himself enjoying a country practice so much that he bought it with the savings from his legacy instead.

Lest any of you should be tempted to overwork your imaginations, I might add that I am still in my twenties and that the prize, in any case, will be quite worthless.

* * *

"Typhoid Outbreak in Scotland: An Ice-cream 'Carrier'?" says the *Manchester Guardian*. If an ice-cream carrier is a person who harbours ice-cream in his body without manifest symptoms (as Dorland's *Dictionary* would lead one to suppose) most of the children in our part of London must come in that category just now, for the Strand is only second to Southend-on-Sea in the number of ice-cream sellers per sq. inch.

Public Health

THE WORLD HEALTH ORGANISATION AND ITS INTERIM COMMISSION

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THE work of the International Health Conference in New York [1] can now be reviewed in the light of the documents signed at its conclusion. These documents consist of (1) the constitution of the World Health Organisation, (2) an Arrangement establishing an interim commission, (3) a protocol concerning the International Office of Public Health, Paris, and (4) the final act of the conference. All four were signed by almost all the representatives of the 51 member-states of the United Nations and the 10 non-member representatives attending as observers; but the first and third were in most cases signed subject to ratification.

CONSTITUTION

The constitution, after an impressive preamble, defines the objective of the World Health Organisation as "the attainment by all peoples of the highest possible level of health." The first of the organisation's functions is to "act as the directing and coördinating authority on international health work." Among the twenty-one other functions are strengthening health services; furnishing necessary aid in emergencies; providing health services to special groups, such as trust territories; establishing epidemiological and statistical services; proposing conventions and regulations; promoting maternal and child health, mental health, research, technical training, and health propaganda; adopting international standards for biological, pharmaceutical, and food products, and for diagnostic procedures, public health practices, the nomenclature of diseases, and causes of death; and promoting the improvement of nutrition and environmental hygiene. Services will be rendered only at the request of governments, and coöperation with other agencies in the various fields is enjoined. The scope is thus even wider than that of the Health Organisation of the League of Nations, the Paris Office, and the Health Division of UNRRA combined, though obviously all these functions will not be taken up from the beginning. Already alarm has been expressed at the proposal to standardise diagnostic procedures, but it seems that all that is intended is the standardisation of laboratory techniques, such as that of the serodiagnosis of syphilis, formerly pursued by the League of Nations.

Membership is open to all States. A simple majority vote of the World Health Assembly will admit any State not accepting membership by signing the constitution as a member or observer at the International World Conference (Spain, Germany, and Japan were the only States not invited to the conference). Colonies or other territories not responsible for their international relations may become associate members on application by the "mother" country; their representatives "should be chosen from the native population"—a clause which may lead to embarrassment—and their rights and obligations will be determined later.

DIVISION OF DUTIES

The work will be carried out by the World Health Assembly, an executive board, and a secretariat. Member-states will be represented in the assembly by not more than three delegates, with alternates and advisors; delegates "should be chosen from among persons most qualified by their technical competence in the field of

1. See *Lancet*, 1946, i, 970; ii, 58, 99, 142.

health, preferably representing their national health administrations." The assembly will meet annually and in special session and determine its own place of meeting in advance. Among its functions is the authority to adopt conventions or agreements by a two-thirds vote; members undertake to accept such conventions within eighteen months or furnish reasons for non-adoption. The assembly may also adopt regulations on quarantine requirements and standardisation of nomenclatures, diagnostic procedures, and biological and pharmaceutical products (including their labelling and advertising); and such regulations will come into force at a given date unless specifically rejected by members. These are new and important powers, designed to ensure uniformity and obviate delay experienced in the past, but they may excite opposition if too much is attempted too quickly.

The executive board is to consist of 18 persons designated by 18 delegates elected by the assembly, holding office for three years and eligible for re-election. The board will meet at least twice a year, act as the executive organ of the assembly, and take emergency measures. The director-general, who is nominated by the board and appointed by the assembly, has direct access to government departments and nominates his own staff, the conditions of whose appointment are to conform to those of other United Nations organisations.

The location of the headquarters is to be decided by the assembly, and it seems likely that it will be in Europe. Regional committees and offices may be set up. As soon as possible the Pan-American Sanitary Bureau is to be integrated—whatever that may mean—with the World Health Organisation, by mutual consent. Annual, epidemiological, and other reports are to be made by member-states to the World Health Organisation. The constitution, which may be amended by a two-thirds majority of the assembly, enters into force when 26 members of the United Nations have become parties to it: it is hoped that this number will be reached before June, 1947, when the first assembly is expected to meet.

INTERIM COMMISSION

The Arrangement provides for the immediate establishment of an Interim Commission of 18 persons designated by that number of States. Its duties are to convoke the first session of the World Health Assembly within six months of the constitution coming into force; to provide, for the agenda of the meeting, proposals on programmes and budget, the location of headquarters, regional areas, and staff regulations; to prepare an agreement with the United Nations; to take over the functions of the Health Organisation of the League, the Paris Office, and the Health Division of UNRRA relating to the international sanitary conventions; to negotiate with the Pan-American Sanitary Bureau and other international organisations; to prepare for a revision of the sanitary conventions and the lists of causes of death; to establish liaison with the commission on narcotic drugs and other commissions of the Economic and Social Council; and to consider any urgent health problem brought to its attention by governments. The Interim Commission is to derive its funds from a loan by the United Nations, and governments may make advances to it against their future contributions to the World Health Organisation.

The commission[2] met in New York immediately after election by the International Health Conference and elected Dr. Stampar (Yugoslavia) as chairman and Dr. B. Chisholm, late deputy Minister of Health of Canada, as executive secretary; it also set up committees on administration and finance, epidemiology and quarantine, and relations with other bodies. It is understood that its next meeting, which must be held within four months, will be in Geneva early in November.

Finally, in the protocol, the signatories agreed, as between themselves, to hand over the duties of the Paris Office to the Interim Commission or the World Health Organisation on the entry into force of the protocol; and, if the Paris Office has not been dissolved by mutual consent before Nov. 15, 1949, to denounce at that time the Rome Agreement of 1907, thus finally terminating the Office. The protocol comes into force when 20 governments which were signatories of the Rome Agreement have become parties to it.

We may conclude that the United Nations have made a good start in the field of health and that unification is at least—and at last—in sight. The many tedious hours spent by the delegates in the hot-house atmosphere of New York have not been wasted.

2. Mr. Tange (Australia), Dr. Paula Souza (Brazil), Dr. Routley (Canada), Dr. Sze (China), Dr. Shousha Pasha (Egypt), Dr. Leclainche (France), Dr. Lakshmanan (India), Dr. Togba (Liberia), Dr. Mondragon (Mexico), Dr. van den Berg (Netherlands), Dr. Sandberg (Norway), Dr. Paz Soldan (Peru), Dr. Medved (Ukrainian Soviet Socialist Republic), Dr. Krotkov (Union of Soviet Socialist Republics), Dr. Melville Mackenzie (United Kingdom), Dr. Parran (United States of America), Dr. Guzman (Venezuela), Dr. Stampar (Yugoslavia).

Paratyphoid at Coatbridge

On August 22 a case of enteric fever was admitted to the burgh infectious diseases hospital, Coatbridge, Lanarkshire. Next day 3 more cases were admitted. All were bacteriologically confirmed as paratyphoid B fever. All had consumed ice-cream from a common source. On August 24 the manufacture and the sale of the ice-cream was stopped, and local practitioners were informed of the outbreak. A bacteriological investigation revealed that an employee who made and sold the ice-cream was excreting *Bact. paratyphosum B* in his stools. It was not possible to determine the total quantity of ice-cream likely to have been infected, but it is estimated that at least 1500 cones and wafers were sold on one day. The ice-cream was hawked within a certain area of the town, and the cases are confined to that area. The total number of cases up to August 30 was 74, the majority being in children.

Infectious Disease in England and Wales

WEEK ENDED AUGUST 24

Notifications.—Smallpox, 0; scarlet fever, 665; whooping-cough, 2058; diphtheria, 285; paratyphoid, 66; typhoid, 36; measles (excluding rubella), 2140; pneumonia (primary or influenzal), 299; cerebrospinal fever, 39; poliomyelitis, 30; polio-encephalitis, 1; encephalitis lethargica, 2; dysentery, 52; puerperal pyrexia, 138; ophthalmia neonatorum, 82. No case of cholera, plague, or typhus was notified during the week.

Deaths.—In 126 great towns there were no deaths from scarlet fever, 1 (0) from enteric fever, 2 (0) from measles, 8 (0) from whooping-cough, 3 (0) from diphtheria, 29 (2) from diarrhœa and enteritis under two years, and 7 (2) from influenza. The figures in parentheses are those for London itself.

Birmingham reported the death from an enteric fever.

The number of stillbirths notified during the week was 242 (corresponding to a rate of 28 per thousand total births), including 30 in London.

"... There was another occasion during the [Hot Springs] Conference when the delegates of the other nations appeared to be deeply impressed by the clear indication of the trend of thought on food and nutrition in Great Britain. It was when an account was given of the war-time food policy we have implemented here and of the various measures we have adopted to distribute foods according to nutritional needs. After this meeting Professor André Mayer, the distinguished French physiologist, took me by the arm as we walked along one of the long corridors and said in his characteristically charming manner, 'M. Drummond, Vous Anglais, vous faites toujours les révolutions avec tant d'élégance!'"—Sir JACK DRUMMOND, F.R.S., speaking at the Royal Institution on June 2.

Letters to the Editor

TREATMENT OF MENINGITIS

SIR,—There is much truth in Dr. Wilfrid Gaisford's remarks (August 17) against intrathecal penicillin and in favour of intensive systemic therapy in "non-traumatic meningitis." But his statement is an over-simplification of the therapeutic problem, since he does not draw any distinction between (1) the various bacterial forms of purulent meningitis, and (2) the different extent of penetration of the blood-brain barrier by serum, sulphonamides, and penicillin in the presence of acute meningitis. Neither of these factors can be ignored in the treatment of meningitis.

Recent pronouncements appear to have given rise to a widespread impression that intrathecal penicillin must at once be given whenever spinal puncture reveals a turbid fluid. "Treatment by penicillin is indicated for all meningococcal cases," we are told.[1] The "introduction at once of intrathecal penicillin if the lumbar tap is turbid" is recommended in addition to sulphonamides and systemic penicillin.[2] Surely the problem has got a bit out of focus! Is it already forgotten that prompt and adequate sulphonamide therapy is rapidly curative in about 95% of meningococcal cases? Is there any evidence so far that the cure of these can be hastened by penicillin? I do not think so, nor have I any reason to believe that any considerable part of the other 5% can be saved by penicillin either.

Since the meningococcal form is the most common form of bacterial meningitis, the recommendation for intrathecal penicillin on discovery of a turbid lumbar tap results in much unnecessary intrathecal injection. In the great bulk of such cases doubtless no harm will come of it, but unless the technique is invariably meticulous, which is a practical impossibility, the potential danger is by no means negligible. It is not only that the impurities of penicillin are irritating to the meninges and may even be non-sterile, but the introduction of grave extraneous infection—e.g., *Streptococcus viridans*, coliforms, or *Pseudomonas pyocyanea*—is more common than is generally realised.

In pneumococcal meningitis the balance of evidence at present appears to be in favour of intrathecal and systemic penicillin as well as large doses of sulphonamides. But the evidence for intrathecal penicillin is not so strong as to justify a rush to it without prior examination of a smear from the spinal fluid.

When staphylococcus meningitis is suspected, intensive therapy by all routes may be justified without delay, but this is a rare condition and there is usually some clinical guide to the diagnosis.

It was a great relief, a few years ago, to get rid of the trauma and risks associated with routine intrathecal injections in the treatment of meningitis. Before we return to them let us consider well whether any real advantage is to be gained.

London, S.E.13. H. STANLEY BANKS.

SIR,—In his letter of August 17 (p. 253) Dr. Gaisford condemns—in no mild terms—the use of intrathecal injections of penicillin for nontraumatic meningitis. He states that meningitis is a systemic disease and intensive systemic therapy is the best form of treatment. I think most people a short while ago would have been in complete agreement with him; the reason for the "retrograde step in therapy" is surely that patients went downhill steadily and even died when treated on the lines so ably advocated. The observant medical attendants then retraced their steps and tried intrathecal medication, with the result that those patients not beyond recall recovered.

There is a theoretical obstacle to systemic treatment; though not merely banausic it is often referred to as the "blood-brain barrier," and though merely a theoretical obstacle for many of the sulphonamides (as Dr. Gaisford argues with effect) it is a very real handicap when the large molecule of penicillin has to be taken into account.

Epping, Essex. FRANK MARSH.

1. Penicillin, London, 1946, p. 273.
2. *Ibid*, p. 276.

WATER-SUPPLIES

SIR,—In the *Times* of August 10 I read that the Cumberland County Council has been reviewing the present and potential supplies of water to the county. Presumably that fortunate county of lakes and mountains has water enough available for all time.

But should not some authority at the highest level be actively inquiring into the available water of the whole country in view of widespread housing schemes which will entail the provision of large new water-supplies in town and country alike? As regards the country, cottagers in village or scattered country districts draw their moderate water-supply from shallow wells (except when these run dry) in quantities limited by habit, by the labour of working buckets and windlass or pump, and by what their well may yield at a given time. If all these cottagers and all the new ones promised are to have water by pipe and taps (hot and cold), baths and bathrooms, and water-flushed sanitation, an enormous quantity of new water will be needed. Where is it to be found? Having knowledge of country life, I estimate very roughly that a cottage family at present supplied by a draw-well would, if afforded the "amenities" proposed for baths, w.c.s, and kitchen taps, soon come to use 10, 15, or 20 times the volume of water previously used in daily life. A single lavatory flush runs off two gallons. The total will amount to very large figures.

I am not enough of a geologist to know whether or where this water can be found, but I read with apprehension from time to time of falling rivers and failing streams whose dwindling flow is attributed to heavy pumping from new deep wells for water undertakings or industry. And it is well known that the water level over the clay of the London basin, for example, has similarly been a good deal lowered in recent years.

Will it not be necessary to take very far-reaching steps to conserve vastly more of the water that falls from the skies, if we wish to use so much more? The question may become one of urgency. Very few of us even conserve the rain that falls on our houses. And from streets, roads, land drainage ditches, and the like we run it off to the sea as fast as we can.

The Cumberland County Council had a comparatively simple problem to deal with: but is it not clear that we need a general survey of the present and potential water-supplies of the whole country?

Upavon, Wilts. E. W. AINLEY-WALKER.

NON-SPECIFIC EPIDIDYMITIS IN INDUSTRY

SIR,—The recent articles and correspondence on non-specific epididymo-orchitis (*Lancet*, 1946, i, 775, 779, 834, 870) raise questions of interest to industrial medicine.

It is not uncommon in my experience to see workmen who develop mild epididymal pain after exertion. The history is usually that, while lifting, pain is experienced over one spermatic cord, and shortly afterwards in the testicle on the same side. As the pain does not quickly settle the workman soon reports to the works' surgery. On examination the epididymis is slightly swollen and tender and there is a tenderness of the vas. In one case, the body of the testicle was also slightly enlarged and tender, and in yet another case the symptoms and signs were bilateral. Examination of the urethra and a centrifuged deposit of the urine reveals no abnormality. A supporting bandage usually relieves these patients, the symptoms disappearing in a few days. In two cases, however, the question of workmen's compensation has arisen, owing to the loss of a few days' working time. In all the cases seen, the symptoms have been mild, and the principal anxiety of the patient has been over the possibility of hernia. No signs of this have been discovered.

Apart from these cases, where no obvious urinary infection exists and where the symptoms are mild, I have seen two severe cases of unilateral epididymo-orchitis. These also had, as a precipitating cause, exertion or sudden effort. One had a history of gonorrhœa six months previously, while the other case had flakes in the urine, which contained a fair number of pus cells but no organisms on direct examination.

The questions, both of urinary infection and exertion (given as a precipitating cause), have obvious bearings on these cases in industry. The possibility of bias,

induced by workmen's compensation, in the history of industrial cases, would be absent in those cases noted after physical training or "strain" in the Services. Slesinger [1] noted these cases in Service personnel and postulated the theory of a reflux of urine down the vas during effort. However that may be, it may be important that the rôle of muscular exertion in causation be more precisely defined in, at any rate, some of the cases.

Oxford. G. WHITWELL.

THE SISTER-TECHNICIAN

SIR,—With regard to the article on Democratic Nursing in the issue of July 6, we feel it very necessary to protest strongly against one of Mr. Cohen's suggestions. This is that married sisters working in health centres should have a short training in the duties of a laboratory technician. If sisters trained in this way are responsible for the routine investigations the standard of the laboratories in the health centres will not be a high one, for the work of a technician is highly specialised and is only acquired by many years of experience. In the opinion of this committee, the laboratories should be staffed with trained technicians to obtain a satisfactory standard of work. PHYLLIS LANGAN PLUMBRIDGE
Secretary of the Committee.

London General Medical Branch, Association of Scientific Workers.

VARIATION IN THE FEMALE PELVIS

SIR,—In connexion with the article by Dr. C. Nicholson and Mr. H. Sandeman Allen (August 10), I should like to comment on a few variations in the female pelvis which we observed in the X-ray department of Shrodells Hospital, Watford. The patients here are probably representative of the London suburban population and belong to all social strata, being referred for pelvimetric analysis by private practitioners, obstetric specialists, antenatal clinics, and maternity homes in the neighbourhood.

A striking feature is the comparative rarity of the typical android pelvis, as described by Caldwell and Moloy, with all its associated features—the acute angle of the forepelvis, the short anterior transverse diameter, the long and narrow sacro-sciatic notch, the short posterior sagittal diameter, the deep symphysis pubis, the narrow subpubic angle, the wide and straight sacrum, and the deep true pelvis. The incidence of pelves showing at least a few of these characteristics was not more than 6–7% of the total of 1200 pelves examined. In a follow-up of the subsequent course of delivery we found a surprisingly high need for interference and assistance in this type. While the total need for interference in all cases delivered at home by practitioners and in nursing homes or hospitals was around 11%, the pelves with android tendencies required assistance in 62%.

To determine an android hind-pelvis we use a much lower figure for the sagittal index than that given by Nicholson and Allen for their scutiform type. We do not consider the arbitrary figure of 30 for the upper level of the index as really indicative of a short post-sagittal diameter if the index for the whole series of 307 cases is not higher than 35·6. The figure which we stipulate as the upper level for the index denoting a narrow android hind-pelvis is 25. We feel that the inclusion of pelves with indices above this figure would lead to very slight variations of the round type being considered among the android group. This would lead to erroneous conclusions if an assessment of the course of labour in relation to pelvic type is attempted.

Table VI of Nicholson and Allen, which gives the mathematical basis for their conclusion that pelvic type has no influence on the course of labour, shows however—be it statistically significant or not—that the scutiform pelvis required assistance in 46·5% of all pelves of this type, while the narrow (anthropoid) only required interference in 32·3%, the flat in 37·5%, and the round in 38·7% in all cases of their respective types. I am convinced that if a lower sagittal index were applied to separate the scutiform group from the rest, and thus all near-gynæcoid pelves be excluded, then the percentage assistance rate in the first group would rise considerably.

1. Slesinger, E. G. *Proc. R. Soc. Med.* **36**, 323.

The correlation coefficient between the sagittal index and the ischial spine distance is very near the limit of being statistically significant and would suggest that with a low sagittal index occasionally an interspinous narrowing could be expected, as is actually the case in the funnelling of the true android type.

I do not think that any decisive conclusions can be derived from consideration of the course of delivery in about 30 cases of the scutiform type. This type embodies only one feature of the android pelvis, and the quantitative limits for inclusion in this type are drawn too widely. From a radiological point of view I do not feel it justifiable to diagnose an android pelvis from the comparative relationship of two segments of one longitudinal diameter in the inlet plane alone, as was done in the case of the scutiform pelvis. I firmly believe that consideration of all the other characteristics at different levels of the pelvic cavity is at least as important, if not more so, and enables one to arrive at a usable prediction about the probable course of labour. If typical android features are present in various parts of the pelvic canal a prolonged and difficult labour is to be expected in the majority of cases in which only the slightest disproportion coexists.

Pinner. J. RABINOWITCH.

"CURARINE"

SIR,—Some confusion has arisen in the nomenclature of alkaloids from curare which it is important to resolve in view of the renewed interest shown in curarising drugs.

The word curarine was applied by Boehm in 1897 to an amorphous alkaloid which he isolated from gourd (calabash) curare. From tube-curare he isolated a chemically different amorphous alkaloid which he called tubocurarine, and King in 1935 described the isolation and chemical structure of a highly active crystalline alkaloid from tube-curare which he regarded as the crystalline form of Boehm's preparation and applied the name *d*-tubocurarine chloride to it. Dutcher has recently isolated the same *d*-tubocurarine chloride from native curare prepared from *Chondrodendron tomentosum*.

Ranyard West, whose work on the treatment of spastic rigidity, Parkinsonism, and tetanus with curarising drugs in 1932–36 and subsequent years aroused so much interest, worked at first with crude native curares. Later he used an amorphous alkaloid called "curarine" which King prepared from *Strychnos toxifera*, a liane known to be used in the preparation of calabash curare in British Guiana. West ran into the difficulty that cases of bronchospasm often occurred during treatment and has rightly emphasised this danger. Recently, however, reports have been published in this country of nearly 2000 cases of anæsthesia in which a preparation supplied by Messrs. Burroughs Wellcome & Co., as "curarine chloride" has been used without any cases of bronchospasm occurring. The discrepancy between this series and Ranyard West's reports is due to the fact that the drugs used were different; the Wellcome "curarine chloride" is crystalline *d*-tubocurarine chloride derived from tube-curare.

Messrs. Burroughs Wellcome & Co., in naming their preparation "curarine chloride," were actuated by a desire to avoid a polysyllabic name. The term curarine would be better dropped entirely, leaving new alkaloids of this class to carry their appropriate adjectival prefixes, which Messrs. Burroughs Wellcome & Co. now propose to do.

Wellcome Physiological Research Laboratories, Beckonham, Kent. J. TREVAN.

AID TO DEFÆCATION

SIR,—Your correspondent, C. W. B. (August 10), advises rubbing the lower back in order to secure an easy defæcation. This is indeed a treatment of value, but it is only successful in suitable cases.

In every great cattle-market you will find wise farmers testing the alimentary canal of a cow or steer they wish to buy by scratching the sacral area of its spine with their walking-stick. This commonly produces an evacuation, and from this excrement the experienced old farmer decides on whether to bid or to abstain.

This method is, however, of less efficacy in the case of horses, and is practically valueless in the case of constipated dogs. The nerve stimulus acting upon the

nerves of the intestinal muscles produces an immediate reaction when the contents of the intestine are comparatively liquid; the nerves of the skeletal muscles, which are called into play in the case of hard fæces, are not affected. Cows therefore readily react, but the habitually constipated human must not expect such a result unless he regularly takes a daily meal of foods like boiled beetroot, grated raw carrot, grated raw turnip, or cabbage.

The same mechanism comes into operation when a hay rake is applied to the sacral spine of a lazy bull; in this way the muscles of the vas deferens are stimulated, but not the skeletal muscles themselves.

London, W.1. JOSIAH OLDFIELD.

SIR,—Your correspondent may be interested to know that this manœuvre was described in my *Treatment of Some Chronic and Incurable Diseases* (Bristol, 1937, p. 106), a second edition of which is in the press:

"A wave of colon peristalsis can often be encouraged by auto-massage of the muscles just above the left posterior superior iliac spine. With the fingers of the left hand close together, a circular clockwise pressure is made over an area about the size of half a crown, the skin being fixed under the fingers. This can be practised in the lavatory, if a motion just fails to come."

Incidentally this spot is one to which the descending colon sends out messages of discomfort or disease, when it will be found to be very sensitive.

I learned of this trick twenty years ago from a patient from tropical South America who had been taught the method by a native doctor with a hereditary "degree" only.

Bristol. A. T. TODD.

CIRCULATION IN THE KIDNEY

SIR,—The report by Dr. Trueta and his colleagues recalls four renal cases which I investigated radiologically at a Service hospital in India.

The men were all referred for routine intravenous pyelography, and each showed absence of function on one side. The first two showed normal function on both sides when the examination was repeated after about 48 hours. In neither case was there evidence of calculus formation or other abnormality.

The unilateral cessation of function prior to the first examination was thought to be due to restriction of fluids combined with excessive sweating in the hot climate. It was, however, difficult to understand why this was complete rather than only partial and why it was unilateral. Nevertheless, when further cases with unilateral absence of function were found in which there was no other abnormality, the examination was again repeated within 48 hours, following a more liberal intake of fluids; and two then showed restoration of normal function on both sides. There was no evidence of calculus formation on the original films in either case, and the minor calices, when visualised at the second examination, were normal.

In the light of Dr. Trueta's paper, I am inclined to think that these 4 cases were examples of the device whereby the cortex of a kidney is excluded from the renal circulation, consequent upon diminished blood-volume; in other words, the altered function was simply the result of diminished fluid intake in otherwise normal subjects in a hot climate.

Withington, Manchester. BRIAN DONNELLY.

THE LONDON COLLEGE OF OSTEOPATHY

SIR,—Mr. W. E. Tucker (July 27, p. 145) entirely discredits the theory of osteopathy, while accepting many of the manipulative procedures introduced to England by the osteopaths. His grounds for discrediting the theory are the findings of a select committee of the House of Lords. However august such a body may be, it is hardly one which should be chosen to investigate, clinically and theoretically, a form of therapy.

It is only too patent that while orthopædic surgeons and physiotherapists have adopted some manipulative methods, in large part these have been badly learned. The College sets out to teach qualified medical practitioners all that is best in osteopathy as taught and practised in America. W. HARGRAVE-WILSON

London College of Osteopathy. Sub-Dean.

SMALLPOX AND VACCINATION

SIR,—Dr. Boul and Dr. Corfield (August 24, p. 284) are to be congratulated on the success with which the outbreak of smallpox in Essex in the early part of this year was controlled and a major epidemic prevented. This is one more illustration of the efficacy of modern measures for combating smallpox if efficiently carried out, and it supports the view that smallpox, especially the major variety, is, of all the epidemic diseases known in this country, one of the most amenable to control.

This does not mean that all the measures adopted by them were of equal value. Some no doubt would call in question the value and advisability of the mass vaccination campaign. We are told that 15,000 persons were vaccinated in five days, but we are not told the total number for the whole of the campaign. It is to be noted that Dr. Boul and Dr. Corfield make no claim that the mass vaccination campaign played any material part in bringing the outbreak so satisfactorily to a close, and in this I think they are wise. Results have sometimes been claimed for mass vaccination campaigns when there was no real evidence to justify the claim. It is a debatable point whether a mass vaccination campaign, involving the vaccination of many thousands of persons, with all the suffering from "bad arms"—not to mention more serious results—which such a measure necessarily entails, is ever really called for until it is certain that other and less drastic measures have failed. In addition to the injury to health there is all the public scare and upset which such campaigns inevitably engender. This would matter less if there was any guarantee that a mass vaccination campaign would cut short an outbreak, but even with the most energetic campaign there will always be plenty of people left unprotected to carry on the outbreak.

In the outbreak of smallpox in the neighbouring county of Middlesex, reported in the *British Medical Journal* for August 10, 1946, equally satisfactory results were obtained without any recourse to mass vaccination of the general population.

Other points in the article by Dr. Boul and Dr. Corfield calling for comment are:

1. Of the 4 fatal cases, 2 were vaccinated and each had four marks; so even "efficient" vaccination is no guarantee against death from smallpox if too long an interval has elapsed. In one of the cases the interval was only 27 years. Of the 2 fatal cases which were unvaccinated one (R. Pe.), a contact, might have escaped death had he not foolishly refused vaccination for five days, when it proved to be too late. It is to be hoped that when compulsory vaccination is repealed hostility to vaccination, which compulsory vaccination undoubtedly engenders, will gradually disappear, and that no close contacts will then refuse vaccination. There is good reason to believe that vaccination during the incubation period, if performed early enough, does mitigate an attack even if it fails to completely protect.

2. One of the cases (Mr. Rd.) was the sanitary inspector who arranged the disinfection of the houses and bedding. He had been vaccinated but never re-vaccinated, and his attack unfortunately proved fatal. Another case was a nurse at the smallpox hospital who had an abortive attack. All members of a public-health staff who may have to fight smallpox—doctors, nurses, sanitary inspectors, &c.—should of course be protected by repeated vaccinations as a matter of routine.

3. I agree with most of their "Conclusions," though I am a little doubtful about no. 3, which deals with the question of "marks." I am inclined to think that length of interval since the last vaccination is of more importance than the number of marks. I would rather make "little and often" my slogan. I admit of course that in the case of the general public frequent vaccination is quite impracticable, but then I regard immunisation of the general population as not the way to protect a community against smallpox. The case of a public-health staff, however, is quite different, and they should be vaccinated every few years. Indeed, it might not be a bad plan to make it an annual event for the whole staff, headed by the medical officer of health. After the first vaccination there would be practically no reaction, so no inconvenience would be caused.

Leicester. C. KILLICK MILLARD.

CHILDREN WHO SPEND TOO LONG IN BED

SIR,—I am not competent to question the accuracy of the rules for sleep that Dr. McCluskie lays down in his article of August 31 (p. 302), though I should like to know how he obtained his results, and whether he is giving average or mean figures: from my own very limited experience of infants and children I should have said that the individual variation covered a far greater range than that of 30 minutes per 24 hours. It would also be interesting to know if a significant proportion of neurotic children have a history of having been kept too long in bed.

I particularly want to emphasise the impossibility of following Dr. McCluskie's rules when there is more than one child in the family. It might be feasible, even for the unassisted mother, who has cooking, shopping, and housework to do, as well as looking after the baby, to arrange her time-table so that an only child could be released from its bed directly its 12 hours at night and its 6 or $2^1/_2$ in the day were up. But when there are two or more children, one perhaps an infant on four-hourly breast-feeds, the difficulty of getting Tommy up after one hour's sleep in the afternoon, of keeping John happy from 7.0 A.M. to 7.0 P.M. without a break, of feeding Mary at 6.0 A.M., 10.0 A.M., 2.0 P.M., 6.0 P.M., and 10.0 P.M. would send most mothers to the psychiatrist on their own account, before their children were so much as threatened with that modern bogyman. Dr. McCluskie should remember that after the children have been put to bed there is still their father's dinner to cook, and if that is to be followed by a round of "pottings" and a 10.0 P.M. breast feed, can we blame the mother who does not rise at 6.0 the next morning to feed the infant and wake and dress the children who have been in bed since 6.30 or 7.0 the previous evening? I should also like to know how Dr. McCluskie deals with the infant who is not old enough to sit or crawl and who, when propped up in a pram with his toys around him and enjoined to stay awake because this is his playtime, proceeds to fall asleep in the most uncomfortable position possible, in spite of having slept 14 hours the previous night and 3 hours that same morning.

I feel strongly on this subject because it seems to me that this is another case of the academic approach being used to a problem that is mainly human and domestic. Too many overworked women are unnecessarily worried if their babies' meals are 15 minutes early or late, though the baby may raise no objections. Don't let us overload their consciences further by threatening them with neurotics or psychopaths for children if they treat themselves to a 7 or 8 hour night or an occasional half hour's rest in the afternoon. The neurotic mother, however rigidly she adheres to a time-table, is not likely to bring up the happiest or even the healthiest children.

London, W.11. CATHERINE STORR.

A SYNDROME SIMULATING ACUTE ABDOMINAL DISEASE

SIR,—The paper by Mr. Goldstone and Dr. Le Marquand in your issue of August 24, in which they describe what they believe to be a new abdominal syndrome occurring in European Servicemen in West Africa, was most interesting to me as their description very closely simulates and indeed may be identical with, a condition which can also occur in West Africans and which I described last year (*J. R. Army med. Cps*, 1945, **84**, 201).

Briefly, among 230 cases of infective hepatitis in Nigerian troops seen over a period of two years, there were 7 cases which were so striking clinically, and so closely resembled each other, that I called the group "the acute abdominal syndrome" and emphasised that their importance lies in the fact that a surgeon with no experience of such cases might easily feel it his duty to explore the abdomen even in the presence of jaundice.

Could it be that the cases of Mr. Goldstone and Dr. Le Marquand were in fact suffering from latent or subclinical infective hepatitis? Although the urine was tested in each of their cases, in subicteric patients bile-salts are present only intermittently in the urine, and several specimens at intervals should be examined. Or could it be that my cases were suffering from this new syndrome which presumably came on during the course of infective hepatitis? Whatever the answer the clinical similarity of our cases is striking and the prognosis without surgery excellent. In support of your contributors' theory of a staphylococcal origin, and for what it is worth, staphylococcal infection (pyomyositis) is very prevalent among West Africans.

In over a year's service with native Indian troops in India no similar cases were encountered.

Stoncleigh, Surrey. S. ORAM.

ENTERTAINING ALLOWANCE IN THE NAVY

SIR,—The recent Admiralty Fleet Orders (453–457) set out the entertaining allowance for Executive Officers, Royal Marine Officers, Wren Officers, Engineer Officers, and Supply Officers (Paymaster Branch), but no mention is made of the Medical Branch. For many years the Medical Branch have felt that they have a very justifiable grievance in that senior officers have no entertaining allowance and yet are expected to give hospitality to Admiralty visitors and anyone whom Parliament wishes to be entertained at the hospital. During the war years this was a very heavy item and numerous foreign and allied officers were given hospitality on many occasions. It seems that every branch of the Navy is given entertaining allowance except the Medical Branch, and this surely should be put right.

London, W.1. CECIL P. G. WAKELEY.

ADVERTISING PATENT MEDICINES

SIR,—Dr. Thompson's article of August 24 on the advertising of patent medicines in the public press "provided ammunition" in plenty for those who would attack the more unscrupulous methods adopted by the trade; but he did not touch on an aspect of the subject to which our own profession can give immediate remedy—the trading on the gullibility of doctors in the medical press. An all-wise Government now sees to it that only a limited proportion of the morning mail contains literature from the drug firms; but recollections of the bad old days before the recent war teem with pamphlets, all of them persuasive, most of them expensively got up, some of them well-written, but few of them read and almost none of them asked for.

I am well aware of the purpose and importance of this form of literature, and I neither question the wisdom of the drug firms in spending their money and their highly qualified employees' time on its production, nor the usefulness of some of it to the medical practitioner. Nor do I suggest that any of the medical journals should be without their advertisement section, quite apart from the financial side of the question. But when I look through the advertisements composed for the notice of the medical profession it seems to me that some take a great many high sounding words to say very little; others endeavour to blind the humble doctor with science, or pseudoscience; a few are frankly misleading. On the other side of the coin are all the arguments which could be advanced by the advertisers, many of which are readily admitted. The point, however, is this: that doctors are themselves susceptible to the pressure of advertisements, and to the salesmanship, as opposed to the information therein contained, and are liable to accept the over-simplification (of imperfect scientific knowledge) which is designed to sell a product. They thus contribute to the perversion (and consequent increased cost) of advertising, which is usefully employed in bringing genuine innovations to the notice of the profession, but crosses the frontier between ethics and mercenary expediency when it suggests that the opinion of an anonymous authority, or the testimony of some thousands of medical practitioners, which favours a particular product, however elegant, is a scientific fact.

Camberley, Surrey. W. LANE PETTER.

OUR HOUSES

SIR,—Mr. Saward (August 24) is quite right. Of course every house should have two W.C.s, *and* with hand-washing basins. But when the waterworks company impose an annual tax of 10*s*. on each "extra" W.C., as they do here, people have to put up with minimum essentials. Blame the waterworks, not the general public

Bristol. ARTHUR T. SPOOR.

APPEAL FOR MEDICAL AND NURSING JOURNALS

SIR,—Reports and requests from UNRRA missions in Europe make it abundantly clear that the greatest expressed need of doctors in the liberated countries is for medical literature covering the war years, so that they may bring themselves up to date with advances in unoccupied countries.

From time to time appeals for medical literature for individual countries have appeared in the medical press, and the British Council, the Ministry of Information, the Royal Society of Medicine with its microfilm scheme, and other bodies have done something to cope with the problem, but, as a whole, the needs of Europe have hardly begun to be met.

Even if UNRRA could spend its now scanty funds on medical re-education—which it is authorised to do only in the limited sense of informing doctors how to use drugs and other medical supplies supplied by UNRRA with which they may be unfamiliar—a special difficulty arises in the case of British medical and nursing literature on account of the paper shortage.

I am, therefore, appealing for complete sets of general and specialist medical and nursing journals covering approximately the war years. They should be sent to Dr. H. Hadaway, Room 1934, Health Division, UNRRA, 19, Portland Place, London, W.1 (Telephone: Langham 3090/341), and carriage will be repaid if requested. If it is felt that the sets cannot be given free of charge, a price should be stated before the sets are forwarded to us and we will try to obtain authority for their purchase. A particular request which we have so far been unable to meet is for a complete set of THE LANCET (1939 to 1945 inclusive) for Hungary.

London, W.1. NEVILLE M. GOODMAN.

PHYSIOLOGY OF CONVALESCENCE

SIR,—I am sure your leading article of August 10 was not meant to imply that convalescence is merely a matter of protein administration. Nevertheless this may be an opportune moment to draw attention to other factors influencing convalescence—namely, the patient's personality and emotional state, and his relationship with his doctor.

Every surgeon is at times confronted by the case where "things will go wrong" despite irreproachable technique before, during, and after operation. In patients who seem to be of equally good physical type the course of convalescence after the same operation may differ enormously. I suspect that it does not entirely depend on postoperative feeding, and I wonder how much attention was paid to emotional factors in the experiments you describe. A surgeon with an indifferent technique (there are some such about) may present some surprisingly good end-results. I am led to believe that personality as well as protein, character as well as calories, play their part. Convalescence being a process of psychic healing as well as tissue healing, it is worthy of study by the psychiatrist as well as the biochemist.

Convalescence on the whole is better conducted by the family doctor, who is more likely to understand the mental make-up and requirements of his patient. Even the specialist surgeon who attaches as much importance to pre- and post-operative care as he does to operative technique (no longer a rara avis) is as likely as any other—perhaps indeed more likely—to disregard his patient's personality. Moreover not all surgeons are equally suitable for all patients; and just as, with free selection, a patient gets the practitioner he deserves, he should also have the surgeon whose personality best fits his own. The family doctor's choice of surgeon is or should be influenced by the surgeon's personality as well as his ability with a scalpel.

To a patient HIS operation is a major event in his life—a milestone if not a tombstone, a turning-point, ominous and fraught with danger. It may come as a climax to a series of mounting fears, or as a devastating bolt from the blue; in any case the trauma is psychic as well as physical. Even after the operation, fears for the future may remain; often a modification or radical change in his life is necessary. These considerations need skilled help, and his convalescence will be influenced accordingly.

Certain operations, moreover, have a special significance to the patient. The loss of the uterus or a breast in the female, prostatectomy or removal of a testicle in the male are examples of mutilating operations, with particular effects on the psyche. In considering cancer, the patient's fear necessitates regard for personality as well as postoperative prognosis. Psychic preparation, suggestion, reassurance, and explanation are as necessary as the choice of pre-anæsthetic or the Fowler position. Here the psychiatrist may well be able to show the influence of personality and reaction-type as well as of neuroses and anxiety patterns in determining success.

Is it too much to hope that the nurse should help more constructively in these problems? At present, and through no fault of her own, her conversation consists of useless if not harmful platitudes, interspersed with blood-curdling reminiscences. Were she brought more into the picture as an intelligent assistant to the team her constant presence might be used to the mental as well as physical benefit of the patient.

Convalescence depends in its final analysis upon the total personality of the individual, and upon his mental and physical make-up, and their reactions to trauma. These should not be neglected in any study of convalescent problems.

London, W.1. S. CHARLES LEWSEN.

DESOXYCORTONE AND ARTHRITIS

SIR,—Dr. Harrison will always be in trouble with his statistics until he cultivates the habit of defining his symbols carefully. His recent calculation (*Lancet*, August 10) differs from mine not because either of us is incapable of arithmetic but because the P which he calculates represents among other things the probability of a number of dead rats not developing arthritis. Such a probability is naturally much higher than my estimate based on the behaviour of live rats.

My prolusion was purposely vague to spare Dr. Harrison's feelings. But now he tells us that he has the support of a member of the Institute of Statistical Analysis at Oxford. I trust for the good name of Oxford statistics that I may assume that this adviser never read the paper of Selye (1944) on which the arguments are based. Serious discussion is difficult, because the logic is almost entirely that of Lewis Carroll rather than of Dodgson. This mysterious P, the meaning of which is always changing, is calculated to two places of decimals suggesting accuracy; but it is a matter of arithmetical convenience how it is calculated and the answer depends on the method. This is the sort of thing which Alice found so trying and which made her head go round.

The use made of P is just as startling as the methods of calculating it. Statistics do not prove a hypothesis directly; but if good experimental design reduces possible alternative explanations to two or three, statistical methods may show that all except one are improbable. Dr. Harrison has to choose between Selye's hypothesis that adrenalectomy and thyroidectomy facilitate the production of desoxycortone arthritis and his own hypothesis that their effect is negligible. There is no question of Selye's hypothesis being improbable. It is Dr. Harrison's which is on the borderline of being eliminated. P stands for the maximum probability of Dr. Harrison being right, and his argument can fairly be summarised by saying that he considers that he has afforded statistical proof of his rightness if he can show that the odds against himself are less than 20 : 1; whereas Selye is wrong unless the odds are 20 : 1 in favour. No doubt we shall hear from Dr. Harrison that this is a "perfectly valid statistical procedure" and an orthodox application of the nul hypothesis, or another of those numerous phrases with which specialties exert their tyranny. If so, Selye is truly in an unfortunate position. He never attempted to justify his statement statistically but relied on quantitative as well as qualitative differences and on control series represented by a succession of papers in previous years. He also gave a number of subsidiary arguments which led up to his experiments. All these points are unrepresented in the contingency tables which are said to summarise his evidence. In addition, the number of controls in the contingency tables is so small that it is virtually impossible for Dr. Harrison's requirements to be fulfilled.

I must apologise to Dr. Harrison for the Pickwickian vigour of this onslaught. The point at issue is quite important. In medicine, we are always being bullied by the expert behind the scenes who threatens us with

specialised profundities. If he really collaborated and his name appeared at the head of an article, it would not matter because he could be attacked by fellow experts. Dr. Harrison's paper is typical of hundreds of others. His experimental work is excellent. The arithmetic of his statistical adviser is beyond reproach. But there is no logical cohesion between the two. He and his adviser have unwittingly misled each other. Neither is to blame. The fault lies in our cultural legacy of science split up into water-tight compartments. What is true of statistics is equally true of radiology, histology, clinical laboratory reports, &c. I want to plead for more whole-hearted collaboration. Experts must not lose touch with general medicine, and general medicine must learn from experts.

Royal Society of Medicine. DENYS JENNINGS.

SPLANCHNIC BLOCK FOR ANURIA

SIR,—Your leading article of August 17 on the recent work of Trueta and his colleagues [1] refers to the need for further trial of splanchnic block in anuria. The interesting and attractive explanation of oliguria made possible by their observations lends belief to the probable benefit from splanchnic block. Nevertheless, caution is needed in interpreting a diuresis which may follow this method of treatment.

In the last two years, we have had 4 cases of severe oliguria after abortion, all treated conservatively without hypertonic solutions, splanchnic block, or decapsulation, and all had a spontaneous diuresis and recovered. Detailed biochemical studies were made, and are being reported elsewhere. If splanchnic block had been done towards the climax of their desperate illness, doubtless it would have been given the credit for their recovery.

CASE 1.—Single, aged 31. Abortion at 16th week, followed by 10 days oliguria with secretion of only 262 c.cm. urine. Blood-urea rose to 550 mg. per 100 c.cm. Excellent diuresis then occurred, and complete recovery. Well two years later.

CASE 2.—Single, aged 37. Abortion at 16th week, followed by 14 days severe oliguria with a total secretion of 2360 c.cm. urine. Blood-urea rose to 350 mg. per 100 c.cm. Good diuresis then began and blood-urea returned to normal. Well 22 months later.

CASE 3.—Married, aged 24. Two children. Incomplete septic abortion at 16th week. Oliguria persisted for 13 days, and during this time she passed only 1350 c.cm. urine. Like the previous cases, she was extremely ill with vomiting and hiccough, and she became œdematous. Blood-urea rose to 400 mg. and the serum potassium to 42·5 mg. per 100 c.cm. The heart became completely irregular and the electrocardiogram showed very large T-waves and absent P-waves. Spontaneous diuresis then occurred, and, although colpotomy was necessary for pelvic abscess, she made a satisfactory recovery, and was well three months later.

CASE 4.—Single, aged 31. Admitted on account of blood-stained vomitus, but found to have an incomplete abortion. She had been losing for a week. The next five days a moderately severe oliguria was noted. Blood-urea rose to 365 mg. per 100 c.cm. A diuresis then began, and her blood chemistry returned to normal within two weeks. She was quite well 18 months later.

As far as could be determined, these cases were not due to incompatible blood-transfusion, sulphonamide therapy, or abortifacients. They may have begun as a reflex vascular spasm with cortical ischæmia, and possibly progressed to thrombosis and cortical necrosis.

In the obstetrical wards there has also been one fatal case of anuria from cortical necrosis of the kidneys in a girl of 16 admitted at term with severe accidental concealed hæmorrhage. She was delivered of a stillborn child and developed anuria and died on the third day. A splanchnic block with amethocaine hydrochloride was given on the second day, and repeated on the third day, but without any effect.

About 1500 deliveries and 400 abortions are admitted annually at this hospital. In view of our experience it is surprising that only 19 cases of acute renal failure after abortion, and only a total of 52 associated with pregnancy, have so far been published.[2]

M. A. M. BIGBY.
F. AVERY JONES.
J. MACVINE.
Central Middlesex County Hospital, London, N.W.10.

1. Trueta, J., Barclay, A. E., Daniel, P., Franklin, K. J., Pritchard, M. M. L. *Lancet*, August 17, p. 237.
2. O'Sullivan, J. V., Spitzer, W. *J. Obstet. Gynæc.* 1946, **53**, 158.

Obituary

ARTHUR TUDOR EDWARDS

M.A., M.D., M.CHIR. CAMB., F.R.C.S.

Mr. A. Tudor Edwards, who died suddenly at St. Enodoc's, Cornwall, on August 25, won a world reputation by his advancement of thoracic surgery.

Born in 1890, Arthur Tudor Edwards was educated at Mill Hill School, at Cambridge University, and at the Middlesex Hospital where he was awarded the senior Broderip and university scholarships. From the first it was clear that his bent was surgery. At the Middlesex he worked under the late Sir John Bland-Sutton and Mr. (now Sir) Gordon Gordon-Taylor; the surgery of mangled limbs he learned from the mechanical genius of Meurice Sinclair; and he gained a wide experience of traumatic and general surgery during the first world war, in which he served as a major with a casualty clearing station. After demobilisation he acquired an aptitude for treating the aftermath of operations on the gastro-intestinal tract that must have been the envy of his colleagues. The years of waiting were ended by his appointment to the Westminster Hospital and the Brompton Hospital. His way was not easy; the attitude to thoracic surgery was at that time one of cautious, and indeed justified, reserve which was to be overcome only by proof that major procedures could be undertaken with safety. In his successes with the surgical treatment of bronchiectasis, bronchial and œsophageal carcinoma, and pulmonary tuberculosis, Tudor Edwards provided that proof; and to the Brompton he attracted visitors of all nations, eager to learn his methods.

Coster

His reputation was established through his pioneer work in developing techniques which helped to advance thoracic surgery from the occasional reluctant, and always precarious, intervention to the status of an acknowledged specialty ranking with abdominal and other accepted branches of surgery. But he had further claims to recognition: he was a great operator and a teacher of distinction. Those that saw the easy grace of his technique in the difficult procedures that had previously defeated others realised that he was in the front rank of great operators; his associates were perhaps most impressed by the courage and foresight with which he embarked on difficult cases, and by his sound clinical judgment. Really great success in major surgery comes not to the lone worker but to the man who can organise and inspire his colleagues, assistants, and nurses to form one harmonious unit, and in this again he set a great example.

"My first meeting with Tudor Edwards," writes G. M., "was in the early nineteen-twenties, when I sought his help on behalf of a patient with bronchial carcinoma. That first contact made an impression which is still clear; for even at that time he showed the characteristics which were to make him a leader and a pattern for the younger men in his specialty, both in this country and abroad. His manner was grave and courteous, he paid careful attention to my notes of history and clinical findings, to the reports of bronchoscopist and pathologist—and then he crosschecked them all! Essential data must be verified if he did not know and trust those who had recorded them. We were not offended, for it was clear that his one object was the safety of the patient, and this he ensured by every resource he could command. Nothing second-rate would do. He was an outstanding organiser of team-work. Surgeon, physician, radiologist, pathologist, anæsthetist, physiotherapist, nursing staff, surgical assistant—all knew what was expected of them and gave of their best. The patient also was made fully aware of the nature of the

operation planned, of its risks, and of any disabilities it would entail. His full coöperation was obtained in a carefully planned course of preoperative and post-operative treatment. Tudor Edwards, or "Tudor" to his friends, could act with the utmost decision and despatch; but action was quiet and seemingly unhurried. His manner in the operating theatre was typical of the man—decisive, but gentle and considerate. I never heard him speak impatiently or unkindly to those who were assisting him."

His published work gives some idea of his vast experience in the last twenty-five years. Thus his last important paper, in the first number of *Thorax*, contains an analysis of over a thousand cases of bronchial carcinoma, in 70% of which he had performed either pneumonectomy or lobectomy. He was the first surgeon in this country to perform with success lobectomy by dissection; and he had already had many successes with tourniquet lobectomy before its general introduction in 1931. He was the first surgeon in this country to perform a pneumonectomy; and he was among the first—if not actually the first—to report successful resection of the carcinomatous œsophagus. He is also known for his fundamental contributions to the treatment of empyema.

In 1936 the London Hospital invited him to organise a department of thoracic surgery, and he resigned from the Westminster Hospital to concentrate on his specialty. As consultant thoracic surgeon to the L.C.C. he was responsible for founding the successful unit at St. Mary Abbot's Hospital. He was also surgeon to King Edward VII Sanatorium, Midhurst, and was attached to Queen Alexandra's Hospital, Millbank. The strain of these many activities, along with that of a busy consultant practice, inevitably took its toll. In 1938 he had a severe illness, but made a good recovery. In the autumn of 1939, however, he again fell ill. Even this did not deter him from once more throwing all his energies into work during the second war. He was obliged to limit his operating, but, as consultant adviser to the Ministry of Health, took an active part in the founding of centres for the reception of thoracic casualties throughout Great Britain; these have proved so valuable that it is difficult to see how they can be dissolved. As civilian consultant to the R.A.F. he founded a special centre; he was also consultant thoracic surgeon to the War Office, and served on many committees. In 1939 he was awarded the honorary degree of M.D. by Grenoble University, and in 1943 was appointed to the council of the Royal College of Surgeons. He was a past president of the Association of Thoracic Surgeons, and was recently elected first president of the Association for the Study of Diseases of the Chest, which owes its origin largely to his inspiration and enthusiasm. Only this year the degree of M.D. was conferred on him, honoris causa, by the University of Oslo, which, during his last illness, sent him a gold ring. He is survived by his widow.

G. G.-T. writes: "Those who have been reckoned great in surgery must of necessity be supremely skilled in the craftsmanship of our profession; they must by the initiation of some novel and successful system of treatment or by the operative invasion of territories hitherto unconquered have conferred untold blessing on mankind; their work must have illumined the dark, mysterious chasms in our knowledge of disease; but they must also have trained and inspired a band of surgical acolytes. Tudor fulfilled these criteria right well; his operating theatre became a Mecca not only for thoracic surgeons but for general surgeons from all over the world." "Sincerity and directness of purpose," adds a colleague, "were unmistakable in his character, and one feels that he would ask no greater memorial than the realisation of how much the chest surgery of today owes to his efforts."

Surgeon Commander W. T. GWYNNE-JONES, R.N., was one of the five occupants, all of whom lost their lives, when a Royal Naval Air Ambulance crashed on Mickeldore Crags, near Scafell, while carrying a patient from Abbotsinch naval air station to Warrington. Commander Gwynne-Jones, who was 54 years of age, qualified at the London Hospital in 1915.

HARRIE LESLIE HUGO SCHÜTZE

M.B. MELB., M.D. WÜRZBURG

Dr. Harrie Schütze, who died at Berne, in Switzerland, on August 9, was born in Melbourne in 1882, the son of a German father and an English mother. Educated at Brackley and Cumloden, he graduated M.B. at the University of Melbourne in 1905. Continuing his medical education he took his M.D. at Würzburg two years later and became assistant in the Institute of Hygiene in that city. In 1912 he was elected to a Beit fellowship and in the following year he was appointed to the staff of the Lister Institute of Preventive Medicine in the bacteriological department, where he remained throughout his professional life. For many years towards the end of his service Schütze was in charge of the vaccine department of the Institute, a position for which his natural bent, training, and experience well fitted him.

One of his colleagues writes: "A competent bacteriologist and a careful, thorough, and conscientious investigator, he was so critical of his own work that his results, though obtained in somewhat specialised fields, stand today as he left them. His early work, largely of an orientating character, stressed the importance and reality of the different members of the salmonella group of organisms and brought order into a field which was becoming confused. Later he showed the importance of the envelope of the plague bacillus in the antigenicity of the vaccines made from it, and he also demonstrated the essential differences between those otherwise closely related micro-organisms, *Pasteurella pestis* and *Past. pseudotuberculosis*.

"In 1913 Schütze married Henrietta Leslie, the novelist and playwright. They shared common interests in art, music, literature, and travel, and, apart from the war when they lived at Radlett, they entertained their friends, in a style and manner not soon to be forgotten, in their charming house in Chelsea. Of a quiet, studious, and retiring disposition, with a pleasant subdued voice and a cultured, courteous manner, Schütze's feelings often moved him more deeply than appeared on the surface; his concern for the persecuted and dispossessed scholars of Europe was real, as were his efforts to relieve their distress."

OTTO MAY

M.A., M.D. CAMB., F.R.C.P.

Dr. Otto May, chairman of the British Social Hygiene Council, died on August 15. As a former principal medical officer of the Prudential Assurance Company he held an established position in the insurance world, but his brilliant academic career was unknown even to many of his friends, while his modesty and concern with at one time unpopular medico-sociological problems obscured his professional ability and attractive personality. Born in 1879, the second son of the late William May, he was educated privately. Entering St. John's College, Cambridge, with a foundation scholarship he took a first in both parts of the natural sciences tripos, and after holding a demonstratorship in physiology at Cambridge completed his medical education at University College Hospital. He qualified in 1907 and was awarded the Atchison scholarship and the Liston medal. After spending a year in house-appointments at U.C.H., he became in 1908 medical registrar at the Middlesex Hospital, and the following year physician to outpatients at the Evelina Hospital for Children. To this period, while he held a B.M.A. research scholarship and a Beit fellowship, belong his papers on sensory disturbances of heart disease, the mechanism of cardiac pain, and posterior root section for the treatment of spasticity.

When he joined the Prudential Assurance Company in 1912 he thus brought to his new work a background of clinical experience and scientific training which quickly won recognition. He served the Assurance Medical Society as secretary for many years, and in 1926 in his presidential address, assessing the progress of life-assurance medicine, he urged doctors to provide the actuaries with data on which to base more accurate assessments of mortality. Dr. May also discussed in our columns tuberculosis in relation to life assurance and the value of periodical medical examinations. He was an honorary member of the Association of Life Assurance Medical Directors of America.

"Perhaps May's many gifts," writes D. C. N., "were displayed to the best advantage during the international congress on Life Assurance Medicine in 1938, when he acted as chairman of the organising committee. His many live contacts with colleagues abroad and his familiarity with their languages and special work and interests, were invaluable in selecting speakers and arranging the programme. His quiet humour and never-failing courtesy went far to ensure the smooth working of committees under his chairmanship. He always had a smile and a kindly word for the younger men trying to find their feet in this rather perplexing no-man's-land between the worlds of scientific medicine and of shrewd business, and he combined most happily the wisdom and caution of long experience of the effects of morbid conditions on life expectation with an alert interest in modern methods of research and treatment."

Of his work for the British Social Hygiene Council Sir Drummond Shiels writes: "In the first world war, May lent his full energies to Mrs. Neville Rolfe and to the organisation she founded (afterwards the British Social Hygiene Council) in the fight against the taboos and prejudices—inside and outside the profession—which hindered effective measures for the prevention and treatment of the venereal diseases. Thereafter, in writings and in speech, and often with little official support, he continued his work for the council in the long years between the two wars, and at his death he was chairman of its executive committee. He also rendered substantial service to the Central Council for Health Education, when that body assumed responsibility for V.D. propaganda. He lived not only to see the venereal diseases take their appropriate place among medical problems, but also to be cheered by new and promising treatments. He had a very happy family life and was always prepared to fight against forces or conditions which prevented happy family life for others. During the late war he returned to duty from his retirement and led a team in long and strenuous days of medical examination of recruits for the Services. In his quiet but effective way he did something for public health and for human happiness which his friends will remember with pride and gratitude."

Dr. May married Miss G. Mabel Rose and they had two sons.

Births, Marriages, and Deaths

BIRTHS

BAGSHAW.—On Aug. 29, in Liverpool, the wife of Mr. H. Bernard Bagshaw, F.R.C.S.E.—twin daughter and son.

BINKS.—On Aug. 26, at Oldham, Dr. Margaret Binks (née Jackson), the wife of Dr. Paul Binks—a son.

BROWN.—On Aug. 21, the wife of Dr. John Brown, of Bedlington—a son.

FRANKLIN.—On Sept. 1, at Edgware, the wife of Dr. C. B. Franklin—a son.

HURMAN.—On Aug. 26, in London, the wife of Dr. J. Esmond Hurman, R.A.F.V.R.—a son.

MACDONALD.—On Aug. 29, at Stanwix, Carlisle, the wife of Dr. Ian Macdonald—a son.

MACLAINE.—On Aug. 26, at Retford, the wife of Wing-Commander F. V. Maclaine, M.B., R.A.F.—a son.

MCLAUGHLIN.—On July 19, in Dublin, the wife of Lieut.-Colonel F. E. McLaughlin, I.M.S.—a daughter.

ROGERSON.—On Aug. 30, at Whitchurch, Shropshire, Dr. Evelyn Rogerson, wife of Dr. Gerard Rogerson—a daughter.

ROSENBERG.—On Aug. 24, at Worthing, the wife of Dr. Henry Rosenberg—a daughter.

SCUDAMORE.—On Aug. 26, at Macclesfield, the wife of Flight-Lieutenant T. O. Scudamore, M.B.—a son.

SOLLEY.—On Aug. 25, in London, the wife of Dr. Rupert Solley—a son.

TEARE.—On Aug. 28, the wife of Dr. Douglas Teare, of Midhurst—a son.

WALKER.—On Aug. 30, at Kingston, the wife of Dr. G. D. Walker—a son.

WALSH.—On Aug. 29, at Milton, Suffolk, the wife of Dr. Rodney Walsh—a daughter.

YOUNG.—On Aug. 24, at Nottingham, the wife of Dr. J. Horton Young—a daughter.

MARRIAGES

CARLILE—BRYANT.—On Aug. 28, at Henbury, Bristol, Edward Wilson Carlile, B.D., to Elizabeth Bryant, M.B.

COOPER—COX.—On Aug. 22, at Watford, Keith E. Cooper, M.B., to Eileen Mary Cox.

DRURY—BELDAM.—On Aug. 24, in London, Roger Anderson Brownsword Drury, B.M., to Gillian Beldam.

PUXON—WEDDELL.—On Aug. 29, at Colchester, François Edward Mortimer Puxon to Margaret Weddell, M.R.C.O.G.

DEATHS

MITCHELL.—On Aug. 26, at Ambleside, Thomas Houghton Mitchell, M.D. Durh., aged 83.

Notes and News

THE DENTIST'S INCOME

THE Minister of Health and the Secretary of State for Scotland have appointed a committee of nine members, including four dentists, under the chairmanship of Sir Will Spens, to recommend "what ought to be the range of total professional income of a registered dental practitioner in any publicly organised service of general dental practice." The Minister has further written to Sir Will Spens stressing that the terms of reference do not bind the committee to base their recommendations on what dentists have earned in the past, but make it clear that the committee should state what in their view the remuneration of dentists should be if the proper social and economic status of general dental practice is to be maintained in the future, and if the profession is to attract suitable recruits.

TREATMENT OF RECURRENT HERPES

RECURRENT herpes is seldom a serious disease, but it causes discomfort and disfigurement for days at a time and as such may be a lifelong burden. The treatment consists in finding a satisfactory local application. Dr. Arthur Whitfield writes: "The application of a drying powder, which is the usual treatment, has, I think, very little effect; and ointment simply increases the sensation of heat and often leads to suppuration. Attacks are generally preceded by premonitory sensations of burning and itching. I found that tar solutions applied at this stage help to abort the attack; and, after several experiments, I settled finally on a water-soluble varnish, 'Pellanthum,' to which is added 10% of liquor picis carbonis, made up by Messrs. Handford and Dawson, Harrogate. This can be carried about and easily smeared over the affected area, the resulting film being almost invisible. There is no evidence that the treatment removes the tendency to relapse, but it does at least ease the lot of those that suffer from this tiresome disease."

University of Cambridge

Dr. M. Hynes has been appointed reader in medicine, from Oct. 1 next. Dr. C. L. G. Pratt has been appointed university lecturer in mammalian physiology, and Dr. G. P. McCullagh, university lecturer in pathology. Mr. A. L. Hodgkin, M.A., has been appointed temporary university lecturer in physiology, and Dr. H. Butler temporary university demonstrator in anatomy.

University of London

As already announced, the title of professor of clinical pathology in the university has been conferred on Dr. R. J. V. Pulvertaft, in respect of the post held by him at Westminster Hospital medical school.

Dr. Pulvertaft is 49. After leaving Westminster School he served from 1915 to 1919 in the Royal Sussex Regiment, being seconded to the Royal Flying Corps and R.A.F. as observer (Palestine) and pilot (B.E.F.). At the end of the war he went up to Trinity College, Cambridge, where he had won a scholarship in classics, and after taking the second part of the natural sciences tripos, in physiology, he went to St. Thomas's Hospital as a university scholar. Having qualified in 1923 he became assistant bacteriologist in the venereal diseases department and was pathologist to the medical and surgical units from 1923 to 1932, holding a Plimmer research fellowship for part of this time. In 1932 he was appointed director of the J. B. Carlill laboratories at Westminster Hospital, and reader in pathology in the University of London. He became M.R.C.P. in 1927, M.D. in 1933, and F.R.C.P. in 1938. During the late war he served in the Army, chiefly in Egypt and Palestine, and was for a time assistant director of pathology, Middle East Forces. In 1944 he was appointed O.B.E. His original observations have been largely concerned with the behaviour of streptococcal and other infections; before the war he made a special study of aerosol disinfection, and of late he has worked on penicillin. He was for several years editor of *Discovery*.

As already announced, the title of professor of physiology has been conferred on Mr. W. R. Spurrell, F.R.C.S., in respect of the post now held by him at Guy's Hospital medical school.

Mr. Spurrell graduated B.SC. Lond., with first-class honours in physiology, in 1921. He studied medicine at Guy's Hospital, qualifying M.R.C.S. in 1924, and M.B. Lond., with gold medal and distinction in surgery and pathology, in 1925. The following year he graduated M.S., and passed his final examination for the F.R.C.S. At Guy's Hospital he held appointments as outpatients officer, house-surgeon, demonstrator in anatomy and physiology, and surgical registrar; he was also awarded the Parsons research fellowship. Subsequently, in the University of Leeds, he was research assistant in the department of experimental pathology from 1928 to 1930, and was demonstrator in physiology before taking up his present appointment at Guy's Hospital. He is the author of numerous articles, and has taken a special interest in the physiology of the alimentary tract.

Society of Apothecaries of London

At a court of assistants held on August 20 with Dr. H. F. Powell, the master, in the chair, Dr. C. T. Parsons was elected master for the ensuing year, and Dr. J. P. Hedley and Prof. E. C. Dodds, F.R.S., wardens. Professor Dodds was appointed representative at the British-Swiss Medical Congress at Bâle, and Sir Cecil Wakeley on the governing body of the British Postgraduate Medical School and the proposed British Postgraduate Medical Federation.

It was unanimously resolved to award the society's gold medal in therapeutics for 1946 to Sir Alexander Fleming, F.R.S., and Sir Howard Florey, F.R.S., in recognition of their discovery of penicillin.

The following were admitted to the freedom of the society :

By Redemption : Richard Clitherow, M.P. ; B. J. Frankenberg ; Lord Amulree ; A. J. Rook ; C. W. F. McKean.
By Servitude : G. M. Woodwark.

The following were appointed examiners : pathology, R. W. Scarff ; midwifery (deputy examiner), Anthony Charles ; chemistry, Phyllis Sanderson. The following diplomas were granted :

D.I.H.—A. Anderson ; K. Biden-Steele ; M. P. Fitzsimons ; O. G. Bennett ; G. F. Keatinge.

L.M.S.S.A.—F. W. Flight ; D. Rivers ; C. M. M. Severn ; P. R. Needham ; I. T. Holloway ; A. Macarthur ; F. Deutscher ; D. A. Bailey ; H. Walker ; G. Steinberg ; R. Cartledge ; W. F. Belsham ; J. M. Jones ; C. C. Gibbons ; R. N. H. Vann ; R. M. Michelmore ; R. M. Jenkins ; E. J. Rich ; A. Culiner ; J. L. Struan-Marshall ; K. R. W. Miller.

London Hospital

From Oct. 16 to 19 a postgraduate course for former students will be held at the hospital. Those who wish to attend should notify the dean as soon as possible. The annual dinner will take place on Thursday the 17th, at 7.30 P.M., at Claridge's Hotel, Brook Street, London, W.1, when Sir Henry Bashford will be in the chair.

International Conference in London

An international medical conference is to be held at B.M.A. House, Tavistock Square, from Sept. 25 to 27, to consider the promotion of closer ties among the national medical organisations in the different countries. The conference is being convened by the British Medical Association in conjunction with the Association Professionnelle Internationale des Médecins. The languages will be English and French, and an interpreter will be present.

Aslib Conference

Sir Reginald Stradling, F.R.S., president elect of the association, will open the 1946 conference at the Polytechnic, 309, Regent Street, London, W.1, on Saturday, Sept. 14, at 10.30 A.M. Further information may be had from ASLIB office, 52, Bloomsbury Street, W.C.1.

Royal Sanitary Institute

The institute will hold their 1947 Health Congress at Torquay, from June 2 to 6, under the presidency of Earl Fortescue.

London Scientific Film Society

During the coming session, beginning this month, the society will show scientific and documentary films on Sunday afternoons and evenings ; it also hopes to arrange for lectures and the showing of research films on weekdays. Among other proposed activities are the organisation of scientific films for children, the publication of a quarterly journal, and the production of experimental films. Inquiries should be directed to the society at 34, Soho Square, London, W.1.

Merseyside Telephone Bureau

Doctors who have no-one at home to answer their telephones have set up a central bureau in Rodney Street, Liverpool, where urgent messages can be left. They will keep in touch with the bureau while on their rounds and receive any messages which have been sent during their absence. The *Daily Express* (August 27) states that the new service, which is staffed mainly by former medical orderlies and telephonists from the Forces, will cost each doctor £20 a year.

17th London British General Hospital

A reunion dinner of this hospital will be held at Oddenino's Restaurant, Piccadilly, London, W.1, on Oct. 25, 1946. Tickets can be obtained from Dr. C. H. Atkinson, 53 Park Street, W.1 ; Dr. D. Blatchley, 2 Chatsworth Road, W.4 ; Dr. S. P. Rea, 84 Banstead Road, Carshalton, Surrey.

Return to Practice

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

Mr. A. SEYMOUR PHILPS, F.R.C.S., 104, Harley Street, W.1.
Mr. A. H. M. SIDDONS, M.CH., F.R.C.S., 140, Harley Street, W.1.
(As from Sept. 29.)

THIOUREA DERIVATIVES IN THYROTOXICOSIS.—Messrs. Genatosan Ltd. point out that the American series of cases of thyrotoxicosis, quoted in our annotation of August 10 (p. 207) as showing an incidence of agranulocytosis of 0·5%, was treated with thiouracil and not methyl thiouracil. Though methyl thiouracil has been submitted to clinical trial in Great Britain, Denmark, and Switzerland, there appear to be no published reports of agranulocytosis with this drug. According to Astwood and Vanderlaan (*J. clin. Endocrin.* 1945, **5**, 424) propyl thiouracil is even more satisfactory than the methyl and ethyl homologues, and it is now undergoing clinical trial in this country.

Major D. C. BOWIE, O.B.E., F.R.C.S.E., R.A.M.C., has been mentioned in despatches in recognition of gallant and distinguished services in the defence of Hong-Kong in 1941.

Appointments

CAMPBELL, HARRY, M.B. St. And., D.P.H. : deputy M.O.H. and deputy school M.O., Bath.
FISHER, R. E. W., M.B. Belf., D.P.H. : chief M.O., South Metropolitan Gas Co., S.E.15.
FOX, P. J., M.B. N.U.I., D.P.H. : temp. asst. school M.O., Cornwall.
GOULD, Surgeon-Lieut. D. W., M.R.C.S. : M.O., Hong-Kong.
HYDE, W. D., M.B. Edin. : M.O.H., Enfield.
MORTON, WILLIAM, M.D. Glasg. : superintendent, Nottingham City Hospital.

Gloucestershire Royal Infirmary and Eye Institution :
BIRKS, P. M., M.B. Adelaide, F.R.C.S.E. : surgeon and urological surgeon.
EVANS, C. F., F.R.C.S., D.L.O. : asst. surgeon to E.N.T. dept.
HAMILTON, H. A., M.B. Camb., M.R.C.O.G. : gynæcological surgeon.
HUGHES, T. H., M.R.C.S., D.A. : anæsthetist.
HYDE, E. W., M.B. Camb., D.M.R. : radiologist.
JARRETT, R. F., M.B. Camb., M.R.C.P. : physician.
TOM, ARTHUR, M.R.C.S., D.A. : anæsthetist.
WILKIN, W. J., M.B. Camb., F.R.C.S. : surgeon and radium officer.

Kent and Sussex Hospital :
ASHBY, P. T., M.B. Camb., D.A. : anæsthetist.
EASTON, J. H., M.D. Camb., M.R.C.P. : physician.
JACOBY, N. M., M.D. Lond., M.R.C.P. : pædiatrician.
SYMONS, H. M., M.B. Melb., D.O.M.S. : asst. ophthalmic surgeon.

Royal Sheffield Infirmary and Hospital :
DORNAN, ALFORD, M.B. Belf., F.R.C.S. : orthopædic surgeon.
GRAY, J. D., M.B. Sheff., F.R.C.S. : surgeon, E.N.T. dept. (from Nov. 26).
HATHERLEY, EDITH, M.B. Sheff., D.O.M.S. : ophthalmic surgeon.
JORDAN, ARTHUR, M.B. Lond., M.R.C.P. : biochemist.
LODGE, THOMAS, M.B. Sheff., F.F.R. : radiologist.
SNEDDON, I. B., M.B. Sheff., M.R.C.P. : dermatologist.
STUART-HARRIS, C. H., M.D. Lond., F.R.C.P. : physician.
WAYNE, E. J., M.D. Leeds, F.R.C.P. : physician.

Medical Diary

SEPT. 8 TO 14

Monday, 9th

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
3.45 P.M. Prof. R. A. Willis : Invasive Spread of Tumours.
5 P.M. Dr. Michael Kremer : Cerebrospinal Fluid.

LONDON SCHOOL OF HYGIENE, Keppel Street, W.C.1
4 P.M. Dr. Earl Carlson : Cerebral Palsy in Children.

Tuesday, 10th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Prof. R. A. Willis : Metastasis.
5 P.M. Dr. John McMichael : Circulatory Failure.

Wednesday, 11th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Prof. R. A. Willis : Metastatic Growths simulating Primary Ones.
5 P.M. Dr. John McMichael : Circulatory Failure.

UNIVERSITY OF GLASGOW
8 P.M. (Department of Ophthalmology.) Prof. W. J. B. Riddell : Irregular Dominance in Hereditary Nystagmus.

Thursday, 12th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Prof. R. A. Willis : Spontaneous Tumours in Animals.
5 P.M. Dr. R. G. Macfarlane : Hæmostasis.

EDINBURGH POSTGRADUATE LECTURES
4.30 P.M. (Royal Infirmary.) Dr. I. G. W. Hill : Electrocardiogram in Coronary Disease.

Friday, 13th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Prof. R. A. Willis : Experimental Production of Tumours.
5 P.M. Dr. R. G. Macfarlane : Hæmostasis.

PAINFUL FEET
IN PRISONERS-OF-WAR IN THE FAR EAST
REVIEW OF 500 CASES

E. K. CRUICKSHANK
M.B. Aberd.
From the Department of Medicine, University of Aberdeen

THE symptom known as "painful feet," "burning feet," "aching feet," "sore feet," and "happy feet" first appeared among prisoners-of-war in Changi Camp, Singapore, at the end of July, 1942—i.e., five and a half months after their capture. Some of the Malayan doctors present in the camp were already familiar with it, and Landor and Pallister (1935) had described it in inmates of the local jails who were on a diet deficient in vitamin B and had noted that the pain disappeared when green vegetables were added to the diet.

The following account is based on the records of 500 cases personally observed.

SYMPTOMS

Pain of two types was felt in the feet:

(1) *A dull ache* was usually the earliest abnormality and was felt below the heads of the metatarsals and in the balls of the toes. At first it was present only at night after a long day's standing or walking, developing as the patient was trying to sleep. As the days passed, the ache became more pronounced, coming on in the early morning and increasing when the patient retired to bed. It was variously described as aching, burning, or throbbing.

(2) *Sharp stabbing pains* became superimposed on the ache in 58·6% of the 500 cases. A single pain lasted ½–2 sec., shooting, parallel to the toes and soles of the feet, into the heels, through the ankle-joints, and sometimes up the shins to the knees. In 6·4% there were similar symptoms in the hands, but these usually developed only in long-standing cases 4–8 weeks after the onset of symptoms in the feet.

As the condition progressed, the ache or burning sensation became constant, being present all day, getting worse in the evening, when the shooting pains began to appear. Both pains reached their maximum when the patients went to bed, and often prevented sleep, at first for 1–2 hours, but later, in the severe cases, throughout the night. Exercise relieved the pain considerably for a time; so many patients got up and walked around most of the night. Some put their feet in cold water or massaged them, whereas others preferred warmth. All these measures, however, gave very temporary relief; and, as time passed, the patients became worn out, red eyed, and irritable from loss of sleep and constant pain.

At this stage, usually several weeks after the onset, the appetite rapidly became poor in many of the men, and these often showed pronounced lassitude and loss of weight.

Nearly 80% of the patients gave a previous history of a deficiency state of the vitamin-B_2 type—stomatitis, glossitis, scrotitis, or defective vision.

SIGNS

General.—In the early case the general condition was good unless there had been some recent debilitating disease, such as severe dysentery or chronic malaria, common precursors of the syndrome. In the established chronic case there was evidence of rapid loss of weight. The face had a strained worried look, with dark shadows under the eyes, the result of constant pain and lack of sleep. Some patients were nervous and jumpy, particularly at any prospect of having their feet examined.

The incidence of associated deficiency conditions in the 500 cases reviewed when they came under observation was as follows.

Vitamin-B_2 deficiency	
Scrotitis	30·0%
Stomatitis (angular stomatitis, glossitis, lesions of buccal mucosa, palatal erythema)	31·6%
Defective vision (the result of retrobulbar neuropathy)	13·0%
Vitamin-B_1 deficiency (8·0%)	
Œdema	6·2%
Neuritic signs:	
Absent or sluggish reflexes	2·2%
Hypalgesia of legs	1·8%
No associated deficiency disease	42·0%

Diarrhœa was not an associated condition in the cases reviewed, though 36% had a history of one or two attacks of dysentery. Most of the patients were outpatients, only severe cases being admitted to hospital. Cases occurring in hospital patients with some other disease, such as chronic dysentery or malaria, are excluded.

Feet and Legs.—No abnormality of the feet and legs was seen in the great majority of cases. Some feet were red, some pale, some somewhat bluish; but, when the feet of 50 patients with painful feet were compared with those of 50 persons without painful feet, an equal variety of hue was found in the skins of the controls. There was no evidence in the skin of vascular spasm or of trophic changes. Most of the feet were warm, and the dorsalis pedis and posterior tibial arteries were easily palpable. The capillary circulation appeared normal, in that an area blanched by pressure rapidly recovered its colour on release of the pressure. Some patients had deformities of the feet—various degrees of flat-foot and hallux valgus—but the proportion was no higher than in a group of controls. In a few of the severe cases the feet sweated excessively, and, if they were dried, visible beads of sweat again appeared in a few minutes. Some patients in hospital adopted a characteristic attitude in bed. They sat forwards in a half-squatting position, gripping their toes in their hands. They were extremely nervous of having their feet examined and withdrew the foot rapidly if they were lightly touched. Hypersensitivity to pinprick and light touch was present in about 22·2%, but in most of these, if the feet were firmly gripped and handled, there was no complaint of pain. Cramps and muscle spasm were rare, and there was no muscular tenderness.

Nervous System.—Tendon reflexes were exaggerated in 23%, and in most of these cases the reflexes were affected in the arms as well as legs, even when there were no pains in the hands. In these patients the slightest tap with a reflex hammer produced a very brisk response; in some cases 3–10 clonic movements of the ankles (and, in a few, of the patella) were elicited when clonus was tested for. The abdominal reflexes were present in all cases and usually brisk. The plantar responses were usually flexor, but in some cases an equivocal response was repeatedly found; the feet in those cases were extremely sensitive, and pronounced withdrawal was associated with such responses. The exaggerated reflexes developed gradually in the course of the disease, becoming apparent on an average 3–6 weeks from the onset of symptoms, though some cases showed this feature at the first examination. Of the 51 cases which showed hypertension (discussed below) 39 had exaggerated reflexes, and 12 had reflexes within normal limits—i.e., 76% of all cases with hypertension, as compared with 23% of the whole series, showed increased reflexes.

The gait in severe cases was slow and hobbling because of the pain but showed considerable individual variation. In 2·2% the tendon reflexes were absent or very sluggish, and in 1·8% hypalgesia of the feet and legs was found; these were regarded as cases of associated vitamin-B_1 deficiency. No other sensory changes were present.

Cardiovascular System.—In 9 cases there was tachycardia (pulse-rate 90 or more per min. after the patient

RESULTS OF TREATMENT OF 500 CASES OF PAINFUL FEET WITH VITAMIN-B SUPPLEMENTS

No. of cases	Treatment	Approx. content of—			Results of treatment								Remarks
		Vitamin B_1 (µg.)	Riboflavine (mg.)	Nicotinic acid (mg.)	Complete relief		Much improved		Improved		No change or worse		
					No. of cases	Average time	No. of cases	Average time	No. of cases	Average time	No. of cases	Average time	
119	Nicamide 2 c.cm. 5–8 daily i.v. injections	..	..	340	20	During or within a few days of injection	62	During or within a few days of injection	19	During or within a few days of injection	18	..	Mostly outpatients given rice polishings 2 oz. daily after injections (15 relapses within 1–2 weeks)
20	Boiled green gram 8 oz. daily	750–1000	3·3	2	..	..	11	19 days	7	29 days	2	35 days	All severe and long-standing hospital cases
323	Rice polishings 3 oz. daily by mouth	2500	0·25–0·5	20–40	..	..	128	6 weeks	51	6 weeks	144	6 weeks	Mostly outpatients
38	Marmite 1 oz. daily by mouth	233	1·03	33	..	..	21	3 weeks	5	26 days	12	2 weeks	Mostly outpatients

had been lying down for half an hour). Of these, 1 had associated hypertension alone, 3 had hypertension with exaggerated reflexes, 2 had hypertension with absent reflexes, and 3 normal blood-pressures and normal reflexes. None of the cases showed evidence of organic heart disease.

Of 189 cases in which the blood-pressure was recorded, 51 gave readings that were considered hypertensive.* (The upper limit of normality was arbitrarily placed at 130/90 mm. Hg; the average reading for 500 subjects without sore feet over the same period was 121/78.) The average age of the patients with hypertension was 28 years (oldest 42, youngest 21). The average blood-pressure in the hypertensive cases was 142/104 mm. Hg (highest 200/142). The average reading for the other 138 cases in which blood-pressure was recorded was 118/76 mm. Hg.

In all the cases with hypertension the symptoms were severe and of long standing. In this group the feet had been painful for 1–5 months (average $2^1/_2$ months); the average loss of weight, during 6–18 months' imprisonment, was $3^1/_2$ st. (maximum 7 st. 4 lb., minimum 9 lb.); in all cases sleeplessness had lasted more than a month, in some for as long as three months; and in 49 out of the 51 the appetite had been poor for a month.

In 11 of the 51 patients hypertension developed under observation. In the rest it was present when the first blood-pressure reading was taken; these were usually men who had been held on the lines as long as possible and referred to hospital only when they became unfit for duty.

No albumin was found in the urine of any of these cases.

TREATMENT

When the pains in the feet first appeared they were assumed to be a result of a deficiency of vitamin-B complex, in view of the findings of Landor and Pallister (1935).

General.—All the patients were rested as far as possible. Those with milder symptoms were taken off duties which involved standing or walking. Those with more severe symptoms were admitted to hospital and kept in bed, except for bathing and going to the latrines. This was very difficult to enforce, because of the temporary relief obtained from exercise, and the men often slipped out of bed and were found walking round and round the buildings.

Diet.—The patients received the ordinary camp diet, the calculated calorie value and food content of which are shown in fig. 1. Available extra sources of vitamin-B complex were as follows.

Rice polishings.
Green gram (*Phaseolus radiatus*)—one of the pulses.
Extract of green leaves.
Ground-nuts (available in small quantities only).
Soya bean (available only after the major wave had passed).
'Marmite.'
'Nicamide' (B.W. CO.) (nikethamide, the diethylamide of nicotinic acid); 2 c.cm. is equivalent to 340 mg. of nicotinic acid.
Synthetic crystalline vitamin B_1 (in small quantities).

RESULTS

Crystalline Vitamin B_1.—In 6 cases 2 mg. was given daily intravenously for seven days, but no improvement resulted. Owing to very limited supplies and to the occurrence of frank beriberi in the camp no further cases of painful feet were treated by this method.

Nicamide.—In preliminary experiments with this drug it was found that no improvement resulted from administration by mouth. Intramuscular injection produced improvement, but intravenous injection produced the most rapid and satisfactory results. A daily dose of 1·7 c.cm. was given intravenously for 5–10 consecutive days in 119 cases. These were divided into two groups.

(1) In 98 chronic cases (symptoms present for a month or more) results were as follows:

(*a*) 10 patients obtained complete relief, except for occasional aches, for two months. The symptoms gradually disappeared, usually after the fourth or fifth injection. The response did not occur immediately on injection. Nicamide has no immediate peripheral vasodilator effect as has nicotinic acid.

(*b*) 54 patients showed considerable improvement. They were able to sleep, and the sharp shooting pains became occasional or disappeared. Of these cases 12 relapsed within a week of completing the injections in spite of 2 oz. of rice polishings daily. (In groups (*a*) and (*b*), when possible, all patients were given 2 oz. of rice polishings daily for one or two months after the injections.) Of these 12 patients, 5 were as bad as ever, and 7 were partially relieved.

(*c*) 16 patients showed some improvement. The shooting pains became less frequent, and they could get some sleep at night.

(*d*) 18 patients showed no improvement.

(2) In 21 acute cases (treatment instituted within three weeks of onset) results were as follows:

(*a*) 10 patients obtained complete relief except for occasional aches, but 3 of them relapsed ten, seventeen, and twenty-two days after the last injection.

(*b*) 8 patients showed considerable improvement.

(*c*) 3 patients were slightly improved.

To 10 patients, used as controls, 2 c.cm. of sterile water was given intravenously daily for five days—2 said there was slight improvement.

Since the severity of the condition had to be gauged to a considerable extent by the patient's statements,

* Blood-pressure was not recorded in the earlier cases, when the possible association with hypertension had not yet been recognised.

malingering and exaggeration of symptoms were difficult to exclude. Only by careful observation and certain tricks could these be detected, and there is no doubt that some patients made the most of their symptoms to avoid camp fatigues and heavy work.

Green Gram.—In 20 chronic cases 8 oz. of boiled green gram was given daily for various periods. These cases were all relatively severe and of long standing, and were chosen because a considerable amount of weight had been lost. The results were as follows:

(1) In 11 cases there was considerable improvement in an average of nineteen days. Of these, 2 had had five nicamide injections of 1·7 c.cm. intravenously before the green gram, with slight improvement in 1 and none in the other. One further patient, owing to his severe symptoms, was given a course of five nicamide injections while receiving green gram, but with no improvement.

(2) In 7 cases there was some improvement in an average of twenty-nine days. Of these, 1 improved considerably when nicamide was given, and 2 showed no improvement with nicamide.

(3) In 2 cases there was no improvement in an average of thirty-five days. Of these, 1 had had nicamide before the green gram, with no improvement. The other was given nicamide after thirty-one days on green gram and was considerably improved.

Rice Polishings.—In 323 cases 3 oz. of rice polishings was given daily. This dose was chosen because it was the average maximum amount that could be taken by a patient in a day. In many cases a larger dose produced diarrhœa and abdominal discomfort. It was unpleasant material to take; and, since most of the patients received their dosage as outpatients, it was difficult to make sure that the full daily dose was taken; some patients were actually caught trying to dispose of it. This must be taken into consideration in assessing results.

Of the 323 cases treated with rice polishings none was completely relieved; 128 (39·6%) showed considerable improvement after an average of six weeks' treatment, the time varying from two to twelve weeks; 51 (15·8%) showed some improvement in the same average period; 144 (44·6%) were not improved or worse. In the first two groups a few patients relapsed while still on rice polishings.

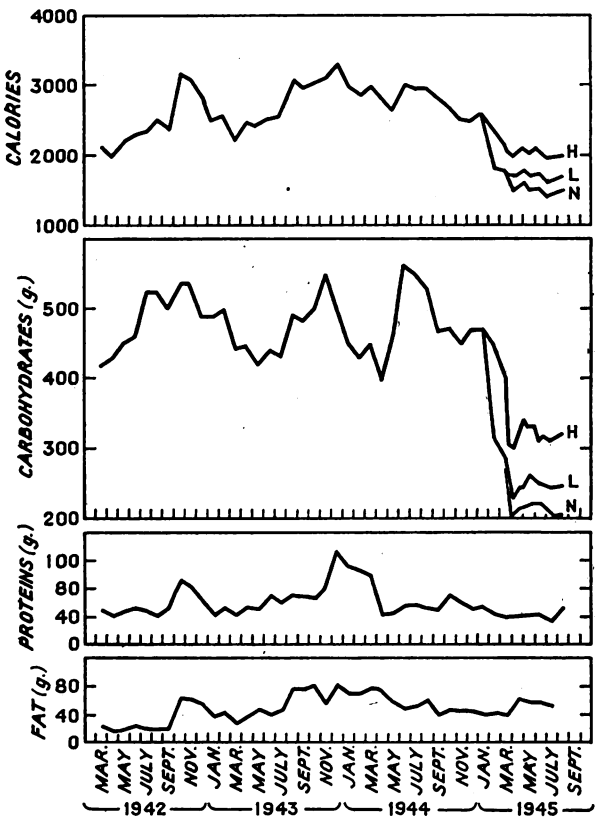

Fig. 1—Calories, carbohydrates, proteins, and fat in daily ration: H, heavy-duty ration; L, light-duty ration; N, no-duty ration.

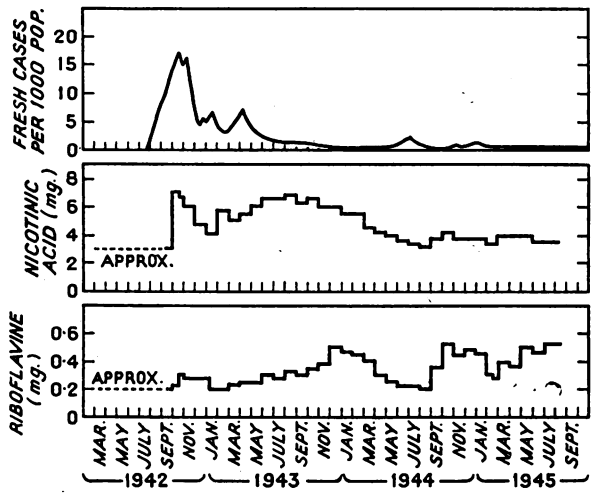

Fig. 2—Incidence of fresh cases of painful feet per 1000 of population compared with amounts of nicotinic acid and riboflavine per 1000 calories of diet.

Marmite.—To 38 patients 1 oz. of marmite was given daily by mouth. None was completely relieved; 21 (55·3%) showed considerable improvement in three weeks; 5 (13·2%) were considerably improved after an average of twenty-six days; and 12 (31·5%) were not improved after two weeks' treatment.

The results of treatment are summarised in the accompanying table.

CONTROLS AND FOLLOW-UP

Unfortunately no true control group was kept in which no treatment whatever was given, because the condition was considered to be a vitamin-deficiency syndrome from the first, and it was not regarded as justifiable to withhold treatment. However, cases occurred outside our camp in isolated areas where no specific source of extra vitamin B was available; in these no considerable improvement took place until better rations were supplied, when the symptoms gradually became less severe and eventually disappeared.

It was impossible to follow up the cases indefinitely, and a considerable number of the patients who had not much improved left for other camps while under observation. The incidence graph (fig. 2) shows that there was a sharp fall in the number of fresh cases at the end of November, 1942, when Red-Cross supplies became available, and thereafter there was a considerable general improvement in the diet as the camp personnel began to receive pay from the Japanese. It became possible to supplement considerably the basic Japanese ration with locally purchased foods, such as green gram and groundnuts. With this improvement in the diet the cases which had not responded to specific treatment gradually improved, and by July, 1943, the syndrome had almost disappeared from the camp. Nor did a wave of fresh cases occur thereafter.

However, 6 patients seen three years after the onset said that their feet had not quite returned to normal. They complained of occasional aches in the feet at night, with stabbing pains at times. The symptoms were often worse in cold or wet weather.

The abnormal briskness of tendon reflexes, where present, gradually became less as the pain disappeared, but there was usually a lag of one or two months in those cases where the disappearance of pain was rapid.

Cases with raised blood-pressure gave normal readings from one to three weeks after considerable improvement or disappearance of the symptoms.

DISCUSSION

The painful-feet syndrome developed among British and Australian prisoners-of-war in Japanese hands six months after they had been on a diet low in vitamin-B complex and first-class protein but adequate in total calories. Fresh cases ceased to appear in any number, and the patients gradually recovered after a few months, when there was an all-round improvement in the diet, with an increase in protein and the vitamin-B complex, particularly vitamin B_1 and nicotinic acid. The syndrome had almost disappeared before there was any increase in the riboflavine intake. The peak incidence of painful feet occurred at a time when fresh cases of recognised vitamin-B_1 deficiency were relatively few and the vitamin-B_1 non-fat-calorie ratio was above the critical level of 0·3 (Williams and Spies 1938).

Crystalline vitamin B_1 given intravenously in a few cases produced no improvement. The intravenous administration of the diethylamide of nicotinic acid brought about relief or much improvement in 68·8% of cases in which it was used. This substance has no pharmacological vasodilator effect, as has nicotinic acid. No other pure vitamin of the B complex was available for therapeutic trial. No definite conclusions can be drawn from the results of treatment with marmite, green gram, and rice polishings, as there were no adequate controls; the only controls were 9 patients who received no treatment except two weeks' rest, of whom 2 improved considerably.

The beneficial effects of a diet or of dietary supplements containing adequate amounts of vitamin-B complex point to a B-complex deficiency. The nicamide observations suggest a deficiency of nicotinic acid as an important factor. But, at a later date of imprisonment, when the nicotinic-acid content of the diet again fell to, and remained at a level as low as, that at which the initial outbreak developed, there was no recurrence of these cases in any great number. During this later period, in contrast to the earlier, the riboflavine content of the diet was adequate. A simultaneous deficiency of nicotinic acid and riboflavine may therefore be necessary for the production of the syndrome. The evidence obtainable in the circumstances in which the syndrome was observed does not justify any more definite conclusion.

Pain.—The patients' descriptions of the pain do not throw much light on the mechanism of its production. It differs distinctly from that of causalgia, pink disease, intermittent claudication, erythromelalgia (Brown 1932, Lewis 1936), pseudo-erythromelalgia (Craig and Horton 1938), and asthenia crurum dolorosa (Ekbom 1944). The stabbing pains of the painful-feet syndrome are reminiscent of tabetic lightning pains, but are felt as longitudinal not as transverse stabs, and only below the knees. There is a closer resemblance between the combined aching and stabbing pains of the syndrome and the pain of peripheral neuritis in its earlier irritative stages, but in peripheral neuritis exercise and pressure usually aggravate the pain, and muscular tenderness is present. The closest resemblance is afforded by the immersion-foot syndrome (Ungley et al. 1945), in the hyperæmic stage of which a diffuse severe burning or throbbing pain is felt in feet and legs; about 7–10 days after rescue shooting or stabbing pains are superadded, in bursts like machine-gun fire and radiating from the centre of the foot. They are relieved by cold but aggravated by heat and by exercise; and they are accompanied by circulatory changes and objective neurological signs not seen in the painful-feet syndrome. The excessive sweating seen in some severe cases of painful feet resembles that described in the later stages of immersion foot.

Peripheral nerve damage is demonstrable clinically and pathologically in immersion foot. The resemblance between the pain of painful feet and of immersion foot and peripheral neuritis suggests that the foot pain may be produced by some dysfunction of peripheral nerve-fibres or nerve-endings which does not progress to a stage where clinical evidence of nerve damage is found. It seems unlikely that the pain is due to circulatory changes in the feet, since it does not resemble the pain of known disorders of the blood-vessels, and there was no clinical evidence of local vascular disturbance. The mechanism by which the pain is produced is therefore obscure; a metabolic disturbance of nerve-fibres or nerve-endings, due to vitamin deficiency, is the most attractive hypothesis.

Exaggerated Reflexes.—The significance of these is difficult to assess. They developed in only 23% of the cases. Their presence in the arms in many patients whose pain was confined to the feet and legs argues against any explanation based on hypersensitivity of afferent nerve-endings. In the great majority of cases they were not accompanied by any other sign of a pyramidal-tract lesion; the abdominal and cremasteric reflexes, for example, were active, and the plantar responses were flexor except in a few cases where the feet were hypersensitive and equivocal responses were obtained. It seems likely that the exaggeration of reflexes, which developed mostly in the more severe cases, may have been an effect of protracted pain and loss of sleep. On the other hand, when the incidence of painful feet was at its height, there occurred in the camp some cases of frank spastic paraplegia and a few of quadriplegia of obscure ætiology. Some of these began as painful feet, with exaggerated reflexes, and later developed clear-cut signs of upper motor neurone damage. It is possible, therefore, that exaggerated reflexes in painful feet signify a minimal and reversible degree of damage to the central nervous system, due presumably to dietary deficiency.

Hypertension.—There is no evidence to show whether the hypertension observed in 51 out of 189 cases adequately examined, is attributable to a specific disturbance of blood-pressure regulation or is a general effect of the long-continued pain and sleeplessness with which it was always associated. In all cases except one the blood-pressure fell with recovery to within normal limits. In cases where pain was promptly relieved by nicamide, the fall was not abrupt but took place gradually in one or two weeks. In the single case where hypertension persisted, it was still present after three years and was regarded as essential hypertension.

SUMMARY

A syndrome of which the chief features were aching and stabbing pains in the feet was observed in prisoners-of-war in Singapore at a time when their diet was deficient in protein and the vitamin-B complex. Hypertension and exaggerated tendon reflexes were added features in some cases. Observations on 500 patients are recorded.

The diet records, and the beneficial effect of treatment with nikethamide (the diethylamide of nicotinic acid), point to a deficiency of nicotinic acid, perhaps in conjunction with riboflavine deficiency, as a major factor in the production of the syndrome.

I wish to thank General A. G. Biggam for permission to publish this paper; Dr. R. C. Burgess, who was responsible for the diet calculations; and Prof. R. S. Aitken for help and criticism in the preparation of the article.

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FOLIC ACID IN THE TREATMENT OF MEGALOBLASTIC ANÆMIA

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MUCH attention has been aroused by recent reports by Spies (1946) and others on the use of folic acid in megaloblastic anæmias of various types; the work has been summarised in recent articles in this journal (*Lancet* 1946a and b).

By courtesy of Dr. Spies and Messrs. Lederle Laboratories Inc. we have received a small quantity of synthetic folic acid, and have treated nine patients suffering from megaloblastic anæmia. For this initial investigation we chose six cases of classical addisonian pernicious anæmia, with typical megaloblastic bone-marrow and histamine-fast achlorhydria, but with no neurological signs and no preceding history of diarrhœa or dietary deficiency. These six patients were given folic acid in varying amounts by mouth or by injection. The object of this part of the investigation was to confirm the hæmopoietic activity of folic acid, as recorded by Spies (1946), and to assess dosage. The other three cases were examples of refractory megaloblastic anæmia of the type described by Davis and Davidson (1944) which failed to respond to parenteral liver therapy but responded to proteolysed liver given by mouth.

During the present investigation, our patients received a normal ward diet, but no liver was included in the meals. A similar diet has been given by us to many cases of pernicious anæmia, and of refractory megaloblastic anæmia, without producing any change in the blood picture. In all cases, a control period of at least a fortnight was instituted before the commencement of folic acid therapy to ensure that spontaneous remission was not taking place.

ADDISONIAN PERNICIOUS ANÆMIA

CASE 1.—A man, aged 72, with typical addisonian pernicious anæmia, under treatment for 4 years. He had responded satisfactorily to 'Anahæmin,' but some months before admission his doctor had stopped treatment with parenteral liver on account of general and local reactions. At the commencement of folic acid therapy his hæmatological findings were Hb 38% (5·2 g. per 100 c.cm.); red cells 1,250,000 per c.mm.; white cells 4400 per c.mm.; P.C.V. 17·5%; M.C.V. 140·0 c.μ; M.C.H.C. 29·7%; reticulocytes <1%; C.I. 1·5.

The patient was tested with folic acid and anahæmin 0·01 c.cm. intracutaneously. A marked local reaction occurred at the site where the liver was injected, but no reaction occurred from the folic acid. Accordingly folic acid 20 mg. was given intramuscularly on the 1st and 2nd day of treatment; no local or general reaction occurred. Folic acid 20 mg. was given by mouth daily from the 3rd to the 20th day of treatment. Table I shows that there was a very satisfactory rise in reticulocytes, red cells, and hæmoglobin, which was up to the standards demanded by the United States Pharmacopœia Anti-anemia Preparations Advisory Board (hereafter referred to as the *U.S.P.* standard). After folic acid treatment was stopped, the red cells and hæmoglobin continued to rise for a further 21 days, without additional therapy. Owing to the limited supply of folic acid, treatment with anahæmin was started on the 41st day, after preliminary desensitisation, and by the 81st day the blood-count and blood picture had been restored almost to normal.

CASE 2.—A man, aged 37, with typical addisonian pernicious anæmia. He was first treated with liver injections 18 months before the present investigation and improved greatly as a result; at that time he was in the Services overseas; he had had no tropical disease. He was discharged from the Army on account of ill health, and had had no anti-anæmic therapy for 9 months before he was referred to us. At the commencement of folic acid therapy his hæmatological findings were: Hb 52% (7·2 g. per 100 c.cm.); red cells 2,050,000 per c.mm.; white cells 3400 per c.mm.; P.C.V. 22·0%; M.C.V. 107·3 c.μ; M.C.H.C. 32·7%; reticulocytes <1%; C.I. 1·3.

The patient was given folic acid 10 mg. by mouth daily for 20 days. Table I shows that this resulted in a good hæmatopoietic response which, however, did not reach the *U.S.P.* standard; but by the 28th day the erythrocyte increase was satisfactory on this basis. The red cells continued to increase for a further 23 days after the cessation of folic acid therapy, and no rise occurred during the ensuing 27 days. It is to be noted that although the hæmoglobin was 100%, the colour-index was still above unity.

CASE 3.—A man, aged 52, with typical addisonian pernicious anæmia. He had suffered from weakness and breathlessness for a year, but these symptoms had become much worse during the four months prior to admission to hospital. He had never previously been treated with liver. At the commencement of folic acid therapy his hæmatological findings were Hb 50%; red cells 1,870,000 per c.mm.; P.C.V. 23·5%; M.C.V. 125·7 c.μ.; M.C.H.C. 29·4%; reticulocytes <1%; C.I. 1·3. He was given folic acid 10 mg. daily by mouth. From table I it will be seen that this produced an increase of 1,270,000 red cells and 26% Hb in 14 days—which is fully up to the *U.S.P.* standard. Owing to shortage of beds, the patient was treated as an outpatient for the first 7 days, and hence the peak of the reticulocyte rise was not established.

CASE 4.—A man, aged 53, with typical addisonian pernicious anæmia. He had suffered from weakness and breathlessness for 6 weeks before admission. No anti-anæmic therapy had been given before admission to hospital. At the commencement of folic acid therapy his hæmatological findings were: Hb 36% (5·0 g. per 100 c.cm.); red cells 1,270,000 per c.mm.; white cells 3800 per c.mm.; P.C.V. 14·5%; M.C.V. 114·2 c.μ; M.C.H.C. 34·5%; reticulocytes <1%; C.I. 1·4.

The patient was given folic acid 5 mg. daily by mouth for 68 days. Table I shows that he gained 36% Hb and 1,780,000 red cells per c.mm. in 21 days—a rise which conforms to the *U.S.P.* standard. The reticulocyte rise and the rate of regeneration over the first 14 days of treatment were, however, below this standard. By the 57th day of treatment the hæmoglobin had reached 100%, but the colour-index was still above unity, and the M.C.V. was 102·4 c.μ.

CASE 5.—A woman, aged 38, with typical addisonian pernicious anæmia, who had never had liver therapy. She had suffered from weakness and breathlessness for two years, but these symptoms had become much more marked during the two months prior to admission to hospital. Partial thyroidectomy for thyrotoxicosis had been carried out six years previously, with remission of all symptoms and signs other than exophthalmos. At the commencement of folic acid treatment her hæmatological findings were: Hb 28%; red cells 970,000 per c.mm.; white cells 1200 per c.mm.; P.C.V. 11·5%; M.C.V. 118·6 c.μ; M.C.H.C. 33·9%; reticulocytes 2·4%; C.I. 1·44.

She was given folic acid 200 mg. intramuscularly in the first twenty-four hours. Table I shows that this resulted in a sharp rise of reticulocytes and an increase of more than one million red cells and 20% hæmoglobin in 11 days—a result which fully satisfies the *U.S.P.* standard optimal rise. The effect of this initial injection had finished by the 14th day; so a second injection of 100 mg. was given. This resulted in the reticulocytes rising to 16% on the 4th day after injection, and a gain of half a million red cells and 14% hæmoglobin in six days.

CASE 6—A woman, aged 79, with typical addisonian pernicious anæmia. She complained of increasing weakness and breathlessness for six months. Two years previously she had been treated for pernicious anæmia, but had had no liver by mouth or by injection for the past year. At the commencement of folic acid treatment her hæmatological findings were: Hb 26%; red cells 1,080,000 per c.mm.; white cells 2000 per c.mm.; reticulocytes <1%; C.I. 1·2.

The patient was given a single dose of folic acid 400 mg. by mouth. Table I shows that the response was truly dramatic, particularly in view of the patient's age. The reticulocytes started to increase rapidly on the 3rd day, and reached the high figure of 42% on the 5th day. Fourteen days after the administration of the single large dose of folic

TABLE I—RESPONSE TO FOLIC ACID IN 6 PATIENTS WITH PERNICIOUS ANÆMIA

Case	Red cells (millions/c.mm.)							Hb % (Haldane)							Reticulocytes (%)			Treatment	
															Initial	At peak	Day of peak	Folic acid (mg. per day)	No. of days given
1	*1* 1·25	*7* 1·40	*14* 2·30	*21* 3·31	*42* 3·78	*81* 4·74	.. ..	*1* 38	*7* 42	*14* 56	*21* 72	*42* 80	*81* 96	.. ..	<1·0	40·0	9	20 Also anahæmin 12 c.cm. on days 41–80	20
2	*1* 2·05	*7* 1·81	*14* 2·09	*20* 2·92	*26* 3·86	*43* 4·27	*70* 4·19	*1* 52	*7* 52	*14* 62	*20* 80	*26* 90	*43* 92	*70* 100	<1·0	10·0	10	10 No treatment on days 20–70*	20
3	*1* 1·87	*5* 1·98	*10* 2·34	*14* 3·14	*25* 3·47	.. ..	.. ..	*1* 50	*5* 54	*10* 66	*14* 76	*25* 84	.. ..	.. ..	<1·0	—	—	10	25
4	*1* 1·27	*8* 1·25	*15* 1·84	*22* 3·05	*35* 3·45	*57* 4·20	*81* 4·85	*1* 36	*8* 36	*15* 52	*22* 72	*35* 80	*57* 100	*81* 104	<1·0	9·0	8	5	81
5	*1* 0·97	*7* 1·98	*11* 2·13	*14* 2·00	*20* 2·50	.. ..	.. ..	*1* 28	*7* 36	*11* 48	*14* 48	*20* 62	.. ..	.. ..	2·4	24·0	7	200 im. 100 im.	day 1 day 14
6	*1* 1·08	*4* 1·20	*10* 2·04	*14* 3·02	*21* 3·18	.. ..	.. ..	*1* 26	*4* 34	*10* 50	*14* 68	*21* 66	.. ..	.. ..	<1·0	42·0	5	400 by mouth, Single dose	

Italic figures represent day of blood examination. im. = intramuscularly.

* Folic acid 10 mg. was given daily by mouth from the 71st day, and this produced a further rise of red-cell count to 5·05 million on the 91st day.

acid, the red cells had increased by two million per c.mm., and the hæmoglobin by 42%. No further rise occurred by the 18th day, so folic acid 100 mg. was given by mouth on the 21st day. The red-cell increase reported above far exceeds the *U.S.P.* standard.

REFRACTORY MEGALOBLASTIC ANÆMIA

CASE 7.—A woman, aged 37, first admitted to hospital in March, 1944, when she was 5 months pregnant. Her hæmoglobin was then 56% and red cells 2,050,000 per c.mm. The bone-marrow was megaloblastic. A test-meal showed the presence of free hydrochloric acid. A diagnosis of pernicious anæmia of pregnancy was made. She failed entirely to respond to 4 c.cm. of anahæmin given intramuscularly, but responded to proteolysed liver, an increase of red cells of one million per c.mm. occurring in 20 days. The patient was then discharged from hospital, but owing to difficulty in obtaining proteolysed liver she did not continue treatment. She was readmitted in April, 1946, with a history of weakness and of intermittent diarrhœa of a fatty type; a fat-balance test carried out according to the method of Cooke et al. (1946) showed the percentage absorption to be 75%. A test-meal again showed the presence of free hydrochloric acid, and the patient was now thought to be suffering from idiopathic steatorrhœa. She had never been abroad, and the dietetic history was normal. No anti-anæmic treatment had been given for 18 months before the commencement of folic acid therapy as described below. During a control period of 14 days, the reticulocyte count ranged from 2% to 3·5%, but the erythrocyte and hæmoglobin levels remained stationary. At the start of folic acid therapy her blood findings were as follows: Hb 40% (5·5 g. per 100 c.cm.); red cells 1,370,000 per c.mm.; white cells 7800 per c.mm.; P.C.V. 19·0%; M.C.V. 138·7 c.μ; M.C.H.C. 28·9%; reticulocytes 3·5%; C.I. 1·5.

The reticulocyte response and the rise in red cells over a therapeutic period of 14, 21, and 28 days reached the standards demanded by the *U.S.P.* Board, although the patient was suffering from idiopathic steatorrhœa and not from addisonian pernicious anæmia (table II). Despite continued folic acid therapy, 20 mg. daily, no further rise in red cells occurred during the next 20 days. The M.C.H.C. on the 36th day was 27·2%, and, in view of this evidence of iron deficiency, ferrous sulphate was then added to the treatment. Ten days' treatment with iron produced a small rise in the hæmoglobin and no change in the red-cell count. Accordingly, intensive therapy with anahæmin was begun, treatment with folic acid and iron being continued simultaneously. Seventeen days after the commencement of parenteral liver therapy the level of hæmoglobin and red cells remained unchanged. Treatment with proteolysed liver was then begun, 1 tablespoonful t.i.d. being given. An increase of one million red cells and 14% hæmoglobin occurred in 13 days, with the restoration of the blood picture to normal.

CASE 8.—A man aged 61. Six weeks before this patient came under our charge he had been diagnosed as having pernicious anæmia, and during the month preceding the commencement of folic acid therapy he had been given 24 c.cm. of anahæmin. There was no response to this therapy; the blood figures continued to fall, and the bone-marrow remained megaloblastic. The patient gave a 2 years' history of weakness and breathlessness. He said that he suffered from hæmorrhoids, which had bled intermittently during the preceding 6 years. No loss of blood was evident after admission to hospital, and the stool benzidine test was persistently negative. The dietetic history was normal, and there was no diarrhœa. There were no abnormal neurological signs; the liver and spleen were not palpable, and there was no abnormal glandular enlargement. There was no history of hæmatemesis and no visible enlargement of veins on the abdominal wall. There was no albuminuria. It is noteworthy that the patient's daughter died in our wards a year ago with a severe refractory megaloblastic anæmia and was found at autopsy to have cirrhosis of the liver. In view of this family history, liver-function tests were performed on our patient. The serum bilirubin was 0·65 mg. per 100 c.cm.; the blood cholesterol was 167 mg. per 100 c.cm.; and the cephalin cholesterol test was negative. Serum alkaline phosphatase was 7 units per 100 ml.; serum albumin 3·06 per 100 c.cm.; serum globulin 2·15 g. per 100 c.cm. The lævulose-tolerance test and hippuric-acid test were both normal. In short neither clinical examination nor laboratory tests demonstrated the presence of hepatic dysfunction. No adequate explanation for the low serum albumin was found. At the commencement of folic acid therapy the blood figures were: Hb 28% (3·9 g. per 100 c.cm.); red cells 950,000 per c.mm.; white cells 5200 per c.mm.; P.C.V. 13·0%; M.C.V. 136·8 c.μ; M.C.H.C. 30·0%; reticulocytes 2·2%; C.I. 1·5.

This patient, who showed no response to a very large dosage of anahæmin, responded to folic acid therapy with a reticulo-

TABLE II—RESPONSE TO FOLIC ACID THERAPY IN CASE 7

Day of therapy	Hb (%)	Red cells (million/c.mm.)	Reticulocytes (%)	Bone-marrow
1	40	1·37	3·5	Megaloblastic
4	..	..	17·5	Normoblastic
5	42	1·43	35·5	..
6	..	..	38·6 (peak)	..
15	58	2·93	2·1	..
22	62	3·01	<1	..
29	72	3·59	<1	..
36	72	3·55	<1	..
43	72	3·45	<1	..
48	78	3·64	<1	..
53	78	3·87	<1	..
58	84	4·09	<1	..
65	80	3·68	<1	..
72	84	4·28	<1	..
78	94	4·65	<1	..

Therapy.—20 mg. folic acid by mouth on 1st to 10th days; 10 mg. folic acid by mouth on 11th to 20th days; 10 mg. folic acid by mouth on 22nd to 65th days. Ferrous sulphate gr.vi t.i.d. on 38th to 65th days. Anahæmin 4 c.cm. i.m. on 48th, 52nd, and 55th days. Proteolysed liver, one tablespoonful t.i.d. on 65th to 78th days.

cyte rise, an alteration of his bone-marrow from a megaloblastic to a normoblastic state, and a rise in erythrocytes which was satisfactory for the first 8 days but thereafter failed to improve with this therapy (table III). Although the stool benzidine was negative, the M.C.H.C. was only 26·3% on the 20th day. Accordingly ferrous sulphate was given for 14 days without result. The patient was then given proteolysed liver 1 tablespoonful t.i.d. for 14 days. This resulted in an increase of half a million red cells per c.mm. in 11 days, but thereafter no further improvement took place.

CASE 9.—A man, aged 62, had been under treatment for refractory megaloblastic anæmia since 1942. He showed no response to anahæmin, but on the recommendation of one of us (L. S. P. D.) proteolysed liver was tried in January, 1945. The results of this treatment were satisfactory, the bone-marrow changing from a megaloblastic to a normoblastic state and the red cells rising from 1·93 to 3·44 million over a period of 21 days, with a reticulocyte peak of 11·0%. The patient was unable to obtain proteolysed liver after May, 1945, and had no therapy other than iron and cod-liver oil up to the time of his readmission to hospital in June, 1946. Clinical examination revealed that the liver was two finger-breadths enlarged on palpation; the spleen was not palpable, and no glandular enlargement was found. The ankle reflexes could not be elicited, the knee-jerks were weak, and there was an extensor plantar response on the right side, the left being doubtful. The patient was underweight; there was no history of diarrhœa, no evidence of glossitis, and the dietetic history was satisfactory. A test-meal showed that there was histamine-fast achlorhydria. At the beginning of the present investigation the blood figures were: Hb 46% (6·3 g. per 100 c.cm.); red cells 1,700,000 per c.mm.; white cells 6200 per c.mm.; P.C.V. 22·0%; P.C.V. 129·4 c.μ; M.C.H.C. 28·6%; reticulocytes 1%; C.I. 1·4.

This patient was first given 4 c.cm. of anahæmin—twice as much as our experience has shown to be adequate to

TABLE III—RESPONSE TO FOLIC ACID THERAPY IN CASE 8

Day of therapy	Hb (%)	Red cells (million/c.mm.)	Reticulocytes (%)	Bone-marrow
1	28	0·95	2·2	Megaloblastic
5	34	1·10	14·0	..
6	..	..	17·4	Normoblastic
7	..	..	18·2 (peak)	..
8	44	1·68	14·4	..
15	44	1·74	1·6	..
20	36	1·75	1·5	..
26	42	2·02	2·4	..
30	40	2·07	<1	..
35	46	2·23	2·0	..
36	46	2·24	2·1	..
41	48	2·66	<1	..
47	50	2·77	<1	..
50	50	2·78	<1	..

Therapy.—20 mg. folic acid by mouth on 1st to 36th days. Ferrous sulphate gr. vi t.i.d. on 21st to 35th days. Proteolysed liver one tablespoonful t.i.d. on 36th to 50th days.

produce a maximal response in addisonian pernicious anæmia. This resulted in a slight rise in reticulocytes and an unsustained rise in red cells. The bone-marrow, however, remained megaloblastic. Folic acid therapy was then begun, and a second submaximal rise in reticulocytes occurred (table IV). This was followed by a rapid red-cell rise and change in the bone-marrow to the normoblastic state. Treatment with folic acid for 28 days produced a gain of approximately two million erythrocytes and 34% hæmoglobin. Continued treatment, however, failed to increase the blood-count, and the blood picture remained macrocytic. Treatment with proteolysed liver is now being given.

DISCUSSION

This short series includes six cases of addisonian pernicious anæmia, of which four were treated with folic acid daily by mouth in doses ranging from 5 mg. to 20 mg.; two received a single large dose by the parenteral and oral route respectively. Of the cases receiving daily oral treatment, only case 1, who received 20 mg. daily, had a reticulocyte response and red-cell rise completely up to the standard demanded by the *U.S.P.* Board. Cases 2 and 3, who received 10 mg. daily by mouth, reached the standard at 28 days and 14 days respectively. The reticulocyte rises, however, were suboptimal. With

TABLE IV—RESPONSE TO FOLIC ACID THERAPY IN CASE 9

Day of therapy	Hb (%)	Red cells (million/c.mm.)	Reticulocytes (%)	Bone-marrow
1	46	1·70	<1	Megaloblastic
6	48	1·61	<1	..
7	..	..	4·2	..
8	..	..	5·3 (peak)	..
9	..	..	5·0	..
10	60	2·31	4·1	..
11	..	..	3·3	..
13	..	..	2·2	Megaloblastic
14	58	1·98	1·3	..
16	58	1·99	<1	..
20	..	..	1·3	..
21	..	..	6·0 (peak)	..
23	62	2·06	2·9	..
27	74	2·6	1·6	..
29	..	..	..	Normoblastic
30	80	3·18	<1	..
40	86	3·68	<1	..
45	92	3·85	<1	..
49	94	3·89	<1	..
52	100	3·94	<1	..

Therapy.—1st day 2 c.cm. anahæmin, 2nd day 2 c.cm. anahæmin; 20 mg. folic acid by mouth on 17th to 49th days.

regard to case 4, who received 5 mg. daily, the red-cell rise over 21 days conformed to the *U.S.P.* standard, but the reticulocyte rise was suboptimal. In all six cases the bone-marrow was transformed from a megaloblastic to a normoblastic state. The clinical state of the patients improved coincidentally with the blood.

The variations in response of individual cases of pernicious anæmia, with similar blood levels, to parenteral treatment with a standard amount of a potent preparation of liver is recognised by all hæmatologists, and is the principal factor in causing great difficulty in the assessment of potency and dosage. Hence it would be unwise to define the optimal daily dose of folic acid until a much larger series of cases has been treated. Our observations suggest that the therapeutic daily dose by mouth is between 5 mg. and 20 mg. At the time of writing, it would be safer not to reduce the daily dose below 20 mg. in the treatment of pernicious anæmia—an amount found to be satisfactory by Wilkinson et al. (1946).

Attention is drawn to the excellent response which resulted from a single large dose of folic acid given by mouth or parenterally. If results similar to those produced in case 6, who received a single dose of 400 mg. orally, can be obtained regularly, the simplest and most effective method of treatment may prove to be an initial large dose followed at weekly or fortnightly intervals by doses of 50–100 mg.

Most reports have been of treatment with folic acid over relatively short periods, presumably because of the small supply. Published accounts do not clearly indicate that folic acid by itself can regularly restore the blood picture to normal in pernicious anæmia, but we have had private reports from the United States that this has been accomplished. The problem of maintenance therapy has yet to be settled.

With regard to the three cases of refractory megaloblastic anæmia, the following observations appear to be justified.

1. Parenteral injection of a potent purified liver extract was ineffective, while folic acid, in each case, produced a rise in reticulocytes, red cells, and hæmoglobin, and transformed the bone-marrow from the megaloblastic to the normoblastic state. In no instance, however, was folic acid alone able to restore the blood picture to normal.

2. Proteolysed liver by mouth was able to restore the blood picture to normal in case 7, after the red-cell count had ceased to rise with adequate administration of folic acid. In case 8, proteolysed liver also caused a further rise in red cells subsequent to folic acid therapy, but did not restore the blood to normal. Treatment with proteolysed liver has just been begun in case 9.

It is of interest to note that cases 7 and 9 had previously responded to proteolysed liver. Since megaloblastic anæmias, refractory to anahæmin, will respond to both proteolysed liver and folic acid, it might be postulated that folic acid is the active principle in proteolysed liver. The data obtained in cases 7 and 8, however, indicate that a refractory megaloblastic anæmia can respond to proteolysed liver after folic acid has ceased to be effective. This would suggest that in liver and proteolysed liver there exists some as yet undiscovered anti-anæmic principle additional to the specific anti-anæmic factor in anahæmin, and to folic acid.

SUMMARY

An account is given of the response of six cases of addisonian pernicious anæmia and three cases of refractory megaloblastic anæmia to folic acid.

In all cases the bone-marrow was transformed from a megaloblastic to a normoblastic state.

The effective daily dose of folic acid given by mouth to cases of pernicious anæmia in the relapse stage varies widely in different patients. The suggested dose is 20 mg. daily.

Three cases of megaloblastic anæmia refractory to 'Anahæmin' responded to folic acid which was, however, unable to restore the blood to normal.

The relationship of folic acid to proteolysed liver is discussed.

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CONFUSION OF AMŒBOMA WITH CARCINOMA

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THE many abdominal cases admitted to Queen Mary's Hospital, Roehampton, during the later years of the war 1939–45 included some in which left iliac colostomy had been performed for no apparent reason. The patients had not sustained any wounds affecting the pelvic colon or the rectum. Digital examination of the rectum, sigmoidoscopy, and barium enema did not reveal any lesion which would have justified operation. In some cases the operation had been advised for neoplasm of the rectum, and in others a definite diagnosis of carcinoma had been made, yet no trace of any new growth could be found. At first I naturally thought that a mistake had been made, that overwork, perhaps the heat and burden of the desert, had been responsible for a "phantom tumour"; but, as other cases followed, and as the operation had been advised, and in some instances carried out, by well-known surgeons, it was clear that there must have been some compelling reason for operation. The answer was not far to seek, though at first it was not obvious.

In tropical regions where amœbiasis is endemic *Entamœba histolytica* may cause in the large intestine a granulomatous condition which is often mistaken for carcinoma. A good example is cited by Ogilvie (1945). A factor common to the patients mentioned above was that they had all had amœbic dysentery, and all except one had been treated with emetine. The logical conclusion was that the colostomy had been performed for an "amœboma" of the rectum or of the pelvic colon, and that the operation, with or without emetine, had brought about the disappearance of the tumour.

Manson-Bahr (1945) has emphasised that amœbiasis is more widespread than is commonly realised, and that not only can it be contracted without causing pronounced symptoms, but also it may lie dormant for years before declaring itself. He has described (personal communication) the case of an officer who contracted the disease at the age of 2 years and developed a liver abscess at the age of 28, with no symptoms during the intervening years. A similar case was seen by one of my colleagues, Dr. J. G. Willmore. Here, a retired warrant officer, who had contracted dysentery in the Burmese war in 1885, developed a large liver abscess in 1922, without any signs of illness and without having left England during the intervening years.

It is important that the prevalence of amœbiasis should be recognised, and that surgeons should be alive to the possibility of amœbic granuloma simulating carcinoma. I have no doubt that in amœboma of the rectum colostomy is helpful rather than otherwise, but the danger is that large-scale operations on the bowel may be performed without any attempt at differential diagnosis. Some even question the advisability of colostomy in such cases and look upon the operation as unnecessary and somewhat drastic. It is easy to be wise after the event, when the nature of the tumour is realised, but the man on the spot is often in the best position to judge, and the operation may have been the best for the patient in the circumstances. One might go further and say that, whatever the diagnosis, colostomy in the presence of acute or subacute obstruction was the only correct surgical procedure and, as a temporary expedient, undoubtedly saved life.

Radical surgery, such as resection of the colon or excision of the rectum, is much more serious. In three cases reported by Gunn and Howard (cited by Howells 1946) the preoperative diagnoses were carcinoma of transverse colon, carcinoma of cæcum, and carcinoma of colon. Two of the patients died as a direct result of operation. Yeomans (cited by Howells 1946) emphasised the almost invariably fatal outcome of radical surgery without anti-amœbic treatment.

If a tumour of the colon or of the rectum is discovered in a person who has served in the East, it would be wiser to regard it as an amœboma rather than a carcinoma until thorough pathological examination has proved otherwise. In amœboma of the colon special care and repeated examination of the stools may be necessary before *E. histolytica* is demonstrated. With accessible tumours, like those of the rectum, a biopsy should not be omitted, for the specimen may not only help to distinguish a neoplasm from an inflammatory condition, but also provide evidence of *E. histolytica* cysts. Failing the services of a pathologist experienced in tropical protozoology, a course of emetine should precede any attempt at radical surgery.

Occasionally amœboma and carcinoma may coexist. Morgan (1946) reported the case of a young R.A.F. officer with a swelling in the right iliac fossa. Investigation proved that he had contracted amœbic dysentery, and appropriate treatment led to almost complete disappearance of the tumour. The patient reported to hospital later, when it was found that the swelling had recurred; and, owing to the failure of further treatment, operation was decided on. On removal of the cæcum, the tumour proved to be carcinomatous.

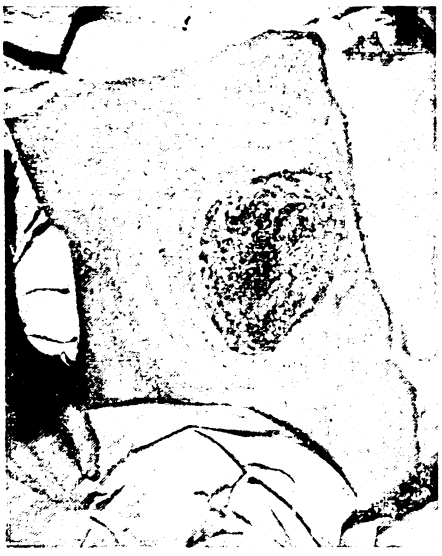
AMŒBIASIS OF SKIN AND SUBCUTANEOUS TISSUE

I wish to draw attention to a condition which may affect the skin and underlying tissues and may readily develop after colostomy performed for such cases, when amœbiasis is not suspected.

A colour-sergeant of the Royal Marines, aged 57, was admitted to Queen Mary's Hospital, Roehampton, with a diagnosis of carcinoma of rectum. There was little docu-

mentary history, but he said that he had served all over the world but had never had dysentery. The beginning of the illness he attributed to a "strain," the result of lifting heavy shells, which caused a "lump" to appear in the left lower abdomen. This was associated with diarrhœa, tenesmus, and piles.

He was admitted to hospital, where his stools were examined without anything being found to explain the diarrhœa. He was told that he had cancer of the bowel, and left iliac colostomy was performed, presumably preparatory to removal of the "growth."



Amœbiasis of skin following closure of colostomy

After the operation a large infected area developed round the colostomy, and it was only by diathermy excision that further spread was prevented.

The patient had been discharged from the Service and had been sent to Queen Mary's Hospital for further investigation and treatment. As it was less than six months since his operation and he was anxious to go home to help with the harvest, he was discharged and instructed to return later for closure of colostomy.

He was later readmitted to Queen Mary's Hospital, when he was in good health. There was no blood or mucus in the stools. For four days before operation he was given succinyl sulphathiazole tablets to sterilise, as far as possible, the contents of the large intestine.

At operation the colostomy was dissected free. In spite of extensive scarring of the abdominal wall, the bowel was mobilised without much difficulty and without the peritoneal cavity being entered. Continuity of the bowel was re-established, and the layers of the wound were drawn together over a small drainage-tube.

The wound progressed well for three days but then became acutely inflamed and broke down completely. The sutures in the bowel also gave way, with re-establishment of the colostomy.

During the next four weeks the infected area continued to spread in spite of every form of treatment, local and general. The inflamed area extended almost from the iliac crest to the costal margin and consisted of foul sloughing tissue (see figure). The patient's general condition was rapidly deteriorating.

Reviewing the case, the possibility of amœbiasis occurred to me, even though examination of the stools elsewhere had apparently proved negative. A fresh specimen was examined by Dr. Mackenzie Douglas, who reported the presence of numerous *E. histolyticæ*.

The further care of the patient was then undertaken by Dr. J. G. Willmore, to whom I am indebted for an account of his treatment. Intramuscular emetine gr. 1 was given daily for twelve days, and 'Diodoquin' 2 tablets by mouth twice daily for ten days. The local area was kept as dry as possible, and for this reason the bowel was not irrigated with 'Quinoxyl'; the sloughing wound was dusted heavily with a powder consisting of equal parts of calcium penicillin and succinyl sulphathiazole and covered with tulle-gras.

The stools rapidly became clear of amœbæ, the man's general condition improved rapidly, and a striking feature was the disappearance of the agonising pain in the wound and its rapid healing.

DISCUSSION

This was one of our earlier cases and occurred before I had come to consider that a colostomy without any lesion to explain it was almost pathognomonic of amœbiasis. It was thought advisable to publish the case in view of the possibility of surgeons in different parts of the country having to deal with colostomies of this type—i.e., where investigation proves negative and amœbæ are not found in the fæces.

Amœbiasis of the skin was originally described in 1892 by Nasse (cited by Manson-Bahr 1938), who recorded a case of ruptured liver abscess with invasion of the skin. Nasse recognised living entamœbæ not only in the liver pus but also in the skin at the advancing edges of ulceration.

Hsu (cited by Manson-Bahr 1938), in China in 1937, described circum-anal ulcerations, fistulæ, and warts, due to dysentery amœbæ. He demonstrated the organism in sections, in erosions of the cervix, and in urethral ulcers in the male.

Manson-Bahr (1938) described a case similar to the one recorded above, in which the parietes in the vicinity of the colostomy and abdominal wall were involved. He emphasises the fact that this peculiar gangrene, with its colour, method of spread, and punched-out margins of ulceration, cannot be forgotten or confused with any other form of gangrene or ulceration of the skin. He further emphasises the importance of microscopical sections of the gangrenous skin, where the amœbæ will be found, even though they may not have been found in the stools.

Gabriel (cited by Manson-Bahr 1938) reported a case in an ex-soldier who had served in India fifteen years previously. Though the patient had never had clinical dysentery, *E. histolytica* cysts were present in the fæces. The lower part of the rectum, the pelvic floor, and the perineal tissues had been destroyed. Response to emetine therapy was remarkable.

It may be as well to call attention to the converse of the error described above—i.e., where patients with carcinoma of the rectum have been treated for dysentery. I have seen two such cases. In each the mistake was due to the omission of digital examination of the rectum. Both patients had been sigmoidoscoped and examined with X rays and barium enema. In both the carcinoma was situated low down in the rectum; in one it involved the side wall, and in the other the growth completely encircled the bowel. In the first case the sigmoidoscope was passed beyond the ulcer without suspicion, whereas in the second it was evidently passed through and beyond the growth before observation began. Both patients had been treated elsewhere for amœbic dysentery and had been referred for operation for hæmorrhoids.

The barium enema does not help much in the diagnosis of neoplastic conditions of the rectum, particularly those situated low down, for the delineation of a filling defect with barium does not properly begin until the pelvi-rectal junction is reached. It is equally possible to miss a carcinoma of the rectum with the sigmoidoscope, and this emphasises the fact that the first internal examination should always be with the finger. The patient should be requested to strain down so that an ulcer, which at first may not be palpable, may come within the ambit of the examining finger.

I am indebted to Sir Walter Haward, D.M.S. Ministry of Pensions, and Major-General Brooke Purdon, medical superintendent, Queen Mary's Hospital, Roehampton, for permission to publish this article.

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GOUT IN LEUKÆMIA

REPORT OF A CASE

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IT has long been a matter of great interest that, though the uric-acid content of the blood is increased in leukæmia, gout hardly ever occurs in this condition.

Forkner (1938), in his exhaustive monograph, could only cite Roberts and Rose Bradford (1907), Schultz (1931), Brunner (1932), and Vining and Thomson (1934) as having reported cases in which the two diseases coexisted.

Roberts and Rose Bradford, in their article on gout, state that "in myeloid leukæmia the quantity of uric acid produced and voided in the urine is greatly increased, and it might have been expected that persons so affected would exhibit a strong proclivity to gout. This, however, does not appear to be the case." They only encountered one patient in whom the two diseases were associated, and that patient had had gout for many years before myelogenous leukæmia arose. They could find no case in which gout supervened as a result of myeloid leukæmia.

Vining and Thomson, in reporting their case of gout and aleukæmic leukæmia in a boy aged 5 years, also state that they could find no case in the literature of gout supervening on a leukæmia.

The present case is thus of special interest in that acute gout developed for the first time in a patient undergoing treatment for leukæmia.

CASE-RECORD

A man, aged 37, was admitted to Mount Vernon Hospital under my care on May 16, 1945. He complained that for the previous ten weeks he had been feeling "sluggish," his abdomen had been getting prominent, and he was dyspnœic on exertion. He had no cough, loss of weight, or pain, and bowels and micturition were normal. There was no family history of gout or leukæmia. The personal history showed that he had had pleurisy in 1931 and 1935. He had been to India but had not contracted any illness there.

On examination he was of rather spare build, with slight pallor of skin and conjunctivæ. Abdomen enlarged; no petechiæ. Throat clean, tonsils moderately enlarged, no gingivitis, teeth in good condition. Clinical examination of lungs showed no abnormality except a slight pleural rub audible at the level of the seventh rib in the left axillary line, probably the result of previous pleurisy. Trachea central. Heart showed no enlargement, no murmurs, and rhythm regular.

The abdomen was distended, practically the whole of it being occupied by an enormous spleen, which formed a firm smooth non-tender swelling which descended from under the left costal margin right across the abdomen and down to the right iliac fossa, with well-marked notches on the anterior border. No enlargement of liver, no ascites, no palpable glands, no sternal tenderness. Ophthalmoscopic examination was normal.

Examination of the blood next day showed Hb 56% and white cells 354,000 per c.mm. (polymorphs 42%, lymphocytes 3%, myelocytes 46%, and myeloblasts 9%).

The diagnosis of chronic myeloid leukæmia was thus definitely established, and it was decided to treat the patient by deep X-ray therapy applied to the spleen. This was started on the 18th. The factors used were kV 190, mA 6, filter of 0·5 mm. Cu, focus skin distance 40 cm., size of field 10 × 15 cm. Each treatment consisted of 100 r incident over the spleen.

Three days later, May 21, the patient developed a typical attack of acute gout. He complained of sudden onset of severe pain in the right toe. His temperature was 99·8° F. The metatarsophalangeal joint of the right great toe was bluish red, somewhat swollen, and very tender. The site of maximal tenderness was on the medial aspect of the joint. The pain was aggravated by pressure and movement. No other joint was affected.

Progress.—I treated the patient with colchicum and decided to continue the röntgen therapy. The affected joint during the subsequent few days became more swollen, but the pain was kept in check with colchicum. Ten days from the onset of acute gout the swelling of the joint began to subside and the temperature became normal. The leukæmia improved, and the spleen became materially smaller. Irradiation was discontinued on June 1. The table summarises blood examinations performed between May 17 and July 4.

The patient left the hospital on July 5 feeling very fit.

OBSERVATIONS DURING TREATMENT

Date 1945	Deep X-ray treatment	Hb (%)	White cells	Uric acid in blood*	Date 1945	Hb (%)	White cells	Uric acid in blood*
May 17	..	56	354,000	..	June 2	68	58,000	..
„ 18		..	..	..	„ 4	64	25,200	..
„ 22		54	225,000	..	„ 6	76	29,000	4·9
„ 23		..	..	4·9	„ 8	72	19,000	5·1
„ 24		54	244,000	..	„ 13	78	13,800	5·2
„ 25		..	..	..	„ 15	..	18,800	6·4
„ 26	100 r to spleen	56	277,000	..	„ 18	..	13,500	6·4
„ 28		60	137,000	..	„ 20	86	18,600	5·6
„ 29		..	..	..	„ 22	..	15,000	6·0
„ 30		..	..	5·1	„ 25	92	11,700	5·7
„ 31		62	76,000	..	„ 27	96	11,400	4·9
June 1		..	..	..	July 4	..	..	3·2

* mg. per 100 c.cm.

DISCUSSION

Gout is commonly regarded as a disordered purine metabolism characterised by (1) recurring attacks of acute arthritis, (2) an excess of uric acid in the blood—i.e., hyperuricæmia, and (3) deposition of urates in the cartilages of the joints and in other structures. Of the joints, the commonest to be affected is the metatarsophalangeal joint of the great toe, and this was the joint involved in the present case.

The normal limits of the uric-acid content of the blood are 0·7–3·7 mg. per 100 c.cm., with an average of 2 mg. per 100 c.cm. In gout the uric-acid content of the blood may be increased to an amount two or three times as great as that in normal blood. Hyperuricæmia is not, however, confined to gout and occurs in conditions in which gout is almost unknown, notably in cases of renal insufficiency, pneumonia, and leukæmia. It has been stated that uric acid is the first nitrogenous constituent to be retained in renal insufficiency, and in uræmia the uric-acid content of the blood may be very large. In pneumonia and leukæmia the increased amount of uric acid in the blood is due to the considerable destruction of the nuclei of the leucocytes. In these diseases the kidneys excrete large quantities of uric acid but cannot eliminate the uric acid as rapidly as it is formed.

The way in which the increased amount of uric acid in the blood is produced in leukæmia is briefly as follows. The nucleoprotein of the nuclei of the leucocytes is broken down by enzymes. It is first hydrolysed, protein molecules being split off and nucleic acid liberated. The latter consists of 4-nucleotides (H_3PO_4 + base + carbohydrate). The carbohydrate present is either a hexose or a pentose. The bases are pyrimidines and purines, the latter being adenine (6-aminopurine) and guanine (2-amino-6-oxypurine). In the tissues, more especially in the liver, adenine and guanine are deaminised to hypoxanthine (6-oxypurine) and xanthine (2, 6-dioxypurine). Hypoxanthine is oxidised to xanthine and the latter to uric acid (2, 6, 8-trioxypurine).

In gout the increase of uric acid in the blood is not regarded as due to increased production as in leukæmia but as probably due to diminished excretion by kidney with normal production. Gout is not a primary renal

defect but a metabolic disturbance, and it is thought that in gout uric acid probably circulates in an abnormal form. This explains why the kidneys cannot eliminate the uric acid, which consequently collects in the blood.

Uratosis, as opposed to hyperuricæmia, is absolutely confined to gout and is pathognomonic of it. Though uratosis probably does not occur in the absence of hyperuricæmia, the latter may exist for prolonged periods without inducing the occurrence of uratosis—i.e., gout. It is thought that in gout the uric-acid salts which have accumulated in the blood alter from a soluble to a less soluble state, the blood becomes supersaturated, and urates are suddenly deposited from the supersaturated solution. Inflammation is excited mechanically by the deposition of urate crystals in the affected tissues, and a gouty paroxysm results.

In the present case the attack of gout came on in a patient who, except for age and sex, did not show the usual predisposing factors cited in gout, such as heredity and habitual excesses in food and drink. This case thus differs from that reported by Vining and Thomson (1934), in which there was a family history of gout. They considered that the obvious explanation in their case was that in the leukæmic state there were present large quantities of uric acid from the breakdown of immature white cells which, in a subject carrying a latent tendency to gout, led to uratosis. The attack of gout in my patient was apparently produced as a direct result of the greatly increased uric-acid content of the blood resulting from the rapid destruction of white blood corpuscles. After the first dose of 100 r the white-cell count was reduced in a few days from 354,000 to 225,000 per c.mm., and it was at this time that the attack of gout developed. It therefore seems that acute gout can, though apparently very rarely, result purely from the increased amount of uric acid in the blood which occurs in leukæmia.

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TUBERCULOUS ABSCESS FOLLOWING INTRAMUSCULAR PENICILLIN

REPORT OF A CASE

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So far as we know, tuberculous infection at the site of penicillin injections has not been described. Abscesses sterile on routine examination are not infrequent; but they are not always examined for tubercle bacilli. We have observed a case in which there is reason to believe that penicillin administration was responsible for a tuberculous abscess. Theoretically, direct inoculation at the time of injection appears to be possible. If this is so—and the case to be described appears to bear it out—it is an indication for more stringent precautions in the administration of penicillin.

A boy, aged 11 years, with no relevant previous medical history, was admitted on July 24, 1945, with a large painful abscess in the right axilla which had been present for about a week. Two days after admission the abscess had become soft and was opened. The pus gave a pure growth of *Staph. aureus*. On the 30th a continuous intramuscular penicillin drip was set up. The initial site of injection was the outer aspect of the upper third of the left thigh. During the first twenty-four hours patient complained of much discomfort at the site of injection, whereupon the drip was discontinued and a fresh one put up in a similar site in the right leg. The penicillin was discontinued on August 3, by which time he had had 500,000 units. On the 22nd patient was discharged, with his wound healed and no evidence of any residual suppuration.

On Nov. 30—i.e., some three months later—he again attended hospital, complaining of a painful swelling in the left thigh near the site of his first penicillin injection. A spherical fluctuant swelling, about 3 inches in diameter, was found on the lateral aspect of the upper third of his left thigh. There was no evidence of skin involvement, and the swelling was only slightly tender. A chronic abscess seemed the most likely diagnosis, infection by one of the common penicillin-resistant contaminants being postulated. He was admitted to hospital three days later, the swelling having increased in size during this period. On Dec. 5 the abscess was explored through a small incision and about 8 oz. of thin yellowish fluid and some fibrinous clots were evacuated. The bacteriological report on the pus was as follows: "Routine cultures sterile. Morphological *Myco. tuberculosis* present in large numbers in the direct smear." Later the acid-fast bacilli were confirmed to be *Myco. tuberculosis* by culture and by guineapig inoculation.

The abscess did not heal, and exuberant granulation tissue appeared in the wound. Histological examination of this showed typical tuberculous granulation tissue. Radiography of his chest, spine, and legs showed no abnormality. At this time his Mantoux reaction was positive in 1 in 10,000 O.T.

On Jan. 7, 1946, an attempt was made to excise the tuberculous area completely. A large diffuse area of necrotic tissue was found extending superficial and deep to the fascia lata and tracking in the intermuscular planes almost as far as the shaft of the femur. At no point could the bone be felt to be directly involved. The pathological tissue was excised. The wound was closed completely, apart from a small drain at its lower extremity, which was removed on the second day. Complete healing was eventually obtained.

DISCUSSION

The history of the case suggests that a hæmatoma formed at the site of the first penicillin injection. This would explain the severe pain noticed at the time. Human blood is an excellent medium for the growth of tubercle bacilli, and early evidence of growth can be observed in two or three days.[1] We have observed that the addition of penicillin to laked human blood appears to improve the growth of tubercle bacilli. One of us has found in in-vitro experiments that this is especially so when the concentration of penicillin in the blood is low. The optimal concentration appears to be about 20 units per c.cm. When the concentration of penicillin is very high, this adjuvant effect disappears. Furthermore, by keeping the hæmatoma sterile, penicillin would prevent it from being overgrown with contaminants which would interfere with the growth of tubercle bacilli.

Regarding the source of the tuberculous infection, the most obvious and indeed the most likely solution is that it was introduced at the time of the injection. Tubercle bacilli might have gained access to the penicillin powder, the diluted penicillin solution, or the apparatus or needle used. The infection could have been conveyed by one of the people dealing with these. The two house-officers setting up the drip were radiographed with negative results, but a further endeavour to pin-point the source of infection after a lapse of months is likely to be profitless.

The other, less likely, possibilities are as follows:

(1) That a sterile hæmatoma formed at the site of the injection, which was infected from a transient tuberculous bacteræmia from some other source. This can be dismissed as a practical possibility, as we have been unable to find any evidence of tuberculosis elsewhere.
(2) That the injection activated a pre-existing localised focus of tuberculosis, such as a lymph-gland or a bursa. We regard this as equally unlikely, since no such structures are described in this position.
(3) That the infection tracked as a cold abscess from some distant source and was not connected with the penicillin therapy. We have conducted an exhaustive search in an endeavour to prove this happy solution, but clinically and radiologically we have been unable to do so. At this

1. Pryce, D. M. *J. Path. Bact.* 1941, **53**, 327.

stage it does not seem likely that such a hidden focus would remain obscure.

On the assumption that the infection was introduced at the time of the penicillin therapy, the incubation period, until clinical manifestations appeared, was about four months.

Our chief reason for publishing the case is to draw attention to this serious complication of penicillin therapy. We appreciate the fact that the probable solution lies in some flaw in the aseptic technique used, though it is possible that the infection gained access to the penicillin during its manufacture. Penicillin is now used so extensively that it is not unlikely that similar cases might occur. Knowledge of the possibility of this happening would lead, we hope, to added care in its administration. It should at least lead to a routine examination of post-penicillin abscesses with a view to excluding tuberculosis.

SUMMARY

A tuberculous abscess developed at the site of intramuscular injections of penicillin.

The infection took about four months to cause symptoms.

The source of the infection was in all probability either the penicillin or the apparatus for its administration.

Post-penicillin abscesses should be examined for evidence of tuberculosis.

The importance of aseptic technique in the administration of penicillin is emphasised.

Our thanks are due to Sir Claude Frankau, under whose care the patient was admitted, for permission to publish this case.

LIGHT-WEIGHT OXYGEN MASK OF PLASTIC MATERIAL

BASIL S. KENT
M.B. Lond., D.A.
LATE SQUADRON-LEADER R.A.F.V.R.
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THE mask to be described was primarily designed as a passengers' disposable oxygen mask for altitude flying in the Royal Air Force, but it should have a wide field of utility in anæsthesia and oxygen therapy.

Various materials were tried, such as rubber, paper (including paper impregnated with resins and plastics), cardboards, papier mâché, fabrics (including plastic-coated and doped fabrics), metals (notably aluminium), and plastics. As a result of these investigations polythene was considered to be the most suitable material. Polyvinyl chloride or cellulose acetate can be used but have some disadvantages.

CHARACTERISTICS OF POLYTHENE

Polythene, an odourless vinyl-type resin and a simple polymer of ethylene, was developed in this country by Imperial Chemical Industries Ltd. and is sold under the trade name of 'Alkathene.' It is a thermoplastic material which readily lends itself to both compression and injection moulding. Despite its delicate appearance and the thinness to which it can be moulded, it is very strong, pliable, and resistant to tearing, though extremely light. Owing to the inert nature of polythene, a mask made of it is virtually non-irritant and does not cause dermatitis, as rubber mouldings sometimes do. Polythene will burn, but less vigorously than rubber. It costs about 1*s.* 2*d.* per lb. Since a polythene face-piece weighs about $^1/_2$ oz., the material for each will cost about $^1/_2 d$. Polythene is 100% reclaimable—i.e., it can readily be remoulded and used again.

THE MASK

The mask consists of a thin polythene face-piece to cover the nose and mouth, incorporating a gauze-covered ventilation orifice and slots for a single elastic strap; a reservoir bag, into which oxygen is delivered through a fine inlet tube, is attached (figs. 1 and 2).

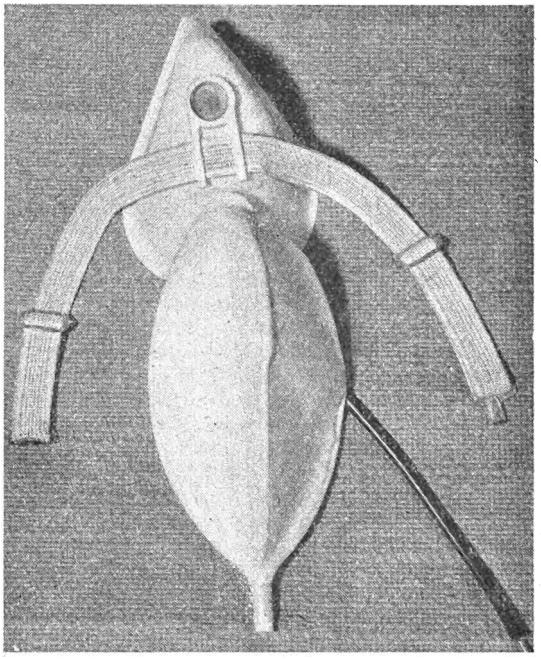

Fig. 1—Polythene mask and latex reservoir bag.

Face-piece.—The oronasal moulding has been designed to fit on the face and not over the face. The necessity for odd appendages has been eliminated, as the orifice operating as both inlet and outlet valves, the slots for the suspension strap, and the bevelled turret over which the reservoir bag is slipped are incorporated in the one moulding. The shape gives a reasonably curved and tapered bearing surface round the periphery. In designing a mask to fit the face, the measurement from the bridge of the nose to the tip of the chin (the nasion-menton) is most important; radiography shows (fig. 3) that in this axis the bearing points of the face-piece are directly over bone—the nasal bone above, and the tip of the mandible below—and that the face-piece has been shaped to stand well clear of the nasal contour, which varies widely from subject to subject. A comfortable visual field has been retained, and glasses may be worn with the mask in position. A suitable dead space—about 75 c.cm. on an average face—has been achieved. The orifice housing, the suspension slots, and the most forward point of the bevelled turret are in alignment, so facilitating packing and eliminating the projections which easily catch in aircraft fittings, bed-clothes, &c. This type of mask can be made in different sizes to suit children or adults.

The face-piece is made by injection moulding, hot liquid polythene being forced into a special mould under high pressure. Advantages of this method are rapidity of output by unskilled labour (about fifty times as fast as rubber moulding), cheapness, uniformity of shape, and a very low rejection-rate combined with economy of material, since all trimmings and rejects are reclaimable.

Ventilation Orifice.—A phosphor-bronze gauze (80–90 mesh) covering an orifice 11 mm. in diameter acts as both an inhalation and an exhalation valve. The resistance of this arrangement is so low as to be unnoticed even when no gas is flowing. It will adequately cope with high inspiratory and expiratory velocities. The position of the orifice does not cause overdilution of the inspired gases. Turbulence created by the gauze mesh is an advantage at high inspiratory and expiratory flows.

Suspension.—A single light-weight and readily adjustable elastic band passing just below the lobes of the ears (fig. 2) holds the mask in position. The simple ring-and-hook fastening permits of rapid removal with one hand (useful in cases of vomiting, &c.).

Reservoir Bag.—The thin latex bag is very similar to the B.L.B. design. Its patency is ensured by the position of the inlet tube, which holds its neck open (fig. 3). A drainage plug is provided in the bottom of the bag for the removal of excessive fluid due to condensation.

A conical bag made from thin ($^{6}/_{1000}$–$^{8}/_{1000}$ in.) non-toxic polyvinyl chloride sheet and sealed by heat in a high-frequency electric field may be used instead of the latex bag. The polyvinyl chloride bag is cheaper, stores indefinitely, and is less vulnerable; but the latex bag is more elastic.

Inlet Tube.—This is made by extrusion of polyvinyl chloride and has an internal diameter of $^{1}/_{8}$ in. The narrow bore and fine tube are an innovation which much reduces weight and bulk.

ADVANTAGES

Since the mask incorporates the reservoir-bag partial-rebreathing principle, it is economical in gas. In aviation it is efficient up to an altitude of 30,000 ft. in warm aircraft, maintaining a satisfactory oxygen saturation of the blood with the user at rest and on minimal standard oxygen flows.

Comfort.—The chief advantage in this mask lies in its lightness, the entire assembly weighing only $1^{1}/_{2}$ oz. The great reduction in weight adds enormously to the wearer's comfort, which is further enhanced by the smooth finish of the mask and the low resistance to breathing.

Fig. 2—Mask and bag in position.

Plasticity.—The plasticity of polythene varies imperceptibly with large changes of temperature; in this useful characteristic it is unlike plastics of the polyvinyl chloride group, which are renowned for variability of plasticity with fluctuations of temperature.

Sterilisation and Cleanliness.—The extremely low cost of the finished article enables it to be thrown away after use, thus overcoming the usual difficulties and inconvenience of sterilisation. This is particularly advantageous in cases of phthisis and infectious diseases of all types. If it is desired to retain the mask, it can easily be washed and treated with antiseptic solutions. Its smooth finish facilitates removal of sweat, dirt, and condensation.

Acoustics.—Because of the position of the ventilation orifice, conversation is well heard through the mask.

APPLICATION IN MEDICINE

The equipment can be used for routine oxygen therapy in the same manner as the well-established B.L.B. mask and with similar oxygen flows and consumption. For average cases the flow can be adjusted so that the bag remains a little inflated at the end of inspiration.

The mask is less conspicuous if the face-piece is made flesh-coloured or almost transparent. Attractive colours might be a boon in the pædiatric department.

The advantages of so light a mask on the face of a patient in extremis are obvious, the weight being less than a sixth of that of the standard B.L.B. design.

A similar type of transparent face-piece for anæsthetic purposes would provide a mask of less than a twelfth of the weight of those in current use. It would also enable the anæsthetist to observe through the mask itself whether the patient was breathing through nose or mouth, the colour of his lips, the squeezing and pinching of soft tissues, the position of the airway, &c.

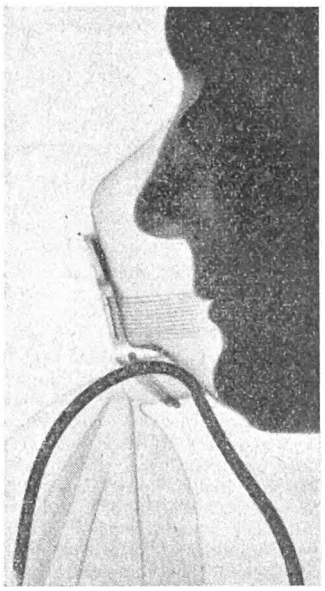

Fig. 3—Radiogram showing how the mask bears directly on bony points above and below, and how the inlet tube keeps the neck of the bag patent.

SUMMARY

A light-weight oxygen mask of new design, with a plastic (polythene) face-piece, though designed for aviation, could readily be applied to anæsthesia and oxygen therapy.

The complete assembly weighs only $1^{1}/_{2}$ oz. The face-piece is so cheap that it can be thrown away after use, is inconspicuous, and interferes little with conversation.

I am indebted to the Director-General, Medical Branch, Royal Air Force, for permission to publish this paper; to the Director of the Institute of Aviation Medicine, Farnborough, where the development was carried out; and to those colleagues who assisted, criticised, and encouraged, particularly Flight-Lieutenant A. J. Barwood and Flying Officer J. D. Wilson.

PICROTOXIN IN BARBITURATE OVERDOSAGE

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PICROTOXIN is now accepted as the drug of choice in the treatment of barbiturate poisoning. It is a powerful convulsant which acts mainly on the medullary centres, stimulating in particular the respiratory centre.

Duff and Dille (1939) have proved by animal experiments that picrotoxin rapidly disappears from the blood. Very soon after injection the blood-picrotoxin level falls and becomes steady in about 20 min. After 2 hours the quantity in the blood is negligible as picrotoxin is taken up by the tissues. For this reason the drug should be given either intravenously or intramuscularly in small doses and at short intervals—e.g., 15–30 min. Only in this way can an effective concentration be maintained in the blood.

Overdosage of picrotoxin manifests itself by convulsions, which can be countered by the slow intravenous

administration of a soluble barbiturate. In cases of barbiturate poisoning very large doses of picrotoxin have been administered with success. Kohn et al. (1938) report recovery after 671 mg. of picrotoxin had been administered in four days, and Richards and Menaker (1942) mention recovery after 1944 mg. The largest amount given appears to be 2134 mg. (Rovenstine 1938).

CASE-RECORD

A woman, aged 24, was admitted to hospital at 12.30 A.M. on April 6, 1945, completely unconscious and breathing stertorously. The pupils were of normal size, all the reflexes were absent, and the patient was flaccid. Her mother believed that the patient had taken about 50 pink tablets some $5^1/_2$ hours previously. The patient was last seen going to her room at 7 P.M. and was found at 7.30 P.M. lying unconscious on the floor. Part of a tablet was brought to hospital. It was presumed to be 'Soneryl' and this was later confirmed. Each tablet contained gr. $1^1/_2$ of soneryl. The patient worked as a packer at a nearby drug-manufacturing firm.

A stomach washout was immediately performed, but the fluid returned was clear. Picrotoxin 10 mg. was injected intravenously at once, but with no effect. A large amount of an aqueous solution of picrotoxin was then made up, and about 2 hours after admission intramuscular injections of 5 mg. doses were started. These were continued at 15-minute intervals throughout the days of the 6th, 7th, 8th, and 9th, except for a few short lapses of 2 hours each on the 8th and 9th. Fresh amounts of picrotoxin solution were prepared daily.

At 11.15 P.M. on the 9th the patient became restless and showed signs of returning consciousness. The picrotoxin was therefore discontinued. She relapsed, however, into unconsciousness, and the drug was started again 3 hours later. It was finally discontinued at 5.15 A.M. on the 10th, when she had definitely regained consciousness.

During her unconscious period she was fed nasally with small glucose feeds. The head of the bed was raised. She became febrile and chesty on the 8th. She was therefore put on sulphathiazole in full pneumonia doses, but this had little effect on the temperature, so it was discontinued after 3 days. On her return to consciousness she was found to have a right lower lobar pneumonia. This developed into an empyema. Rib-resection was performed, the empyema cleared up, and the right lung expanded fully. She then developed a left-sided empyema, for which she also had a rib-resection. The patient was discharged from hospital on Sept. 7, 1945, but continued to attend the outpatient department for dressings. She was finally discharged on Feb. 15, 1946. Radiography on that date showed clear lung fields.

She had confessed to taking 100 tablets—i.e., gr. 150—of soneryl on the night of her admission to hospital.

COMMENTS

This patient was unconscious for $4^1/_2$ days, during which time 1745 mg. of picrotoxin was administered by intramuscular injections, except the first dose, which was given intravenously. She appeared to tolerate the drug well, and it did not seem to have any adverse side-effects.

The development of the right-sided pneumonia must have been a consequence of her long period of unconsciousness. The left-sided pneumonia followed the operation for the first rib-resection.

Lumbar puncture with withdrawal of cerebrospinal fluid was not done deliberately, because I wanted to gauge fully the effectiveness of picrotoxin.

POSTSCRIPT

Since the above report was written, I have had to treat another case of gross barbiturate poisoning.

A woman, aged 38, was admitted unconscious to hospital at approximately 2 P.M. on June 17, 1946. The history suggested an overdose of 'Luminal' (phenobarbitone), and she afterwards confessed to having taken 40 luminal tablets, 18 soneryl tablets, and 4 'Nembutal' capsules at about 10 P.M. on the previous night. She had therefore been unconscious for at least 14 hours before admission.

She was deeply comatose and flaccid, and all reflexes were absent, including the pupillary light reflex and the corneal reflex. She was given three ampoules of nikethamide (1·25 g.) intramuscularly and later 10 mg. of picrotoxin intravenously, but did not respond. Regular doses of picrotoxin—5 mg. every fifteen minutes, intramuscularly—were commenced at 4.15 P.M. on June 17 and continued until 5 P.M. on the 20th except for short intervals when the patient seemed to be regaining consciousness. On the evening of the 20th she became very restless and was almost fully conscious. All her reflexes were present. Picrotoxin was therefore discontinued. By next day she was fully conscious and was able to speak rationally. Nasal feeding was then stopped.

On June 19, while she was still unconscious, she became febrile and "chesty," with bilateral basal crepitations. She was put on sulphapyridine in full pneumonia doses by intramuscular injection. She responded well to this and it was stopped on the 25th. Radiography of the chest on the 21st suggested slight consolidation at both bases but on July 5 the lung fields were clear. She was then discharged from hospital.

Throughout her period of unconsciousness she was nursed with the head of the bed raised, and was fed by nasal tube.

In this case the patient was unconscious for about 14 hours before treatment was started, and received a total of 1020 mg. picrotoxin in three days.

My thanks are due to Dr. E. Miles, medical superintendent, for permission to publish these cases, and to Mr. R. E. Frizzell, the hospital pharmacist, for his help in making up the large quantities of picrotoxin solution required.

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Medical Societies

TUBERCULOSIS ASSOCIATION

ON July 19, the second day of the association's Oxford meeting, with Dr. NORMAN TATTERSALL, the president, in the chair, a discussion on the

Relationship between Primary and Adult Pulmonary Tuberculosis

was opened by Dr. HANS USTVEDT (Norway), who said that the divergent views on the subject were due largely to national variations in the epidemiological picture. The dogma of universal childhood infection had been killed by the agreement at the 1937 Lisbon conference that primary infection now occurred chiefly during puberty and early adult life. With good conditions for observation it was found that about a third of primary infections were accompanied by demonstrable signs. Differences between children and adults were not great; though there was a malignant type, primary infection often had a benign course. On the other hand, destructive adult tuberculosis had had a characteristic maximum between the ages 15 and 30, though this was apparently being levelled off throughout adult years. Tuberculosis dissociated from immediate primary infection originated (apart from the probably few cases of superinfection) in reactivated latent foci or in "postprimary" metastases from foci in lymph-glands or other organs. The interval between primary and postprimary disease was in most cases under 5 years, and was often only 1–2 years. Scandinavian figures, using erythema nodosum as an index of the start of infection, showed that the morbidity curve of serious disease had a high peak in the first five years, and especially in the first year. Pleurisy most often appeared within six months, and there was a large concentration of disease in the years immediately following the pleurisy. Norwegian statistics also showed that the steep rise in the morbidity and mortality curves nearly synchronised with the age-group at which the number of new infections was greatest and the five-year period thereafter.

Theoretically, destructive pulmonary tuberculosis could develop directly from the primary focus or its immediate neighbourhood by breakdown, or it could start from a new focus in another part of the lung. Outside Norway much emphasis had been placed on the latter method; Radeker's "Frühinfiltrat," which was usually subclavicular, was not compatible with the theories of development from tiny apical foci, and his claim that it was due to superinfection was not buttressed by adequate tuberculin testing, and

there was much to suggest that the focus he described arose from primary infection. As Scheel and Heimbeck had emphasised in 1928, the problem must be solved by repeated examination of individuals with primary infections. In 1938 Malmros and Hedvall had claimed that phthisis started in small or moderate-sized cloudy spots, which were often multiple and might originate in the supraclavicular region and/or in the first intercostal space. In 1944 Frostad had shown that of 135 cases of phthisis 48 had developed directly by breakdown from the primary focus or its immediate vicinity; in many cases he had demonstrated cavitation in the primary infection area. By a series of X-ray examinations, he had also shown in 11 cases that the quiescent primary focus was reactivated after a long interval, breaking down into destructive pulmonary tuberculosis: in others destructive pulmonary tuberculosis developed from an entirely new infiltration at another site.

Dr. Ustvedt said that phthisis could develop in the following ways: (1) direct from the primary lesion or its neighbourhood; (2) by reactivation of latent primary foci; (3) from metastatic foci of hæmatogenous, lymphogenous, or bronchogenic origin; or (4) through new foci of superinfection. It was thus important to detect primary infection, and to observe it carefully for the first few years.

Dr. S. ROODHOUSE GLOYNE (London) asked whether individual morbidity was related to the typical mortality curves. There was evidence that many primary infections occurred outside childhood. To recall Koch's phenomenon, the most significant part was the necrosis—the cardinal sign of the reinfection—and this could be produced with a large enough dose in the primarily infected guineapig, in which the naturally progressive disease was its own sensitising agent. But had the phenomenon any relation to haphazard infection in man? There were two schools of thought. According to one, man was infected only once in his lifetime and subsequent tuberculous disease resulted from the maintenance of the original infection. The other held that fresh infection was possible, but paid little heed to the fate of the all-important original dose.

Precise knowledge of the time-sequence in the "post-primary" phase was lacking. Perifocal satellite lesions around the primary focus spread to the lymphoid follicles in the walls of the small bronchi. The disease might then become indolent or quiescent or it might progress until a small caseous lesion ulcerated into a bronchus; this marked the end of the postprimary stage and the beginning of the chronic bronchogenic excavating lesion of the adult, of which the outward sign was sputum. On the whole, the evidence for the complete healing of the primary complex in childhood was not conclusive, though abdominal and, still more, cervical primaries tended to heal.

Terplan had shown that age of onset did not necessarily influence the anatomical appearances of primary infection. He had also collated a series of post-mortem records in which the first infection was represented by a fully calcified complex whilst another complex of a fresh infection was also present. He had, moreover, recorded cases with primary foci and foci of true exogenous infection.

The most difficult lesions to assess in the adult were the three types of solitary spherical foci: (1) Assmann's, a caseous pneumonic infraclavicular lesion; (2) the circular focus of Fraenkel confined to no special area of lung; and (3) the pulmonary tuberculoma, probably of similar structure to (2). As to the possible causes—metastatic deposits, blocked bronchi, and unusual primary foci—he had seen lesions which corroborated the last two, but observation had not convinced him that hæmatogenous metastasis was a valid explanation.

The terms "endogenous" and "exogenous" should, he suggested, disappear. Along with the changing incidence of the disease and the age of onset, the pathological picture also appeared to be altering. At least five types of lesion could be identified: (1) the childhood primary focus which heals; (2) the childhood focus which smoulders until cavity formation in later life; (3) the childhood lesion which progresses to bronchopneumonia and death; (4) the primary focus in a previously tuberculin-negative adult; and (5) the healed childhood lesion with adult reinfection of primary type, the latter either also healing or progressing to destructive disease.

Dr. A. MARGARET MACPHERSON (London) described a follow-up of 729 children (over 600 for five or more years), of whom only 7 had developed adult pulmonary tuberculosis. She had been impressed by the number of adolescents with early adult infection, with either a calcified primary lesion or a recent primary focus. Characteristically these patients had no constitutional disturbance, a normal B.S.R. and weight, and a negative family history; glandular enlargement seldom occurred with the lesion, which was in the upper third of the lung and tended to develop into typical pulmonary tuberculosis.

Dr. WALTER PAGEL (Middlesex) decried the importance of exogenous infection. There were two main types of phthisis, following either (1) immediately after the primary complex, or (2) after an interval. His series suggested that the former accounted for about 25% of cases. On the other hand, he felt that small post-primary foci did not sterilise themselves as easily as the lesions of the primary complex.

Prof. W. H. TYTLER (Wales) said that the question would be clarified by large-scale statistical studies; exhaustive pathological investigation restricted the number of cases that could be tackled. The frequency with which primary infection was delayed till young adult life was increasing, but varied in different countries. It appeared that at the Phipps Institute many tuberculin-positives became negative, provided that their original infection had resulted from "no known contact." Did such persons who had lost allergy retain some immunity?

Dr. USTVEDT replied that morbid anatomy was not the most reliable line of approach. The problem of the negative reactor was important, but undoubtedly allergy could be separated from immunity. The form of tuberculosis varied in different countries; in Britain the frequency of calcareous shadows was an impressive feature.

ASSOCIATION OF CLINICAL PATHOLOGISTS

THE association's summer meeting at Oxford on July 26 and 27, under the chairmanship of Dr. S. C. DYKE and Dr. A. H. T. ROBB-SMITH, was opened by Dr. R. WINSTON EVANS (Manchester) with a paper on *Observations on Sickle-cell Anæmia* based on experience in West Africa. Sternal marrow from 20 cases showed that specific changes were not present in the early cells and only occasionally in reticulocytes and normoblasts—i.e., sickling only took place with ease after loss of the nucleus. Sealed, moist preparations typically showed expansion, tenseness, and filamentous extensions 6–8 hours before sickling, and then an explosive onset. Among 600 fit soldiers subjected to routine testing there had been an overall incidence of 19·9%, with the highest—30%—in the Gambians. The clinical findings varied, and might include leg ulceration, which suggested that the sickling was really not the primary lesion but merely superadded to other diseases. Discussion showed general agreement that oxidation-reduction was the important factor, producing sickling in 10–15 minutes, whereas alteration in pH alone had no influence.

Dr. E. JACOBSEN (Copenhagen), discussing *Reticulocytes and their Humoral Regulation*, said that if reticulocytes were kept in saline at 40° C there was no drop in their number in 6 hours, whereas when liver was added the reticulocytes ripened very quickly. The liver principle he divided into two parts—a thermolabile fraction absorbed by florodin, and a thermostable fraction not absorbed. The thermolabile portion was a xanthine, of which folic acid was probably a part; stomach tissue also contained a good deal of the thermolabile fraction. Organs of different animals had different amounts of ripening substance, those with few reticulocytes having the highest ripening value while those with many reticulocytes had a low value. He suggested that increased reticulocytosis might therefore not necessarily mean an increased output from the bone-marrow, but might indicate a decrease in the ripening factor.

Dr. S. WRAY (Harrogate), in a paper on *Acid Phosphatase* based on 25 cases of prostatic carcinoma, explained the method of estimation and its increase in prostatic carcinoma; it was probable that maintenance doses of

œstrogens would be necessary for the rest of the patient's life.

In a discussion on the *Reliability of Clinical Hæmoglobinometry* Dr. R. G. MACFARLANE (Oxford) showed how in a series of investigations a 20% difference between two examiners had occurred. Eight men and eight women had been chosen—four trained and four untrained men and the same in the women. Heparinised blood was tested by sixteen methods on sixteen samples by sixteen observers. The results showed no real agreement between the different methods and the base line of the National Physical Laboratory, in which iron is estimated by King's method. The conclusions on the significant errors were that differences of 4% were significant with any one observer and 5% with any two observers. Dr. I. D. P. WOOTTON (London) showed that colorimetric methods agreed more closely with iron estimations than did gas analysis; it was suggested that grey wedges should be used, calibrated directly in grammes of hæmoglobin. Dr. MACFARLANE suggested that the original N.P.L. standard of 13·8 g. per cent. was too low and that 14·7 g. per cent. should be accepted as the standard 100% hæmoglobin.

Dr. JANET VAUGHAN (Oxford) spoke on the *Incidence of Homologous Serum Jaundice after Transfusion* from observations at the North-west London Transfusion Depot. Of 2040 patients followed up five months after transfusion, only 1084 could be included in the series; of these, 77 (7·3%) had developed jaundice. In a control group no cases of jaundice occurred. The incubation period after transfusion was 50–150 days, with the majority between 60 and 100 days. All cases were mild in contrast to other centres, where several deaths had been reported. Fewer cases followed whole-blood transfusion than plasma or serum, probably because this was pooled. Serum for prophylactic purposes should not be pooled, and for transfusion only the smallest pools should be used; and all blood products should carry an identification number, so that records could be easily checked.

Reviews of Books

Control of Pain in Childbirth

(2nd ed.) CLIFFORD B. LULL, M.D., F.A.C.S., clinical professor of obstetrics, Jefferson Medical College; ROBERT A. HINGSON, M.D., surgeon U.S. Public Health Service, director, postgraduate medical course, Philadelphia lying-in unit, Pennsylvania. London: W. Heinemann. Pp. 348. 42*s*.

THIS book could be read with advantage by every obstetrician in this country, and by every anæsthetist who attends obstetric cases. All practitioners who do midwifery would find it helpful. We are a long way behind the United States in obstetric analgesia and anæsthesia, and Professor Lull and Dr. Hingson stimulate us to improve our own well-tried techniques, if not to expand the scope of our obstetric analgesia. They have written a good and comprehensive section on anatomy and physiology, and they review and assess all known methods of anæsthesia and analgesia, using clear and attractive diagrams to illustrate the action of each drug on the various systems. They have a proper bias towards local and caudal anæsthesia, and put in a strong plea for the use of continuous spinal anæsthesia. These methods have much to recommend them; but British obstetricians have never liked them and so get disappointing results. Let them read this book carefully and try again. There are good chapters on analgesia in domiciliary midwifery, neonatal resuscitation, and anæsthesia in cæsarean section. We have no comparable volume by British authors.

A Handbook of Social Psychology

KIMBALL YOUNG, professor of sociology, Queen's College, New York. London: Kegan Paul, Trench, Trubner. Pp. 578. 21*s*.

NOBODY questions the importance of social psychology, but many doubt whether it yet has independent scientific status. Prof. Kimball Young's exposition partly answers such doubts, but contains too much discussion and too little experiment to allay them wholly. In a field which touches daily life so closely, a textbook must do more than state, examine, illustrate, and organise matter which is within everyone's knowledge; and the well-informed reader will require that it should enable him to correct his erroneous beliefs, and to enlarge the stock of facts and generalisations through which he can predict the outcome of known circumstances. This the book does insufficiently, in spite of the author's wide range, critical erudition, and lucid grasp. There are three main divisions: the first deals with basic relations of personality to society and culture, the second with human conflict, and the third with mass behaviour. In the first there are chapters on animal behaviour, drives and emotions, factors in learning, the mechanism of personality, stereotypes, myths and ideologies, and dominance and leadership. Prejudice, revolution, war, and morale are expounded in the section on human conflict; problems of crowd behaviour, fashion, public opinion, propaganda, and power make up the final division of the book.

Cardiovascular Disease in General Practice

(2nd ed.) TERENCE EAST, D.M. Oxfd, F.R.C.P., physician-in-charge of cardiological department, King's College Hospital, London. London: H. K. Lewis. Pp. 198. 12*s*. 6*d*.

UNLIKE most of his fellow authors, Dr. East has succeeded in bringing out a new edition of his book which is actually shorter than the original. This is typical of his approach to his subject: he restricts himself to aspects of cardiology important to the man in practice. No unnecessary words are used; indeed at times the style is almost telegraphic. The teaching is essentially sound, though many will deprecate the choice of cæsarean section for delivery of the mother with heart-failure. Pruning of the section on anæmia and heart disease would have left room for fuller exposition of the important subject of heart disease in old age.

Howell's Textbook of Physiology

(15th ed.) Editor: JOHN F. FULTON, M.D., Sterling professor of physiology, Yale University. London: W. B. Saunders. Pp. 1304. 40*s*.

THE editor of this edition of the well-known book originated by Howell has delegated many sections to different writers. In the main, it is a sound exposition of the subject with a strong physical bias; thus, there are good chapters on hæmodynamics, and on muscle-nerve physiology and electrical changes in the heart. The nervous system is also unusually well treated, and the section on the circulation is full of fundamental information. Many students will feel the book is worth having for these sections, which occupy more than two-thirds of it. The remainder is also good, but respiration, metabolism, nutrition, excretion, and reproduction are not dealt with in the same detail, and there is no separate section for the endocrine organs. When as many as 40 pages are allotted to the electrocardiogram and its interpretations, this seems parsimonious. In spite of these criticisms, which are chiefly of imbalance—a defect almost inseparable from multiple authorship—the book reaches the status of a standard work.

Experiments with Mammalian Sarcoma Extracts

in regard to cell-free transmission and induced tumor immunity. CARL KREBS, OSKAR THORDARSON, JOHANNES HARBO, from the Aarhus Kommune Hospitals Röntgen and Lysklinik. Translated by Robert Fraser. Pp. 96.

THESE further studies of the Krebs, Rask-Nielsen, Wagner sarcoma were undertaken to find out if this tumour is produced by a virus and is capable of cell-free transmission, and also in an attempt to increase the resistance of mice against inoculation with tumour cells. Neither object has so far been attained, but the value of this work lies in the detailed description of the procedures adopted. Cell-free transmission of mammalian sarcomas has on occasion been successful, but never repeatable at will. It seems therefore that the crucial factor has been some neglected trifle or totally unsuspected condition. These authors record one experiment only in which cell-free transmission may have occurred. They conclude that they have no evidence to support the hypothesis that mouse leukosis is caused by a virus.

THE LANCET

LONDON: SATURDAY, SEPT. 14, 1946

B.C.G.: the Next Phase

By his social experience through the centuries, European man has acquired a fair resistance to tuberculosis; but until the introduction of B.C.G. vaccine the bacteriologist had failed to add one cubit to its stature. From the "brownish-clear fluid which is durable in and for itself," which Koch called tuberculin, to the bacillus which Calmette and Guérin isolated from "lait du Nocard," the tale of these vaccines is a long one, and it is written in the textbooks for those to read who wish. But most of these vaccines belong to the past; they are dead, both metaphorically and literally, excepting only B.C.G.

Introduced by Calmette shortly after the first world war as a means of protecting children born in tuberculous households in Paris, B.C.G. vaccine has passed through several critical phases. Oral administration, which was first employed, was too haphazard and came to a dramatic end under the opprobrium of the Lübeck affair, for which it was not in fact responsible. Subcutaneous and intracutaneous inoculations followed, but caused many cold abscesses at the site of inoculation. Quite recently B.C.G. has successfully negotiated the trial of two new transcutaneous methods—a scarification and a multiple-puncture technique. As to its real efficacy, many international discussions have raised the temperature amongst the critics, and no useful purpose would be served at this late stage by going over all the arguments which concerned the experts in the Health Organisation of the League of Nations. Four facts, however, stand out from the mass of official reports and protocols of experiments: (1) the Calmette-Guérin bacillus is harmless to man; (2) inoculation with it increases resistance to tuberculosis; (3) the degree and duration of this immunity have not yet been precisely determined; but (4), like the immunity conferred by other bacterial vaccines, it is not permanent.

An impressive array of information collected from various parts of the world has recently been set forth by the European regional office of UNRRA [1] and in a memorandum, prepared by Prof. W. H. Tytler,[2] which has been presented to health departments jointly by various tuberculosis organisations.[3] These bodies have made it clear that informed opinion is now in favour of a clinical trial of B.C.G. in this country, and they also advocate a single source of supply under official control. Because of the earlier bacteriological reports on the unstable virulence of the bacillus, and because of the Lübeck incident, stress has rightly been laid on the care with which the vaccine should be prepared by the laboratories. When a vaccine is made of living micro-organisms, almost as much concern, however, should be felt about its care when it is no longer under the watchful eye of the bacteriologist who has prepared it.

The subcutaneous and transcutaneous methods of giving B.C.G. have been pioneered chiefly in Scandinavia. The Norwegians began with tuberculin-negative nurses and then went on to immunise groups of the general population. Later B.C.G. was introduced for the Norwegian forces in Britain, and between 3500 and 4000 were inoculated. This group deserves special mention because it is the only large body of persons immunised while living in this country; but so far as we know the results have not yet been published. It has been claimed that the vaccine "gives a standardised innocuous primary infection," but the UNRRA bulletin emphasises what is regarded as a contra-indication to its use—namely, a latent allergy in the individual. It points out that

> "In Scandinavia nurses undergoing B.C.G. vaccination are completely segregated; there is an ante-vaccinal period of isolation, during which all the requisite preliminary investigations are made, viz., tuberculin testing, radiography, ascertainment of home conditions to eliminate the possibility of recent infection. Thereafter the vaccination is carried out and, one month later, the individual is tuberculin tested. Should the reaction prove negative, the individual is segregated for another month and again tuberculin tested."

If these difficulties have been overcome in Norway, there is no reason why they should not be tackled here, but with the present shortage of staff they will not be easily surmounted. The memorandum presented to the health departments advocates a trial—purely voluntary—with selected groups of people who are exposed to unusual risks of tuberculous infection. Those who work in hospital—medical students, nurses, and domestics—come to mind at once; and these groups certainly lend themselves to medical supervision, though not all their members are employed very long in one place. In the industries with a high incidence of tuberculosis it might be less easy to arrange appropriate trials; while children in tuberculous households in this country do not in general run such serious risks as they did in Paris when the vaccine was introduced. The primary object of an inquiry should be to determine whether B.C.G. vaccine will give in Britain the satisfactory results claimed for it in Scandinavia, in Canada, and in some other parts of the world. It should be borne in mind that tests on a small scale in New York, where the conditions more closely resemble those of the large British cities, have not been strikingly favourable: moreover, the clinical picture of tuberculosis varies in different countries, racial resistance differs, and neither social circumstances nor anti-tuberculosis measures are the same. Granted therefore that the vaccine is efficacious, it will not necessarily produce dramatic results in this country where infection is already under fair control, and where spontaneous arrest of the disease is very common: it is more likely to do conspicuous good in the devastated and hungry parts of Europe where ordinary precautions have broken down and cannot be restored for a long time; or in the tropics. There are some, indeed, who consider it mere wishful thinking to suppose that prophylactic vaccination will hasten

1. *Bulletin of Communicable Diseases and Medical Notes*, 1946, 4, 708.
2. Memorandum on B.C.G. prepared for Tuberculosis Association, Joint Tuberculosis Council, and National Association for the Prevention of Tuberculosis, 1946; see *Lancet*, July 27, p. 138.
3. See *Lancet*, July 27, p. 125.

the slow disappearance of tuberculosis from our midst, and even fear that it may deflect us from more fundamental efforts at eradication. As Prof. ARNOLD RICH has pointed out, however, a disease which still kills twice as many individuals as any other during the productive period of life cannot be regarded as nearly defeated. There is as yet no easy way to victory over so inveterate an enemy, but it is not too much to hope that immunisation, if wisely handled, will prove a useful weapon.

The clinical trial of B.C.G. which we hope soon to see in this country should be placed in the hands of a body such as the Medical Research Council which has the experience, equipment, and personnel for work on a sufficient scale. Only the most carefully compiled figures in significant quantity will satisfy the statisticians. The question also arises whether it should be confined to B.C.G. The vole bacillus discovered by A. Q. WELLS shortly before the war [4] is running the Calmette-Guérin organism very close, and BIRKHAUG's latest experiments suggest that in animals its immunising properties are as high.[5]

Excision of the Head of the Pancreas

HOPES of a radical treatment for carcinoma of the pancreas were first raised in 1899 when HALSTED excised a segment of the duodenum and part of the pancreas for an ampullary growth; but progress was sporadic until, in 1935, WHIPPLE, PARSONS, and MULLINS [6] initiated a systematic study. Since then reports of excision of the duodenum and pancreatic head for carcinoma have become almost commonplace in America.

Apart from the rare islet-cell tumour, malignant growths of the head of the pancreas may be classified according to their site in two main varieties: carcinoma of the ampulla of Vater or its immediate tributaries grows slowly and gives rise to early jaundice, whereas carcinoma of the head of the pancreas proper is more common, more malignant, and gives rise to jaundice somewhat later. A radical resection of either type necessitates removal not only of the pancreatic head but also of the duodenum, because the lymphatic and blood supplies of the two organs are inseparable. So bold an extirpation (involving as it does the division and repair of the intestinal, biliary, and pancreatic tracts) would scarcely be possible without the recent advances in chemotherapy, the discovery of vitamin K, and the excellence of resuscitative and anæsthetic techniques. The problems of the actual excision are anatomical and are largely concerned with avoiding damage to blood-vessels essential to life. The repair which follows has its special difficulties. The thorniest is the treatment of the pancreatic stump; this continues to secrete the most powerful proteolytic enzyme in the body, and mere closure of the cut end has led, through sloughing and digestion of damaged tissues and sutures, to external fistulæ and—still worse—to internal leaking. What remains of the pancreas must therefore be anastomosed to the jejunum, into which it can secrete. The new anastomoses of the biliary and pancreatic tracts to the intestine have no sphincters, and their ostia must therefore be kept away from the main stream of digesting food; unless this is contrived, by admitting bile and pancreatic juice to the jejunum proximal to the gastric opening, ascending cholangitis and pancreatitis will result from reflux of food up the respective channels and the proximal jejunum will be denied the protection from the gastric juice provided by an alkaline flow from above. Opinion differs as to whether radical pancreatoduodenectomy should be done in one or two stages. The advocates of the one-stage operation argue that the double risk of two operations is avoided, that vascular adhesions at the second and more difficult stage are sidestepped, and that the patients, though deeply jaundiced, can be carried safely through by sufficient preparation, particularly with vitamin K. The two-stage protagonists hold that these patients are too ill to stand a major procedure without preliminary biliary decompression; they do not find adhesions a problem at the second stage if the gall-bladder is anastomosed to the jejunum.

WHIPPLE, [7] doyen of pancreatic surgeons and an advocate of the one-stage operation, has lately distilled his wisdom in a formula for the operation. For an ampullary growth the abdomen is entered through a right rectus incision from the costal margin to the umbilicus. After a general survey, the peritoneum is incised to the right of the duodenum, which is elevated to determine the mobility of the pancreatic head, and the configuration of the uncinate process is studied. If the growth appears operable, the common bile-duct is divided behind the duodenum. The stomach is transected proximal to the pylorus, and the origin of the gastroduodenal artery from the hepatic artery revealed, ligated, and cut. The duodenum is divided proximal to the duodenojejunal flexure (this stage must be modified if the uncinate process encircles the superior mesenteric vessels); and the inferior pancreaticoduodenal artery is secured. The pancreas is cut across at the junction of the head and the body, and the splenic vessels, portal vein, and superior mesenteric vessels are dissected off, drawing the pancreatic head to the right. The pylorus, duodenum, lower end of common bile-duct, and head of pancreas are now removed en bloc. A loop of jejunum is brought up and anastomosed to the stomach, pancreatic stump, and cut lower end of bile-duct, from below upwards, so that the gastric opening is the most distal in the jejunum. It seems easier than might be supposed to insert a small rubber tube into the pancreatic duct which is dilated from obstruction, and to thrust the tube through a small hole into the lumen of the jejunum; the cut edge of pancreas is then sutured to the jejunal wall. A drain is inserted and the abdomen closed. WHIPPLE attaches great importance to the use of silk throughout the operation, because catgut is readily digested by any escaping trypsin; and he thinks that the gall-bladder should never be used to anastomose the biliary tract to the intestine—an unavoidable expedient in the two-stage operation.

What are the results? WHIPPLE in 1945 [8] reported that he had done 8 two-stage operations with an

4. Wells, A. Q. *Lancet*, 1937, i, 1221, 1233.
5. Birkhaug, K. *Amer. Rev. Tuberc.* 1946, **53**, 411; see *Lancet*, July 6, p. 17.
6. Whipple, A. O., Parsons, W. B., Mullins, C. R. *Ann. Surg.* 1935, **102**, 763.
7. Whipple, A. O. *Surg. Gynec. Obstet.* 1945, **82**, 623.
8. Whipple, A. O. *Ann. Surg.* 1945, **121**, 847.

immediate case-mortality of 38%, and 19 one-stage operations with a mortality of 31%, 22 of the operations being for carcinoma and all deaths occurring in this group. CATTELL,[9] who favours a two-stage technique for jaundiced patients, has reported 13 two-stage and 5 one-stage operations with 3 immediate deaths—an overall mortality of 17%. It is too early to assess the remote results, but, as might be expected, patients with growths of the ampulla seem to do better than those with growths of the pancreatic head. At least these figures falsify the physician's ancient gibe that the only effect of surgery in pancreatic carcinoma is to let the patient die a better colour.

It would be idle to pretend that American experience of these operations is not greater than ours, but only a perverse and foolish modesty would ignore the work of British surgeons. ILLINGWORTH,[10] GORDON-TAYLOR,[11] MAINGOT,[12] and WATSON[13] have between them recorded 8 cases with 2 deaths, all the successes being with the two-stage operation. This year D'OFFAY,[14] in a hitherto unpublished address to the Royal Society of Medicine, described what appears to be the first successful one-stage radical operation in this country, as well as 2 other cases, one of whom died. D'OFFAY emphasises the accuracy of Courvoisier's law in the differential diagnosis of carcinoma and stone, provided that the law is applied after actual inspection of the gall-bladder through a peritoneoscope rather than by abdominal palpation. PANNETT[15] has also reported 2 successful one-stage operations. The history of the radical operation for pancreatic carcinoma shows that bold thinking has once more confounded those who contend that surgical technique has reached its zenith.

Efficacy of the Penicillins

IT has been known for some time[16] that there are several chemically different penicillins whose structures have a common nucleus, but differ in the nature of a side-chain R. So far five different penicillins have been isolated in the crystalline state from culture media of moulds. Four of these, which have been studied in greater detail than the fifth, are now called penicillins F, G, X, and K in the United States, whereas in Britain they are known as penicillins I, II, III, and IV, according to the historical sequence of their discovery; it is hoped that this confusing nomenclature will soon be replaced by a more congruous chemical terminology. The side-chains R of the different penicillins have the following chemical structures:

For penicillin I (F) C_5H_9 (2-pentenyl)
" " II (G) $C_6H_5CH_2$ (benzyl)
" " III (X) $OH.C_6H_4.CH_2$ (*p*-hydroxybenzyl)
" " IV (K) C_5H_{17} (*n*-heptyl)

The four different penicillins affect the same range of bacteria, but differ quantitatively in their antibacterial power in vitro. Thus, if we assign a value of 100 to the antibacterial activity in vitro of penicillin II (G), the relative values for penicillins I (F), II (G), III (X), and IV (K) are 90, 100, 55, and 140 against the strain of *Staphylococcus aureus* used for routine assays of penicillin (in international units per mg. the figures are 1550, 1667, 900, and 2300); against a strain of hæmolytic streptococcus the values are 82, 100, 140, and 120, and against a cultured strain of *Spirochæta pallida* Reiter 53, 100, 50, and 75.[17] The chemotherapeutic efficacy of the penicillins, however, like that of all other chemotherapeutic agents, depends not only on their activity in vitro but on a series of other factors, such as absorption, excretion, destruction in the body, &c. It is therefore not possible to predict their effectiveness in vivo solely on the basis of the figures for their antibacterial activity in vitro. Recent evidence shows that penicillin IV (K), notwithstanding its high antibacterial action in vitro, is much less efficacious in vivo than penicillin II (G). Thus, in the treatment of *Streptococcus pyogenes* infections in mice, penicillin IV (K) was only 1/11th as effective as penicillin II (G) and only 1/30th as effective as penicillin III (X), and in the treatment of pneumococcus type I infections in mice penicillin IV (K) was only about 1/6th as effective as penicillin II (G) and 1/8th as effective as penicillin III (X).[17] Similar results were obtained in the treatment of experimental syphilis in rabbits. Here various independent investigators[18] found penicillin IV (K) to be only about 1/10th as effective as penicillin II (G). The explanation seems to be that penicillin IV (K) is subject to greater destruction in the body than the other penicillins. This conclusion must be drawn from the fact that after intravenous or intramuscular injection the blood-levels with penicillin IV (K) drop more rapidly than with the other penicillins, while the proportion of the injected penicillin that is recoverable from the urine is much lower with IV (K) than with the other penicillins,[17 19] the figures being about 30% and 80%.

The finding that penicillin IV (K) is less efficacious chemotherapeutically than the other penicillins is of considerable practical importance since commercial penicillin is a mixture of different penicillins with an undefined proportion of penicillin IV (K). The amounts of the different penicillins in the commercial products depend on the strain of mould used in production and on the composition of the culture medium. Strains used by manufacturers up to 1944 yielded predominantly penicillin II (G), but since 1944 a change has taken place in the commercial penicillin preparations, leading to a fall in their content of II (G) and a rise in IV (K). Strain Q176, which is now used by most penicillin manufacturers because it gives the highest penicillin yield, is known to produce under certain conditions a considerable proportion of IV (K). A statistical comparison has shown that the results of treatment in early syphilis with penicillin preparations manufactured before 1944 were decidedly better than those obtained with penicillin manufactured in 1944–46. There may be other causes for this than simply a change in the proportion of penicillin IV (K). Since 1944 the purity of the commercial penicillin preparations has increased considerably. DUNHAM and RAKE[20] have produced evidence to show that

9. Cattell, R. B. *New Engl. J. med.* 1945, **232**, 521.
10. Illingworth, C. F. W. *Edinb. med. J.* 1939, **46**, 331.
11. Gordon-Taylor, G. *Brit. med. J.* 1942, ii, 119.
12. Maingot, R. *Lancet*, 1941, ii, 798.
13. Watson, K. *Brit. J. Surg.* 1944, **31**, 368.
14. d'Offay, T. M. J. Address to Royal Society of Medicine, April 3, 1946.
15. Pannett, C. A. *Brit. J. Surg.* 1946, **34**, 84.
16. See Leading Article, *Lancet*, 1946, i, 539.
17. Eagle, H., Musselman, A. *Science*, 1946, **103**, 618.
18. Committee on Medical Research, the U.S. Public Health Service, and the Food and Drug Administration. *J. Amer. med. Ass.* 1946, **131**, 271.
19. Coghill, R. D., Osterberg, A. E., Hazel, G. R. *Science*, 1946, **103**, 709.
20. Dunham, W. B., Rake, G. *Amer. J. Syph.* 1945, **29**, 214.

impure penicillin preparations are more efficacious than crystalline preparations in the prophylaxis of experimental syphilis. It is conceivable—though by no means proved—that during the far-reaching purification of penicillin now carried out an impurity is removed which exerts a synergistic effect on the treponemicidal action of penicillin. In any case it is desirable to keep down the proportion of penicillin IV (K) in commercial preparations to a minimum. Fortunately it appears to be possible to influence the course of penicillin fermentation induced by the strain Q176 in favour of the production of penicillin II (G) by the addition of specific precursors. In future, producers will have to adopt more comprehensive methods of assay. The usual biological method of assaying penicillin preparations, based on their in-vitro activity against *Staph. aureus*, is, in conjunction with toxicity tests, the only criterion now commonly used for their clinical value. This will have to be supplemented by an analytical method which will reveal their quantitative content of the different penicillins.

Annotations

TWELVE-AND-SIX A HEAD

THE controversy between the Ministry of Health and the Insurance Acts Committee over the current N.H.I. capitation fee, on which we commented in our issue of August 3 (p. 166), has been carried some important steps farther. Despite repeated representations by the committee, the Minister has persisted in his view that the adjustment of the current capitation fee and the assessment of the proper mode and amount of remuneration in the new National Health Service are questions which interlock so closely that they cannot be considered separately. The committee, neither accepting this view nor being empowered to take any part in negotiations for the future service, found itself unable to meet the Minister for the discussions for which he asked, and, in default of negotiation, the Minister has now made his proposed award of an increase of 2*s.* in the capitation fee, to 12*s.* 6*d.*, with retrospective effect from Jan. 1, 1946. This he announced in the public press on August 24.

The Insurance Acts Committee met on Sept. 5 to reconsider its position, and it has decided that it can regard this award only as an interim payment and in no way as a final settlement of the long-standing claim of the panel doctor for higher remuneration. It reaffirms its view that the fee of 12*s.* 6*d.* is gravely inadequate, and regrets that the Minister is unwilling to implement now the report of the Spens Committee, whose findings it had been promised would be applicable to National Health Insurance "irrespective of the institution of any National Health Service." It believes further action should be taken, but before doing anything more it has decided to consult the panel committees, and through them the individual panel doctors. It has accordingly submitted the following recommendation for immediate consideration by the panel committees and their constituents, and for subsequent discussion at the Panel Conference due to be held late in October.

> That, in view of the Minister's failure properly to apply the report of the Spens Committee to the current capitation fee—despite explicit Government promises that this would be done—and in view of the grave inadequacy of 12*s.* 6*d.* as remuneration for assuming medical responsibility for an insured person for a year, it be recommended to all insurance practitioners in England and Wales, Scotland, and Northern Ireland to place their resignations from the National Health Insurance Service in the hands of the Insurance Acts Committee and to authorise that committee at its discretion to put in such resignations to insurance committees unless the Minister is willing fully to apply the Spens Report to the current capitation fee with effect at least from Jan. 1, 1946, or, failing agreement, to refer to the Spens Committee or a representative section of that committee or other agreed independent body the interpretation of the Spens Committee Report in relation to the current capitation fee, both parties agreeing in advance to accept the findings of such body.

There is much justice in the contention of the Insurance Acts Committee that the assessment of a just capitation fee for the present service could and should be separately undertaken now. The offer to submit to the judgment of "the Spens Committee or a representative section of that committee or other agreed independent body" is an offer free from intransigeance which makes an agreed settlement still attainable. But even if the Minister still will not favourably consider any of these proposals, the frustration of this controversy must not be allowed to delay or obscure decisions which are even more important. Next month the National Health Bill may become law. As soon as it does, the Minister will be empowered to draft regulations of the gravest importance to the future of medicine. The British Medical Association has promised the doctors the opportunity of deciding by plebiscite whether the profession, through its negotiators, shall participate in the drafting of these regulations. The time remaining for the effective taking of this plebiscite grows short and must not be wasted.

PSYCHOGENIC PAIN IN LABOUR

IN the early nineteen-thirties Grantly Dick Read[1] postulated that the pains of labour are caused by fear and that the proper relaxation of the cervix is under the control of the autonomic system, which is connected with the thalamus—the seat of all primitive emotions, and notably of fear. Corticothalamic impulses may inhibit the cervix via the sympathetic nerves and set up a state of primary uterine inertia. The uterus may be regarded as a hollow viscus with a detrusor and a sphincter muscle, and it may reasonably be supposed that the action of these two muscles, though primarily antagonistic, is in labour synergistic. The normal polarity between the sphincter and detrusor muscle may be disturbed by impulses from higher centres, and every obstetrician knows that a nervous woman having her first baby, surrounded by solicitous relatives, is a candidate for primary uterine inertia. Read therefore emphasises the importance of reassuring the expectant mother and of engendering such a confidence in her obstetrician, midwife, and institution that she faces labour with a mind calm and relaxed and a body in which the sympathetic nervous system has not got the upper hand of the parasympathetic. Having been instructed in the nature and function of labour she knows what sensations to expect, and does not panic when, for instance, the head distends the perineum. Many women so fortified and instructed can complete their labours without an anæsthetic or with only a minimal amount during the conclusion of the second stage. For such a technique of psychological anæsthesia to be effective the woman must be schooled from her first antenatal visit, and this, of course, demands time and patience on the part of her obstetrician. Read advises that she should be taught how to relax, and instructed to practise relaxation every day. The woman is also shown, by anatomical diagrams, exactly what happens in labour; discussion about the baby is encouraged and the woman's mind is focused on the child and away from herself. It is impressed on her that labour is a great event and a memorable occasion culminating in the lusty cry of a healthy child which it is her great feminine privilege to have borne.

1. Read, G. D. Natural Childbirth, London, 1933; *see also* Revelation of Childbirth, London, 1943.

While some obstetricians have hailed Read's work as a pioneering service to obstetrics, others have decried it as a new flight of psychiatric fancy. His method has been employed in the U.S.A. by Blackwell Sawyer,[2] who personally delivered 168 women in a small general hospital without the assistance of a resident. His material consisted of 62 primiparæ and 106 multiparæ. He had 1 fœtal death (a premature infant dying twelve hours after delivery) and he used forceps 9 times—for occipito-posterior position and deep transverse arrest 4 times and for a big head (low forceps) 5 times. He had 1 set of twins, and 1 breech and 1 face presentation. In other words, his obstetrical material was fairly representative. The women with malpresentations suffered the most pain, but of the 106 multiparæ, 90 said that they were helped greatly by the method, that they had no pain during the first stage, and that they concluded the second stage in two to five expulsive efforts. They were all offered ether as an anæsthetic but only 4 accepted it. There was no hysteria or uncontrollable crying or screaming. They were prepared to go through their labour again, conducted in the same manner; some of the women were astonished at the smoothness of their delivery. Of the 62 primiparæ, apart from malpresentations and forceps for big heads there were 53 cases, of whom 5 were frightened, groaning, and complaining women all through their delivery and were written off as complete failures. Among the remaining 48 little pain was experienced. In 10 of these pethidine was used in doses of 50–100 mg., one or at most two injections being given; this "took the edge off the pain" and enabled the patients to coöperate. In all primiparæ the perineum was injected with procaine and a small episiotomy performed. Patients with whom the technique was successful were calm and cheerful.

Sawyer's conclusion is that the method when carefully applied is valuable in relieving the pain of normal childbirth in 90% of cases. The extent of relief varies, but it is a positive phenomenon, complete in some and partial in others with whom the minimal use of analgesic drugs as an adjuvant will have an added effect. The great drawback to the method is that it is very time-consuming, and there cannot be many obstetricians in this under-doctored country who will have time to apply it properly.

It is at least abundantly clear that fear should be banished from the expectant mother, and that if she has full confidence in her attendants and the arrangements made for her confinement (and this confidence is the natural corollary of decent and efficient antenatal supervision) then she will have an easier, safer, and speedier labour.

THE SICK FAMILY

SOCIALLY troublesome families, such as a number of medical officers of health have been investigating in this country,[3] were recognised in Holland to be a social problem during the period following the first world war. In 1926 a compound or colony was created by the city council of Amsterdam on a peninsula between two canals at the edge of the city. It consisted of 52 bungalows adequately equipped and associated with a kindergarten, clubroom, and other amenities. Social assistance and supervision were arranged, and much effort was put into the scheme. But in the course of years it became evident that it had utterly failed to restore these families to a satisfactory independent way of life: "the village became a collection of social curiosities and freaks; after the evacuation of the compound these families lived, and live, in almost indescribable squalor in the poorer quarters of the town." Dr. Arie Querido,[4] who has reported on the matter, draws the picture so familiar in every description of such families—dirt, disorder, fecklessness, neglect, and misery. "Whatever is the prevailing social problem, these families express it in its most acute form. In times of prosperity they are the parasites and petty criminals; when it is difficult to obtain work, they are the first and longest out of a job; when there is a shortage of houses, they are roofless; if there is a shortage of food, they are the first to go hungry."

Dr. Querido, in his capacity as director of the municipal department of mental hygiene in Amsterdam, was asked to look into this question because of the presumed importance of mental abnormality as a cause of the social failure. He was able to classify the families into three groups. In the first the social problem disappeared if certain adverse conditions of health and work could be remedied; the second group of families could never keep its head above water unless it had external help; but the third group was certain to fail no matter what social assistance was provided in the hope of remedying or averting its deterioration. Querido therefore came to regard the severe "social problem" family as a diseased biological unit, of which social deterioration was the chief symptom; he compares the measures that one takes to treat an individual patient who has mental disorder with those which are necessary for the disordered family, and finds them very similar. He is opposed to any such drastic solution as disrupting the family by withdrawal of the children: he compares it to killing a patient and then saying that the problem of his disease is solved. When he calls the social problem family a unit, he evidently means what he says.

To treat the family, two conditions, he insists, must be fulfilled—there must be means of treatment, and power to make these means effective. A committee which has considered the question has put before the Dutch government proposals to this end. A person who is apparently unable, by reason of mental disease or other mental failings, to fulfil his material and moral obligations towards himself and those who are dependent on him, can be placed under legal supervision by order of a judge. When one or both parents are thus dealt with, the supervisor (who is an expert in psychiatric or social work) establishes contact with the family, who must follow his instructions. He will be the guardian of their children, the parents being reduced to the legal status of minors. If attempts to improve the situation fail then the family can be placed, on the supervisor's recommendation, in an institution or camp for a period of a year (which can be prolonged by judicial decision). So far as the means of treatment are concerned, in the first instance the whole family would be placed in an observation camp where thorough psychiatric, medical, and social investigation would be carried out; thereafter the family would be placed in one of the "education camps," providing for about 15 families. While living in this camp the children would go to the ordinary school in the neighbourhood, and the members of the family would work in the ordinary farms and industries of the locality. Social assistance would be at hand for building up the household again. After a successful stay in the camp the family would return to its original locality, but would remain under supervision until the court brings it to an end.

These proposals are drastic and could only be warranted if the problem family presented as serious a menace to society as criminals or dangerous lunatics. Querido maintains that it does: "the course proposed involves a serious infringement of personal liberty and offers possibilities of abuse. On the other hand, the problem family offers serious dangers, is an infectional focus to society and presents an intolerable state of human indignity, so that strong measures are justified."

2. Sawyer, B. *Amer. J. Obstet. Gynec.* 1946, **51**, 852.
3. Savage, S. W. *Brit. med. J.* 1946, i, 86. Brockington, C. F. *Lancet*, 1946, i, 933. Wofinden, R. C. *Publ. Hlth, Lond.* 1944, **57**, 136. Stallybrass, C. O. *Med. Offr*, 1946, **75**, 89. Martin, A. E. *Publ. Administration*, 1944, **22**, 105.
4. Querido, A. *Med. Offr*, 1946, **75**, 193.

WAR AND THE PUBLIC HEALTH

THIS week the Ministry of Health published a report by Sir Wilson Jameson, the chief medical officer, "On the State of the Public Health During Six Years of War." [1] The enemies facing the public-health services—epidemic disease, malnutrition, and mental stress—were, as the history of 1918 suggested, potentially more menacing than the more usual hazards of battle. The same standard of planning was required to face both these threats to the nation's welfare, and the medical preparations for war were important threads in the larger pattern of national defence. Traditionally this country is supposed to "muddle through" its difficulties, but there are no signs that this was the way at the Ministry of Health. The menace of death in all its forms was faced, an intelligent appreciation reached, and a plan framed which was bold in conception, careful in detail, and yet elastic enough to meet the changing needs and fortunes of war. When it was put to the test there were of course failures and mistakes, but all in all the offensive-defensive campaigns waged by the Ministry and its satellites in town and country were as successful as those of the fighting Services.

It was soon realised that intelligence, in the military sense, was a first essential. Even before September, 1939, an intelligence section was established at the Ministry to provide information not only for the civil population but also for the military Services. During the war itself, field investigations on epidemic illness and sample surveys of patients in the E.M.S. hospitals and of minor sickness among the civil population kept the Ministry staff well informed. Gloomy if reasoned forecasts of casualties evoked a major effort in building up the staff, equipment, and organisation of the Emergency Medical Service. With the number of injured mercifully less than had been anticipated, the switch of the service to the less dramatic but none the less useful forms of medical care was rapid and effective. Experience in the blitz with the nation-wide civilian defence casualty organisation, and in particular the ambulance service, showed the advantages of large-scale administration in this field. Into the fight were called the auxiliary services of the laboratory. Blood-transfusion was widely used, and, as the report says, its practice "has increased prodigiously and will increase still further. Transfusion is a procedure directed to the treatment of disorders of the circulation. There is little in medicine on which the study of the circulation does not impinge and it is for this reason that the advances stimulated by the war in this field have had, and are likely to have more, profound repercussions in many fields of civilian medical practice." The Emergency Public Health Laboratory Service spread a net of laboratories, well-staffed and adequately equipped, over the whole country. These undertook not only routine diagnostic and public-health work but also valuable field researches on epidemic diseases.

While the responsibility for feeding the people lay elsewhere, the Ministry of Health busied itself with surveys of the essential foods. Insufficient diet, particularly when combined with overwork and overcrowding, brings in its train the risk of an increasing incidence of tuberculosis, and the preventive efforts of local-government doctors were redoubled. The hardships of war bear most heavily on expectant mothers and young children; their defences were strengthened by dietary supplements. The traditional association of Mars and Venus brought a rising incidence of venereal diseases, leading the Ministry to discard its last Victorian inhibitions and to embark on a virile and aggressive publicity campaign. Another enemy, insidious but disabling, was the anxiety and fear engendered by the onslaught on the civil population; it was countered by the psychological selection tests and welfare work in industry, and psychiatric treatment in special E.M.S. clinics.

What were the results of this campaign? The ultimate arbiter must be the account of the nation's health in the vital statistics of the war years, for "facts are chiels that winna ding." The infant and child mortality-rates are particularly sensitive indicators of social well-being; despite the loss, by enemy action, of the lives of 7000 children under the age of 15, and an increase in accident deaths through war conditions, the mean annual death-rates in the three five-year groups under 15 were below the rates for any year before 1939. New records for the second and third years of life were set up in 1942; and new low levels for neonatal, infant, and child mortality in the first ten years of life were attained in 1944. The stillbirth-rate declined continuously throughout the war, while successively lower records for maternal mortality were established in 1940, 1942, 1943, and 1944. Another index to national health is the tuberculosis death-rate. After a disquieting rise in 1939–41, the pre-war downward trend was resumed, to reach a new low-level record in 1944. In the field of epidemic diseases, the major triumph was the immunisation campaign against diphtheria; in 1944, deaths were less than one-third of the pre-war average, although this essentially preventable disease still caused more deaths than enemy bombs. Diseases such as typhoid fever, which might have been expected to spread in the disturbances and dirt of bombed cities, were held in check, but there was an increase in scabies, food poisoning, and dysentery, due, no doubt, to the difficulties of personal and culinary hygiene. Field research, stimulated by an awakening of the community's social conscience, uncovered the importance, as causes of disability, of rheumatism, anæmia, and accidents in the home; and the need for special care for the aged. These are not new problems, but their extent was highlighted by the statistics which these studies produced.

The advantages of nation-wide organisation in preventive medicine have been fully demonstrated. In the new Health Service these advances can be consolidated if administrative efficiency is tempered with humanity.

1. On the State of the Public Health During Six Years of War, 1939–45. Ministry of Health. H.M. Stationery Office, 1946. 5s.

FOOD FROM THE SEA

IN normal times about thirteen million tons of fish is removed from the oceans of the world every year. Of this catch some is consumed directly, either fresh, preserved, or canned; but a large part goes to the making of over a million tons of fish meal, which contributes indirectly to human diet through the nourishment of farm animals and poultry; and the Antarctic whale-oil industry produces upwards of half a million tons of fat, of which a quarter of a million tons is converted for eating. In the years before the war the average annual consumption of fish in this country was 16½ lb. per head; this was two or three times the consumption in France, Germany, or the U.S.A., but only half that in Japan, and possibly a tenth that in Norway. Measured by labour, fish are a cheap source of first-class protein. There is a wide variety of edible species, all highly nutritive and rich in minerals—the iodine content, for example, is 50–200 times as great as that in any other food, while that of calcium and phosphorus is as high as in beef. Moreover, fish are available all the year round, and new techniques of freezing enable such fatty fish as the herring, which vary with the seasons, to be distributed at their best throughout the year. Perhaps we do not benefit fully from the bounties of the sea. Certainly long usage has clouded our appreciation of this unique harvest for which no field must be ploughed or cultivated, no seed sown, and no stocks tended.

As on land, animal life in the sea depends either directly or indirectly on plant life. This is found mainly

in the plankton, of which there are three groups—producers, consumers, and reducers. The producers comprise largely the chlorophyll-bearing diatoms and algæ, which by solar energy build up organic matter from inorganic nutrients in the water. The consumers or zooplankton feed on the living or dead matter of this phytoplankton or its metabolic products, and are in turn consumed by such fish as herring, pilchards, sprats, mackerel, and, curiously enough, one of the world's largest mammals—the rorqual whale. Much of the dying or dead plankton falls to the sea floor, where it is eaten by the bottom fauna, including worms and shellfish, which in their turn form the food of the bottom-living fish. The amount of plankton is very large, being especially rich in some Polar areas, but varies from one region to another; it has been estimated that in the English Channel alone the annual crop of phytoplankton amounts to 3600 tons per square mile. Suggestions that the plankton might be used directly as human food were revived during the late war after a German report that the zooplankton had a nutritive value equal to that of the best meat, and the phytoplankton to that of rye flour. Investigation showed, however, that the probable yield from our seas did not warrant the establishment of a special fishery.

The reducers, the sea's bacteria, are particularly important to the marine life-cycle. As ZoBell has recently indicated,[1] only a very small part (0·1%) of the primary production of organic matter in the world's oceans is removed each year in the form of fish, commercial algæ, &c.; the remaining residues and waste products of plants and animals undergo bacterial decomposition and return in mineralised forms to the sea and atmosphere, where they supply the phytoplankton with the elements, such as nitrogen, phosphorus, and carbon, from which its cell substance is synthesised. Without these bacteria the sea floor would soon be cluttered up with a mass of dead plant and animal remains, and plant life, denied its essential elements, would cease. A further important function of aquatic bacteria is the conversion of dissolved organic matter into particulate organic matter (bacterial cell substance), which animals can utilise. ZoBell himself has found that, given suitable conditions, bacteria can mineralise roughly 70% of the organic content of sea water and convert 30% into bacterial cell substance or intermediate products. It is debatable, as he points out, whether bacteria are sufficiently abundant in sea water to constitute an appreciable item in the diet of marine animals, but cumulatively they are clearly important to the food cycles of both animals and plants.

A COMPASSIONATE RELEASE

IN July several newspapers reported the case of a young officer of the Royal Army Medical Corps who was released from the Service soon after the death of his father, with whom he was in partnership. The press reports made it appear that his release was the result of pressure by a Member of Parliament to whom 400 patients were said to have written; and the patients seemed to have been actuated by a belief that this doctor was the only man who understood a method of treatment practised by his late father. As may well be supposed, these newspaper reports have caused indignation, especially among those whose tenure of one-man practices did not prevent their acceptance for service during the war. We understand, however, that this officer was not in fact released on the ground that he is professionally indispensable at home: indeed, the local medical war committee, which judges such matters, decided that he was not. The War Office granted him compassionate release, obtainable in extreme cases of individual hardship of financial or domestic nature. Although there has been some relaxation since the end of the war in regard to one-man businesses (and practices) the number of Army medical officers granted compassionate release has been very small—less than 40 out of a total of over 8000 releases.

HOKEY-POKEY PENNY A LUMP

THE present outbreaks of enteric fever recall the profession's ancient quarrel with the uncontrolled sale of ice-cream. It is 67 years since a *Lancet* commission drew attention to the appallingly filthy conditions in which ice-cream was made in the Italian quarter of London.[1] Gone are the days of "penny a lump," but "hokey-pokey" (the Cockney's rendering of the Italian *ecco poco* or "here's a bit") and the outbreaks are still with us. In the interval ice-cream has been credited with ptomaine poisoning, carbolic-acid poisoning, zinc poisoning, and scarlet fever, as well as recurrent outbreaks of enteric. An outbreak of unspecified diarrhœa in Lancashire was traced to premises with "two vessels containing ice-cream in process of manufacture . . . within a yard of a pail-closet; and the fine strainer used for straining the milk and cornflour after boiling was within about four inches of a dolly tub in which were babies' napkins soiled with diarrhœal excreta."[2] Advances in bacteriology served to underline the extent of the scandal. Thus in 1894 the medical officer of health for Islington found in specimens of ice-cream "almost uncountable colonies of *Bact. coli*"[3]; and in 1897 the M.O.H. of Liverpool was impressed with "the marked similarity between plate cultivations of the ice-creams . . . and those of sewage."[4] Only fourteen years ago bacterial counts were found to range from 625,000 to 265,000,000 per c.cm.[5]

In the nineties some local authorities and the larger manufacturers were pressing for regulation of manufacture and distribution, but it was not until the enactment of the London County Council (General Powers) Act of 1902 that the first specific control was imposed. "It is difficult to believe that such categorical exposure of a foul danger to public health should not have been followed by reform until more than twenty years have passed."[6] In 1927 the Ice-Cream Association of Great Britain and Ireland invited the Minister of Health to propose a legal definition of ice-cream and to enforce the licensing by local authorities of all makers and vendors, whose premises should be inspected[7]; but no action was taken. Since then some authorities, and notably Hove, which provisionally adopted the same standard as for pasteurised milk,[8] have shown themselves increasingly alive to the risks. Last year a Ministry of Food order prohibited the admixture, except by licence, of dried eggs, since these may contain salmonella organisms; under the licence makers must pasteurise the mix within two hours of manufacture, and must observe certain other precautions. Otherwise, "it is only when conditions of manufacture are grossly insanitary that the Food and Drugs Act, 1938, is called in to protect the public."[9] Most of us will therefore agree wholeheartedly with the resolution passed by the conference of sanitary inspectors at Westminster on Sept. 5 calling for the compulsory registration of all ice-cream vendors. Until this step is taken no comprehensive plan of control is possible.

THE annual Harveian oration will be delivered at the Royal College of Physicians by Sir Maurice Cassidy on Friday, Oct. 18, at 3 P.M. His subject will be Coronary Disease.

1. Marine Microbiology. Claude E. ZoBell, PH.D., associate professor of marine microbiology, Scripps Institute of Oceanography, University of California. Waltham, Mass.: Chronica Botanica Co. (in London from Wm. Dawson and Sons Ltd.). Pp. 240. $5.

1 *Lancet*, 1879, ii, 590. 2. *Ibid*, 1900, ii, 1149. 3. *Ibid*, 1894, ii, 862. 4. *Ibid*, 1897, ii, 1458. 5. *Ibid*, 1932, ii, 1230. 6. *Ibid*, 1902, ii, 998. 7. *Ibid*, 1927, ii, 896. 8. *Ibid*, 1938, ii, 1084. 9. *Ibid*, 1945, ii, 214.

Special Articles

LENGTH OF STAY IN HOSPITAL

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IT has recently been suggested that the need for hospital beds could be diminished by the provision of better facilities for outpatients or by the building of hostels for patients who require only one or two nights' accommodation for investigation or other purposes (*Lancet* 1943, Lister 1945, Morgan 1945, Nelson-Jones 1946). Others have urged the creation of special wards or hospitals for illnesses which cannot be classed as incurable but nevertheless require protracted or specialised treatment; rheumatoid arthritis, peptic ulcer, ulcerative colitis, and nephritis have been put in this category.

With these suggestions in mind, we have recently analysed a year's admissions to a medical ward of 21 beds, 10 male and 11 female. The ward is essentially a diagnostic and research unit. There was great pressure on our beds during the year under review, as the Radcliffe Infirmary, which serves a population of 250,000, had at that time only 80 general medical beds, and there were no other medical beds in the area except in cottage hospitals or hospitals of the poor-law type. The ward was protected from the full pressure of the competition for beds by the fact that it was "on take" on only one day a week. In other words, though containing one-quarter of the medical beds, it admitted only one-seventh of the emergencies which came into the medical side of the hospital. In spite of this, over 30% of the admissions were emergencies.

During the period under review 180 men and 175 women were admitted to the ward. Though the total number of patients was 355, the total number of admissions was 440, because 28 patients were readmitted on one or more occasions during the year. The average proportion of occupied beds was 19 out of 21; 626 (8%) of the available bed-days were wasted. This wastage was partly due to temporary war-time conditions —beds had to be kept empty and available for D-day casualties—but it was also an inevitable result of the system of emergency admissions. All emergency cases must be admitted on the day of "take." It therefore behoves the house-officer to arrange the discharge of patients so that some beds are empty on the appropriate day, and it is impossible to estimate with accuracy the number of beds required.

The average duration of stay in hospital was about 16 days, but the accompanying figure shows that this average figure is somewhat misleading. The largest fraction of patients stays the shortest time in hospital, and the proportion of patients remaining in hospital steadily declines as the period of treatment increases. The length of stay in 26% of admissions was less than six days, and in nearly 50% of cases the patient was discharged within eleven days of entering hospital. At the other extreme is the group of 24 patients who were in hospital for more than fifty days. They accounted for 1772 bed-days, which may be roughly expressed by saying that 5% of the admissions accounted for 25% of the bed-days. An analysis of the whole series of patients will be published by us elsewhere, and we deal below only with the two extremes of short and long admissions.

SHORT ADMISSIONS

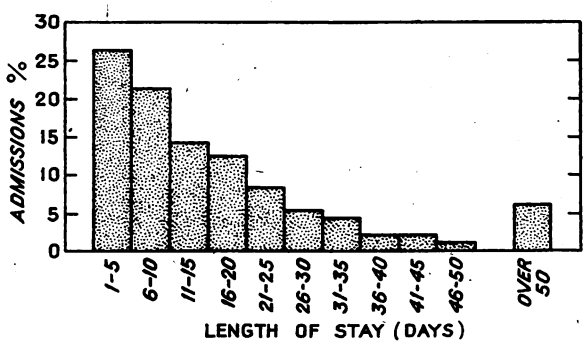
The reasons for inpatient treatment of the patients who stayed less than six days are shown in table I:

* With a grant from the Medical Research Council.

66 patients in this group were responsible for 113 admissions; 27 were admitted as emergencies for the treatment of acute illness, and 10 of these died shortly after admission, the remainder being either discharged or transferred to other hospitals within a few days. All the other patients were admitted from the waiting-list: 17 patients were admitted for follow-up examination, coming either from other areas or from remote parts of the surrounding counties; 11 patients undergoing treatment with thiouracil were repeatedly admitted for estimation of basal metabolic rate, accounting for 54 short admissions; 3 patients were responsible for 5 admissions for blood-transfusions; and the remaining 8 patients were admitted for specific investigations.

In all, 39 patients from the waiting-list were responsible for 86 admissions and 151 (2%) of the bed-days. Short stays in hospital of this kind undoubtedly give rise to some administrative problems. They tend to disturb the smooth routine in a busy medical ward. Most of the patients are in fair health and often in full employment, and they may resent the small restrictions which must be imposed in a hospital ward. Moreover, the amount of nursing time devoted to them seems out of proportion to their needs. These are the considerations which have led to the suggestion that patients of this type might equally well be treated in the outpatient department.

It is possible to divide the short-stay patients admitted from the waiting-list into two groups. The first are



Frequency histogram to show the percentage of admissions entailing different lengths of stay in hospital.

those who require a bed overnight, either because an examination, such as cholecystogram or basal metabolism, is to be carried out fasting, or because the patient lives too far away to travel to and from hospital in one day. Admissions of this kind can be arranged to suit the convenience of the patient and the hospital, and patients should rarely need to stay more than one night. The other group is constituted by patients who come in for a short treatment, such as transfusion or paracentesis, and require a bed for about twenty-four hours. These admissions can also be planned ahead, though not so far ahead as the first group, and the patients are more liable to overstay the expected time because things go wrong. The division is not hard and fast, for some investigations, such as lumbar puncture and gastroscopy, entail a recovery period. Follow-up patients come into both groups. Indeed, it is only necessary to make an analysis of this kind to realise that the antithesis between outpatients and inpatients is false; rather should we think of the key hospital as a centre for diagnosis and special treatment, which may or may not require the patient's admission.

The need for short stays in hospital grows steadily with advances in diagnosis and treatment. Periodic transfusions for refractory anæmia, estimation of the metabolism of patients receiving thiouracil, and desensitisation to liver of patients with pernicious

TABLE I—REASONS FOR ADMISSION OF PATIENTS WHO STAYED IN HOSPITAL LESS THAN SIX DAYS

Reason for admission	Patients	Admissions
Acute illness—		
Died	10	10
For diagnosis and treatment	17	17
Follow-up examination and investigation	17	18
Estimation of basal metabolic rate	11	54
Blood-transfusion	3	5
Gastroscopy	2	2
Sternal puncture	2	2
Lumbar puncture	1	1
Paracentesis of abdomen	1	2
Radiography	1	1
Miscellaneous	1	1
Total	66	113

anæmia are examples of recent additions to the list. Transport to and from hospital inevitably presents considerable difficulties in a rural area, and often investigations arranged for outpatients would be more expeditiously and conveniently completed if a night's lodging could be provided. Far from using outpatient facilities inadequately, we believe we are using them to excess. It would be kinder to admit to hospital some of the patients who now undergo tedious and exhausting investigations as outpatients, but shortage of beds has made it impossible. It is probably true that when it is possible to consider the comfort of the patient more closely the demand for short-term accommodation will greatly increase.

LONG ADMISSIONS

The reasons for prolonged inpatient treatment in the 24 patients who were in hospital longer than fifty days are shown in table II. Many of them were gravely ill, and 6 of them had died by the time of the follow-up, from one to two years later. The largest fraction was made up of 14 patients who underwent surgical treatment after medical investigation; 2 patients were kept in hospital because they were the subjects of research, and 2 others because it was difficult to find accommodation for them elsewhere—a woman needing special X-ray therapy, and a boy dying of lymphosarcoma. The remaining 6 are a heterogeneous group who had in common only

TABLE II—REASONS FOR STAY IN HOSPITAL LONGER THAN 50 DAYS

	Cases		Cases
Surgical intervention	14	*Long-term treatment*	6
Splenectomy	5	Pituitary cachexia	1
Gastric surgery	3	Puerperal fever	1
Cholecystectomy	2	Rheumatoid arthritis	1
Nephrectomy	1	Subacute nephritis	1
Miscellaneous	3	Thyrotoxicosis	1
Difficulty in obtaining institutional care	2	Ulcerative colitis	1
Lymphosarcoma	1	*Research*	2
Reticulosis	1		

the fact that they required prolonged medical treatment. In retrospect it appears that only 3 of these 24 patients (rheumatoid arthritis, nephritis, and ulcerative colitis), accounting for 260 (less than 4%) of the available bed-days, could have been referred to a long-stay hospital, if such had been available.

A different picture was obtained when we inquired into the fate of some of the patients with chronic diseases who stayed in hospital less than fifty days. In table III we have summarised the data for all cases of peptic ulcer, rheumatoid arthritis, ulcerative colitis, and nephritis in this group. Many of these patients had been incapacitated for more than a year before admission to hospital. They remained in hospital only three weeks on the average and then were discharged home, sometimes with a short interval in a convalescent home or cottage hospital. The results of treatment have been strikingly unsuccessful: 8 of the 12 patients have required readmission, and only 6 of them are back at work, from one to two years later. Therapeutic failure may be inherent in the nature of these diseases, though one would not judge so from reading textbooks of medicine and treatment. A more justifiable comment would be that the diagnostic hospital is not adapted to the treatment of subacute and chronic illness. Patients with peptic ulcer and similar diseases are not admitted unless there is some complication, such as vomiting, hæmorrhage, or intractable pain; and, when they are admitted, they are often discharged before treatment could be effective. This is largely the result of shortage of beds, but there are also reasons which must be included under the heading of psychological attitudes and motivation. Both diagnostic and teaching hospitals are driven to regard themselves as sorting- and clearing-houses, and the tempo is too swift for great interest to be taken in protracted therapeutic procedures.

DISCUSSION

Short-stay admissions are important because of their increasing frequency, long-stay admissions because they account for a relatively high proportion of occupied beds. Both are of particular interest to the outpatient physician, who has the hard task of selecting patients

TABLE III—ANALYSIS OF PATIENTS WITH CHRONIC ILLNESS WHO STAYED IN HOSPITAL LESS THAN 50 DAYS

Disease	Patients	Average duration of stay in hospital (days)	Average duration of incapacity (months)		Patients readmitted
			Before discharge	After discharge	
Peptic ulcer	7	18	24	12	4
Rheumatoid arthritis	3	22	14	13	2
Ulcerative colitis	1	44	30	24	1
Nephritis	1	18	None	22	1
Total	12	21	12*	14	8

* This figure represents the mode or usual duration of incapacity, and not the average, which is distorted by a few very chronic cases.

for admission. We do not find that patients who could be dealt with as outpatients are being admitted to hospital unnecessarily. On the contrary, the work of the outpatient department would be easier if some of the patients now investigated there were admitted to hospital for one or two nights. We therefore agree with Rock Carling and Power (1943), who pointed out that the existence of a highly organised and efficient outpatient service is likely to increase rather than diminish the demand for beds. Our main criticism of the present arrangements for admission is that too much responsibility is left with house-officers and administrative staff, and that more care might still be taken in selecting patients from the waiting-list and in correlating the outpatient and inpatient work of the unit. The rival claims of medical urgency, social stress, and efficient employment of the ward need balancing, and doctor, secretary, and almoner should combine in the task. Whenever a patient fails to enter hospital when written for, an inquiry should be made by the almoner.

Our review has less bearing on the problem of long-stay hospitals. There is little doubt that the potential demand for accommodation for long-stay cases is very

great. It could be better assessed from an analysis of the records of outpatient clinics and X-ray departments than from a study of this kind. With the present shortage of beds, the physician seeing outpatients rarely attempts to secure admission for cases of peptic ulceration and rheumatoid arthritis; and, when such patients are admitted, they are referred within a few weeks for treatment in convalescent hospitals, their own homes, or the outpatient department. All that we can say is that provision of hospitals for prolonged treatment of these patients would not greatly relieve the pressure on beds required for purposes of diagnosis. By the same logic it should not reduce the variety of clinical material in the teaching hospitals. Any measure which entirely removed chronic illness from the teaching hospitals would have a lamentable effect on the training of nurses and students and on the advancement of knowledge.

The present tendency to specialisation in medicine, both by individuals and by departments, is continuously raising obstacles to the communication of ideas and to the integration of treatment. Sickness is not just a production job which can be broken down into separate elements and treated by the methods of modern mass manufacture. It is a personal and individual problem, and the operative proverb is "too many cooks spoil the broth," and not "many hands make light work." In a previous paper from this department, the need for continuity in treatment was heavily underlined (Brown and Carling 1945). The community hospital has a corporate spirit, which might be weakened by overelaboration of function and loss of adaptability. What is required today is not a further specialisation of purpose but an internal reconstruction. At present the medical beds in hospitals in this country are usually divided into a series of separate units or firms which work more or less independently and whose chiefs have a great sense of pride and property in their charge. This traditional arrangement is steadily becoming less adapted to the needs of the patient and the medical student. It is suggested that the time has come for a division on more functional lines.

If we think in terms of patients, we find that we have to deal with emergency admissions, usually of acutely ill patients; short-stay admissions from the waiting-list of patients who are not ill and do not require much nursing; and medium- and long-stay admissions. If we translate these demands into bricks and mortar, we shall design a medical unit which consists of three sections: (1) the diagnostic and treatment unit, which would correspond very closely with our present ward; (2) the short-stay ward or hostel, which would cost half as much per bed-week; and (3) the long-stay ward, where the emphasis would be on treatment and research. All these three adjoining sections would be the field of work of one team of nurses, technicians, assistants, and physicians, whose outpatient department would be on the same floor or at least connected by direct lift. The optimal size of a unit of this kind would probably be about 75 to 100 beds. With less beds than this the subsections for the two sexes would become too small for effective working, whereas a larger number of beds would be too many for an integrated unit with a life and personality of its own.

For several reasons we are opposed to the suggestion that special hostels should be provided for short-term admissions of every kind, and that these hostels should be separate from the wards of the hospital. The clinical field is already divided into too many separate compartments, and we do not want to split it up further. Most of our short-term patients enter for follow-up or for special treatment, and they like to come back to the ward where treatment was started and where they feel that their case is understood. The introduction of hostels would be only too likely to bring its own crop of psychological and administrative problems. Even now the recurrent type of admission is sometimes inadequately supervised, as the period of observation extends over several generations of house-officers. Lack of careful supervision is obviously undesirable, and it may be dangerous in protracted treatment with thiouracil or sulphonamide drugs. Recurrent admissions are essentially part of the follow-up work of the ward. Evidence of the value of following up all patients who have been admitted to hospital has been published from this department (Brown and Carling 1945). We believe that the follow-up should be separated from the diagnostic work of the outpatient department, and that it should be carried out in close proximity to the ward. The same team of senior medical officer, secretary, and almoner should be responsible not only for the selection of cases from the waiting-list but also for the general follow-up and for the supervision of recurrent admissions.

SUMMARY

We have analysed 440 consecutive admissions to a medical ward which is essentially a diagnostic and research unit.

Short-stay cases form a high proportion of the admissions, but there is no evidence that the number could have been reduced without detriment to the patients by provision of better outpatient facilities.

Patients who were in hospital for more than fifty days account for only 5% of the admissions but 25% of the bed-days. More than half of them were patients who eventually required surgical treatment. Only 3 patients in this group, accounting for less than 4% of the bed-days, could have been referred to a long-stay hospital or a centre for special treatment.

Special accommodation for short-stay and long-stay cases would have released only 6% of the bed-days, and therefore would not have relieved to any great extent pressure on the beds required for diagnostic purposes.

Patients who might be expected to need prolonged treatment seem to have been admitted to hospital with some reluctance owing to shortage of beds, and they were often discharged prematurely. The results of treatment in this group were strikingly unsuccessful. The need for long-stay accommodation could be better estimated from an analysis of outpatient and X-ray records than from a study of this kind. It is undoubtedly great.

The common practice of splitting the medical beds in a hospital into small autonomous units does not seem ideal. They should be arranged in functional groupings to meet the needs of the different types of admission.

We are indebted to Miss I. F. Beck for much help in tracing patients and analysing the data. For suggestions for hospital design we have obviously borrowed from the ideas of Sir E. Rock Carling.

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Carling, E. R., Power, C. M. (1943) *Lancet*, ii, 619.
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"Medical schools are charged with the responsibility for admitting not those who say, however earnestly, that they want to study medicine, but those judged to have the motivation, industry and ability for the pursuit of a profession involving the health and the lives of the people who will seek medical aid in the years to come. The admission of students lacking the qualifications for a medical career is wasteful and harmful no matter how much the student himself thinks he would like such a career. The cost of failures in medical school, in money and time and work and disappointment, is so great that extreme care must be exercised in the selection of students, even if enrolments decrease. Freshman enrolments in 1946 will exceed 5500 mainly because of the many veterans admitted . . . about 60% will be in this category. . . . About 12% are women."—*J. Amer. med. Ass.* August 17, p. 1355.

A NEW HEALTH SERVICE

THE DESIGN IN SOUTHERN RHODESIA

"Irksome and circuitous as the methods of democracy may seem to harassed administrators, in the long run the results are more stable and permanent. Progress in public health must be built increasingly on the basis of an informed public opinion and intelligent public coöperation. There is in a democratic country no short cut."

FROM this principle the commission which has been inquiring into the health services of Southern Rhodesia [1] goes on to affirm that the colony has now passed the pioneer stage and must therefore proceed by democratic methods. In its recommendations it has sought to retain freedom of action and choice for doctor and patient alike; to free the citizen from the fear of financial embarrassment through ill health, while yet leaving him to shoulder some responsibility; and to intervene to provide services only where they are not already being efficiently provided at a reasonable cost.

To introduce a national health service in Southern Rhodesia may be at once more difficult and easier than in this country, for in the colony there is already a government medical service and all the European hospitals except one are government hospitals. Some of the more obvious administrative snags are thus absent. But Southern Rhodesia has the heavy responsibility of a large and impoverished African population, who will be able to contribute only a small part of what must be spent on them. The commission firmly opposes any attempt to relate expenditure on African health to African revenue.

The commission is equally convinced that health problems are indivisible, and that, though methods of dealing with each section of the population may vary, a national service must cover everybody. It therefore proposes that for all races hospital treatment, maternity and X-ray treatment, and laboratory services should be provided by the State. And though the individual is to be left to pay for his general practitioner, his dentist, his surgical appliance, and his drugs, his burden is to be adjusted to his financial strength: the maximum he will be asked to pay for these services in any one year will range from £2 (income of £100) to £55 (income £2000). All amounts above this will be met from a national medical fund on production of the doctor's receipted account. The maximum covers the doctor's bill for a whole family, which means that married men with children will probably make heavier claims on the fund than bachelors or childless couples. No contributions have to be paid, apart of course from general taxation. Patients who do not wish to accept the salaried consultant staff at the hospitals must pay the full rates at the hospitals as well as their private doctor's fee. A medical committee of control, on which laymen as well as doctors would be represented, will be set up to investigate cases in which excessive visiting or excessive prescribing is suspected.

The commission recommends the creation of a separate department of health directly responsible to the minister of health. It also proposes the establishment of a national health board and the division of the colony into five regions with further subdivisions of areas which would approximate to the present native districts. The board would have nine members, including representatives of the regions, the secretaries for health and native affairs, and two doctors. Its functions would be advisory and policy-making and it would have the duty of drawing up a national health plan from the plans submitted by the regions. Each of the regions would in turn have its council, again an advisory and planning body, and in each region and area there would be a medical officer of health in charge of the State health services.

Assuming that right of private practice will be withdrawn, the following salaries are suggested for doctors in the new service: secretary for health, £2250; consultants, £1500–£2500; directors of public health or research, £1750–£2000; regional M.O.H.s, £1500–£1750; area M.O.H.s, £750–£1500. The general scale for government medical officers (£750–£50–£1500) will, it is felt, not only attract doctors into the service but retain them in it.

1. Report of the Commission presented to the Legislative Assembly, June, 1946. Government Stationery Office, Salisbury, Southern Rhodesia, 1946. Pp. 124.

The larger local authorities which are able and willing to carry out environmental services should continue to do so and should be given financial help to expand them. But in general the smaller municipalities should look towards further expansion of their health services as integral parts of their areas. Similarly, though the State will assume responsibility for the treatment and prevention of venereal diseases and institutional maternity work, municipalities and voluntary organisations will be encouraged and helped to continue any clinics which they are running. The mines and mission hospitals for natives will also be subsidised.

The commission also open the way to a great expansion of the preventive services of the colony with proposals that a nutrition council and a research council should be set up. The members included Prof. C. F. M. Saint, M.S. (chairman), and Dr. T. G. Burnett.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED AUGUST 31

Notifications.—Smallpox, 0; scarlet fever, 744; whooping-cough, 1976; diphtheria, 262; paratyphoid, 44; typhoid, 27; measles (excluding rubella), 1565; pneumonia (primary or influenzal), 279; cerebrospinal fever, 41; poliomyelitis, 21; polio-encephalitis, 4; encephalitis lethargica, 0; dysentery, 74; puerperal pyrexia, 131; ophthalmia neonatorum, 98. 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 August 28 was 854. During the previous week the following cases were admitted: scarlet fever, 46; diphtheria, 17; measles, 42; whooping-cough, 43.

Deaths.—In 126 great towns there were no deaths from scarlet fever, 1 (0) from enteric fever, 2 (0) from measles, 9 (0) from whooping-cough, 5 (0) from diphtheria, 31 (5) from diarrhœa and enteritis under two years, and 6 (0) from influenza. The figures in parentheses are those for London itself.

Halifax reported the fatal case of an enteric fever.

The number of stillbirths notified during the week was 277 (corresponding to a rate of 31 per thousand total births), including 40 in London.

On Active Service

CASUALTIES

KILLED

Lieut.-Colonel ANDREW ROBERT FAUSSET CLARKE, M.C., M.B. Edin., R.A.M.C.
Major C. L. LEWIS, R.A.M.C.
Captain ROYLANCE LYNTON PARKINSON, M.R.C.S., R.A.M.C.
Lieutenant GEOFFREY ROGERS, M.R.C.S., R.A.M.C.
Captain JOHN VARLEY SCHOFIELD, M.B. Leeds, R.A.M.C.
Lieutenant WILLIAM FREDERICK JAYNE WESTON, M.R.C.S., R.A.M.C.

PREVIOUSLY REPORTED PRISONER-OF-WAR, NOW REPORTED DIED AS P.O.W.

Lieut.-Colonel CYRIL ARMSTRONG, M.B.E., M.D. Durh., R.A.M.C.
Captain HENRY ALEXANDER DEVERELL, M.B. Edin., R.A.M.C.
Captain ALFRED KENNETH EASTWOOD, M.R.C.S., R.A.M.C.
Captain BASIL FREDERICK BENBOW GULLIVER, M.C., M.B. Lond., R.A.M.C.

DIED

Captain JAMES LAVINGTON ASHLEY, M.B. Brist., R.A.M.C.
Captain JAMES RAYMOND DUNN, M.R.C.S., R.A.M.C.
Captain PAUL VERRIER ISAAC, M.B. Lond., R.A.M.C.
Captain ARCHIBALD DAVID MORRISON KING, M.B. Edin., R.A.M.C.
Colonel SIDNEY JOHN LIDDON LINDEMAN, O.B.E., M.C., M.R.C.S., R.A.M.C.
Captain WILFRED KENDRICK LLOYD, M.B. Birm., R.A.M.C.
Captain M. M. LOUGHNAN, R.A.M.C.
Major EWEN ARTHUR ELSON PALMER, M.B. Camb., R.A.M.C.
Colonel MICHAEL JAMES WHELTON, M.D. N.U.I., R.A.M.C.
Major EDMUND HUGH LEWIS WIGRAM, M.B. Camb., R.A.M.C.

WOUNDED

Captain J. K. A. BURN, M.B. Aberd., R.A.M.C.

In England Now

A Running Commentary by Peripatetic Correspondents

"OF course," said the German Mayor, "we quite understand that at the end of an unexpectedly victorious war you must be a little disorganised and that your Military Government is a temporary affair, but when is the real government coming out?" This was said some four months after the end of the war. Nobody would think of saying it now, I fancy, but with the Dodo in *Alice* might talk about the Caucus-race. You remember?

"What is a Caucus-race?" said Alice. "Why," said the Dodo, "the best way to explain it is to do it." First it marked out a race-course in a sort of a circle; then the party were placed along the course here and there. They began running when they liked, and left off when they liked, so that it was not easy to know when the race was over. . . . Then the Dodo suddenly called out "The race is over, everybody has won, and everybody must have prizes." Unfortunately for us the prizes on this occasion are given jointly by the British taxpayer and the German population. Since the German population is already subsidised by the taxpayer to the tune of eighty million a year, our administration of Germany bids well to become the most expensive that bureaucracy has ever succeeded in foisting on any people. Not that there are not many well-qualified and devoted administrators in the service; there are. To them the restrictions inevitably imposed by the uncertainty of international affairs, limiting as it does their planning and organisation, must be irksome. There are however far too many to whom the service means a cushy job at a big salary without expenses. To these must be added the large group of people, unsettled by the non-recurring opportunities of the war, who are unable to reseat themselves in normal civilian life but find a haven in the peculiar conditions that obtain in Germany.

It is a little galling to find that a Control Commission driver gets (I do not say earns) a bigger salary than a captain, R.A.M.C., and that an ex-corporal can return to an almost non-existent job at a salary of eight to ten pounds a week with negligible expenses.

There are welcome signs that Authority is not unaware of all this and is taking steps to remedy the defects. Much harm has already been done to our prestige over here, and it is high time to restore it to the position it held at the end of the fighting.

It is perhaps unfortunate that this period should coincide with the arrival of the first families who will absorb a great deal of accommodation sadly needed by the Germans themselves. This new influx is perhaps the most unpopular measure that we have yet conceived. Touching, as it does, only a fragment of the army out here it is debatable whether the atmosphere of artificial comfort provided for the families will do anything but estrange both the Germans and a large number of British as well. What we are seeing in Germany is not what we mean by the "British Way of Life." It is to be hoped that those wives who do come out will realise how important it is that they should bring with them the influences that go to make a British home.

The Control Commission has to face difficulties as great as any that have faced our colonial administrations. In the past, selection for the Colonial Services has been stringent, and the results usually good. Should not the same principle be applied to this, the newest of all our administrative services?

* * * * *

Mumpsimus, "a traditional custom obstinately adhered to however unreasonable it may be." Woe is me! My conscience pricks badly. Every day I meet a myth or a mumpsimus about the hospital and do nothing about it: it does no harm, I murmur, and let it pass. What of the nursing woman-hours wasted; what of discomfort and indignity endured in vain?

I speak here with added authority. Only last week I myself was sigmoidoscoped. The appointment was for 11 A.M. At 5 A.M. I was rudely awakened by the clank of the loaded trolley and my opening eyes beheld a gallon-measure full of soapy water and a large bucket full of mackintoshes. The actual washout was only slightly uncomfortable, the fluid gravitating in and out, in and out of my empty rectum without let or hindrance; when it was over I fell asleep again. At 8.30 I ate a hearty breakfast, at 9 allowed my lower bowel to empty as is its wont, then wrote letters till my hour was come.

Now why, oh why that eerie ceremony at dawn? Do the nursing staff feel they ought to prepare their patients for parade? Must the rectal mucosa have its wash-and-brush-up, spit-and-polish? Should we not declare the mumpsimus, reasoning that in six hours anything may happen, and it doesn't really matter if it does?

* * *

Some griefs are med'cinable, quotes an advertisement, discussing the troubles which cause nervous indigestion and the merits of a dietary product in its relief. All very true, no doubt, but why press Cymbeline into service? Medicinable means medicinal, capable of healing; and not medicable, capable of being healed. And what possesses this power of healing? Clearly grief, or some griefs. Grief is the healer, not the to-be-healed. Must we wait for Belarius to make this abundantly clear?

> Great griefs, I see, medicine the less; for Cloten
> Is quite forgot. (IV, ii, 244.)

But let Imogen speak for herself. On receiving her husband's letter, she exclaims:

> You good gods,
> Let what is here contain'd relish of love,
> Of my lord's health, of his content,—yet not
> That we two are asunder; (let that grieve him:
> Some griefs are med'cinable; that is one of them,
> For it does physic love)—of his content,
> All but in that! (III, ii, 28.)

No other play has all these three: medicinable, and the verbs to medicine and to physic. To medicine occurs only once more, in Iago's terrible boast:

> Not poppy, nor mandragora,
> Nor all the drowsy syrups of the world,
> Shall ever medicine thee to that sweet sleep
> Which thou owedst yesterday. (III, iii, 330.)

Some griefs, we learn, are medicinable; Othello's is not one of them:

> Fell sorrow's tooth does never rankle more
> Than when it bites, but lanceth not the sore.
> (Richard II, I, iii, 297.)

* * *

The psychiatrist went as a bicycle to the ship's fancy-dress dance, the surgeon as Ohm's law, and I—well everyone said that I, complete with stomacher and periwig, looked the living image of Archimedes immediately before attaining notoriety in the first M.B. That is everyone except the capstan-minder's mate, who for some reason was judging the competition.

He had not liked me from the day I had pointed out to the captain that the sprockets were rusty. I should here explain that the Sea Salt's Code shows clearly and simply the inevitable consequences of rusty sprockets. Just as Q.E.D. ends all theorems everywhere, whether anything has been proved or not, so the rule that one rusty sprocket equals three small keelhauls—"small" indicating that the thin end of the boat be used for the operation—holds on all ships, on all the ponds of the earth. The capstan-minder's mate, one might say, had out-sprocketed himself, in that not only were there 15 sprockets rusty, but 7 more were so sclerosed as to be useless. I am surely not to blame because the wretched fellow was under water for most of the time between the equator and latitude 754. This should be no reason for deliberately mistaking me for a hors-d'œuvre varié, and giving the prize to the psychiatrist, whose tyres were not even pumped up.

* * *

It was Sunday morning and I had to visit an outlying hospital. My daughter, aged eight, came along and as she had become rather bored during the car ride I took her in to see the children's ward. While I stood talking to sister one of the nurses showed her around. ". . . and this little boy fell off a ladder. . . . This little girl has a very bad cough." And then my daughter, wanting to show an intelligent interest, was heard to say: "I wonder—have any of them got V.D.?" I understand that the poster showing a bereaved widow was withdrawn because it depressed people. On my part, I should like to raise an embarrassed voice to ask the Ministry of Health to stop *their* poster campaign!

Letters to the Editor

SIR ALMROTH WRIGHT AND ANTI-TYPHOID INOCULATION

SIR,—Sir Almroth Wright has just passed his eighty-fifth birthday and the *Times* has reminded us that this year is also the fiftieth anniversary of the beginning of his work on prophylactic inoculation against typhoid fever. That work was an outstanding landmark in the history of medicine, not only because of its immense practical results but because it demonstrated the possibility of evaluating the changes in an inoculated person's blood which result from successful immunisation. From that time immunisation ceased to be a hit-and-miss procedure.

Wright himself, in his first paper on the subject, was careful to point out that the idea of using prophylactic immunisation against typhoid fever (and also the use of a non-living vaccine for the purpose) had come to him from Haffkine who had applied a similar procedure in combating cholera in India. It is, however, beyond doubt that the whole credit for working out anti-typhoid immunisation, and for getting it adopted in the British Army in spite of considerable opposition from some in high places, belongs to Wright.

In view of this it is surprising to read in Dr. Guthrie's recent *History of Medicine* that

> "During the South African War of 1899–1902 typhoid fever was a more formidable foe than the enemy and accounted for twice as many deaths as his weapons. In the Great War typhoid fever was relatively rare and, even in the most unhealthy centre, that of Gallipoli, the incidence was very small, and the enormous improvement was almost entirely due to the success of anti-typhoid inoculation. This happy result may be traced to the labours of one man—Sir William Boog Leishman (1865–1926), a medical graduate of Glasgow.[3]"

And, in a later sentence:

> "Along with Sir Almroth Wright, who preceded him as Professor of Pathology in the Army Medical College at Netley, and whose name is closely linked with the discovery of vaccine therapy, Leishman set himself to devise a system of inoculation against typhoid. . . ."

The reference given in the above quotation is to page 1058 of Sir Harold Scott's *History of Tropical Medicine*, but it is difficult to see how the relevant sentence on that page can support Dr. Guthrie's statement. It reads as follows:

> "In 1897 he (Leishman) returned to England and was posted to the Victoria Hospital, Netley, as Medical Officer. Netley was at that time the headquarters of the Army Medical School, later transferred to Millbank as the Royal Army Medical College. Dr. (later Sir) Almroth Wright was then Professor of Pathology and Leishman gained experience under him and together they inaugurated inoculation against typhoid fever. He also assisted Wright in his work on anti-typhoid inoculation in the South African War and in opsonic investigations of the staphylococcus and brucella melitensis."

On another page Sir Harold Scott refers to "Sir Almroth Wright's anti-typhoid vaccine."

It is to be noted that Wright's anti-typhoid work began in the summer of 1896 (see *Lancet* of Sept. 19, 1896, p. 807); whereas, according to Sir Harold Scott's statement, Leishman was posted to Netley in 1897 as medical officer. It is also noteworthy that Leishman's name appears as joint author of only one of the series of five important papers on anti-typhoid inoculation published by Wright between 1897 and 1901, the one appearing on Jan. 20, 1900, in the *British Medical Journal*—that is, $3\frac{1}{2}$ years after the beginning of the work.

To check my memory (not at first hand) of these events, I recently wrote to one who was a pupil of Wright's at Netley and himself took part in the early work on anti-typhoid inoculation. He replied that, in his view, "Wright and Wright alone was the originator of anti-typhoid inoculation with killed vaccine"; and he adds that Leishman was not even on the laboratory staff at that time. "He had nothing to do with the introduction of anti-typhoid vaccine."

It would seem, then, that Dr. Guthrie has in some way been misinformed on this matter. I hope that, in honour of the greatest figure in English bacteriology, this mistaken attribution of credit may be put right before it gets copied into other books.

Birmingham Accident Hospital. LEONARD COLEBROOK.

MYTH AND MUMPSIMUS

SIR,—The author of your opening article of August 31 must surely be a young man who delights in pulling the legs of the elderly, but even the presbyopic must see that he is erecting Aunt Sallies for the simple pleasure of knocking them down. On the high spirits and harmless games of youth it would be ungracious to frown, but some of his statements require modification.

1. Dr. Forbes lumps together phlebotomy and exorcism and consigns them both to Limbo. But exorcism was surely always a priestly performance, and phlebotomy properly practised is as useful today as it was in the years before its very success led to its disastrous excess.
2. He appears to approve of increasing the fluid intake if large doses of sulphonamides are given, but he scorns any other reason for promoting diuresis. Are there no other drugs whose concentrated presence may damage the kidneys?
3. He scoffs at diaphoresis and hot baths, but has he never known their benison after a long day in the saddle? Is there no physiological explanation for tired and stiff muscles and have we not in steam a proper therapy?
4. The next time he has to cope with an outbreak of gastro-enteritis, I will wager my old Culpeper to his new Martindale that he will achieve far quicker healing if he will give his patients an ounce of castor oil before he starts them on sulphaguanidine. He writes: "*horribile dictu.*" I reply: "*experto crede.*"
5. Dr. Forbes's fundamental conclusions about enemata and his rejection of all solutions except normal saline may appeal to the youth who has never known the agony of rectal ballooning, but these conclusions will annoy the clinician who has seen what relief a turpentine enema can produce when all the normal saline in the ward has failed to charm forth any scyballæ. He states that "the complete efficacy of normal saline was proved long ago." By whom and where and when?
6. Dr. Forbes then pens the following sentence: "The adolescent girl who is pale, who will not eat, and who faints easily is in all probability working too hard at school and pining with unrequited love for her form mistress." This he calls a psychological upset. Has he never seen a case of chlorosis?
7. He says, "leeching and blistering which survived and were universally practised for centuries and yet have now been totally discarded." Have they? If "'tis true 'tis pity," or so it would seem to those of us who have watched the painful pericarditis or pleurisy relieved by leeches.

I am no *laudator temporis acti* but I wish to protest emphatically against throwing away the baby with the bath water.

London, W.1. CHRISTOPHER HOWARD.

SIR,—In his delightful paper Dr. Forbes makes an earnest plea for definition of terms, with which many of us must be in full sympathy. To show my appreciation in a practical manner, I should like to set the ball rolling towards elucidation of the (now fashionable) term "psychosomatic." Others can then kick it about and eventually it may reach its goal. Meanwhile a good time will be had by all.

It is easier to give a concept of this term than actually to pin it down by a definition. My own tentative conception is that it is analogous to the term "electromagnetic." In an electromagnetic system it is impossible to alter the flow of electricity without altering the magnetic field. Conversely any variation in the magnetic field is at once reflected in the electrical potential. The two are as inseparable as the heads and tails on a coin, being merely different observable aspects of the same phenomenon. In the same way every alteration in the psyche affects the soma, and vice versa, because (and this is the important and difficult point to grasp) they are different but interdependent aspects of the same

phenomenon—a living individual. There is no question of mind over matter or matter over mind. Mind and body, psyche and soma, are as inseparable as inside and outside.

It would therefore appear meaningless to refer to "psychosomatic disorders" as though they were certain recognisable diseases in a class of their own, distinct from other diseases. The phrase "psychosomatic medicine" does, however, suggest to me a certain approach to disease and health. It suggests investigating the patient as a whole, accepting the idea that in every condition of life both psyche and soma are affected, and (in practice) treating whichever is handier.

There is nothing new in this. General practitioners have been doing it for centuries. But with the advent of every new specific drug, serum, vaccine, and operation, the emphasis is shifting more and more towards soma and farther from psyche. General medicine (and surgery in particular) is concerning itself increasingly with ridding a patient of the physical handicap of his illness and getting him back to work. Sometimes this is rather like performing highly skilled running repairs on the car, when really it may be the driver who needs attention. Psychosomatic medicine, studying the patient as a whole, would seek to make it unnecessary for him to break down.

Such is my conception, and I am only too eager to revise it if it be found wide of the mark by my betters.

Mundesley. GEORGE DAY.

SIR,—May I congratulate Dr. J. R. Forbes on his paper of August 31? With the possible exception of those relating to fluid-intake, I feel each one of his remarks is most sane and timely. Of paramount importance are his references to the medically induced neurosis. The abysmal ignorance, exhibited by general practitioners and general consultants alike, concerning the ætiology, prevention, and treatment (usually so simple and straightforward) of the common neuroses is one of the most depressing and deplorable aspects of modern medicine. This lack of simple knowledge, fostered and perpetuated as it is by a mental attitude of derision, means that, for every patient cured by the exhibition of one of medicine's modern therapeutic triumphs, at least one (probably more nearly half a dozen) is allowed to sink irretrievably into chronic invalidism and the misery of a life of medically induced or medically perpetuated neurosis.

Port Talbot. R. J. T. WOODLAND.

SIR,—Dr. Forbes has handled a very awkward subject and presented it in a most acceptable and entertaining manner. It has long been my ambition to write a paper on the same subject.

During nine years in charge of the diphtheria wards of a fever hospital I could never convince any of the sisters that lying flat on a hard mattress without a pillow was most uncomfortable, and therefore not restful. I was looked on with horror and told that every school of nursing insisted on cases of diphtheria being kept flat without a pillow for at least three weeks. They simply would not accept the fact that the same absolute rest could be attained more effectively if the patient had a pillow for his head instead of rolling it from side to side on a hard mattress. Yet all the sisters slept with a pillow or two under their heads.

Manchester. J. EGAN.

PENICILLIN BY INHALATION

SIR,—The papers by Dr. Humphrey and Dr. Joules (p. 221), and Dr. Southwell (p. 225) in your issue of August 17, tempt me to record my own short series of observations.

I used a Collison's inhaler and gave five minutes' inhalation every hour from 6 A.M. to 10 P.M. of a solution of penicillin containing 5000 units to the c.cm. Three cases of postoperative bronchopneumonia and 4 of postoperative bronchitis responded most satisfactorily. The bronchopneumonia cases presented dullness and impaired breath sounds with radiological opacities, but had not progressed to the stage of bronchial breathing and bronchophony. A case of postoperative confluent *Staphylococcus aureus* pneumonia did not respond at all, though relieved promptly by parenteral penicillin. I have not cared to try this form of therapy in any other lobar or confluent bronchopneumonia. Four cases of chronic bronchitis and a comparatively mild case of bronchiectasis improved in that the sputum changed from mucopurulent to mucoid and lessened in amount, though an appreciable quantity remained. A case of postinfluenzal bronchitis and one of a low-grade postinfluenzal bronchopneumonia with mucopurulent sputum believed due to secondary bacterial infection responded promptly and completely; the latter had *not* responded to parenteral penicillin. On the other hand, 2 cases of atypical pneumonia considered of virus origin, with high serum cold-agglutination titres and plentiful mucopurulent sputum, improved hardly at all. I was interested in Humphrey and Joules' observation that *Bact. coli* appeared during treatment, as the same thing occurred in several of my cases.

I have formed the impression that penicillin inhalation has a definite rôle to play in the treatment of accessible bacterial infection with organisms susceptible to penicillin, with or without underlying pathological conditions. Underlying conditions such as chronic bronchitis, bronchiectasis, or a still active virus disease remain unaffected. I suspect that consolidated lung is inaccessible to penicillin by inhalation.

I am indebted to Air Vice-Marshal A. F. Rook, consultant in medicine to the R.A.F.M.S., for encouragement and assistance in this investigation.

Ely. D. FERRIMAN.

SUPRAPUBIC PROSTATECTOMY

SIR,—In suprapubic prostatectomy with closure, as commonly performed, a catheter is passed from the external meatus, through the urethra, into the bladder, and then fixed in place. It is a common experience that it often tends to stick in the cavity which has just been occupied by the enucleated "prostate." Even an india-rubber coudé catheter may so stick. During the last couple of weeks, by borrowing a tip from Ivan McGill, we seem to have overcome this difficulty. Dr. McGill's intratracheal tubes were originally made by himself from ordinary tubing and given their requisite curve by storing the tubes in round tins. We understand they are still so stored. By sterilising catheters, known as whistle-tipped in England and as McCarthy electrotomes in America, in 2-oz. tobacco tins and leaving them in the tins for a couple of days they acquire a curve which seems to permit them to ride smoothly into the bladder. The 2-oz. tobacco tin can accommodate three 22F catheters.

This procedure is so simple that it is unlikely to be original, but it has proved so useful that this note may help those who have not heard of it.

Dublin. T. J. D. LANE.

FUNICULITIS

SIR,—With reference to Lieut.-Colonel Power's interesting paper on funiculitis in British troops in Ceylon (April 20), may I draw his attention to a paper by myself published in THE LANCET many years ago (August, 1908) on the disease I called "endemic funiculitis"? A fairly complete description of it with four illustrations may be found in Castellani and Chalmers *Manual of Tropical Medicine* (3rd ed., p. 1939), in which, in addition to the acute type, mention is made of a mild form with thrombosis of the veins, without suppuration. To this latter type, I feel, belong Lieut.-Colonel Power's cases.

What is the ætiology of endemic funiculitis? In all my Ceylon cases I found a virulent streptococcus; in some of them there was also a filarial infection. I now believe that the streptococcus plays by far the more important ætiological rôle, and that the condition may arise also when there is no concomitant filarial infection. At any rate even if the syndrome should be considered of filarial origin, it is clinically so characteristic that it deserves being given a full description and not dismissed in a few words, as is done in so many books on tropical medicine. It must be kept in mind that the acute type is a very serious disease and is of great practical importance, since often, if the correct diagnosis is not made in time and the appropriate treatment not given immediately, a general streptococcal infection develops with grave risk to the patient's life.

Sintra, Portugal. ALDO CASTELLANI.

CHILDREN WHO SPEND TOO LONG IN BED

SIR,—Dr. McCluskie's stimulating article of August 31 is a welcome addition to the growing body of common-sense advice about infant and child care. Hardly a single criticism he has made could not be illustrated from many cases known to any G.P. Most illustrative, perhaps, of a typically "successful" parental domination is the child of 3 that "lay from 6 A.M. until 8 A.M. in a wet bed playing with the blankets." It is this determination to "train" the unfortunate babe, from the moment of its arrival, for the convenience of its parents' pre-existing habits that has such lamentable psychological results. Instead of making an attempt to compromise, the parents endeavour (fortunately often without success) to mould the child hourly into their own adult groove.

Thus, many modern maternity nurses teach mothers to leave their baby to cry, whatever their maternal instincts, between the rigidly set feeding times: how much this tends to destroy the rapport between mother and child is clear to see. I have known mothers to sit agonised, in obedience to this teaching, watching the clock creep round from 5.15 to 5.30, 5.45, before guiltily picking up the baby ten minutes early for its 6 o'clock feed, for a little overdue mother-love.

One could cite such things ad nauseam—the rigidly measured feeds, to be taken each time, never an ounce to be left, nor an ounce extra given; the agony of the weekly weight figures if there is a week's stasis; the anxiety if an 18-monther soils his trousers. In brief, the modern mother is invited to consider her baby as nothing more than a machine, requiring mathematical precision in treatment and nothing else.

A great deal of the fashionable "training" seems to aim essentially at ensuring the minimal disturbance of that domestic routine which existed before the arrival of the first child, without due regard for the child itself. Two main themes of our instruction to mothers should surely be these: (1) A frank admission that parenthood means unselfishness and "giving out," especially of love and individual understanding; at the least striking a fair balance between needs of parent and child, and rather erring on the side of "putting the children first" (an unfashionable phrase today) than dominating them for parental convenience. (2) While setting out the necessary feeding time-table, principles of child care and management, &c., we should insist that the mother recognises that they are *only for guidance*, and not to be slavishly adhered to like a railway time-table or legal code. Child psychologists would find their work lightened if the parents could be educated to ignore the "baby is a machine" school of management, and to rely on their own instincts and judgment in solving individual problems.

Greenhithe, Kent. G. F. TRIPP.

SIR,—My article—which incidentally is quite unworthy of the publicity it has received—does not describe a "time-table" for infants and toddlers but a "plan" on which to base a time-table. It states quite plainly that "each child as he develops will soon give his mother an indication of how much day-sleep he requires" if the plan is followed. Rigid time-tables create an obsessive mind in both the mother and the child, and too much emphasis cannot be laid on the part played by mother-love in the successful handling of a child.

The individual variation suggested by me is not 30 minutes but an hour, or more, or less. (Approximately 30 minutes is the time named, but some mothers may find it necessary to add; others to subtract.) Nevertheless, having regard to Professor Bühler's table of actual observations, which were timed not to the nearest half-hour but to the nearest second, this variation may be too large. I understand some American physicians are carrying out stop-watch nursery recordings and I await their results with interest.

Between the fifth and the tenth months an infant who sleeps too long in the mornings becomes cross in the afternoons because he cannot sleep. It is easy for a mother to prevent an infant sleeping too long in the morning and so gain the benefit of the afternoon rest and no crossness.

From years of experience with children I find that the healthy child of three years at home begins to prefer all his sleep in one dose. But there is no harm in routine day-sleep above this age provided always (*a*) the length of the day-sleep is related to and not in competition with the night-sleep, and (*b*) that it is the child's physiology and not the teacher's boredom that calls for it. Where there are two or more children who can play outside, day-sleeps can be tiring and exhausting for the mother, because they involve undressing, re-dressing, and remaking of beds. (The practice of putting children to bed during the day with their clothes on is a bad one because it causes overheating of the skin and sometimes sweating.)

"Rounds of pottings," indeed! I have 3 children under six years who have never had a routine "round of potting" in their lives because they go to bed to sleep, not to be taught bad habits.

There is too little respect for genuine motherhood in Britain and too much kow-towing to a nation-strangling matriarchy.

Westcliff-on-Sea. JOHN A. MCCLUSKIE.

FAVUS IN DEVON

SIR,—Whether it be due to an influx from elsewhere or to an indigenous source of infection, there is some evidence of an outbreak of favus in North Devon. Scutula are not always easy to find, nor are the nails often affected, but with Wood's glass, a hand lens, and a microscope the infected hairs on the scalp, tiny crusts surrounding hairs, and incipient bald patches can be noted. Ringed lesions, from which the crusts have been removed by treatment, have led to the diagnosis of "ringworm" of the glabrous skin.

Exeter. H. W. ALLEN.

EFFECT OF PHOSPHATE ON CARBOHYDRATE ABSORPTION IN SPRUE

SIR,—In our preliminary communication (*Lancet*, 1945, ii, 635) we reported experimental evidence that in active sprue there may be "a failure of the phosphorylation of glucose at the time of its absorption." It was our intention to continue our researches and publish the results in detail later, but unfortunately (or fortunately?) the cases suitable for experiment have been too few to provide anything more than indications of the direction in which future research should be developed. For the benefit of others who are more favourably placed for doing experimental work, it seems worth while recording our results of the effects of adding phosphate to carbohydrate solutions administered to cases of active sprue.

In our first experiment a case of active sprue with characteristic history of loss of weight, flatulent dyspepsia, and glossitis was selected and placed on a simple milk diet. An oral sucrose-tolerance test was carried out and the usual flat glucose and normal fructose absorption curves obtained. To confirm that the flat glucose curve did not arise from hold up of the sugar in the stomach, the test was repeated, the sugar solution being injected by tube direct into the duodenum. The resulting glucose-absorption curve was again flat and the fructose normal. Glucose was next injected intravenously, and, as Fairley has found in other cases of sprue, the curve of disappearance of the sugar from the blood was within normal limits.

It was clear that in this case the flat glucose curve was due neither to delayed stomach emptying nor to rapid removal of the sugar from the blood, and was therefore presumably due to failure of absorption. We decided to investigate this failure of absorption by studying the points at which the complicated process of phosphorylation might fail. The accessibility of the phosphate ion was investigated first. We argued that if the phosphate were unavailable because it was absent (which was unlikely on a milk diet) or because it was present in some inaccessible form, then phosphorylation should be restored by the exhibition of the phosphate ion. We therefore repeated the sucrose-tolerance test, administering the sugar (100 g.) direct into the duodenum and adding to it 8 g. of a mixture of potassium acid phosphate and disodium phosphate buffered at pH 7·0. The result was startling. The glucose curve was now normal, the fructose curve remaining unchanged. A week later the sucrose test was repeated without phosphate

and the resulting glucose curve was again characteristically flat, the fructose remaining normal. Some time later the sucrose test plus phosphate was repeated by mouth and again a normal glucose curve was obtained. The relevant figures obtained in these experiments are given below:

DUODENAL ADMINISTRATION OF SUCROSE (100 G.)

Time (hr.)	Dec. 12, 1945 (no phosphate) Glucose	Fructose	Dec. 19, 1945 (8 g. phosphate mixture) Glucose	Fructose
	mg. per 100 c.cm.		mg. per 100 c.cm.	
0	90	0	60	0
1/2	70	15·3	153	7·0
1	76	15·7	114	10·0
1 1/2	70	10·3	55	7·9
2	82	8·4	51	7·0
2 1/2	80	6·0	62	5·2

We have repeated these experiments in a modified way on 3 other cases of sprue, none of which was, however, in a very active stage of the disease. In 2 of these cases the phosphate appeared to assist the absorption of glucose; in 1 it had no effect.

These results are offered in letter form because they are so incomplete and because we are unable to go on with the work owing to lack of cases. I think the results show that in some cases of sprue at any rate the failure of absorption of glucose is connected with failure of phosphorylation of the hexose arising from an apparent inaccessibility of the phosphate ion. In other cases the complicated mechanism of phosphorylation may have broken down elsewhere.

In cases in which the absorption of glucose is restored to normal in the presence of the phosphate ion, the latter might prove a valuable therapeutic agent.

School of Tropical Medicine, University of Liverpool. BRIAN MAEGRAITH.

PERSISTENT ENURESIS

SIR,—Neither Stalker and Band's paper[1] nor your annotation on it (August 17, p. 243) mentions the possibility of endocrine treatment of enuresis, although evidence is available that points to a definite influence of the sex hormones on the urinary system and also, to some extent, on disorders of micturition.

The close developmental and anatomical connexion between the genital and the urinary system provides a basis for understanding a possible action of the sex hormones on the urinary tract. Œstrogens in large doses have occasionally produced bladder distension and hydronephrosis in male and female mice.[2] There is reason to assume that the ureteral dilatation which frequently occurs in women during early pregnancy is due to œstrogenic action and not to mechanical obstruction, for which no evidence exists. Urinary symptoms, such as frequency, urgency, and incontinence, are often encountered in menopausal women and respond remarkably well to œstrogen treatment.[3]

Androgens produce hypertrophy of the urethra in males and females and possess nephrotrophic properties; testosterone produces a true parenchymatous hypertrophy, principally of the cells of the renal tubules. This hormone has also been shown to increase the tonus of the bladder. Intravesical pressure after introduction of increasing amounts of fluid is higher after treatment; the maximal pressure which can be tolerated without pain and the pressure at which desire to urinate is experienced are increased.[4] Everybody who has used androgens in the treatment of prostatism knows that, though it is without influence on prostatic enlargement, the distressing symptoms associated with micturition improve. The size of the urinary stream increases, and the tonus of the detrusor and probably of the sphincter muscles is augmented (cf. Egger[5]). Greenblatt[6] treated 34 women suffering from nocturia, frequency, and incontinence with testosterone parenterally, by mouth, and by pellet implantation. His results were good, even in cases with fibroids where orthodox teaching tends to attribute nocturia to mechanical pressure. Stalker and Band have stressed the point that nocturnal and diurnal frequency, urgency, and sometimes diurnal enuresis may be associated with enuresis nocturna.

Enuresis in children has been treated by Hoffmann[7] with urinary gonadotrophins, and he claimed successes. Testosterone propionate was used by Zehn,[8] who injected 5 mg. for a short period daily, then every third or fourth day, and claimed excellent results. Schlutz and Anderson[9] treated 50 children, 36 boys and 14 girls, between the ages of 3 1/2 and 14 years with daily injections (10–25 mg.), inunction, or oral application of male hormone; 54% were cured, 34% much improved, 12% remained unaffected within 2 months. The authors think that failures were partly due to irregular medication. In some cases the effect was dramatic but one case required treatment for a year. No undesirable effects were produced; relapses occurred but resumption of treatment was again followed by response. Treatment was combined with fluid restriction, high salt intake, and getting the child up once in the early part of the night. Most cases were on this management for some time but did not improve before hormone treatment was instituted.

I have treated a small number of cases with methyl testosterone in doses of 5–10 mg. per day, some combined with inunction of testosterone ointment on the lower part of the abdomen. The number is too small to allow conclusions but all seemed to respond. One boy of 14 years has been symptom-free for the last 9 months. In all cases treatment had to be continued for several months; larger doses or parenteral application might have produced results in a shorter time. No untoward side-effects were encountered. It may be mentioned that two of the children had radiological abnormalities of the first sacral vertebra.

Without underrating the complexity of the problem of enuresis, I believe that androgen treatment is rational enough to be tried on a larger scale, and that, on the strength of the published data and my own observations, results may be expected in a certain proportion of cases. To establish the value of this therapy definitely and to eliminate psychological factors which may easily affect the response to any treatment in enuresis, control cases will be needed who are treated with an inert substance.

London, W.1. H. UCKO.

SUPPLEMENTARY FOOD FOR PREMATURE INFANTS

SIR,—Many will have read with interest the article by Jorpes, Magnusson, and Wretlind (August 17), setting forth the results they obtained by giving premature infants breast milk supplemented with casein hydrolysate and glucose. I hope the writers will give us some further details. For example, did the control babies who had breast milk only receive the same total calorie intake as the "treated" infants, or was the aminosol-glucose given as an extra? Have they evidence as to the effect of giving hydrolysate on neonatal mortality, or on the development of infants by, say, 6 months of age?

If I am correct in understanding that the aminosol-glucose was an extra, it would seem that the controls, on breast milk alone, received at first "minimal food requirements for life," and later an average of 100 calories per kg. (45 calories per lb.), daily, whereas the infants with the supplement received over and above this allowance nearly 20 calories per kg. extra. If this were so, might not the improved gains of babies receiving the hydrolysate be due simply to their improved calorie intake? Since a casein supplement might be poorly tolerated by a premature infant, the deficient increases in weight in the group given casein would not disprove this suggestion. The increases in weight of Professor Magnusson's controls, on breast milk alone, are lower than those I am in the habit of seeing among premature infants born and supervised in a maternity hospital, and given a more liberal calorie intake (*Arch. Dis. Childh.* 1941, **16**, 166). These babies are fed on breast milk

1. Stalker, H., Band, D. *J. ment. Sci.* 1946, **92**, 324.
2. Lacassagne, A. *C.R. Soc. Biol. Paris*, 1933, **113**, 590.
3. Salmon, U. J., Walters, R. I., Geist, S. H. *Amer. J. Obstet. Gynec.* 1941, **42**, 845.
4. Muellner, S. R., Hamilton, J. B. *J. Urol.* 1944, **52**, 139.
5. Egger, K. *Schweiz. med. Wschr.* 1944, **74**, 676.
6. Greenblatt, R. B. Office Endocrinology, Springfield, Ill. 1944, p. 68.
7. Hoffmann, F. *Arch. Gynäk.* 1938, **166**, 240.
8. Zehn, P. *Disch. med. Wschr.* 1939, **65**, 1831.
9. Schlutz, F. W., Anderson, C. B. *J. clin. Endocrin.* 1943, **3**, 405.

when possible, supplemented as necessary, when this falls short, with half-cream dried milk and sugar, or with condensed milk. They usually gain weight at a rate not inferior to their full-term fellows—i.e., about 5–7 oz. weekly or 25 g. daily after the first week of life, which was approximately the rate of gain of the babies given aminosol. There are undoubtedly wide differences of opinion as to the level of calorie intake conducing to the lowest mortality-rates among young premature infants, but there is no doubt that gains are likely to be relatively small if the daily calorie intake is kept as low as 45 calories per lb. body-weight.

The Swedish workers comment that doses of hydrolysate larger than those they advocate often caused vomiting or regurgitation of food—and I too have encountered difficulties when giving casein hydrolysate—so that it behoves those who try this supplement to use it with caution. If it should turn out that the important effect of the hydrolysate supplement was that it provided more calories, then an increase in the breast-milk allowance may still prove preferable. Perhaps Professor Magnusson can clear up some of these points and correct me if I have misunderstood.

London, N.W.3. HELEN M. M. MACKAY.

A SYNDROME SIMULATING ACUTE ABDOMINAL DISEASE

SIR,—When I read the interesting description of their syndrome by Mr. Goldstone and Dr. Le Marquand (August 24) I was puzzled by the omission of Bornholm disease from the differential diagnosis. Neither does Dr. Oram mention it in his letter of Sept. 7.

My attention was first drawn to this disease some years ago by Dr. W. N. Pickles but I saw no examples of it until I was posted to Naples last May. Reference to these patients has been made in your columns by Reynell (*Lancet*, 1946, i, 977) following Scadding's description of cases in the Middle East (*Ibid*, p. 763). Meyer also wrote about cases in C.M.F. (*Ibid*, p. 902), while Martindale described an outbreak on a frigate in the Indian ocean (*Ibid*, p. 834).

Goldstone and Le Marquand ask three questions: 1. "Why does it develop on the right side only?" Epidemic diaphragmatic myalgia occurs on either side, but the authors discuss the condition in reference to the "acute abdomen," and, as Scadding points out, abdominal signs are predominantly right-sided. The pain initially is often central or bilateral, but abdominal tenderness is usually only found under the right costal margin. Pressure there may produce in addition pain in the shoulder or neck. Presumably the upward pressure on the liver is transmitted to the diaphragm. Furthermore, on seeing a patient with pain on the left side, one's attention does not immediately descend to the appendix and gall-bladder, as it naturally does when pain is on the right. The picture with involvement of the left side more resembles that of acute dry pleurisy, and does not as readily attract surgical attention.

2. "Why does it develop so often in West Africa, so rarely in U.K.?" This is an epidemic condition. One may wait for years without seeing it, in the U.K., in Italy, or in W. Africa, and then suddenly it is common.

3. "Might the syndrome be due to an unusual type of epidemic?" Speaking from the armchair, my answer is "yes."

The authors suggest that the cause may be perinephric staphylococcal infection. Four of the thirteen patients had had boils. Is this surprising in European Servicemen in W. Africa? Four had preliminary periods of malaise. Is this unusual in patients admitted with other acute illnesses? One of the authors' patients developed a right perinephric abscess. One of mine had a right apical tuberculous cavity but this does not make the rest tuberculous.

Dr. Oram suggests that latent or subclinical infective hepatitis may possibly produce such symptoms. I do not think so, for I saw a lot of infective hepatitis in Africa and Italy from 1942 to 1946, but did not see patients with "the devil's grip" until this year. There was none in Milan while I was there; a few days later I saw examples in Naples; yet infective hepatitis was common in both places.

Cuckfield, Sussex. PHILIP EVANS.

NUTRITIONAL OPTIC NEUROPATHY

SIR,—The article by Dr. Fitzgerald Moore in your issue of August 17 is of such interest to me that I would like to make some observations on it.

The first real recognition of the syndrome of epithelial and nervous lesions complicated by nutritional optic neuropathy was by H. Strachan,[1] in 1897; I referred to his work in my privately printed paper [2] which Moore mentions.

Strachan in 1888 drew attention to a form of multiple neuritis prevalent in the West Indies. By 1897 he was convinced he was seeing an unrecorded form of neuritis, and stated that its chief features were: "(1) A more or less widespread neuritis, involving some of the nerves of special sense, especially the optic nerve. (2) The occurrence of trophic changes in the skin along the distribution of the nerve terminations, in the muscles, in the mucocutaneous lines, and occasionally in the cornea. (3) The rare but still to be noted occurrence of monoplegias. (4) The fact that the disease may be very severe, lasting for many months or even years. (5) The fact that recovery is the rule and a fatal termination very rare. (6) That it attacks many hundreds of persons, at least in Jamaica, the great majority of these being black or coloured inhabitants, who constitute the bulk of the population, though the white residents are not exempt by any means."

Strachan next detailed some of the most important signs and symptoms and described paræsthesias and gradually increasing impairment of vision, but noted that recovery of sight was the rule and optic atrophy never resulted. He also referred to "the condition of the mucocutaneous orifices" and said: "This demands some little notice as redness and irritation of the eyelids and lips are often the first signs noticed. It soon passes into a slight eczematous condition, especially at the corners of the mouth and round the margin of the nostrils, with fine branny desquamation. A similar condition in the mucocutaneous line in the prepuce is not uncommon. More rarely there is a similar condition of vulva and anus. The lips and inside of the mouth are hyperæmic and there may be much loss of surface epithelium on the tongue."

It is of great interest that Strachan recorded pigmentation of the palms of the hands and soles of the feet. Sensation was blunted and in grave cases involvement of the innervation of the heart and diaphragm led to death. He saw mental involvement only in two or three cases but said such cases could be found in asylums. There is little doubt that he was seeing cases of beriberi and pellagra as well as the syndrome under discussion, but his treatment was nevertheless correct, and consisted in rest in bed and nourishing food gradually increasing in quantity and variety throughout the early and acute stages. Medicinal treatment was given for the malaria believed to be present, and iodides to promote absorption of the inflammatory material in the affected nerves.

Moore says the condition I described in 1928 [3] was identical with that described by Stannus. This is not so. I found defective vision a cause of constant complaint, whereas Stannus [4] records finding only 5 patients with defective vision out of a total of 131, which means there is no conclusive evidence of defective vision in his report. Moore still makes it appear that I first attributed the Sierra Leone disease to avitaminosis in 1930; but it was in 1927 that I attributed it to A and B deficiency [5] and it was then that I introduced the "active treatment" with yeast and cod-liver oil.

Recently Hobbs and Forbes [6] referred to the prophylactic value of first-class protein in nutritional visual defects, and it is interesting to recall that Clark,[7] who investigated the syndrome of epithelial and nervous lesions in Nigeria, concluded that cyanogenic foodstuffs,

1. Strachan, H. *Practitioner*, 1897, **59**, 477.
2. Wright, E. J. The A and B Avitaminosis of Sierra Leone. Reprinted from J. N. Leitch's Dietetics in Warm Climates, London, 1930.
3. Wright, E. J. *West Afr. med. J.* 1928, **2**, 127.
4. Stannus, H. S. *Trans. R. Soc. trop. Med. Hyg.* 1913, **7**, 32.
5. Wright, E. J. Ann. Medical and Sanitary Report for Sierra Leone, 1927, p. 29.
6. Hobbs, H. E., Forbes, F. A. *Lancet*, August 3, 1946, p. 149.
7. Clark, A. *J. trop. Med. Hyg.* 1936, **39**, 269.

such as cassava, maize, sugar-cane, millet, guinea-corn, peas, and beans were a common factor in the diet of all people suffering from pellagra and allied nutritional diseases. As a result he postulated that these diseases were all due to slow prussic-acid poisoning. Although Moore says that in Sierra Leone manioc was largely replaced by rice, the second staple food is still cassava (manioc) and is consumed in varying amounts according to the availability of rice, the first staple; so cassava in some form or other is frequently eaten by a large number of people in Sierra Leone.

Sulphur is the antidote to chronic poisoning by cyanogenic foodstuffs. The daily sulphur requirement of the body is probably in the neighbourhood of one gramme, and as the sulphur content of foods is approximately 1% of the total protein it is apparent that 100 g. of good-class protein is required to ensure an adequacy of sulphur. In Sierra Leone the dietary is deficient in protein and hence in sulphur.

In 1936 I described [8] the experimental treatment of the Sierra Leone syndrome with organic sulphur, using 'Contramine' parenterally in some cases and ichthyol orally for others. Judicious sulphur therapy was of great benefit to the patients and resulted in economy in treatment. Although good clinical results have been consistently obtained by combined sulphur and vitamin therapy in Sierra Leone, I have seen no record of its use in nutritional optic neuropathy.

London, N.W.3. E. JENNER WRIGHT.

ARSENICAL CHICKEN-POX

SIR,—Now that it is generally recognised that an eruption of varicella not so very rarely follows or accompanies herpes zoster, and that herpes zoster in an adult has the power sometimes of infecting a child with varicella—and so on—one comes across many reports bearing on this relationship or identity of the infective agents of herpes zoster and varicella. As it is also believed that the herpes zoster sometimes excited by taking arsenical medicines (Sir Jonathan Hutchinson) is a true herpes zoster, one would expect to hear of examples of (arsenical) varicella following or accompanying attacks of arsenical herpes zoster and of patients with arsenical herpes zoster infecting children in their neighbourhood with (arsenical) varicella; but such observations seem to be very rare. This rarity may be partly due to arsenic being employed much less than formerly in the treatment of cancer, Hodgkin's disease, and anæmias.

Before there was any ordinary talk of a connexion between herpes zoster and varicella (though not before Bokay's writing of 1892) I certainly remember a remarkable mixture of herpes-zoster-like and generalised vesicular eruptions in a young person under arsenical treatment. This surely must have been arsenical varicella. Moreover, in the *International Clinics* (1916, **3**, 185, case 1) I described the case of a man, aged 59 years, who developed typical herpes zoster while under arsenical treatment for leukæmia. The herpes zoster was followed by a generalised eruption of varicella-like spots. A little boy, aged 4 years, who was in a bed in the same ward close to that patient, developed varicella ten days after leaving the ward. An almost exactly similar happening was recorded later by A. Dostrowsky (*Derm. Wschr.* 1931, **92**, 685). A man under prolonged arsenical treatment for lymphatic leukæmia developed (gangrenous) herpes zoster together with a generalised vesicular eruption. This man's child developed varicella 25 days after the zoster eruption appeared in his father. Probably there are similar accounts unknown to me, but I think that arsenical varicella has been rarely observed.

Perhaps in such cases the herpes zoster and the varicella are to be regarded as examples of Milian's "biotropism," the arsenic acting by stimulating the pathogenic "agent" of a latent disease (herpes zoster, varicella) and so making it manifest its presence by an eruption. That is, I think, the most accepted theory, but it still remains almost incredible that arsenic can "produce" a common infectious disease such as chicken-pox.

London, W.1. F. PARKES WEBER.

8. Wright, E. J. *Brit. med. J.* 1936, ii, 707.

DISPENSING OF DRUGS IN HOSPITALS

SIR,—The death of a hospital patient through a nurse misreading a prescription sign has led to the suggestion that the traditional symbols of the apothecary should now give way to the metric system. In fact the metric system is coming into use and its further employment depends on the extent to which physicians choose to adopt it in writing prescriptions. How drugs are measured is not, however, the real issue. It is as easy to slip up over a decimal point as over a drachm loop. The real issue is who measures them. In the case in question a pharmacist would have realised that the quantity was greatly in excess of the proper dose. The law should forbid the dispensing of potent drugs in hospitals except by or under the supervision of a pharmacist.

F. C. WILSON
Member of the Council of the Pharmaceutical Society of Great Britain.

London, S.W.20.

PERIPATETIC ERROR

SIR,—Respectful greetings to Peripatetic Correspondent, no. 3 of August 31. Of your kindness, Sir, please to inform him: (1) that "viva" is called "oral" in Scotland; (2) that only my astral body—admittedly a sticky affair—has even contemplated examing south of N.B. (as your correspondent might call us); and (3) that I am just a clinician—so heaven help your correspondent if he gets an "oral" in Glasgow University or even the "Triple."

Now, Sir, please protect me from retaliatory wise-cracks out of Charles Dickens, or I mobilise the sixteen Snodgrasses in our local telephone directory, and march south.

Glasgow. W. R. SNODGRASS.

Obituary

ALFRED CHARLES FOSTER TURNER

D.S.O., M.D. LOND., D.P.H.

Dr. A. C. Turner, who has been in charge of Leicester's school medical services for the last ten years, died on Sept. 5. Though he had no children of his own, he devoted his life in the truest sense to their care, and many parents both in Leicester and in Rotherham, where he served for many years, are grateful for his kindly and efficient ministrations.

Dr. Turner qualified at St. Thomas's Hospital in 1907 and his connexion with Leicester goes back as far as 1911, when he was appointed the first assistant school medical officer. There are many references in the annual reports of those far off pioneer days to the value of his work. On the outbreak of war in 1914 he joined the North Midland field ambulance and served in France with great distinction. He was wounded in action, twice mentioned in despatches, and awarded the D.S.O. It was characteristic of his humility that he kept the news of this distinction in the background. In 1922 he went to Rotherham as school medical officer and remained there until 1935, when he returned to Leicester in charge of the school medical service, then under the general direction of the medical officer of health. During the late war he was the planner of the city casualty service, and his thoroughness, precision, and attention to detail made a valuable contribution to its efficiency.

He spent the last few months at his desk, in spite of increasing ill health, writing a review of the service with which he was connected for so many years, and his record of the Leicester school medical service from 1905 to 1945 will long remain a classic. Such was his official life, but he was much more than an official. He set an outstanding example of unselfish public service in war as in peace. A reticent man, particularly about his own achievements, he had a most lovable disposition, and his unexcelled stoicism during his long illness was typical of his dogged determination to see all things through without flinching. E. K. M.

ROYAL FREE HOSPITAL.—Prof. Winifred Cullis, D.SC., will give the inaugural address at the prize-giving of the London School of Medicine for Women to be held at B.M.A. House, Tavistock Square, London, W.C.1, on Tuesday, Oct. 1, at 3 P.M.

Notes and News

A FUND FOR THE TUBERCULOUS

At present some 7000 patients are said to be awaiting admission to sanatoria for treatment. Deaths from tubercle average 80 a day in Great Britain and Northern Ireland, and 100 fresh cases are reported daily. Last year Lady Chetwynd founded a fund in memory of her husband, Sir Victor Chetwynd, who died of tuberculosis; she herself was killed in an air crash on Sept. 4, soon after the successful launching of the fund. The original aim was to help Service men and women who had contracted tuberculosis; but the introduction of the National Health Service Bill made it necessary to specify the purposes of the fund more clearly so as to avoid overlapping. It was therefore decided, in the spring of 1946, that the Victor Chetwynd Tuberculosis Fund should provide reablement for such patients, and should also acquire a sanatorium for the treatment of suitable cases. Reablement schemes have been arranged at the village settlements of Papworth, El Alameen, and Preston Hall, and the fund is hoping to control a sanatorium for some 150 patients in Switzerland.

Besides those in the fighting Services—among whom prisoners-of-war have been specially liable to tuberculous infection—the fund is extending help to members of the Women's Land Army and to the Merchant Navy. Members of the nursing services, whether civilian or attached to the Forces, also deserve the sympathetic attention of this new venture in reablement. Contributions should be sent to the secretary, Victor Chetwynd Tuberculosis Fund, 60, South Audley Street, London, W.1.

INTRATHECAL SULPHATHIAZOLE

At the inquest on a 63-year-old woman who died in the Taunton and Somerset Hospital on August 5, a house-physician explained that this patient had been admitted with suspected meningitis; 'Thiazamide sodium' (sodium sulphathiazole) from an ampoule contained in a box had been injected intrathecally, but she had died next morning. A printed form inside the box made no reference to intrathecal injections, but another box of the same preparation which he had since seen contained a warning against intrathecal or subcutaneous injection. The pathologist who had done the autopsy said the cause of death was tuberculoma involving the spinal cord; in his opinion death would have in any case occurred within ten days, and it was impossible to say whether the injection had accelerated death. The coroner, returning a verdict of death due to tuberculoma, possibly accelerated by the intrathecal injection of thiazamide sodium, said he would call the makers' attention to the facts, to ensure that all future boxes were explicitly labelled.

DOWN NORTH

The Grenfell Mission at Labrador have carried on through the second world war, but now their overworked hospitals and nursing stations need repairs and new equipment if the work is to continue efficiently. The mission ask their friends to help them again this year by buying the attractive Christmas cards, calendars, and postcards which may be obtained from their offices at 66, Victoria Street, London, S.W.1.

TUBERCULOSIS IN CHINA

Dr. W. Santon Gilmour, UNRRA's tuberculosis specialist for China, speaking at a press conference in London on Sept. 6, said that China, which had been an urbanised country for thousands of years, had had tuberculosis very much longer than Britain. China was very short of doctors, nurses, and hospitals, and hundreds of small towns and thousands of villages were without the ordinary basic sanitation that was taken for granted in this country. Houses were very small; in the cold North, people kept together in a fug, but conditions were equally dangerous in the tropical South. Moreover, the time-honoured method of fertilisation by the use of human excreta promoted the spread of typhoid and other water- and fly-borne diseases. In some parts there was shortage of food, while in others there was plenty; this unequal distribution was due to the difficulty of transportation and communication. Unfortunately, political instability, with continuing civil war, hindered the initiation and the financial maintenance of any social programme. The tuberculosis-rate was, he said, very high; among schoolboys and university students it was about four or five times as high as in young adults anywhere else in the world. Before the war, except in Peking and Shanghai, China had had practically no arrangements for dealing with tuberculosis; there were no sanatoria, clinics, or regular medical officers and no preventive legislation. Both the Nationalist Government and the Communists were eager to improve conditions, but they lacked personnel and buildings. It was quite certain that the disease could not be dealt with in China as it had been tackled in the West, since this would demand immense resources in doctors and buildings. It must rather be approached as a social disease, with the emphasis on prevention. Some of the people were illiterate, and the whole population must be educated, particularly in the principles of personal hygiene and healthy living. In Chungking and Nanking a start had been made with X-ray surveys of young students, with a view to making them well before they got really sick; thus a part of this generation might be saved to teach the healthy way of living. Among the Chinese, the technically trained—doctors, engineers, and scientists—were at one, irrespective of political views, in wishing to serve China with their particular technical skill. Real progress could not come until both political parties buried the hatchet. But the great thing was the enthusiasm of the technically trained and of the students; they would put up with a great deal, and were united in their desire to do something for China.

University of London

Dr. Dorothy Russell has been appointed professor of morbid anatomy and director of the Bernhard Baron Institute of Pathology at the London Hospital in succession to Prof. H. M. Turnbull, F.R.S., who retires at the end of this month.

Dr. Russell studied medicine at Cambridge and the London Hospital, qualifying M.R.C.S. in 1922 and M.B. London in 1923. After holding appointments as assistant in the medical outpatients' department, the Hale clinical laboratory, and the pathology department, she began research work at the Bernhard Baron Institute, first as a junior Beit fellow, and later with grants from the Medical Research Council, whose scientific staff she joined in 1933. In 1928 she went, as a Rockefeller fellow, for a year to America, where she studied with Prof. F. B. Mallory at Boston and Dr. Wilder Penfield, F.R.S., at Montreal. In 1930 she graduated M.D., winning the university medal; and in 1934 she received the John Hunter medal and triennial prize of the Royal College of Surgeons for work on the morbid histology of kidney and brain. She received the M.A. Oxford (by decree) in 1942, and SC.D. Cambridge in 1943, when she also became M.R.C.P. On the outbreak of war she went to Oxford to work with the Nuffield department of surgery and the Military Hospital for Head Injuries; she returned to the Bernhard Baron Institute in October, 1944. Dr. Russell is a member of the medical advisory subcommittee of the University Grants Committee. She has written extensively on the pathology of renal diseases, with particular reference to the classification of nephritis, and on lesions of the central nervous system. She is the first woman doctor to be appointed to the senior medical staff of the London Hospital.

Royal Faculty of Physicians and Surgeons of Glasgow

At a recent meeting of the faculty the following were admitted to the fellowship:

Andrew Allison, M.B., Glasgow; Charles Douglas Anderson, M.C., M.B., Glasgow; John Duke Olav Kerr, M.B., Glasgow; Robert Andrew Shanks, M.B., Barrhead, Renfrewshire; Edward Andrews Chisholm, M.B., Clarkston, Renfrewshire; John Hutchison, M.B., Glasgow; Archibald McDougall, M.B., Glasgow; James Miller McInroy, M.B., Dundee; William Magauran, F.R.C.S., Lancaster; James Clark Walker, M.C., M.B., Newmilns, Ayrshire.

Liverpool Medical Institution

On Oct. 19 honorary membership of the institution will be conferred on the following:

Dr. A. E. Barclay, Sir Allen Daley, Dame Louise McIlroy, Prof. Charles McNeil, Dr. Ivan Magill, Sir Alfred Webb-Johnson.

Wellcome Foundation

When Dr. N. Hamilton Fairley, F.R.S., takes up his appointment as Wellcome professor of tropical medicine in the University of London, on Nov. 1, he will cease to be director of the Wellcome Laboratories of Tropical Medicine, but will become consultant in tropical medicine to the foundation. Brigadier J. S. K. Boyd, at present director of pathology, War Office, will become director of the laboratories.

London School of Dermatology

A course of lectures in skin diseases is to be held at this hospital, 5, Lisle Street, Leicester Square, W.C.2, on Tuesdays and Thursdays at 5 P.M., from Oct. 1 to Dec. 12.

Chadwick Public Lectures

Sir Arthur MacNalty is to give an address at 26, Portland Place, W.1, on Tuesday, Oct. 8, at 2.30 P.M.; he will speak on Sir Thomas More as Public Health Reformer. At 2.30 P.M. on Tuesday, Nov. 5, at 42, Broadway, S.W.1, Mr. Asa Briggs will lecture on Public Opinion and Public Health in the Age of Chadwick. A lecture on the Prevention of Acute Diseases of the Respiratory Tract, with particular reference to Influenza, will be given by Prof. C. H. Stuart-Harris at St. Mary's Hospital medical school on Thursday, Dec. 5, at 4.30 P.M.

Medical Women's Federation

The London Association of the federation is to hold an evening reception for the council and delegates of the Medical Women's International Association, which is meeting in London this month; the reception will be held at the London School of Medicine for Women, 8, Hunter Street, W.C.1, on Thursday, Sept. 19, from 8 to 10 P.M. The London Association's annual general meeting will be held at B.M.A. House, Tavistock Square, W.C.1, on Tuesday, Sept. 24, at 8.30 P.M.; Dr. Henriette A. Lohr (Amsterdam) will speak on Medicine in Holland under German Occupation.

Lectures on Child Development

The Provisional National Council for Mental Health is holding ten weekly lectures on this subject, beginning on Wednesday, Oct. 9. The lectures are intended for school medical officers; the first will be given by Dr. Kenneth Soddy, director of the council, and the others by Miss R. Thomas, educational psychologist. They will be held at 39, Queen Anne Street, London, W.1, and further particulars may be had from the educational secretary of the council at that address.

Iraq Appointment

Lieut.-Colonel W. R. M. Drew has been appointed professor of medicine at the Royal College of Medicine, Bagdad, in succession to Sir Harry Sinderson.

Lieut.-Colonel Drew, who is 38 years of age, graduated B.SC. at Sydney in 1929 and M.B. in 1930. He joined the R.A.M.C. in 1931, and served in India from 1932 to 1937, except for a period as house-physician at the British Postgraduate Medical School in 1935. In 1938 he became a M.R.C.P., and in 1939 obtained the D.T.M. & H. He returned to the Postgraduate Medical School as clinical tutor, but on the outbreak of war joined the B.E.F., being awarded the O.B.E. after the evacuation from Dunkirk. Since 1942 he has been responsible for the teaching of tropical medicine at the Royal Army Medical College, Millbank, and for the last two years he has been joint hon. secretary (with Dr. N. Hamilton Fairley, F.R.S.) of the Royal Society of Tropical Medicine and Hygiene. He was elected F.R.C.P. in 1945. His published work includes studies of primary atypical pneumonia, the toxicity of mepacrine, and sprue.

Royal Sanitary Institute

Dr. F. T. H. Wood, medical officer of health for Bootle, has been elected chairman of the council of the institute.

Births, Marriages, and Deaths

BIRTHS

AHERN.—On August 5, at Graz, Austria, the wife of Colonel T. M. Ahern, O.B.E., R.A.M.C.—a daughter.

BARNSLEY.—On Sept. 1, at Shorncliffe, Kent, the wife of Dr. Alan Barnsley—a son.

CHILD.—On Sept. 5, at Oxford, the wife of Dr. J. P. Child—a son.

DOVE.—On Sept. 3, at Liverpool, the wife of Dr. W. L. Dove—a son.

FLACK.—On Sept. 5, the wife of Dr. I. Harvey Flack—a son.

GOULSTON.—On Sept. 3, in London, the wife of Dr. S. J. M. Goulston, M.C., M.R.C.P., of Sydney—a daughter.

HAYWARD.—On August 31, at Cardiff, the wife of Dr. J. J. Hayward—a daughter.

LEITH.—On Sept. 1, the wife of Dr. W. F. Leith—a daughter.

MACLURE.—On Sept. 4, at Kamakwie, Sierra Leone, the wife of Dr. H. L. Maclure—a son.

NORMAN.—On Sept. 4, at Llandrindod Wells, the wife of Lieutenant Thomas Norman, R.A.M.C.—a son.

PARSONS-SMITH.—On August 31, at Caterham, the wife of Dr. Gerald Parsons-Smith—a son.

PICKARD.—On August 31, the wife of Dr. H. M. Pickard, of Endsleigh Court, London, W.C.1—a daughter.

SAUNDERS.—On August 30, at Barnstaple, the wife of Mr. K. G. W. Saunders, O.B.E., F.R.C.S.E.—a son.

SCOTT.—On Sept. 2, at Malvern, the wife of Dr. G. S. Scott—a son.

STANLEY.—On Sept. 5, at Portsmouth, the wife of Mr. B. E. C. Stanley, F.R.C.S.—a daughter.

WATSON.—On Sept. 5, the wife of Dr. G. I. Watson, of Vachery Shere—a son.

MARRIAGES

BRAINES—STONE.—On August 26, in Guernsey, Frederick Morley Braines, M.B. Lond., to Beryl Winifred Stone.

HODGKIN—CANDLER.—On Sept. 4, at Clyst St. George, Devon, George Keith Hodgkin, B.M., to Rosemary Candler.

MACALEVEY—ALLPORT.—On July 20, at Singapore, Gerald Esmond MacAlevey, O.B.E., D.S.O., M.C., brigadier R.A.M.C., to Hilda Mary Allport, Q.A.I.M.N.S.R.

TAYLOR—LYNE.—On Sept. 6, in London, John Henry Taylor, M.R.C.S., to Joyce Winefred Lyne.

TOW—CARROTT.—On Sept. 5, Peter Macdonald Tow, M.B., of Wickford, Essex, to Evelyn Mary Carrott.

WILSON—IVOR EVANS.—On Sept. 4, at Swansea, Peter Remington Wilson, M.R.C.S., to Joan Ivor Evans.

DEATHS

BENNETT.—On Sept. 2, in Manchester, Christopher Henry Wentworth Bennett, M.R.C.S., of Sandbach.

BETTS.—On Sept. 1, at Kingsdown, Deal, Alfred John Vernon Betts, M.B. Lond., lieut.-colonel I.M.S., aged 72.

MACPHERSON.—On Sept. 5, at Oxford, Alexander Hill Macpherson, L.R.C.P.E.

Medical Diary

SEPT. 15 TO 21

Monday, 16th

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
3.45 P.M. Prof. J. Kirk: Anterior Abdominal Wall.
5 P.M. Dr. David Slome: Water Balance in Health and Disease.

Tuesday, 17th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Prof. J. Kirk: Posterior Abdominal Wall.
5 P.M. Dr. David Slome: Water Balance in Health and Disease.

Wednesday, 18th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Prof. J. Kirk: Pelvic Wall.
5 P.M. Dr. E. P. Sharpey-Schafer: Hæmorrhage.

UNIVERSITY OF GLASGOW
8 P.M. (Department of Ophthalmology.) Dr. W. O. G. Taylor: Ætiology and Treatment of Paralytic Squint.

Thursday, 19th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Prof. F. Davies: Conducting System of the Heart.
5 P.M. Prof. Samson Wright: Physiological Neuronography.

EDINBURGH POSTGRADUATE LECTURES
4.30 P.M. (Royal Infirmary.) Dr. H. L. Wallace: Care of the Small Premature Infant.

Friday, 20th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Prof. F. Wood Jones: Development and Structure of the Palate.
5 P.M. Prof. Samson Wright: Physiological Neuronography.

TUBERCULOSIS ASSOCIATION, 26 Portland Place, W.1
3.15 P.M. Dr. Honor Smith: Clinical and Pathological Aspects of Tuberculosis of the C.N.S.
5 P.M. Dr. G. B. Dowling: Treatment of Lupus Vulgaris. Dr. D. E. Macrae: Use of Calciferol in Tuberculous Conditions.

Appointments

ADKINS, G. E., M.B. Camb.: tuberculosis officer, Exeter Division, Devon.
DARLOW, A. R., M.R.C.S.: M.O., Uganda (colonial service).
EASTON, L. D., O.B.E., M.B. Edin., F.R.C.P.E.: specialist consulting physician, Perth Royal Infirmary.
HORNE, W. A., M.D. Glasg., D.P.H.: senior deputy M.O.H., Glasgow.
ROBERTS, LLYWELYN, M.D.(Hyg.) Lond., M.R.C.P., D.P.H.: deputy M.O.H., Sheffield.
RUSSELL, P. M. G., M.B. Lond., F.R.C.S., M.R.C.O.G.: surgeon in charge of obstetric gynæcological dept., Royal Devon and Exeter Hospital.
SEARLE, P. W. J., M.B. Brist.: M.O., Fiji (colonial service).

Glasgow Royal Infirmary:
BEATTIE, WILLIAM, M.B. Glasg., F.R.F.P.S.: asst. surgeon.
FLEMING, CHRISTIAN M., M.D. Glasg., F.R.F.P.S.: asst. physician.
IMRIE, A. H., M.B. Glasg., M.R.C.P., F.R.F.P.S.: asst. physician.
INNES, A. J., M.B. Edin., F.R.C.S.: asst. surgeon, orthopædic dept.
JARVIE, JAMES, M.B. Glasg., F.R.F.P.S.: asst. surgeon.
MCDOUGALL, ARCHIBALD, M.B. Glasg., F.R.F.P.S.: asst. surgeon, orthopædic dept.
RAESIDE, DAVID, M.B. Glasg., D.M.R.: third asst. radiologist.
SHORT, D. W., M.B. Glasg.: asst. surgeon, orthopædic dept.
YOUNG, STEPHEN, M.B. Glasg.: surgeon, E.N.T. dept.

Royal Infirmary, Bradford:
Full-time—
CAMPBELL, R. J. C., M.B. Edin., D.M.R.: radiologist.
CARR, R. J., M.D. Durh., D.M.R.: radiologist.
KELLETT, H. S., M.B. Camb., D.C.P.: pathologist.
LEWIS, R. I., M.D. Lond., D.M.R.E.: radiologist.
Visiting—
BENSON, JOHN, M.B. Leeds, F.R.C.S.E.: ophthalmologist.
DAVIDSON, C. L., M.D., B.CH.D. Leeds, M.R.C.P., D.C.H.: asst. physician.
DAVIDSON, J. S., M.B. Edin., F.R.C.S.E.: asst. surgeon.
DAWSON, JAMES, M.B. Glasg., F.R.C.S.: surgeon.
DICK, I. L., M.D. Edin., F.R.C.S.E.: orthopædic surgeon.
LANGLEY, R. L., M.D. Edin., M.R.C.P.E.: pædiatrician.
LLOYD, R. I. T., M.B. Leeds, F.R.C.S.: ophthalmologist.
MARTIN, F. R. R., M.B. Camb., F.R.C.S.: asst. surgeon.
NAYLOR, ARTHUR, CH.M. Sheff., F.R.C.S.: orthopædic surgeon.
OTTY, J. H., M.B. Aberd., F.R.C.S.E., D.L.O.: E.N.T. surgeon.
PRICE, J. A., M.D. Belf., M.R.C.P.: physician.
SMITH, L. W., M.B. Camb., M.R.C.P.: asst. physician.
WATSON, G. W., M.B. Edin., F.R.C.S.E.: surgeon.

Examining Surgeons under Factories Act, 1937:
BYRNE, P. S., M.B. Lpool: Milnthorpe, Westmorland.
CARAHER, F. A., L.R.C.P.I.: Carnforth, Lancaster.
HEAP, G. M., M.R.C.S.: Rochdale, Lancaster.
WEBSTER, F. J. D., M.B. Leeds: Bridlington, York.
WHITE, J. A., M.B. Glasg.: Saltcoats, Ayr.

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

Mr. BRYAN MURLESS, F.R.C.S., M.R.C.O.G., 808, Acutts Arcade, Durban, S. Africa.

Mr. R. W. NEVIN, F.R.C.S., 53, Harley Street, W.1. (Tel. Langham 1077.)

PENICILLIN IN WOUND EXUDATES

M. E. FLOREY
M.B. Adelaide
RESEARCH CLINICAL ASSISTANT

E. C. TURTON
M.B. Lond., M.R.C.P.
REGISTRAR

RADCLIFFE PENICILLIN UNIT OF THE MEDICAL RESEARCH COUNCIL

E. S. DUTHIE *
M.B. Dubl.
DEMONSTRATOR IN PATHOLOGY, UNIVERSITY OF OXFORD, AT SIR WILLIAM DUNN SCHOOL OF PATHOLOGY

THE routine prophylactic use, in severe battle casualties, of intramuscular doses of penicillin prompted an investigation into the penicillin content of wound exudates after 100,000 units, the recommended initial dose. It was hoped to determine whether such a dose would be followed by exudation of the drug into a wound, and whether it would remain longer there than in the blood-stream, thus exercising a protective effect during long periods in transit, in which no injections were given. When this time-limit was found, the same dose was placed locally in the wounds, and the duration of a protective concentration in blood and wound exudate following each method of administration was compared.

METHODS

Exudates were first collected from 22 lacerated wounds in airborne battle casualties at the first removal of dressings in the Radcliffe Penicillin Unit, and at different intervals following the immediate administration of 100,000 units of penicillin.

Owing to circumstances over which the Unit had no control, the supply of fresh cases ceased after three months, and so, as the experiments continued and the same wounds had to be used, the age of the latter increased until the last one was 67 days old. The immediate effects of trauma, therefore, could only have exerted an influence on the earlier results. Intramuscular administration was investigated before local when conditions more nearly approached those for which this method of prophylaxis had in fact been used.

Collection was usually by means of a Pasteur pipette, but a rubber drainage-tube was used on one occasion and a glass tube on five occasions. When collection took more than a few minutes, the collecting vessel was surrounded with ice.

Assays of blood and urine were also carried out to ascertain if there was any correlation between penicillin concentration in the three fluids.

The method of assay used for low concentrations either in the blood-stream or wound exudate was Heatley's drop-on-slide method (Garrod and Heatley 1944). For urine and wound exudate, when enough was collected and when the presence of more than 0·1 unit per c.cm. could be expected, the cylinder-plate method (Heatley 1944) was used. To make the test more delicate, the plates were seeded with a 1 : 1000 dilution of broth culture of the test staphylococcus (N.C.T.C. no. 6571).

Controls were obtained for wound-exudate samples by the addition of penicillinase or by using those collected so long after the last administration that they were free of penicillin.

Difficulties in Interpretation.—The reading of slide tests was made difficult in centrifuged exudates by the frequent presence of contaminating bacteria. To exclude false readings from inhibition of the test staphylococcus by the contaminants, a series of tests was set up in which serum was inoculated with the test staphylococcus and with one of six varieties of gram-negative bacteria cultured from the wounds. Various dilutions of suspensions of the contaminants were used for inoculation. Though they prevented the typical appearance of discrete colonies, microscopical examination always revealed a free though more diffuse growth of staphylococci in the presence of *Ps. pyocyanea* and *Bact. coli*. In the presence of proteus, growth though less abundant took place in every concentration used.

The greatest problem to be overcome, however, was the presence of some inhibitory factor, or factors, other than penicillin in the exudate. Nine wound exudates inhibited the test staphylococcus even when incubated with penicillinase; so their assays are excluded from the tables. Considerable efforts were made to eliminate this factor and to find its source. It was not produced by the gram-negative bacteria infesting nearly all the wounds, nor was it associated with rubber tubing or its preservative. Moreover, it appeared in a sterile serous exudate after it had been incubated for three hours.

Extraction.—Eventually a method of extraction was developed which ensured that penicillin alone was assayed. It depended on the use of ammonium sulphate, of high pH, to precipitate the globulins, and of amyl acetate and phosphate buffer for the actual extraction. To reduce penicillin loss, samples were kept, from the time of collection till the final extraction, in a beaker containing ice, only being removed when centrifuged or shaken. The method was as follows:

(1) The samples were centrifuged until a comparatively clear supernatant fluid appeared.
(2) This was removed with a pipette and diluted if necessary with saline, to make a minimum of 0·4 c.cm.
(3) Ammonium sulphate, equal by weight in grammes to half the volume in c.cm. of the sample from (2), was added and the mixture well shaken.
(4) It was centrifuged at 4500 rev. per min. for about 20 min. —i.e., until there was a sufficiency of clear supernatant fluid to use in the next steps.
(5) A volume of amyl acetate equal to that of an aliquot of the supernatant fluid was added.
(6) During gradual acidification to pH 2·0 with *N*/3 HCl † persistent shaking was carried out to prevent destruction by the acid before extraction had taken place.
(7) The supernatant amyl acetate was separated and removed.
(8) An equal volume of *M*/15 sterile phosphate buffer at pH 7 was added to the amyl acetate and shaken well.
(9) After centrifuging, the phosphate layer was removed for penicillin assay.

When slide tests were used, twofold dilutions were made with sterile serum. A fraction of serum was added to the first undiluted drop, as staphylococci did not grow in the phosphate buffer solution only. The lowest reading was equivalent to a little over 0·02 unit per c.cm. In the cylinder-plate test, undiluted buffer solution and tenfold dilutions were set up, so that, with the plates seeded with a 1/1000 dilution of the test culture, the lowest reading obtainable was 0·1 unit.

PENICILLIN LEVELS FOLLOWING INTRAMUSCULAR INJECTION OF 100,000 UNITS

All cases had received some kind of prophylactic penicillin therapy in transit, but none had been given any in the 24 hours preceding each experiment, nor was the last dose greater than 50,000 units. In eight instances the assays were done on patients within the first week of wounding, but the wounds of the remainder were considerably older.

The results in 11 cases are recorded in table I. Though cases whose wound-exudate controls did not conform to the standard mentioned earlier are excluded, their blood and urinary assays served to confirm the findings in those described. It will be seen that, irrespective of the age, types of bacteria, or pH of the wound, in every case there was a detectable amount of penicillin in the exudate up to 8 hours after injection, which ranged, at the end of this time, from 0·02–0·32 unit per c.cm.

* With a personal grant from the Nuffield Provincial Hospitals Trust.

† An excess of phosphoric acid would probably have been better.

After 12 hours it was still present in 50% of the exudates tested, but beyond this time there was considerable variability between results in different cases. It was noted that, though there were greater variation and prolongation in the duration of demonstrable inhibition in the blood-stream than has been commonly met with in cases treated with this dose (compare Fleming et al. 1944, McAdam et al. 1944, Child et al. 1945), there was a definite correlation between concentrations in the two fluids. Blood- and exudate-penicillin levels were similar at the end of the first hour after injection, but after this the blood-penicillin level fell more rapidly than the exudate-penicillin level—apart from one exception (case 1) there was no instance in which the blood-penicillin level after this time was higher than the exudate-penicillin level. Further, where an inhibitory concentration was prolonged in the blood, it was also prolonged in the exudate.

Urinary excretion of penicillin ranged from 30–50 units per c.cm. during the first 4 hours to 0·0–1·5 units per c.cm. by the end of 24 hours. The 4-hour concentrations were associated with penicillin levels of 0·04–0·08 unit per c.cm. in the blood-stream and 0·16–0·32 unit per c.cm. in the wound exudate. It therefore seems that the penicillin disappears from body fluids after intramuscular injection in the following chronological order: blood, wound exudate, urine.

Possible Factors Influencing Penicillin Assay.—These are discussed here as they apply more particularly to the intramuscular series, for spilling was a larger factor in the local series than any other.

(1) *Blood-urea* estimations were made in each case within 24–48 hours of the assay experiment. In one case (case 2), with a clostridial infection in which inhibition persisted for 24 hours in the exudate and for 12 in the blood, the reading was 360 mg. per 100 c.cm. In the only other case (case 4) in the intramuscular series whose blood-urea could be considered high there was no prolongation of inhibition in the wound beyond 8 hours or in the blood-stream beyond 4. In this case, however, the blood-urea only reached 46 mg. per 100 c.cm. Reduced excretion, as indicated by retention of metabolic products, may have played a part in retaining penicillin in these particular cases but does not appear to have affected the others.

(2) The *pH* of the exudates was tested in four of this series and in nine of those treated by local instillation. In one of these it was 8·0–8·4 (case 1). This was one of the only two (cases 1 and 5) in which the serous character of the exudate might have influenced the penicillin content (Bigger 1944). Inhibition was recorded in the undiluted exudate alone after 8 hours in spite of the fact that the blood continued to show inhibition at a dilution of 1 in 4 at this period. The remaining exudates were mainly thin, turbid, and darkly stained with blood, with various amounts of deposit, only two being purulent, and the eleven tested were within a pH of 6·0–7·5. Destruction of penicillin from this cause therefore should have been minimal.

(3) *Bacteria* were looked for in all the wounds. In the intramuscular series gram-negative organisms were present in eight and coliforms in five. Four exudates which contained coliforms, besides proteus and clostridia, *Staph. albus*, and non-hæmolytic streptococci in one or another, were assayed at various intervals after known amounts of penicillin had been added to them in vitro. One, containing initially 1·0 unit per c.cm. and assayed by the cylinder-plate test, sustained a loss at room temperature of 0·25 unit per c.cm. in an hour and of the whole penicillin content after 9 hours. At 37° C the penicillin completely disappeared within 4 hours. Two others had lost more than 0·3 of their original 0·4 unit per c.cm. within 15 min. at room temperature, and the fourth, assayed by the slide test and containing initially 0·2 unit per c.cm., within 2 hours had lost 0·03 unit per c.cm. at 4° C and 0·16 unit per c.cm. at 37° C. Thus, these exudates, which contained various organisms—the one in common being *Bact. coli*—showed a considerable and rapid loss of penicillin. As a control, a sterile serous wound exudate with a concentration of 0·02 unit per c.cm. was set up. It lost no activity when kept for 24 hours at 4° C, but, on incubation at 37° C without penicillin, it produced another inhibitory factor thus vitiating the comparison.

(4) *Effect of Extraction.*—Eight experiments were made, either by adding known amounts of penicillin in vitro or by injection into patients and comparing the assays of the merely centrifuged and the extracted exudates by cylinder-plate or slide test. They showed that little penicillin was lost during the extraction, and that in some cases an extract would give a value when the merely centrifuged exudate gave either an erroneous one or none at all.

TABLE I—PENICILLIN LEVELS AFTER INTRAMUSCULAR INJECTION OF 100,000 UNITS IN 11 WOUNDS

Wound no.	Age of wound (days)	Bacteria in wound						pH	Wound exudate (slide tests)													Urine (cylinder-plate tests)				Blood
		Bact. coli	*Ps. pyocyanea*	Proteus	*Staph. aureus*	Streptococcus	Clostridium		Controls' inhibition		Units per c.cm. at hours after injection															Duration of inhibition (hr.)
									Before injection	With penicillinase	1*	2	3	4	5	6	7	8	12	16	20	24	12	20	24	28	
1 (C)	4	−	−	−	−	−	−	8·4	0	0	+	+	+	0·16	+	+	+	0·02	0	0	0	0	7	4	0·5	0	8
2 (C)	6	+	−	−	−	−	+	..	..	0	2·56	+	+	+	+	+	0·32	+	+	+	0·02	0·02	..	..	..	..	12
3 (C)	6	+	−	−	−	Vir	+	..	..	0	0·32	+	+	0·32	+	0·16	+	0·32	+	0·08	..	..	..	..	..	..	..
4 (C)	6	−	−	−	+	−	−	..	..	0	+	+	+	0·02	+	+	+	0·02	..	..	..	..	..	>1	>1	..	4
5 (C)	7	−	−	−	−	Vir	+	..	..	0	>0·64	+	+	0·16	+	+	+	0·16	..	..	0†	−	..	..	..	..	..
6 (C)	8	−	+	−	+	−	+	7·5	0·02	0	+	+	>0·04	+	+	+	+	0·16	0·16	0·08	0·04	0·02	25	..	0	..	8
7 (C)	20	?	..	+	−	−	−	..	..	0	+	+	0·32	+	+	0·16	..	..	0†	−	−	0†	..	..	..	..	6
8 (E)	11	+	+	+	−	−	+	6·0	0	..	+	+	+	+	+	+	+	0·02	0·02	0	0	−	>1	0·02	0	..	7
9 (E)	40	−	+	+	−	−	−	..	0	..	+	+	+	+	+	+	+	0·04	0	−	−	−	..	..	..	..	<5
10 (E)	40	+	−	+	+	NH	−	..	0	0	+	+	+	+	+	0·08	+	+	0·04	0·02	..	0	..	..	..	..	..
10 (E)	61	+	+	+	−	−	−	6·0	..	..	0·04	+	0·64	+	+	0·16	..	..	0	−	−	−	..	..	..	..	..
11 (C)	32	+	+	−	−	NH	−	..	0·02	0	+	+	0·08	+	+	0·08	..	..	..	..	..	..	1·4	+	0·4	..	..

For purposes of comparison with table II, inhibition is recorded in units on the assumption that complete inhibition in undiluted slide tests =0·02 unit per c.cm. In tables I and II, + or − in assay columns indicates the presumed presence or absence of inhibition.

(C), exudate centrifuged only.
(E), exudate extracted.
Vir, *viridans*.
NH, non-hæmolytic.
* Samples taken at any time within the first hour.
† 0 at dilution of 1 in 2.

TABLE II—PENICILLIN LEVELS AFTER LOCAL INSTILLATION OF 100,000 UNITS IN 8 WOUNDS

Wound no.	Age of wound (days)	Bacteria in wound							pH	Cubic capacity of wound (c.cm.)	Wound exudate (cylinder-plate tests)							Urine (cylinder-plate tests)					Blood
		Bact. coli	*Ps. pyocyanea*	Proteus	Staphylococcus	Streptococcus	Clostridium	Others			Control before instillation (units/c.cm.)	Units per c.cm. at hours after instillation											Duration of inhibition (slide cell) (hr.)
												0*	18	24	48	60	72	18	24	48	60	72	
12 (E)	9	+	+	−	−	−	+	−	..	5	<0·5	20,000	+	+	500	..	..	..	..	0	..	..	5
	11	+	+	−	−	NH	−	−	5·8	5	..	20,000	+	+	+	+	2000	+	+	+	+	0·25	..
13 (E)	12	+	+	−	−	NH	−	−	6·8	3	..	33,000	..	..	..	..	..	+	2·0	..	..	..	4
	13	..	..	..	..	..	..	..	6·4	5	..	20,000	+	+	+	100	..	+	+	+	0·25	..	..
	16	..	..	..	..	..	..	..	..	5	..	20,000	+	+	+	+	500	..	..	..	..	0	..
14 (C)	17	+	+	−	−	−	−	−	..	6	0	16,600	+	10	..	..	..	+	2·0	..	..	..	0†
8 (E)	18	+	+	+	−	−	−	−	6·4	5	..	20,000	+	100	..	..	..	+	0·5	..	..	..	8
	19	..	..	..	..	..	..	..	..	..	..	20,000	+	+	+	1	..	..	..	0	0	..	..
	23	..	..	..	..	..	..	..	..	..	..	20,000	..	..	..	..	0	..	..	..	..	0	..
6 (E)	22	+	−	−	−	−	−	−	6·8	6	..	16,600	+	10	..	..	..	+	1·5	..	..	..	9
	23	..	..	..	..	..	..	..	6·2	..	..	..	..	..	..	0	−	..	..	..	0	..	..
9 (E)	27	−	+	+	−	NH	NH	−	6·6	5	<0·5	20,000	+	+	1·5	..	..	+	+	1	..	..	7
15 (C)	52	−	+	+	..	NH	..	Mes	..	3	..	33,300	>1000	..	..	..	..	10	..	..	..	..	..
(E)	56	−	+	−	−	−	−	Mes	6·7	1·5	0	66,600	+	>1000	>10	..	..	+	0·5	..	..	..	>6
(E)	67	+	+	+	−	−	NH	−	6·6	1	0·25	66,600‡	+	+	..	..	0	..	..	..	..	0	5
10 (E)	68	+	+	+	−	NH	−	−	..	6	..	16,600	..	..	..	..	..	1·0	0·8	..	..	..	9

(E), exudate extracted.
(C), exudate centrifuged only.
NH, non-hæmolytic.
Mes, *B. mesentericus*.

* Units per c.cm. before instillation.
† On another occasion inhibition present for 5 hours.
‡ Only 66,000 units retained in wound.

PENICILLIN LEVELS AFTER LOCAL INSTILLATION OF 100,000 UNITS

Experiments were made on eight separate wounds, none less than 9 days old, and seven infected with *Bact. coli*. A mild pyrexia was present in five cases, all had had previous courses of intramuscular penicillin, and those whose control exudates showed a small ring of inhibition had had local applications 24–48 hours previously. The wound was first cleaned with saline, and then a solution of penicillin was inserted, the amount varying with the cubic capacity of the wound. Spilling and leakage was inevitable in open wounds during the subsequent period of observation, thus explaining variation in results in the same wound. Assays were made by the cylinder-plate method (table II). The extraction method was used in seven cases. Only one reading was taken in each experiment, as the quantity of fluid required for this test necessitated the emptying of the wound when each sample was taken. A fresh instillation of penicillin for each assay was consequently required. As it was known that the original content of the wound was of the order of 25,000 units per c.cm., the cubic capacity of the wounds being 6 c.cm. or less, it was not considered necessary to make early assays. The duration of a detectable concentration of penicillin was the main point at issue, and it will be seen that in all cases this was for the blood at least 4 hours, for the urine 24, and for the exudate 48 hours. In 50% of cases tested the duration was extended to 6, 48, and 60–72 hours respectively.

Thus, in this series, the inhibition in the wound outlasted that in the urine by about 24 hours. These results were irrespective of the bacterial flora and the age of the wound after 9 days; the pH should not have affected the penicillin content; and in no patient was the blood-urea over 53 mg. per 100 c.cm. A comparison of the duration of inhibitory levels of penicillin by the two methods of administration are set out in table III. It is seen that, though there is very little difference in the duration of a detectable amount of penicillin in the blood-stream, the enormously higher local concentrations from instillation into the wound led to a very much greater duration of inhibition in both urine and wound exudate.

In an attempt to find the amount and frequency of dosage necessary to ensure continuous bacteriostasis in the blood-stream, smaller doses were placed in what suitable wounds still remained to us. Even 33,000 units produced a demonstrable though not necessarily complete inhibitory level in the blood for 5–9 hours. Using this as a basis it should be possible to maintain a constant inhibitory level in the blood by regular instillations of 33,000 units or more.

DISCUSSION AND CLINICAL APPLICATION

The study of these exudates demonstrates the difficulty of reliable assay of penicillin in such fluids. The presence of natural inhibitory factors in pus was demonstrated by Wright et al. (1918). Inhibition has been found by us also in infected pleural exudates and in one instance in a sterile wound exudate after incubation, and by McAdam et al. (1945) in cerebrospinal, peritoneal, and joint fluids. Therefore, before an attempt is made to assay any type of effusion or to estimate its content of penicillin, this source of confusion must be excluded. Extraction provides the best method of doing this, but it lengthens the process of assay considerably. Perhaps the most practicable method would be to control every assay of an exudate by setting up another with penicillinase, and to adopt the more tedious process only if the control shows inhibition.

TABLE III—COMPARISON OF INHIBITION AFTER INTRAMUSCULAR AND LOCAL ADMINISTRATION OF 100,000 UNITS OF PENICILLIN

Source of samples		Minimal duration of detectable penicillin (hr.)	
		Intramuscular	Local
Blood	In all cases tested ..	4	4
	„ 50% „ „ ..	7	6
Urine	In all cases tested ..	20	24
	„ 50% „ „ ..	24	48
Wound exudate	In all cases tested ..	8	48
	„ 50% „ „ ..	12	60–72
Range of concentrations detected in wound exudates (units per c.cm.)		2·56–0·02	2000–1·0*

* All at 18 hours or more from instillation.

The most curious anomaly in dealing with these infected exudates was the apparently rapid destruction of penicillin

when added to them in vitro and yet its long persistence in the wounds. Possibly in the case of intramuscular injection a continual leakage into the wound from the surrounding tissues might explain its presence, whereas the enormous concentrations used in local instillations would not be significantly reduced by the destruction of several units per hour. Further possibilities are that the rate of destruction varies with the concentration of penicillin, or that adsorption takes place when penicillin is first added to an exudate, with the result that its presence is not demonstrated by the cylinder-plate test. The fact that some penicillin persisted (as shown by the controls) even after an intramuscular course, or the usual local applications of 250 units per c.cm., had been discontinued 24 hours previously, showed its ability to withstand total destruction. Whatever the explanation, the assays appear to be an answer to the fears expressed by some—e.g., Meleney et al. (1946)—that penicillinase-producing bacteria would neutralise the effect of the drug in a wound.

A concentration of 0·02 unit per c.cm. was adopted as the lowest protective concentration; but, though adequate against most staphylococcal and streptococcal invasions, it might be low for clostridial infection. If, however, as Ross (1946) has noted, inhibition of relatively resistant strains depends on the size of the inoculum, then, at an early stage after wounding, when multiplication of bacteria cannot have progressed far, such a concentration should have some effect, for, according to his slide-cell tests, this concentration in circulating serum led to partial inhibition of *Cl. welchii*. Intramuscular injections of 100,000 units produced higher concentrations and complete inhibition for $1^1/_2$–3 hours, depending on the strain used. It can therefore be stated that intramuscular injection of 100,000 units leads to the exudation of a useful level of penicillin into the wound which is reabsorbed more slowly so that protection lasts several hours longer than is indicated by the level of circulating penicillin. Though the results recorded here indicate that, with the dose used, reliance could not be placed on a longer period of inhibition than 8 hours, yet none of these cases was examined during the first 24 hours of wounding, when metabolic disturbances and diminished urinary excretion following severe trauma would favour the retention of the drug within the body. Case 2, with fractures of femur, tibia, and fibula, with much laceration of muscles of the leg and back, *Cl. welchii* in his wounds, a blood-urea of 360 mg. per 100 c.cm., and no excision of his leg wound for 9 days, should have produced very favourable conditions for the development of gas gangrene. Yet inhibition and therefore protection in his case was more prolonged both in blood and wound than in any less severely injured case.

Further application to therapeutic fields may be permissible. If the prolonged presence of penicillin in wound exudates indicates its presence in any inflammatory tissue exudation, a ready explanation is found of the remarkably good results obtained by a course of once-daily injections of aqueous solutions in early syphilis (Jones et al. 1946), and of twice-daily injections in acute inflammatory conditions (Bedford 1946) and in gonorrhœa (Cohen and Grover 1945). It may therefore be feasible to treat purely focal infections by a reduced number of injections per 24 hours—e.g., once or twice—while increasing each individual dose to 100,000 units or more without recourse to vehicles, such as beeswax and peanut-oil, which delay absorption (Romansky and Rittman 1945). Certainly the fears expressed by Rammelkamp and Kirby (1945) of the danger of this type of treatment do not appear to have experimental foundation.

In wounds treated locally, not only the duration of protection but also the concentrations of penicillin make a striking contrast to those treated by intramuscular injection. It might be argued that the assay of the fluid in these wounds was not a true index of the concentration in the tissues of their walls; but, as inhibitory concentrations were detected in the circulating blood for as long as after intramuscular injection, and in the urine for at least twice as long, clear proof was given that absorption took place. The necessity of collecting a sufficient amount of exudate for each assay impelled the use of a solution, but for practical purposes it is obvious that, failing complete suture, full retention of a fluid preparation would always be problematical. This disadvantage can be largely overcome by using a solid preparation—powder or tablet. The extraordinary solubility and absorbability of penicillin by body fluids renders it an ideal local chemotherapeutic agent. Those who have used penicillin powder, unmingled with a sulphonamide, in wounds know how rapidly it is dissolved and absorbed, though some exudation invariably accompanies its insertion. So small an area as 1 sq. in. will absorb 1 g. within a few minutes. Wherever hæmostasis can be secured, there is no question therefore that local implantation of the drug in a wound will afford surer protection than any practicable intramuscular dose.

One other point of clinical application emerges from this study. After intramuscular injection the disappearance of penicillin from the urine succeeded its disappearance from the exudate, but in the case of local application it preceded it. Where wounds need to be enclosed in plaster, tests of the urine will indicate the presence of penicillin placed in the wounds, with a 24-hour margin of safety.

The recommendation of intramuscular treatment as the routine method of administration of the drug to battle casualties, together with the ample supplies of penicillin available between D-day and the end of the war, seems to have encouraged the idea among surgeons that this is the route of choice for administration. The discipline of troops has enabled this method of treatment to be carried out effectively and often for a long time. Though the findings in this paper or the use of vehicles delaying absorption may enable fewer injections to be used, and though oral administration may become practicable (Finland et al. 1945, Ross et al. 1945), yet these methods cannot produce concentrations of the drug comparable with those of local administration at the focus of infection. To those who have practised and seen the results of local administration, only using the intramuscular route when inaccessibility of the lesion necessitates it, it has long been obvious that, used advisedly and repeated at suitable intervals, it not only avoids the very undesirable effects of discomfort or even pain to the patient and disturbance of his rest, but that it can accomplish the desired results, both local and systemic, wherever a wound can be so sufficiently closed either by suture or dressings as to retain the drug.

SUMMARY

A method for preparing wound exudates for assay of their penicillin content is described.

Sources of error from other inhibitory factors and from contaminating bacteria are thereby eliminated.

A dose of 100,000 units given intramuscularly to severely injured battle casualties whose wounds were 4–61 days old invariably produced inhibition for 8 hours in the wounds tested, and for 12 hours in 50% of cases.

A dose of 100,000 units given locally into wounds 9–67 days old invariably produced inhibition for 48 hours in the wounds tested, and for 60–72 hours in 50% of cases.

These time-limits were irrespective of the age, bacterial flora, pH, or consistence of the wound exudates.

Blood and urine assays were correlated with these findings and served to confirm them.

A possible application of these findings to the treatment of focal infections is mentioned.

The advantages of local over intramuscular administration in prophylaxis and treatment are also discussed.

We are particularly indebted to Dr. N. G. Heatley for invaluable advice throughout and for carrying out some experiments; Dr. J. Humphrey for suggesting the use of ammonium sulphate in the process of extraction; Lieut.-Colonel J. S. Jeffrey for allowing us to do the work on his cases; Private P. Bowdery for technical assistance; and Dr. R. W. N. L. Ross for some final blood assays.

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CORONARY OCCLUSION IN YOUNG ADULTS

REVIEW OF FIFTY CASES IN THE SERVICES

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ALTHOUGH the last twenty years have seen a rapid development in the clinical diagnosis of coronary occlusion, it is still considered to be very rare in young adults. A considerable number of cases in patients under the age of forty years have been recorded in the literature, although most of the authors describe only 1 or 2 such cases individually.

Smith and Bartels (1932), in reporting 2 cases in patients aged thirty-five and thirty-six, state that they were able to find in the literature up to 1932 only 20 proved cases of coronary thrombosis affecting patients under forty years of age. Since then many more cases have been recorded.

Durant (1937) reports 7 cases in patients aged thirty-five years or under observed in a clinic in four years.

The most extensive series of cases has been recorded by Glendy et al. (1937), who reported 100 patients under forty years of age, collected from several hospitals and clinics in three years; of these only 8, however, were under thirty years of age.

French and Dock (1944) analysed the clinical and pathological features of 80 cases of coronary disease in American soldiers aged from twenty to thirty-six from data received at the American Army Medical Museum since the beginning of the recent war. The striking clinical feature was overweight (in 73 cases), and in every case arteriosclerosis was the basic lesion.

In view therefore of the apparent rarity of coronary thrombosis in young people, I have gone through the records of the Service men and women who have been invalided with, or died from, coronary occlusion or thrombosis, and collected the records of those up to the age of thirty-five for analysis. A careful attempt has been made to select only those cases where the diagnosis was beyond doubt—i.e., either proved by necropsy or where the electrocardiogram shows the characteristic changes of coronary occlusion in support of the clinical diagnosis. All doubtful cases have been excluded. I have collected records of 50 such cases which occurred during the recent war. The youngest patient was aged twenty, and no less than 22 of the 50 patients were in their twenties, although as shown below the frequency increases with age, as in the older age-groups:

Age in years	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
No. of cases	1	2	3	1	3	1	1	3	5	2	4	3	6	7	1	1
	7				8				14				21			
	15								35							

These figures show that coronary thrombosis in the young is not so uncommon as was formerly thought, and that it may occur at an early age. Of the 50 cases of coronary thrombosis the diagnosis was established clinically in 11 and by necropsy in 39.

SCOPE OF PRESENT STUDY

I have extracted from the Service documents all the available data that might have a bearing on the ætiology. None of the cases have been seen by me personally. Unfortunately all the information that one would have appreciated—such as family history, ancestral longevity, and habits, including tobacco consumption, &c.—was not recorded. On the other hand, every case was examined on entry into the Service, and in many cases several times subsequently; hence we have a record in every case of the subject's physical condition before the onset of the catastrophe. The occupation before entry into the Service has also been noted. The past illnesses, if any, and conditions of service are usually recorded; and the relation of physical stress to the onset can thus be deduced. The height and weight of the individual on entry is also usually recorded; hence the relation of body-build may also be considered.

CLINICAL FEATURES

Sex-incidence.—Coronary disease at the usual older periods is recognised as being more common in males; in the young age-group of Glendy et al. (1937) the proportion was 24 males to 1 female. In the present series there was only 1 female—a Wren aged 28. It must be remembered, however, that in the pool from which these cases were drawn there were about 10–15 males to 1 female. Even so, it appears that the disease is more common in males than in females in this younger age-group.

Body-build.—The striking feature was the good physical development and nourishment of these young adults. The recorded weight on entry into the Service in 43 of the 50 cases was over 126 lb. The highest weight was 193 lb., and many were over 150 lb. In 21 of the 39 necropsies remarks such as "well nourished," "powerfully built," and "obese" are made. The physical fitness of the subjects is indicated by the fact that 45 of the 50 were graded fit, or I, on entry. Even in the 5 exceptions the lowering of the category was due to some slight disability, such as flat-foot, defective vision, &c., entirely unconnected with the general physical development. The heart was recorded as normal in every case, including those in the lower category.

Previous Infection.—Rheumatic fever may cause proliferation and fibrosis of the elastic tissue of the coronary arteries, with necrosis resembling arteriosclerosis (Karsner and Bayless 1934). Further, acute rheumatic fever is known to cause changes in the electrocardiogram simulating coronary thrombosis. In the present series 3 persons gave a history of rheumatic fever, 2 of them having had the attack only two years before entry into the Service.

There were 2 cases with a history of scarlet fever, and in 1 of them, in which we have a detailed account of the necropsy findings, including histological examination, it appears that the scarlet fever may have been a causal factor in the pathology.

It is now generally recognised that chronic suppuration and infection extending over many years may lead to atheroma. In 1 case in this series the man sustained a gunshot wound of the arm, which necessitated prolonged hospital treatment owing to the formation of sequestra and to low-grade infection. He was discharged from the Service two years later with the wound healed but with albuminuria, and it was stated that he never felt well subsequently. He died two years after discharge from the Service, and necropsy showed "a striking degree of occlusion of one branch of the coronary artery, due to high-grade atheroma, which at this age is a gross abnormality." He was twenty-nine years of age.

It appears, then, that infection may be an ætiological factor in the production of coronary disease in young people.

Physical Strain.—Of the 50 persons, 23, or nearly half, were subjected to physical stress, the catastrophe occurring immediately after the stress in 11 cases and within a few days in the remainder. On the other hand, in 27 cases there was no evidence of any stress before the onset.

Pre-Service Occupation.—Only 8 of the 46 pre-Service occupations recorded were sedentary. Of the non-sedentary occupations about half may be considered as heavy work.

Prognosis.—In the 50 cases there were 39 deaths, a very high mortality. What is equally striking in these young adults is that in 33 of the 39 deaths the persons were found dead or died almost immediately after a collapse. The longest survival period of the 6 exceptions was nine months. In contrast to the high immediate mortality in this series, Conner and Holt (1930) found an immediate mortality of 16·2% in 287 patients of all ages. Boyd (1944) states that less than 25% of patients die in the first attack. It is also noteworthy that practically all the sudden deaths were in apparently fit and healthy men who had previously carried out their military duties without any signs of cardiac distress, the disease being unsuspected during life and only diagnosed at necropsy.

Of the 11 patients still living several have resumed work, although pain on exertion and breathlessness are complained of. As most of the survival cases are of recent occurrence, the ultimate prognosis cannot yet be determined, but 1 patient has so far survived four years since the first attack (syphilis may have been a factor in this case). The only other patient with evidence of syphilis in the series had also resumed work. It may appear, therefore, that the prognosis in syphilitic cases treated appropriately is good, but in view of the small number of cases this is doubtful. In none of the 39 fatal cases was there any evidence of syphilis either clinically or at necropsy.

Necropsy Findings.—The left coronary artery is usually considered as being more frequently affected than the right. In the present series of 39 necropsies the right coronary artery was affected in 5 cases, the left in 17, and both were affected in 16 (no record in the remaining case).

Leary (1941) considers that in the younger age-group of coronary thrombosis (from twenty-two to forty-five) the pathological lesion is due to subendothelial fibrosis, with necrosis of the intima leading to thrombosis. Calcification, he states, does not occur in this group. In the older group (over forty-seven), on the other hand, the fibrotic process is absent and calcification is well marked; thrombus formation is not so common as in the younger group. The findings in this series of 39 necropsies do not support this view. Only 2 of the cases appear to conform to Leary's younger group, showing the fibrotic reaction without calcification. The remaining 37 appear to present the usual degenerative atheromatous changes met with in coronary disease of older people. In several cases extensive calcification of the coronary vessels is noted by the pathologist. Again, in 29 of the 39 cases no thrombus was found.

The heart was definitely stated to be enlarged in 20 cases. In 1 it was described as small. In 17 cases myocardial infarction was found, either recent or long-standing; in 1 case some of the infarcts appeared to be at least two years old.

DISCUSSION

This series of 50 cases of coronary disease in young adults demonstrates that degenerative changes of a remarkable degree can exist in the coronary arteries at an early age, and that coronary disease is not so rare as formerly thought. It is therefore no longer justifiable to disregard the possibility of coronary occlusion in a doubtful diagnosis owing to the youth of the patient. The individuals are usually in excellent health, of good physical development, and capable of exertion without any untoward effects. Clinical examination is usually negative, and there may be no subjective symptoms before the onset.

Whatever the ætiological factors, they appear to be more common in males. Body-build appears to be an important factor, as most of the subjects were powerfully built, robust, and often adipose. There is evidence that in some cases infections, such as rheumatic fever, scarlet fever, and chronic prolonged low-grade toxæmia, may play a part in the production of the pathological process in the coronary vessels. Atheromatous lesions have been found in children after acute infections. In the present series there were 3 cases with a history of rheumatic fever and 2 of scarlet fever; 1 case followed prolonged suppuration of a gunshot wound. Syphilis appears as infrequent a cause of coronary thrombosis in young people as in the older age-groups, there being only 2 cases in this series. Hypertension does not appear to be so important a factor in this young group as in later life. Only 3 cases showed any evidence of hypertension.

Only 8 of the 46 pre-Service occupations were sedentary and half of the subjects were doing heavy work before entry into the Service. One might deduce from these figures that sedentary workers suddenly called on to experience the stress of Service life were not more liable to coronary disease than manual workers; but, until the proportion of sedentary to manual workers in the Services is known, any inferences are premature and unsound.

The high mortality in this series indicates that the prognosis in the young is much worse than in the older age-groups. The immediate mortality is extremely high (33 cases of sudden death out of 39 fatal cases).

In view of the large proportion of sudden deaths in apparently healthy individuals, the necropsy findings are rather surprising. The absence of thrombus in most cases is unexpected. Again, the fact that in most cases the myocardial infarction was due to gradual occlusion of the coronary vessels by advanced atheroma, often with calcification, as occurs in the older age-groups, and indicating that the pathological process had been present for several years, is also surprising in view of the youth of the subjects.

SUMMARY

A review is given of 50 cases of coronary occlusion in young adults in the Services, the youngest being twenty years of age.

The subjects were of good physical development and previously fit condition.

Previous infection might have been of ætiological importance in only a few cases.

In more than half the cases there was no evidence of physical strain.

Sudden death took place in 33 out of 39 fatal cases.

At necropsy, 37 out of 39 cases showed the usual degenerative atheromatous changes found in coronary disease of older subjects, and in 29 there was no thrombus.

I wish to thank Sir Walter Haward, Director-General of Medical Services of the Ministry of Pensions, for his permission to publish this paper.

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DEFICIENCY DISEASES
IN PRISONERS-OF-WAR AT CHANGI, SINGAPORE
FEBRUARY, 1942, TO AUGUST, 1945

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SINGAPORE capitulated to the Japanese forces on Feb. 15, 1942. Of the troops captured, a proportion were in an exhausted condition, having fought through a strenuous campaign, but the majority had undergone relatively little hardship. In the week that followed the capitulation about 52,000 troops marched out from Singapore to Changi Camp—about sixteen miles—in the heat of the day. An outbreak of bacillary dysentery had begun at the time of capitulation, and the shortage of water and latrine accommodation in the prisoner-of-war camp rapidly resulted in an epidemic in which the morbidity-rate was high, but fortunately the disease was due to a mild Flexner infection and the mortality-rate under the circumstances was low.

GENERAL CONDITIONS

The prisoner-of-war camp was on Singapore Island, in open country near the sea-coast. During the first two years the area included in the perimeter wire was spacious and allowed considerable movement, but in the last eighteen months it was somewhat restricted. Throughout the whole time the housing was inadequate and this was particularly so in the last eighteen months. The peace-time civil prison was used for housing troops, and 4 men were made to occupy cells designed for 1 convict; this building, with its peace-time capacity of 600–700 prisoners, at times held 6000 men. There were never enough permanent buildings, and a large number of the troops were housed in leaf huts with earth floors. These were dark, damp, and impossible to keep clean.

The climate of Singapore is equatorial. The mean temperature is about 80° F, the mean maximum and minimum varying between 87° and 74° F, and the rainfall is about 100 inches a year. The temperature varies but little throughout the year and the rainfall is fairly evenly distributed. The climate must to some extent have offset the privations of the prisoners-of-war, for even when the calorie intake was relatively high they did not complain of the heat and during periods of low food intake they complained of the cold only when it rained.

Clothing was extremely scarce, especially latterly, and the men wore only a pair of shorts. They worked the whole day in this half-naked state and became a mahogany colour with sunburn.

During the first year the bacillary dysentery persisted, and about 80% of the personnel had one or more attacks. Throughout the remainder of the time the disease was always present and a number of minor outbreaks occurred. In the last year amœbic dysentery became increasingly common. In the first two years there was a relative freedom from malaria, but in the last eighteen months some 70% of the total population had one or more attacks.

THE DIET

The Japanese scale of rations for prisoners-of-war was as follows:

Rice	500 g.	Fresh vegetables ..	100 g.
Flour	50 g.	Canned milk ..	15 g.
Sugar	20 g.	Salt	10 g.
Cooking fat ..	5 g.	Tea	5 g.
Meat or fish ..	50 g.		

This scale was not maintained, as can be seen from table I. The details of the diets contained in this table were obtained by averaging the daily issues over a month. Where major changes occurred during the month they are shown.

For the first three years the daily issue of rice, or some substitute, was always more than 400 g. per man. In February, 1945, the first severe cut was made. Men on light duty—i.e., those who were not working for the Japanese or employed on hard work in the camp itself—were given only 325 g. per man per day. This was followed by further cuts, and in the last months of the camp rice was issued in daily amounts of 270, 225, and 180 g. to heavy-duty, light-duty, and no-duty personnel. Almost all the rice supplied was highly milled. The second item in the Japanese scale, a bleached flour, lasted only for the first seven months and did not reappear. The third item, sugar, was maintained at about the 20 g. level throughout the existence of the camp.

The amounts of meat and fish issued varied considerably. Fish was supplied more often than meat. Fresh fish was usually in the form of numerous species of small fish which were exceedingly bony and from which relatively little nourishment could be obtained. The dried fish was in the form of dried sprats (*Stolephorus* spp.), or partially dried and salted horse mackerel (*Caranx* spp.), or, much less frequently, larger dried fish which could not be identified.

Fresh vegetables were not supplied in the first few months, but thereafter sweet potatoes, yams, pumpkin, and cucumber were supplied on a scale exceeding that laid down. Green leaf vegetables in quantity appeared later.

The canned milk on the Japanese scale was supplied only for a little over two months. The last item, cooking fat, was supplied in much more generous amounts than laid down in the scale, except for the first few months.

The diet supplied by the Japanese was supplemented by various means throughout practically the whole period, although the supplements were at times very small. In the first six months or so canned goods, biscuits, &c., which had been brought into camp by our own troops, were issued by the supply depots on a regular scale, but these issues were so small that they were of relatively little value. In October, 1942, Red Cross supplies were brought into the camp and it was possible to supplement the diet very considerably over a period of two and a half months (see table II). In June, 1943, a levy on all money coming into the camp was instituted and the diet was supplemented by purchases of the foodstuffs shown in table I under the heading "Camp Messing Fund."

Estimated Food Value of Diet.—The details are shown in table III. In these calculations no allowance has been made for waste except in root vegetables, although during the periods when food was plentiful there was some waste of rice; in the lean periods waste was reduced to an absolute minimum.

The daily calorie intake in March and April, 1942, was about the 2100 level. It increased slowly, and by August, 1942, had risen to 2500 calories. From then till the end of the third year of imprisonment—i.e., February, 1945—it was usually above the 2500 level.

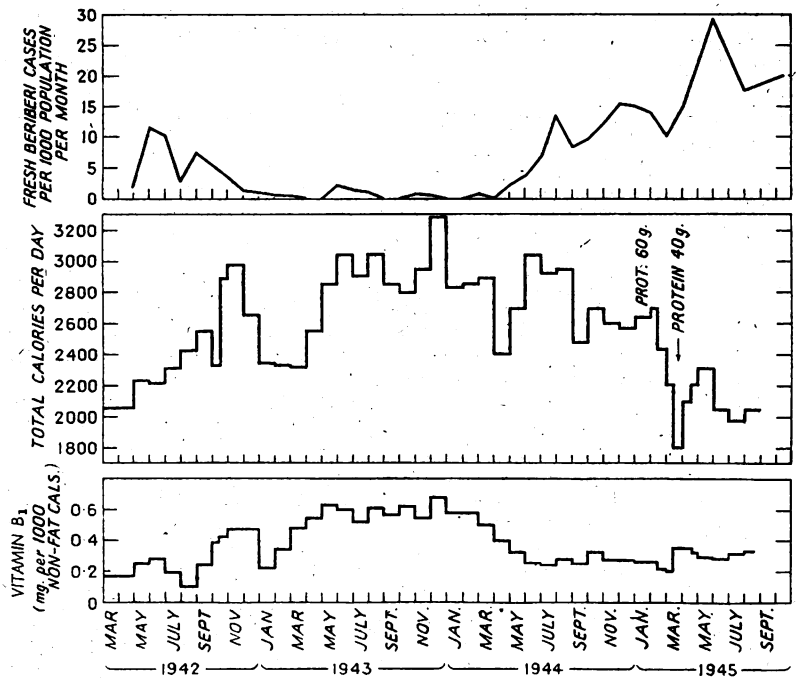

Fig. 1—Monthly incidence of beriberi compared with estimated total calories and vitamin B_1/non-fat-calorie ratio of diet.

During the last six months it fell to 2000 in the heavy-duty scale, 1700 in the light-duty scale, and 1500 in the no-duty scale. Apart from the first few months and the last six months, the calorie intake was not grossly inadequate. The same might be said of the protein content. The fat intake was low for the first few months but thereafter was usually above 50 g. per day. The calcium and phosphorus intakes reached a satisfactory level owing to the dried fish, which was mostly in the form of sprats, and the green leaf vegetables in the diet. Part of the daily ration of cooking-oil was red palm oil, and this together with the green leaf vegetables supplied a high vitamin-A intake. Green leaf vegetables and root vegetables supplied adequate quantities of vitamin C. The diet for long periods was inadequate in several components of the vitamin-B complex. It has only been possible to estimate the vitamin B_1, riboflavine, and nicotinic acid contents, and in all of these there is some deficiency. The position as assessed by estimating the food value of the diet might be summarised as follows. For three out of the three and a half years the energy intake was not grossly inadequate, but for the greater part of the time there was an imbalance in vitamin-B complex. In the last six months there was semi-starvation, with the imbalance, especially of vitamin B_1, still persisting.

In estimating the beriberi-producing potentialities of the diets as prisoners-of-war the formula suggested by Williams and Spies (1938) was used. This formula is the ratio of vitamin B_1 in the diet to the non-fat calories. The vitamin-B_1 values given by these writers have been used in the estimations. In comparison with the figures published more recently, these values are low, but, as will be seen subsequently, this method of appraising diets by relating them to the production of beriberi fitted the picture as it occurred in the camp and proved a reliable means of forecasting the incidence of beriberi. It is to be noted, however, that only when the values of Williams and Spies are used can the vitamin B_1/non-fat-calorie ratio of 0·3 be considered as the level at which clinical evidence of deficiency will appear.

The estimated levels of nicotinic acid and riboflavine are shown in table III. Since, with a variation in the calorie value of the diet from 3000 to 1400 the absolute intakes of nicotinic acid and riboflavine would be misleading, it seemed advisable to relate the intakes of these vitamins to the total energy value; they are therefore also shown in milligrammes per 1000 calories. The content of these three vitamins has been calculated from the tables compiled by Platt (1945).

BERIBERI

The number of fresh cases of beriberi admitted to hospital per 1000 population per month is shown in fig. 1, with the vitamin B_1/non-fat-calorie ratio of Williams and Spies (1938) and the estimated total calorie intake. It was clear from the beginning of the camp that beriberi must occur. The estimated daily intake of vitamin B_1 for the first two months was less than 0·4 mg. and the vitamin B_1/non-fat-calorie ratio was under 0·2 mg./1000. No allowance was made for loss of the vitamin in the preparation and cooking of food, and in the first few weeks probably 25% was lost in this way, bringing the daily intake down to 0·3 mg. Steps were then taken to check this loss of vitamin. Cases of peripheral neuritis ascribed to beriberi were admitted to hospital within a month of the start of this imbalanced diet. All the early cases were in men who had a recent history of addiction to alcohol, but the neuritis appeared in men with no such history within six weeks.

At this time, as mentioned above, a dysentery epidemic was in progress, and some of the patients severely ill with this disease developed the superior hæmorrhagic encephalopathy of Wernicke. Treatment and prophylaxis with vitamin B_1 were eminently satisfactory.

The outbreak of beriberi neuritis was ended in November, 1942, by improvement in the diet, and from then until May, 1944, there was a relative freedom from the disease. In the early part of 1944 the vitamin B_1/non-fat-calorie ratio began to drop and a further outbreak of beriberi was anticipated. In due course it appeared (fig. 1), and it persisted until the camp ended.

This outbreak may be divided into two periods: (1) from May, 1944, to March, 1945, and (2) from March, 1945, until the end. During the first period œdema was by far the most common manifestation and in a proportion of cases was not accompanied by any of the other recognised signs of beriberi. The clinician, however, was satisfied that this was beriberi, and the results of treatment with the pure vitamin supported his view (Cruickshank 1946). The dietary picture also indicates that this was the diagnosis. In fig. 1 it will be seen that at the end of the first period the calorie intake was about 2600 and the protein about 60 g. per day. Apart from the chronic dysenterics, no emaciated men were seen at this time, and a representative group of men showed an average loss of only 14 lb. on their weight before becoming prisoners. These men lost a further 15 lb. in the last six months but they still could not have been grossly emaciated at the end of the third year. Again, the man who got the "beriberi" was not the emaciated chronic dysenteric but the man employed on the heavier work who would seem relatively fit one day and be grossly œdematous the next. It can be presumed therefore that during this period the symptoms were a manifestation of vitamin-B_1 deficiency.

In the second period—March, 1945, to August, 1945—a new type of case appeared. The clinician recognised a different clinical picture, occurring in the emaciated man

and resistant to treatment with vitamin B_1. As can be seen from fig. 1 there was a considerable drop in the calorie and protein intakes. During the last six months the calorie intake remained around the 2000 level and the protein around 40 g. The vitamin B_1/non-fat-calorie ratio during this period was still at the level at which symptoms would be expected, and cases were still occurring which were probably beriberi. It seemed certain that, in the later stages of the camp, two factors were producing deficiency symptoms—an inadequate calorie and protein intake; and an imbalance in vitamin B_1—and that while some individual cases appeared to be due to one or other factor, in the majority both factors played a part in producing symptoms.

To sum up, in the first three years vitamin-B_1 deficiency manifested itself in the form of œdematous, cardiac, and neuritic beriberi and as Wernicke's encephalopathy, and in the last six months, while fresh cases of beriberi continued to occur, the picture was complicated by famine œdema.

During the last few years much experimental work on the minimal and optimal requirements of vitamin B_1 has been done and there is considerable divergence in the estimates of these requirements. During the term of imprisonment, the diet was so deficient in vitamin B_1 that symptoms appeared; it then so improved that fresh cases practically ceased to arise; and lastly it again deteriorated and fresh cases appeared. This experience might indicate which of the levels for minimal intakes found by different workers in induced deficiency are correct. But two criticisms might be levelled at this evidence. The first is that the vitamin B_1 is estimated from food tables and cannot be as accurately known as in an experimental study. This error, however, is not likely to be so great that one cannot give a sufficiently accurate figure for the intake which produced disease. The second criterion is no biochemical investigations have been possible and the more crude criterion of clinical observation has had to be used. On the other hand, the number of experimental subjects in this study has averaged 12,000 over the three and a half years, and since there is a wide individual variation in the utilisation of vitamin B_1 this large number is probably a considerable advantage in deciding the minimal intake. Although dysentery was extremely common it was usually not of a severe type, and in only 14% of cases in the first outbreak were recent attacks of this disease associated with beriberi. In the later outbreak malaria was common and possibly precipitated beriberi in some patients. Again, the emotional state of the troops at the beginning might by raising their metabolic rate have increased their need for vitamin B_1. All these factors may have affected the findings, but it nevertheless seems profitable to draw conclusions as to the level of vitamin-B_1 intake at which symptoms appear.

The vitamin B_1 content of the diet has been estimated from two food-value tables—those of Williams and Spies (1938) and of Platt (1945). The values given by Platt for the different foodstuffs in question are on the whole somewhat higher than those suggested by Williams and Spies. In their figures Williams and Spies allowed for loss in preparation and cooking, but after the first few weeks the loss in the camp, if judged by present-day views on the destructibility of vitamin B_1, must have been negligible, so estimations based on these data probably give a low assessment of the vitamin B_1 in the diet. Table II shows the vitamin-B_1 intake as estimated from both tables.*

If the incidence of beriberi is related to the vitamin-B_1 intake as estimated from the higher value tables, it will be seen that the disease appeared in about six weeks

* In table II it will be seen that the total vitamin-B intake reached 1·6 and 1·3 mg. in October and November, 1944. This high level was due to soya bean in the diet. Soya beans, unless processed, are singularly indigestible, and in a prisoner-of-war camp where boiling was the only method of preparation they apparently passed through the bowel unaltered. It seems reasonable to assume that little of the vitamin B_1 was absorbed and that these figures for the B_1 intake for two months were too high. Again, in the last seven months the vitamin B_1/non-fat-calorie ratio estimated by the higher values will be seen to be relatively high. This is due to the high levels attributed to green leaf vegetables, and clinical experience leads one to believe that these figures were again too high.

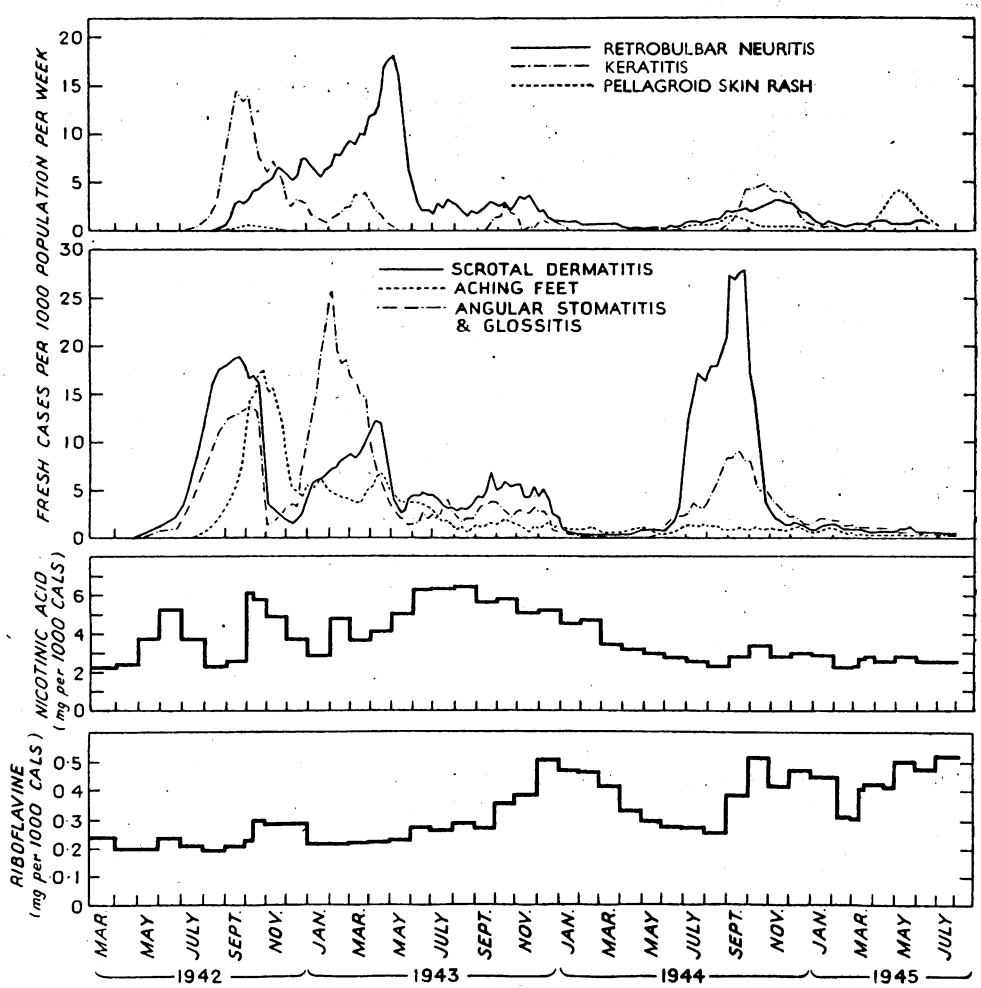

Fig. 2—Weekly incidence of various deficiency conditions compared with nicotinic acid and riboflavine contents of diet.

on a daily intake of 0·2 mg. per 1000 non-fat calories (N.F.C.) or a total intake of 0·39 mg., and that fresh cases ceased to occur when the daily intake rose to 0·5 mg. per 1000 N.F.C. or a total of 1·2 mg.; a further outbreak started when the daily intake fell to 0·36 mg. per 1000 N.F.C. or a total of 0·9 mg. If the levels are estimated from the lower figures, the disease appeared in six weeks on a daily intake of 0·18 mg. per 1000 N.F.C.; fresh cases ceased to arise when the intake reached 0·47 mg. per 1000 N.F.C.; a further outbreak occurred when the intake dropped to 0·26 mg.; and fresh cases kept appearing as long as the intake was below 0·3 mg. and even when it reached the higher level of 0·33 mg. per 1000 N.F.C.

In deciding whether a diet is beriberi-producing, a vitamin-B_1 intake of 0·3 mg. per 1000 N.F.C. should be regarded as an absolute minimum and if the higher values of the more recent food tables are used 0·4 mg. is probably the minimum. This experience suggests that the 0·37 mg. per 1000 N.F.C. found to be adequate for normal carbohydrate metabolism in experimental conditions by Keys and colleagues (1943) is inadequate to prevent cases of disease appearing in a large group. There was a great individual variation in susceptibility to beriberi which might be accounted for by variations in the requirement of vitamin B_1 for carbohydrate metabolism or possibly by varying degrees of biosynthesis (Najjar and Holt 1943). Whatever the reason, this experience supports the views of Williams and colleagues (1943a), who, on the evidence of induced deficiency, concluded that the much more liberal allowance of 0·66 mg. per 1000 N.F.C. is a minimum intake to maintain normal carbohydrate metabolism.

DISEASE DUE TO DEFICIENCY OF VITAMIN B_2

The following disease conditions appeared in the camp: angular stomatitis, glossitis, palatal erythema, scrotal dermatitis, pellagroid skin rash, aching feet, spastic paraplegia, keratitis, retrobulbar neuritis, and nerve deafness. The incidence of fresh cases of six of these conditions per 1000 susceptible population per week is shown in fig. 2. The incidence of spastic paraplegia and nerve deafness is not shown in graph form. Since only about 40 cases of spastic paraplegia occurred in the camp, all within the first eighteen months, the incidence per 1000 population was so low that it cannot readily be shown in a graph. They occurred at a time when the incidence of other conditions, such as sore feet, was as its highest. The incidence of nerve deafness was high, but it was often not noticed by the sufferer until his friends drew attention to it, so a record of the fresh cases would not give a true picture of the outbreak.

It can be seen from fig. 2 that there were two periods of fairly high incidence of these diseases, and during the remainder of the time there was a relative freedom from them. There were also two outbreaks of beriberi, but the first was small and of short duration and occurred early. The first outbreak of the diseases now under discussion was large, extended over a long period, and appeared later. The second outbreak of beriberi was protracted and larger, while the later outbreak of the other disease conditions was of short duration and—for some of them—of much smaller dimensions. It is clear that there is little similarity between the trend of incidence of beriberi and any of these other disease conditions.

The clinical picture of the commoner conditions answers in the main to the descriptions given elsewhere. The keratitis was the disease described by Métivier (1941) as "corneal epithelial dystrophy."

Time Distribution.—There are some points of interest in the relative times of appearance and of highest incidence of these conditions. The first evidence of disease appeared early in May, 1942—about two and a half months after the capitulation and one and a half months after the first cases of beriberi appeared. The glossitis and angular stomatitis and scrotal dermatitis were the first to appear; next came aching feet at the end of July, 1942, nearly three months later—i.e., five and a half months after the capitulation. Keratitis and retrobulbar neuritis appeared at the middle and end of August respectively. It will be seen that there is a tendency to follow this trend throughout. In October and November, 1942, the incidence of mouth conditions and scrotal dermatitis showed a sharp decline; the decline of aching feet was slower and less definite, and there was little evidence of any change in the slowly rising incidence of retrobulbar neuritis. In the subsequent increase in January and February, 1943, this order was again followed, though not so definitely. At this time there was a rapid increase in mouth conditions and a less rapid increase in scrotal dermatitis. Aching feet and keratitis showed a slowly increasing incidence but it did not reach any height. In 1944 scrotal dermatitis and mouth conditions again showed a rapidly rising incidence, starting at the end of May and beginning of June, while keratitis began to increase in August. Aching feet were not much in evidence at this time, and, though there was a rise in the incidence of retrobulbar neuritis, it began earlier and did not reach a high level.

There is then some evidence of a relationship between all these conditions as regards the beginning and end of outbreaks and they appear to fall into three groups †:

1. Mouth condition and scrotal dermatitis.
2. Keratitis and aching feet.
3. Retrobulbar neuritis.

There are, however, some features which do not fit into this picture—the persistence of a high incidence of scrotal dermatitis in March and April, 1943; the slowly rising incidence of retrobulbar neuritis before other disease conditions had appeared in 1944; and the absence of a clear-cut outbreak of aching feet at that time.

The high incidence of scrotal dermatitis might perhaps be accounted for by the fact that when a deficiency state exists the devitalised tissue is particularly susceptible to the action of any irritant or to invasion by bacteria, and in this case a particularly irritant soap or lack of facilities for washing may have been responsible. No explanation for these other phenomena springs to the mind.

The other disease condition shown on the chart—pellagroid skin rash—appeared twice during outbreaks of the diseases just discussed, but the largest outbreak began in the early months of 1945 when these other deficiency conditions were almost absent.

Relation to Nicotinic-acid and Riboflavine Intake.—Fig. 2 ‡ shows that all these conditions, except pellagroid skin rash, were common when the riboflavine level was low and outbreaks came to an end when it reached the higher levels. On the other hand, only the pellagroid skin rash bore any relationship to the estimated nicotinic-acid content of the diet, its appearance coinciding with a low intake of nicotinic acid, though it did not consistently appear when the intake was low. This rash was a mild one, appearing almost entirely in men working in the sun, so it seems that frank clinical evidence of disease only manifested itself under certain climatic conditions with this degree of nicotinic-acid deficiency.

† Woodruff, M. (unpublished data), after correlating information concerning associated conditions, concluded that deficiency disease in the Changi Camp could be divided into two groups: (1) a beriberi (B_1-deficiency) group, and (2) the remainder, the B_2-complex-deficiency group. He pointed out that 49 % of the cases of peripheral neuritis showed other evidence of beriberi, while in only 5 % of the disease conditions in group 2 was there an association with beriberi. Of over 1000 cases of retrobulbar neuritis, 35 % had keratitis, 20 % aching feet, and 28 % stomatitis and glossitis, while only 1 % had beriberi. Of nearly 700 cases of aching feet, 31 % had retrobulbar neuritis, 29 % keratitis, and 24 % scrotal dermatitis, while 7 % had an associated beriberi.

‡ The scale in this figure is based on the relative requirements as laid down by the National Research Council of America, 1942

TABLE I—DAILY ISSUE OF FOODSTUFFS

Foodstuff	1942										1943	
	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
Rice (highly milled)	427	435	469	460	503	506	487	474	483	483	508	500
Flour (white)	54	63	48	48	51	45	46	..	..	..	..	..
Sugar (white)	17	20	20	17	24	26	26	19	20	20	20	20
Biscuits (wholemeal)	9	..	..	..	..	..	..	..	..	..	..	..
Wheat (whole grains)	..	6	26	6	..	..	..	..	..	..	..	..
Ground-nut meal	..	2	8	26	12	..	..	..	..	..	..	..
Ground-nut	..	..	5	4	..	..	..	..	..	5	3	2
Beans (canned)	14	6	6	1	..	..	..	..	..	..	..	..
Maizemeal	..	..	..	..	..	28	19	..	..	..	..	..
Potatoes (canned)	3	..	..	..	..	..	..	..	..	..	..	..
Pumpkin and cucumber	..	..	23	20	20	20	43	44	79	94	104	95
Sweet potatoes	..	..	..	20	20	20	68	109	61	124	160	161
Green leaf	2	..	..	15	15	15	25	11	4	4	28	18
Egg plant	..	..	..	..	..	..	18	..	18	..	..	..
Turnip and radish	..	..	..	..	..	..	..	..	15	9	..	..
Jam and fruit (canned)	7	4	3	11	..	23	..	..	..	..	..	..
Meat and veg. and Irish stew	26	17	1	..	..	..	..	4	..	..	..	..
Meat	26	23	39	52	53	43	45	37	35	26	..	..
Fish	10	..	..	..	..	..	..	..	7	17	44	41
Cheese, butter and margarine (canned)	9	..	..	..	..	..	..	..	..	17	..	..
Ghi	3	6	8	5	7	10	9	6	10	..	7	8
Evaporated milk	26	26	4	..	..	..	..	..	..	..	..	..
Rice polishings	..	..	..	..	..	..	6	22	28	23	..	14
Whitebait	..	..	..	..	..	..	4	12	13	12	..	3
Red palm oil	..	..	..	..	..	..	..	11	10	7	15	11
Coconut oil	..	..	..	..	..	..	..	..	..	4	10	13
Atta flour	..	..	..	..	..	..	..	11	..	..	..	..
Kaffir corn meal (sorghum)	..	..	..	..	..	..	11	..	..	..	..	..
Dried soup powder	..	..	..	..	..	11	..	..	..	..	..	..
Vitaminised caramel	..	..	..	..	..	4	..	..	..	..	..	..
Soya bean	..	..	..	..	..	..	..	..	..	1	14	12

Foodstuff	1943										1944								
	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.
Rice	440	440	440	440	440	440	444	440	487	350	330	310	316	270	415	500	500	495	460
Soya beans	..	..	..	..	..	..	..	..	..	170	150	129	96	..	..	..	..	..	..
Maize	..	..	..	..	..	..	..	..	..	..	..	..	62	131	45	..	..	..	..
Sugar	20	17	20	19	19	22	20	20	20	20	20	23	18	18	20	18	17	20	20
Coconut oil	17	16	21	18	20	30	25	25	25	25	23	21	25	25	25	25	25	25	25
Fresh fish	30	43	62	47	53	84	73	30	56	77	57	..	..	..	18	9	10	..	11
Dried fish	..	..	..	..	..	..	..	22	..	..	..	19	17	..	..	44	45	39	32
Fresh meat	..	..	..	..	..	..	..	..	..	..	9	44	53	71	56	13	..	..	..
Pork	..	..	..	..	..	..	..	..	..	4	4	4	4	..	..	..	..	..	..
Green leaf vegetable	6	5	6	..	..	..	..	90	90	89	70	42	36	64	50	55	60	72	180
Musk melons, pumpkins, &c.	38	4	80	95	44	128	143	170	100	226	100	186	40	..	..	..	..	..	..
Sweet potatoes, cassava, &c.	198	199	70	114	85	200	200	170	200	200	200	200	120	150	125	325	320	260	165
Bananas	..	..	..	..	..	..	..	..	..	..	..	..	93	10	95	90	70	32	21
Coconut	..	..	..	..	..	..	..	..	..	..	..	..	3	20	7	5	..	16	..
Green gram	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5
Pineapple	..	..	..	..	..	..	..	..	..	..	..	..	..	..	67	5	..	..	..
Camp Messing Fund																			
Rice polishings	23	28	28	28	28	16	16	8	8	..	..	..	..	..	..	..	..	..	..
Ground-nuts	12	13	28	28	..	18	28	14	..	2	30	14	5	..	..	..	..	..	..
Green gram	13	40	45	57	90	85	85	85	85	85	25	85	76	15	31	4	7	11	12
Soya bean	..	4	11	6	..	..	..	..	..	..	..	..	..	..	..	8	7	4	..
Dried horse mackerel	18	17	14	..	..	..	..	3	9	2	..	..	..	..	..	..	..	..	..
Whitebait	..	..	28	57	47	28	28	14	18	23	1	2	..	..	..	..	..	..	..
Red palm oil	..	..	14	3	..	..	..	..	3	17	9	3	8	14	13	16	20	22	10
Sweet potatoes	..	..	78	165	145	114	85	..	..	..	..	..	..	..	..	..	..	..	..

Foodstuff	1944			1945						Foodstuff	1945					Foodstuff	1945
	Oct.	Nov.	Dec.	Jan.	Feb.		March				April		May	June	July		Aug.
					1–9	10–28	1–9	10–21	21–31		1–22	23–30					1–15
Maize	..	..	..	..	..	..	..	..	50	Rice	220	250	300	277	277	Rice	270
Rice	460	460	464	460	459	495	450	270	220	Maize	50	50	..	23	23	Maize	43
Sugar	20	19	20	20	18	18	18	18	18	Sugar	18	18	18	20	20	Sugar	20
Oil	25	25	25	25	25	20	20	20	20	Oil	20	20	20	20	20	Oil	22
Soya bean	59	48	..	..	..	..	..	..	..	Fresh fish	10	10	7	6	..	Fresh fish	5
Fresh fish	9	..	..	10	..	13	6	6	6	Dried fish	24	24	35	26	13	Dried fish	29
Dried fish	38	34	29	25	34	15	22	22	22	Vegetable (root)	172	172	183	66	122	Meat	4
Vegetable (root)	136	112	163	195	208	60	24	178	178	Greens	187	187	297	256	298	Vegetable (root)	82
Greens	283	212	300	284	297	150	140	164	164	Fruit	..	..	22	7	..	Greens	312
Fruit	44	14	26	23	26	13	..	..	..	*C.M. Fund*						*C.M. Fund*	
C.M. Fund										Oil	33	33	33	33	33	Oil	33
Green gram	10	1	15	15	15	13	12	12	12	Millet	12	..	..	..	..	Tap chips	10
Palm oil	5	10	13	18	18	18	18	18	33	Tap chips	..	12	12	12	10		

Diets in April, May, and June, 1945, were supplemented with food from Red Cross parcels. The amounts were very small—about 40 g. per man per day of chocolate, jam, bully beef, &c.

Details of the light-duty and no-duty scales introduced in February and April, 1945, respectively, have been omitted owing to lack of space.

C.M. Fund = Camp Messing Fund

Since some of these conditions are probably manifestations of riboflavine deficiency the estimated levels of intake at which symptoms appeared are worthy of note. On an estimated level of 0·21–0·25 mg. per 1000 calories, symptoms appeared in two and a half months in 1942; in 1944, on an intake of 0·33–0·28 mg. per 1000 total calories, this appeared in about the same time. It is not clear, on the basis of our estimated levels, why the number of cases should have fallen in October, November, and December, 1942. The improvement was due to Red Cross supplies coming into camp. For purposes of estimation, the diet during the period under discussion was assumed to be in accordance with the advice given on how the extra food should be consumed; but, since it was distributed to units and in some cases to individuals, the extra food may in fact have been consumed more rapidly with a resultant higher intake over a shorter period.

TABLE II—RED CROSS SUPPLEMENTS OCT. 9 TO NOV. 30, AND DEC. 1 TO 27, 1942

Foodstuff	Average daily diet (g.)		Foodstuff	Average daily diet (g.)	
	Oct. 9–Nov. 30	Dec. 1–27		Oct. 9–Nov. 30	Dec. 1–27
Atta flour ..	17	..	Dried fruit ..	2	..
Dhall	8	8	Cocoa ..	8	8
Milk (canned) ..	21	9	Barley ..	1	..
M. & V.	39	39	Cornflour ..	2	..
Corned beef ..	71	32	Biscuits ..	9	..
Ghee	8	..	Vitaminised caramels ..	1	..
Soupmix	3	3	Jam	2	..
Mabela	10	10	Sugar (white) ..	17	..
Vegetables and tomatoes (canned)	23	23	Lime juice ..	2	..
Guava (canned) ..	9	9			

In fig. 2 it will be seen that a fresh outbreak of keratitis occurred in October, November, and December, 1943, at a time when the riboflavine values of the diet were higher than they had been, and there is evidence of a similar rise in the other conditions. In August the Japanese began making a big aerodrome near the camp and labour was drawn from the camp. Labouring in the heat of the day and in the full glare of the sun may have played some part in producing this increase.

In general the estimated intake of riboflavine corresponds fairly closely with the incidence of disease, so it seems worth while to compare the level at which disease occurred with similar levels found by workers in induced deficiency. Sebrell and colleagues (1941) produced deficiency disease which appeared between the 89th and 232nd days on a riboflavine intake of 0·21 mg. per 1000 total calories. This is in line with experience in the camp where disease developed in 80 days on an intake of 0·21–0·25 mg. per 1000 calories. Williams and colleagues (1943b) found no deficiency disease on an intake of 0·35 mg. per 1000 calories. In the camp disease persisted on this level although it had begun on a lower intake and on two occasions the outbreak of disease did not end until the level reached 0·5 mg. per 1000 calories. This would support the suggestion of Williams and colleagues that 0·5 mg. per 1000 calories is an adequate intake.

There were further experiences which have some bearing on this point. In 1943 a party of 7000 men went up country and 25% of them had vitamin-B_2 deficiency in one or more of the forms which have just been discussed. They went up to conditions of starvation, disease, and appalling hardship, and at the end of nine months when 44% had already died they were returned to the Singapore camp. Within a week or two of leaving the relative comfort of the camp the minor manifestations of vitamin-B_2-deficiency disease disappeared and did not recur as long as the conditions of hardship lasted. Little or no retrogression in cases of retrobulbar neuritis could be found on their return. The calorie intake during this expedition was at times as low as 1200 per day and although it was at other times above the 2000 level rapid loss of weight occurred. The Japanese were merciless in their demands for output of work, and this itself was the direct cause of a number of deaths. The diets consisted of rice and very little else, and the riboflavine intake for long periods was about 0·2 mg. per 1000 calories; for about a month in one camp it was as low as 0·15 mg. per 1000 calories.

When a man is consuming his own tissues his needs for riboflavine may be less, and this idea led me to investigate the relative incidence in different groups of men in Changi Camp. In the kitchens and food stores the men were better fed; hungry men cannot be expected to handle food all day without taking a certain amount of it. On the other hand the men working on the Japanese aerodrome got only their bare rations and were called on for a greater energy output. In the better fed group the incidence of scrotal dermatitis during an outbreak was 34% and in the worse fed group it was only 18%. There were several hundred men in each sample and unfortunately weights were not taken, but had they been there is little doubt that there would have been a clear-cut difference. The impression gained was that riboflavine deficiency was essentially the disease of the man who was maintaining or gaining weight. The pellagroid skin rash on the other hand occurred essentially in emaciated men. In some 60 men treated for skin rash in hospital the average weight was 102 lb., while a group of fit men at the same period had an average weight of 125 lb.

PREVENTION OF DEFICIENCY DISEASE

In the prevention of deficiency disease beriberi was always regarded as being of primary importance, for it is a killing disease. The vitamin-B_2-deficiency diseases, though they seemed likely to be responsible for a considerable amount of permanent incapacity, were unimportant as a cause of death. Steps taken to prevent beriberi built up the diet to a greater or less extent in components of the vitamin-B_2 complex and some measures taken had both purposes in mind. It seems advisable, however, to deal with each separately.

Beriberi.—The occurrence of beriberi was foreseen some time before it actually appeared, and attempts were made immediately to minimise the danger. The best means of doing this was of course to enrich the diet, and in March, 1942, the G.O.C. Prisoner-of-war Camp, Changi, wrote to the H.Q. Imperial Japanese Army pointing out that the diet was grossly deficient in certain vitamins and asking for additional foodstuffs which were known to be in Singapore in considerable quantity. The Japanese did nothing, although the case was presented again and again in the early months.

A measure which was adopted early and to which considerable attention has been paid throughout was the preparation and cooking of food so that none of its vitamin content was lost. This is particularly important in the case of the rice. The ordinary highly milled rice has about 0·5 μg. vitamin B_1 per g. in the pericarp dust and fine layers of pericarp that may remain after milling. It is however readily soluble in water, and if it is washed and the water discarded about half of it is lost, while if it is boiled in excess of water which is afterwards discarded there is a further loss. Seeing that at times the total daily intake of vitamin B_1 was not more than 0·4 mg., and that 0·2 mg. came from rice, the importance of this measure can be appreciated.

A measure which is widely advocated for preventing beriberi is the growing of yeast, but unfortunately unless yeast is grown on a medium rich in the vitamin-B complex it has little capacity to synthesise this vitamin. In fact recent work (Malm 1945) suggests that it does not synthesise it at all but simply captures it from the medium in which it is grown. Yeast was grown in the

early days of the camp but it proved of little value in clinical use and was abandoned as a means of prophylaxis.

For about eighteen months in the existence of the camp—i.e., from November, 1942, until May, 1944—by pooling money coming into the camp and by purchasing and issuing foodstuffs rich in vitamin B_1 on a fixed scale the diet was maintained above the beriberi level. In table I under the heading "camp" the details of food purchased can be seen. In the last year the money for purchasing foodstuffs was less and the prices were fantastically high, so little could be done to supplement the imbalanced and latterly inadequate diet. When the Japanese learnt of their country's capitulation they offered as much rice as was wanted. The consumption of large quantities of rice at this time would have led to very grave imbalance, resulting in severe beriberi. A strong stand was taken in this matter, and after some protest it was agreed to restrict the daily issues of rice to a level which would not cause a serious imbalance. Fortunately this period was short, and with the arrival of relieving troops the prisoners-of-war went back to a European diet.

Vitamin-B_2-deficiency Disease.—The minor manifestations in the syndrome referred to as vitamin-B_2-deficiency disease in this paper were believed to be due to a riboflavine deficiency. There was a significant association between disease conditions in this group, and no such association could be found between them and beriberi. In addition, the commencement, course, and cessation of outbreaks led us to think that, excepting pellagroid skin disease, they probably had a common ætiological factor.

The policy in prevention was based on raising the riboflavine value to the highest possible level. Some tables of riboflavine values were available in the camp, but they were old and judged by the more recent tables highly inaccurate. They did indicate however that, of the limited foods available, fresh green leaves and légumes were the only ones which could be obtained in sufficient quantity to be of value. This was the reason for the main items in the supplementary foodstuffs purchased.§

§ The other foodstuffs were introduced for the following purposes: (*a*) The rice polishings were to ensure the absence of beriberi and also to raise the nicotinic-acid level. (*b*) The palm oil was to increase the calorie intake and make the food more palatable. (*c*) The dried fish, preferably sprats, was to maintain at a reasonable height the calcium and protein intake.

TABLE III—ESTIMATED FOOD VALUE OF FOODSTUFFS

—	1942											1943			
	March	April	May	June	July	Aug.	Sept.	Oct. 1–9	Oct. 9–31	Nov.	Dec.	Jan.	Feb.	March	April
Protein, g.	41	40	45	50	47	43	48	50	83	85	67	41	43	48	59
Non-fat cals.	1874	1911	2058	2017	2120	2271	2251	2075	2480	2452	2259	2173	2181	2062	2243
Total cals.	2060	2060	2263	2222	2315	2466	2548	2260	2899	2973	2659	2340	2330	2313	2568
Vitamin B_1, µg.	390	405	593	732	551	488	678	953	1191	1246	1159	715	923	1140	1410
Riboflavine, µg.	498	434	470	566	517	484	555	559	905	890	824	557	570	586	699
Nicotinic acid, µg.	6809	7001	11,097	14,299	10,997	8489	11,194	15,366	19,180	20,782	18,588	11,142	13,892	17,118	19,601
B_1 (mg.) per 1000 non-fat cals.	0·21	0·21	0·29	0·33	0·26	0·21	0·30	0·46	0·48	0·51	0·51	0·33	0·42	0·55	0·63
Riboflavine (mg.) per 1000 total cals.	0·24	0·21	0·21	0·25	0·22	0·20	0·22	0·25	0·31	0·30	0·31	0·24	0·24	0·25	0·27
Nicotinic acid (mg.) per 1000 total cals.	3·31	3·40	4·90	6·44	4·75	3·44	4·39	6·80	6·62	6·99	6·99	4·76	5·96	7·40	7·63
Williams and Spies:															
Vitamin B_1	316	341	526	587	424	393	559	842	1075	1161	1053	474	766	1019	1234
B_1 : non-fat cals.	0·17	0·18	0·26	0·29	0·20	0·17	0·25	0·40	0·43	0·47	0·47	0·22	0·35	0·49	0·55

—	1943								1944							
	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.
Protein, g.	87	106	98	86	88	85	84	137	95	109	96	47	49	65	63	56
Non-fat cals.	2300	2612	2632	2583	2472	2419	2579	2542	2099	2239	2259	1788	2161	2546	2485	2366
Total cals.	2867	3049	2911	3057	2854	2800	2942	3295	2834	2862	2891	2411	2691	3039	2928	2943
Vitamin B_1, µg.	1651	1812	1701	1561	1784	1352	1262	3039	2685	2577	2201	1000	924	919	887	818
Riboflavine, µg.	872	1014	1026	1022	1034	1111	1104	1653	1226	1380	1243	789	809	862	832	773
Nicotinic acid, µg.	24,377	25,990	21,177	21,189	24,941	16,892	15,012	16,771	17,346	16,625	14,259	10,284	10,818	11,477	10,778	9737
B_1 (mg.) per 1000 non-fat cals.	0·72	0·69	0·65	0·60	0·72	0·56	0·49	1·20	1·28	1·15	0·97	0·56	0·43	0·36	0·36	0·35
Riboflavine (mg.) per 1000 total cals.	0·30	0·33	0·35	0·33	0·36	0·40	0·38	0·50	0·43	0·48	0·43	0·33	0·30	0·28	0·28	0·26
Nicotinic acid (mg.) per 1000 total cals.	8·50	8·52	7·27	6·93	8·74	6·03	5·10	5·09	6·12	5·81	4·93	4·27	4·02	3·78	3·68	3·31
Williams and Spies:																
Vitamin B_1	1441	1568	1390	1610	1433	1529	1418	1724	1220	1289	1155	715	704	650	630	662
B_1 : non-fat cals.	0·63	0·60	0·53	0·62	0·58	0·63	0·55	0·68	0·58	0·58	0·51	0·40	0·33	0·26	0·25	0·28

—	1944				1945											
	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.		March			April		May	June	July	Aug.
						1–9	10–28	1–9	10–21	22–31	1–22	23–30				1–15
Protein, g.	54	80	79	62	62	69	49	48	42	43	50	51	63	50	40	55
Non-fat cals.	2112	2259	2144	2161	2181	2222	2046	1824	1406	1390	1476	1587	1706	1456	1435	1480
Total cals.	2493	2696	2600	2579	2637	2696	2436	2205	1797	1799	2108	2219	2320	2051	1984	2057
Vitamin B_1, µg.	823	1592	1273	990	997	1015	645	554	636	771	818	802	861	728	619	877
Riboflavine, µg.	963	1398	1092	1237	1212	1245	744	671	734	774	878	887	1172	968	1026	1126
Nicotinic acid, µg.	9583	11,664	9834	10,140	10,289	10,537	7999	7218	6700	6950	7704	7980	9266	7466	7220	8375
B_1 (mg.) per 1000 non-fat cals.	0·39	0·70	0·59	0·46	0·46	0·46	0·32	0·30	0·45	0·55	0·55	0·51	0·50	0·50	0·43	0·59
Riboflavine (mg.) per 1000 total cals.	0·39	0·52	0·42	0·48	0·46	0·46	0·31	0·30	0·41	0·43	0·42	0·40	0·51	0·47	0·52	0·55
Nicotinic acid (mg.) per 1000 total cals.	3·84	4·33	3·78	3·93	3·90	3·91	3·28	3·27	3·73	3·86	3·65	3·60	3·99	3·64	3·64	4·07
Williams and Spies:																
Vitamin B_1	547	743	602	595	590	607	421	360	490	490	523	514	494	412	442	486
B_1 : non-fat cals.	0·26	0·33	0·28	0·28	0·27	0·27	0·21	0·20	0·35	0·35	0·35	0·32	0·29	0·28	0·31	0·33

The amounts arrived at were as follows:

Rice polishings	30 g.
Palm oil	30 c.cm.
Green gram (*Phaseolus radiatus*)	100 g. in all
Ground-nut	
Soya bean	
Sprats or dried fish	50 g.

The camp food tables indicated that the green gram, *Phaseolus radiatus*, had an unusually high riboflavine content while that of soya bean was low. The more recent tables show the reverse, but in view of our information the green gram was always purchased in preference to the other légumes. It will be seen from fig. 2 that the riboflavine level of the diet did not reach any great height until December, 1943, and from table I it will be clear that the cessation of the outbreak of vitamin-B_2-deficiency disease was probably due to the introduction by the Japanese of 170 g. of soya bean in place of an equal amount of rice.

The importance of green leaf vegetables in the diet was appreciated by the British administration in the camp, but, for the first two years, the Japanese were either indifferent or could not be made to understand that much sickness could be avoided if they would allow the proper cultivation of vegetable gardens. At the end of the second year a new Japanese commandant was more intelligent about the matter and good vegetable gardens were made. From September, 1944, until the end of the camp these gardens were probably responsible for our freedom from these diseases. In fig. 2 it will be seen that the riboflavine content was higher in that period.

Since no green leaf vegetables were available at the time of our greatest need and légumes were not obtainable in the required quantities, at the beginning of 1943 it seemed worth while to try to extract the vitamins from some of the non-edible plants and grasses growing round the camp. Fortunately power was available and the engineers built various ingenious devices for crushing leaves so that their cellular structure was broken down. They were then macerated with water and the extract was drunk. As long as fresh rapidly growing structures were available the results obtained from this extract were excellent, but soon the area to which the prisoners-of-war had access was cleared of all such plants. Coarse tropical grasses were then used and little benefit appeared to be derived from the extract.

SUMMARY

An outline is given of the general living conditions in the prisoner-of-war camp on Singapore Island. The Japanese ration scale and the supplements that could be procured are described.

Estimation, week by week, of the composition of the diet showed that the energy and protein intakes were not grossly inadequate except in the last six months, but there was throughout a deficiency of one or more of the B vitamins.

There were two outbreaks of beriberi. The first, which occurred early, was uncomplicated but in the second the picture was confused by famine œdema.

Comparison is made between the minimal levels of intake of vitamin B_1 to prevent disturbance of metabolism, as defined by workers on induced deficiency, and the estimated levels at which beriberi appeared or disappeared in the camp. It is concluded that the higher limits proposed on the basis of experimentally produced deficiency (0·66 mg. per 1000 non-fat calories daily) are in best agreement with experience in the camp.

The order and times of appearance of disease conditions attributed to deficiency of one or more components of the vitamin-B_2 complex are compared with those of beriberi and with the estimated riboflavine and nicotinic-acid contents of the diet. They appeared and disappeared in a definite sequence, independent of beriberi and with an inverse correlation with the riboflavine intake, except pellagroid skin rash which showed some relationship to the intake of nicotinic acid.

The requirements of riboflavine as defined by workers in induced deficiency are compared with the estimated levels in the camp diet. The level required to prevent deficiency as suggested by the camp diet is similar to the findings of some experimental workers, and camp experience again supports the higher suggested minimum levels (0·5 mg. per 1000 total calories daily).

Of 7000 men who left the camp to work up country, more than a third had signs of vitamin-B_2 deficiency in camp, and they subsequently suffered so severely from starvation and disease that 44% died within nine months; yet under these conditions the signs of vitamin-B_2 deficiency, except retrobulbar neuritis, disappeared. Further, vitamin-B_2-deficiency disease in camp was commoner in the relatively well-fed men. Pellagroid skin rash, on the other hand, was more often found in the emaciated.

The means used in attempting to combat deficiency diseases in the camp are briefly described.

I wish to thank Lieut.-Colonel Kenneth Alford, I.M.S., and Major R. Orr, A.A.M.C., for their coöperation in the prisoner-of-war camp, and Dr. Isabel Leitch, Rowett Research Institute, for her help and criticism in the preparation of this paper.

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BLOOD-GROUPS IN BONE-MARROW

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"THE fact of belonging to a definite blood-group is a fixed character of every human being and can be altered neither by the lapse of time nor by intercurrent disease" (Lattes 1932). This statement on the fixity of blood-groups may be said to represent the present consensus of opinion.

With the modern tendency to give repeated blood-transfusions in various conditions, however, replacement of the patient's red cells with donor's cells means that part of the patient's peripheral blood will evince the characters of the donor's cells. Should the donor's cells carry different hæmagglutinogens from those of the recipient, anomalous results will be obtained when attempting to establish the patient's own group, and cases are on record where all the patient's cells had been replaced and only the group of the donor could be ascertained from the patient's blood. In such a way an apparent, though not real, change of blood-group may be found. For example, the blood of case 11 of Coombs et al. (1946) appears to have been entirely replaced; and case 4 of Wiener and Sonn (1946) was an erythroblastotic infant whose Rh-positive cells were entirely replaced by Rh-negative donor cells within two days.

Hitherto, in establishing the true group of such cases, there has been little option but to wait until the donor cells have disappeared; though, as the patient's cells start to reappear, the differential agglutination method

of Dacie and Mollison (1943) may reveal the group while donor cells are still present. There are times when it is important to know the nature of a patient's cells, when complete typing has not been carried out before the institution of a line of treatment which has falsified the true picture. Such a case was seen recently at this hospital, and it was considered that investigation of the bone-marrow red cells, which are not subject to the same replacement by donor cells as are those of the peripheral blood, might establish the true blood-group. As no reference to the reliability of bone-marrow grouping could be found in the available literature, normal children were used as controls at the same time.

INVESTIGATION

Marrow was obtained from twelve children who had had no transfusions and in whom marrow puncture was being undertaken for diagnostic purposes.

The first two marrow samples were taken from the sternum with an ordinary Salah needle. As, however, the yield of sternal marrow was rather too small for the purpose, particularly in small infants, and rendered proper oxalating of the sample difficult, the later punctures were made through the flat area of bone internal and distal to the tibial tuberosity. Needles, used according to the size of the patient, were those designed by Gimson (1944) for marrow infusions.

Marrow was aspirated into a syringe, from which it was immediately expelled into a small test-tube containing double oxalate mixture (3 parts of ammonium to 2 parts of potassium oxalate) which had been allowed to dry and then moistened with a drop of normal saline just before use. If the oxalate was used dry, various degrees of agglutination jeopardised the chances of satisfactory grouping. Only marrow discharged direct into the oxalate was used, any adhering to the side of the tube being carefully avoided.

Marrow suspensions so obtained were ABO- and Rh-typed in small tubes in the ordinary way.

RESULTS

All twelve marrows showed the same ABO agglutinogens and agglutinins as those found in their corresponding specimens of blood. Similarly, no difference was found in the Rh genotypes of marrow and peripheral blood from the same patient. The presence of nucleated red cells and the myeloid series did not interfere with reading the test.

From these results it appeared that the true blood-group and Rh genotype could be ascertained from the marrow cells. Therefore marrow grouping was undertaken at intervals on the patient whose peripheral blood could not be grouped owing to repeated blood-transfusions. The following hæmatological findings are given in detail to illustrate how the divergent blood and marrow pictures came into line again as the donor cells were eliminated.

Baby X, with erythroblastosis fœtalis, was the second child of healthy parents, whose first child was normal. Baby X was born on Feb. 20, 1946, and became jaundiced on the 23rd. Blood-group A, β in the serum, Rh-positive.

The mother, blood-group A, Rh-negative, had a low Rh antibody titre at birth of the baby, and a titre of 1/64 on March 2, 1946, and 1/256 on March 5, when some blood was taken from her for preparing anti-Rh serum.

Between Feb. 24 and April 5 the baby received eight transfusions of whole blood with group-O Rh-negative blood, the rise in red-cell count after each transfusion being only transient. In the meantime the mother's blood had been processed by Miss B. E. Dodd, who reported that it contained antibodies to the Rh factors C and D.

On April 5, to cross-check this finding, the baby's blood was now genotyped and found to be Rh-negative. Also, the ABO group, which was put up as a routine, was O, with neither α nor β demonstrable in the serum.

Results were the same on April 7, except that weak β was now present in the serum. This reversal of group with β in the serum was also confirmed by Miss Dodd on April 8, though at birth the baby had group-A Rh-positive blood.

From April 5 to 18 the baby slowly lost its red cells, the count falling from 4,700,000 to 4,280,000 per c.mm. On the 18th the peripheral blood-cells were group O, with β in the serum, and there was a trace of agglutination with anti-D serum. In the marrow, on the other hand, the cells were group A and Rh genotype CDe, cde.

As marrow smears at this stage showed only 2·5% of primitive red cells, it was apparent that the repeated transfusions were producing a condition of red-cell hypoplasia, and further transfusions were withheld in the hope that the marrow would be stimulated to make its own cells.

On April 25 the peripheral red cells were grouped as A, with a good anti-D reaction but no agglutination with anti-C serum. On the 27th the blood-count had fallen to 3,530,000 per c.mm., and the blood antigens were A CDe, cde, a formula corresponding to that in the marrow.

These results are summarised in the accompanying table. Since then, the marrow has produced 12% of normoblasts, and the red-cell count is slowly rising. In the meantime the father, group A, has been genotyped as CDe, cDE.

CHANGES IN THE BLOOD

Date	Antigens present	
	Blood	Marrow
Feb. 25 ..	A Rh +	..
April 5 ..	O cde, cde	..
April 6 ..	O cde, cde	..
April 7 ..	O cde, cde	..
April 18 ..	O cDe, cde	A CDe, cde
April 25 ..	A cDe, cde	A CDe, cde
April 27 ..	A CDe, cde	A CDe, cde

DISCUSSION

It is clear from the twelve normal controls that the bone-marrow red cells contain the same hæmagglutinogens as do the peripheral cells. Also, the case illustrated demonstrates that, where frequent transfusions have been given, the marrow cells, being in a sense fixed, may reveal the true antigens when the peripheral blood-group is either obscured or altered by donor cells.

In the present case there was no indication at birth to genotype the baby, which was merely recorded as Rh-positive. As the father was CDe, cDE, and the mother made anti-C and anti-D agglutinins, there cannot be much doubt that the infant was originally a CDe, cde, a typing confirmed by the marrow and to which the peripheral blood eventually reverted. As the father was not available when the baby's blood was giving an untrue picture, the marrow reaction gave valuable corroborative evidence about the type of agglutinins present in the mother's serum.

The behaviour of β suggests that the original antibody was obtained from the mother, its disappearance and reappearance coinciding with its obsolescence and the baby's starting to manufacture its own β.

The return of the antigens to the blood showed some odd features. That the Rh antigen was detectable before its ABO counterpart was probably due to the use of higher titre anti-Rh sera; but why D should reappear before C was demonstrable with high-titre serum is not so clear, if the fixity of antigens is accepted, and may be due to the fact that the factor D as a rule seems to be more readily agglutinable than either C or E.

I am indebted to Dr. Donald Paterson for access to the patient, to Miss B. E. Dodd for her help with the sera, and to Mr. G. W. Cecil for much technical assistance.

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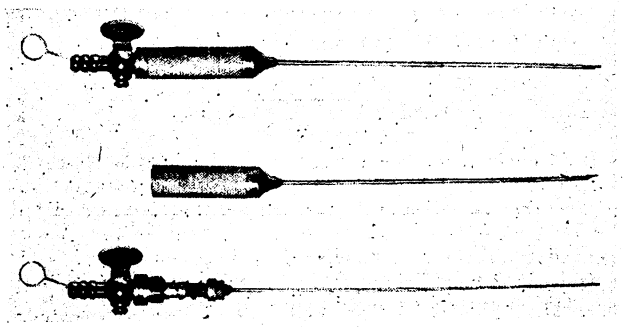
New Inventions

PNEUMOPERITONEUM-REFILL NEEDLE

THE induction of a pneumoperitoneum is much more difficult in most cases than that of an artificial pneumothorax, because, owing to the softness of the abdominal wall, it is extremely difficult to be certain when the point of the needle is within the peritoneal cavity. Again, in the pleura a good negative pressure is usually found, except when the pleura is adherent, whereas in the peritoneal cavity the pressures are often difficult to record because: (1) they are not so great as in the pleural cavity, and (2) a loop of intestine or a piece of omentum may obstruct the hole in the needle.

The needle described was designed by Veress, in Switzerland, to get over these difficulties. It is extremely simple to use and very efficient. The point of the needle is formed by a strong, hollow, but blunt trochar running within the needle, with an exit hole at one side, just below the blunt end of the trochar. The distal end of this trochar is fitted with a spring so that it projects about 1 mm. beyond the point of the needle, but can be withdrawn within the needle, being pushed out again by the spring when released. When the needle is pushed through the tissues of the abdominal wall, the blunt trochar is pushed back against the spring, and the cutting edge of the needle, within which it runs, pierces the tissues easily, the spring pushing the blunt trochar forward as soon as the peritoneal space is reached, displacing the gut or omentum in front of it, but not damaging it, as the trochar is blunt. A swing on the manometer may or may not be recorded, but it is quite



Above, the needle assembled for use. Middle, the cannula. Below, the spring and trochar.

safe to allow air to run in at this stage, at the end of which the pressures will be easily recorded.

The technique in actual experience is helped by the following suggestions. After anæsthetisation of the skin and parietal peritoneum in the usual way, the needle is inserted much more easily if a small nick is made in the skin just medial to the lateral border of the rectus at about the level of the umbilicus. As the needle is pushed forward, the blunt trochar is pushed back against the spring as it pierces the external fascial layer of the sheath of the rectus abdominis, but springs forward as soon as this is pierced. As the needle is pushed forward slowly, the blunt trochar is again pushed back as the internal layer of the sheath of the rectus abdominis is encountered, the trochar springing forward again when this is pierced. These two movements are important to observe and are much more easily detected if the patient raises his head from the couch, thus contracting the rectus abdominis while the needle is being inserted.

The original needle obtained from Switzerland is somewhat large; so the size has been reduced by the Genito-Urinary Manufacturing Co. Ltd., but the principle is exactly the same.

It is interesting to note that about 1925 G. Zorraquin, of Buenos Aires, designed a needle which was almost identical with this and was made by the Holborn Surgical Instrument Co. Ltd. for the exploration of the chest in cases of pleural effusion, so that fluid could be obtained without damaging the underlying lung.

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Reviews of Books

Technical Minutiæ of Extended Myomectomy and Ovarian Cystectomy

VICTOR BONNEY, M.S., M.D., F.R.C.S., consulting gynæcological and obstetrical surgeon to the Middlesex Hospital and consulting surgeon to Chelsea Hospital for Women. London: Cassell. Pp. 282. 30*s*.

THIS, the latest and probably the best book from the pen of Mr. Victor Bonney, is the gospel of the apostle of conservatism. In it, with the utmost simplicity of language and great clearness of detail, he explores almost every possible way of performing multiple myomectomy. Mr. Bonney takes his reader and imaginary pupil by the hand and leads him into the theatre and demonstrates each step in each type of operation. The 241 illustrations, drawn by himself, are in the same style as those of the famous *Textbook of Gynæcological Surgery*—little masterpieces of exposition. All gynæcologists and surgeons likely to perform myomectomy should have this book.

The 1945 Year Book of Neurology, Psychiatry and Endocrinology

Edited by HANS H. REESE and MABEL MASTEN; NOLAN D. C. LEWIS; and ELMER L. SEVRINGHAUS. Chicago: Year Book Publishers. Pp. 720. 18*s*.

SERVICEABLE and comprehensive, this triple volume devotes four-fifths of its space to neurology and endocrinology (almost equally divided) and a fifth to psychiatry: clearly the editors consider that a high proportion of the voluminous literature of psychiatry adds nothing to our knowledge. It is consequently regrettable that space is allotted to reflective or expository articles, such as "viewpoints on basic problems of psychopathology," "relationship of psychoanalysis to psychiatry," "psychiatric problems in obstetrics and gynæcology," which contain little that is new. In the neurological section the editorial notes are frequent and helpful; special attention is drawn to the meningeal responses to intrathecal medication, and the advantages of giving penicillin otherwise than by this route for the treatment of meningitis. The section on endocrinology is the last which Professor Sevringhaus will edit; in a prefatory note he compares the situation in 1934, when he began the series, and now: great advances have been made, but fundamental relationships have not changed, and there are still conspicuous gaps—for example, in our detailed knowledge of the mechanism of the menstrual cycle and of the hormones of the pituitary. This section is, as ever, the most thickly packed, and bespeaks the great if uneven activity in this field that prevails in American laboratories and clinics, from which come most of the papers abstracted. The value of the yearbook would be enhanced if the index were more itemised.

A Practical Handbook of Midwifery and Gynæcology

(3rd ed.) W. F. T. HAULTAIN, M.B., F.R.C.O.G., obstetrician and gynæcologist to the Royal Infirmary, Edinburgh; CLIFFORD KENNEDY, M.B., F.R.C.O.G., assistant gynæcologist to the infirmary. Edinburgh: E. & S. Livingstone. Pp. 388. 20*s*.

THIS handy synopsis of obstetrics and gynæcology represents the teaching of the famous Edinburgh school and it will therefore have a wide appeal north of the Tweed, but English readers will find the book equally acceptable to southern examiners. Though primarily written for the student about to qualify, it is also a useful book of reference for the busy practitioner who wishes to check up on some point quickly. The chapters on the infant and on breast-feeding are particularly good and the chapter on sexual disorders is useful and contains a small section on contraception. Not all will agree with the view that chloroform is the best anæsthetic when absolute uterine relaxation is required for difficult rotation or version, but the authors make the claim with various laudable reservations. The Edinburgh school, to be sure, are masters in the administration of chloroform; but the English schools are not, and until its use is excluded from obstetrics, some pregnant women will have their lives endangered every year. There are other anæsthetics available which are safer and equally efficient.

THE LANCET

LONDON: SATURDAY, SEPT. 21, 1946

Occasion for Thrift

OUR Armed Forces, it is clear, are to be maintained at a substantial strength in peace-time; but though Service claims must be met in peace as in war they can no longer have exclusive priority. Other tasks of almost equal urgency lie ahead: the country's damaged economy must be repaired, and the Government has pledged itself to improve the life and lot of the people. If these purposes are to be fulfilled our supply of skilled man-power must be carefully husbanded and wisely allocated between the various claimants. Thus the medical profession must meet the higher peace-time requirements of the Services while helping to man the new National Health Service, which will ultimately call for more doctors than the country now possesses. Plainly, more doctors must be trained; the universities are alive to this fact,[1] but they cannot promise any large increase within the next few years. Meanwhile, the best use must be made of existing resources. In these straits, an authoritative body is needed to balance the claims of civilian and military medical services and satisfy itself that no doctor is wastefully engaged in either. Since its establishment during the war, the Medical Personnel (Priority) Committee has concerned itself with exactly these questions. The committee's importance will be undiminished in the days of peace; indeed, its brief should be extended and its membership enlarged to represent all interested parties. Its duties should, as now, be advisory, and, like other official committees that are in the making, it should publish its findings.

There will be plenty of work for the committee. It might first consider the proposal that medical students shall continue to be called up for military service, except when specially deferred, before starting their medical course proper. The alternative system, by which doctors would normally do their military training after qualifying, would require close understanding between the Ministries of Labour, Education, and Health, and the universities and Service departments; and it could not be effected immediately since the medical schools already have more candidates than they can accept from the ranks of the demobilised. But in a year or two the change should be practicable, and it is not too early to plan for that time. Many students would prefer that the break, if break there must be, should come between school and university rather than later; but will it not be more profitable for both the community and the individual if the doctor serves after qualifying, when he can help to reduce Service demands on the country's restricted supply of medical men and can gain the knowledge of Service medicine which he will need if ever he is recalled to the Forces?

Then there is the step which many think inevitable—the merging of the medical branches of the three Fighting Services into a single organisation, no longer keeping itself aloof from civilian medicine but closely linked to the National Health Service. This measure would provide doctors in the Forces with an opportunity for widening their experience and might well increase the efficiency of medical care for all fighting men; but above all would be its saving in overlap and hence the economy it would effect in hospitals, equipment, and man-power. This step was advocated early in the war by MEDICUS, M.P.,[2] after a tour of the B.E.F., and now, as then, the need is for a unifying authority. The Personnel Committee would be well constituted to study this scheme in detail and to advise on its practicability.

There is a further aspect of economy that should not be overlooked: time spent with the Forces should be profitably occupied. And here again is an opportunity for the integration of military and civilian medicine which we have already discussed in detail.[3] The late war proved the eagerness of the young medical officer, even under difficult conditions, to enlarge his experience. This thirst for further knowledge was to some extent recognised and appeased by short courses and clinical meetings in hospitals; during the last campaign in Europe one hospital (known, with a levity that concealed respect, as the University of Duffel) won a reputation for teaching that might be the envy of established centres. In peace-time this field can be more fully explored (see p. 432). It may be found that some of the best teachers have returned to civilian life, and certainly much will depend on the good will of civilian hospitals. The Services, for their part, may look with favour on a suggestion which is calculated to increase their appeal and efficiency. The newly recruited medical officer must first serve with a battalion or in a comparable post with the other Services, for this work calls for a special knack that is not learnt overnight. Moreover, better than any other appointment, it teaches the precise functions and effects of Service medical practice; indeed, many of those who joined the Forces for the duration as specialists suffered a permanent disability through not having held these posts. But training should also include opportunities to work in military medical units, large and small, and even in administrative offices. This arrangement would not only benefit the Services by instructing men in their operation but might also, by providing first-hand experience of many branches of medicine, enable junior graduates to return to civilian life with a better idea of where their bent lay.

Service with the Forces should not be divorced from, or delay advancement in, civilian work, but should rather be a normal phase in a single career. It may be that in the years to come the young doctor will be able to count his time in the Forces towards seniority in the National Health Service, and that senior men will be free to return to the Services for short periods without jeopardising their civilian position; they might, if specialists, thus help to make good a deficit that will probably be felt even more strongly in the Services than in civilian practice. Such a correlation may have to wait on more settled days; but economy in the use of doctors cannot wait.

1. See *Lancet*, August 31, p. 305.

2. *Ibid*, 1940, i, 987.
3. *Ibid*, 1945, ii, 531.

Surgery in the Aged

THE defeatism to surgical diseases in the aged is passing. The view of operation on the elderly as a desperate expedient is still reflected in the undue proportion of old people with acute surgical complaints to be found in institutions for the chronic sick; but the E.M.S., by sending doctors from voluntary hospitals as emergency staff to these institutions up and down the country, has influenced surgical opinion on the illnesses of old people. Many surgeons have returned to voluntary hospitals with an increased respect for the tolerance of the elderly for major operative procedures. The improved expectation of life means inevitably that surgeons will be increasingly occupied with patients over 60.

As TANNER [1] remarks, the improved results are not so much due to changes in technique as to better pre- and post-operative care and a higher standard of anæsthesia. The old patient's knowledge of dietetics is rarely profound; he is often faddy, practising self-imposed restrictions, especially on protein foods, green vegetables, and fruit. Rationing difficulties and poverty have usually added their burden. A preliminary period in hospital before operation, when surgical circumstances permit, is well spent; WHIPPLE [2] has pointed out the need for extra proteins to increase the powers of wound healing, and STEVENSON, WHITTAKER, and KARK [3] have found powdered milk useful for this purpose. With syrup flavourings it can be made into a palatable drink, and should be given between meals, say at 10 A.M. and 2.30 P.M., in 8 oz. feeds, and a further 16 oz. as a milk-shake at 9 P.M. By this means 72 g. of protein and 1100 calories can be added to the daily diet. It seems unnecessary to give amino-acids. Extra vitamin C is needed for the formation of collagen fibres,[4] and many of these old patients bear the stigmata of vitamin-B deficiency; so vitamin supplements in full doses should be added to the diet. The hæmoglobin needs watching, for many of these old people are anæmic; this is best corrected with iron, or if need be liver, for blood-transfusion requires particular care, since their hearts will not tolerate much overloading. Bed is a dangerous place for the old man; as often as not rest in bed, rather than the surgeon, is responsible for a pulmonary embolus. This is a complication ever to be feared in the aged, and in some operations a preliminary double femoral ligation, as is being increasingly practised in America, might be advisable. Just before operation is not the best time to change the habits of a life-time, so enemas and purges are better avoided. Smoking should be restricted for 48 hours before operation, but it will do no good to cut off the pipe after meals and have the patient fumbling, restless, and miserable. Morphine, when indicated for pain, should be given in small doses. HARDY, WOLFF, and GOODELL [5] have shown that the maximum analgesic effect is obtained with gr. $^1/_6$, and that a larger dose merely depresses respiration. The patient who requires pre-operative gastric lavage should have his washout first thing in the morning and just before the evening meal; the usual practice of leaving the stomach empty for the night robs the patient of the benefit of the night's absorption of food and fluid.

Of all the anæsthetics for the aged, local injection, with the patient preferably asleep (at any rate for the Englishman), seems to be the most satisfactory; spinal anæsthetics, especially high spinals, are badly tolerated by old people. Gas and oxygen is probably the most dangerous, for any sustained cyanosis is lethal. Light cyclopropane is almost certainly the safest. The old patient should not be intubated as a routine; when the patient is light this leads to much bronchial spasm, and, as NOSWORTHY [6] has pointed out, this may largely be responsible for subsequent lung collapse. Postoperatively, intravenous drips are better avoided; with a small catheter at least 5 pints of fluid a day can be administered by rectal drip. Protracted gastric aspiration is badly tolerated, and it is often maintained unnecessarily long after abdominal operations. Although his tissues heal well, and the peritoneal cavity does not seem to lose its power of coping with any mild spilling, the old person's resistance to infection is always poor, penicillin, preferably started before operation, is a valuable weapon against wound sepsis, which may spread into the peritoneal cavity and be responsible for the subsequent peritonitis. To avoid the unpleasantness of repeated injections, penicillin may now be given in 100,000-unit doses, and Dr. FLOREY and her colleagues demonstrate in this issue (p. 405) that such a dose given thrice daily will maintain a bacteriostatic concentration in the blood. Prophylactic sulphonamide therapy TANNER thinks is of definite value against pulmonary and peritoneal infection; he quotes a series of 120 unselected partial gastrectomies with one death, and attributes part of this success to sulphonamides. Sulphamerazine may come to be the drug of choice, for it has the advantage of requiring only 8-hourly administration and its conjugated form is relatively soluble in neutral and acid urine, thus avoiding the risks of drug concretions and damage to the renal parenchyma.[7] Succinyl sulphathiazole has proved its value in the preoperative preparation of the patient for intestinal surgery; in appendicitis, so treacherous in the aged, it may be used as an added safety factor. For diverticulitis, often seen in the aged, phthalyl sulphathiazole, which requires but a daily dose of 3–6 g., may be superior.

In the decision to operate on an old person the surgeon should not be too much influenced by the knowledge that the patient's blood-pressure is high; even a history of coronary thrombosis is no absolute contra-indication. Hypertension was present in 77% of 341 "healthy" Chelsea pensioners examined by HOWELL.[8] "Give me preferably the old patient with high blood-pressure," GORDON-TAYLOR has remarked. Fall of pressure in the aged is a bad prognostic sign, and when "systolic figures approach 110, the outlook is grave." [8] The surgeon should bear in mind that hæmoptysis, hæmatemesis, and profuse rectal bleeding may result from hypertension rather than local disease. Gastric surgery for ulceration is now being increasingly performed with success in old people. Gastric perforation is by no means rare in the higher

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6. Nosworthy, M. D. Quoted by Mimpriss, T. W., Etheridge, F. G. *Brit. med. J.* 1944, ii, 466.
7. Henderson, J. *Surg. Gynec. Obstet.: int. Abstr. Surg.* 1946, **83**. 1.
8. Howell, T. H. *Practitioner*, 1946, **156**, 444.

age-groups, and TANNER has seen it even at 91; it seems certain that this diagnosis is often overlooked. For the old patient with ulcer, gastrojejunostomy is sufficient, for the mucosa is usually degenerative and ulceration does not recur. The stomach growth, of course, does require partial gastrectomy, and it is amazing how well the aged withstand this procedure. TANNER records a successful total gastrectomy in a patient of 74, and WAUGH and GIFFIN [9] one in a patient of 72. In such patients preliminary splanchnic block may be dangerous, for, especially with the anterior approach, pressure on the aorta may fracture some of the atheromatous plaques usually present. Resection of œsophageal growths is now being successfully performed even in old patients, and the risks are worth taking. The pharyngeal pouch quite common in the aged is being dealt with under local anæsthesia by first transplanting the pouch to a higher level and at a second operation coring out the mucosa. Growths of the colon can be expeditiously dealt with by Paul's operation, and even if there are secondaries in the liver an attempt should be made to remove the local growth. Patients with secondaries in the liver often live for two or three years in fair comfort and removal will spare them the misery and pain of the local spread. The aged do not always need the full abdomino-perineal resection; where the growth is at the pelvirectal junction, or high in the rectum, the simpler operation of leaving a distal blind rectal stump (Hartman's operation) is ample. CUTHBERT DUKES,[10] and GLOVER and WAUGH,[11] have shown that distal retrograde spread is slow, and that it only occurs in 1% of cases, and then usually only when the normal upward channels have been blocked. Section of the bowel an inch below the palpable edge of the lesion will satisfy pathological requirements. The breast carcinoma usually needs but a local amputation to avoid the local ulcerating mass, and to remove what the patient knows perfectly well is slowly whittling away her life. Admittedly, such carcinomas are often extremely slow growing, but, with the ever-extending propaganda on cancer of the breast, no patient can dismiss it lightly from her mind. Minor operations, even circumcisions, are often necessary in old people and should not be shirked. Hæmorrhoidectomy can easily be performed under local anæsthesia. The frail old lady withstands well an operation for procidentia, and it will give her comfort. As HOWELL astutely remarks, "trifling matters often distress the aged more than great ones."

The possibility of a vascular catastrophe alway hovers over the old patient. Embolism of a mesenteric or peripheral vessel is a condition amenable to surgery, and has to be borne in mind. The peripheral embolus is too often overlooked till too late for surgery; numbness and loss of power, rather than pain, may be the chief symptoms. The limb with a peripheral embolus, if operated on early (usually under local anæsthesia), does well. Arteriosclerotic gangrene is now being treated by more conservative methods; gangrene of a single toe often ends with no more than loss of the superficial skin. Reflex vasodilatation,[12] by heating the body or immersing the opposite limb in water at 110° F, is probably the best way of encouraging the collateral circulation; it does as much as a sympathectomy and certainly more than vasodilator drugs. For the frail patient, particularly with spreading gangrene, amputation under ice anæsthesia has a place. The results of surgery in the "old man's illness"—prostatic obstruction—have been much improved; Millin's retropubic operation has largely justified the original optimism. The other old person's disease, trigeminal neuralgia, is being increasingly operated on early, and these patients withstand the operation remarkably well. Fractured neck of femur, which was the harbinger of death for many of the aged in the past, is now almost routinely treated with the trifin nail—a procedure which even the very old withstand well. Aseptic necrosis and extrusion of the pin have rather damped initial hopes, but a good result can usually be anticipated in at least 50% of cases; where this fails McMurray's osteotomy is extremely valuable.

One example of the success being attained must suffice. CARP [13] has collected figures from a variety of sources covering 2558 patients submitted to operation at ages over 60; these show an average operative mortality of 13·1%—a gratifying result. It does indeed seem that the age of the "lean and slippered pantaloon" may become a less formidable problem to the surgeon than that of the "fair round belly with good capon lined."

9. Waugh, J. M., Giffin, L. A. *Proc. Mayo Clin.* 1941, **16**, 363.
10. Dukes, C. E. *J. Path. Bact.* 1940, **50**, 527; *Proc. R. Soc. Med.* 1941, **34**, 571.
11. Glover, R. P., Waugh, J. M. *Surg. Gynec. Obstet.* 1946, **82**, 433.
12. Learmonth, J. R. *Edinb. med. J.* 1943, **50**, 140.
13. Carp, L. *Ann. Surg.* 1946, **123**, 110.

Annotations

DENTAL CONTROVERSY

THE dispute between the dental profession and the Minister of National Insurance raises an important point of principle. Negotiations for a new scale of fees for dental work done for insured persons began as long ago as January of this year, when the Dental Benefit Council set up a negotiating committee consisting of three dentists, representatives of three approved societies, and a number of Government members. This committee issued a questionary to more than 1000 dentists engaged in N.H.I. practice to ascertain (*a*) to what extent the cost of running a practice had risen owing to the war, and (*b*) what were the private fees charged to non-insured patients in the same walk of life as those treated under N.H.I. The committee issued a unanimous report and submitted a scale of fees which represented an average increase of about 100% over the pre-war scale. This scale of fees has now been rejected by the Minister of National Insurance. The dental profession feels that having exhausted what it regards as the normal negotiating machinery it has no alternative but to abstain from participating in the service. The dental profession fears that if the present Minister is prepared to disregard negotiating machinery in connexion with dental benefit in this way, and to rate the value of a dentist's services so low, there can be no hope of any better treatment in a scheme applying to the whole nation.

The scale which the Minister proposes to adopt from Sept. 30 will yield an average net increase of 50% over pre-war, according to the Ministry's letter circulated to dentists on Sept. 12, but the rise is not uniform. Thus the fee for full upper and lower dentures, which unfortunately is the form of treatment most necessary for working-class patients, is £7 15*s*. When the scheme started in 1926 this fee was £6; the present fee is £6 7*s*. 6*d*.; and the dentists were prepared to accept 9 guineas. The dentists contend that they cannot

guarantee a satisfactory service for insured persons at any scale below that which the Minister rejected, and the Joint Advisory Dental Council recommends dentists to refuse to undertake N.H.I. work unless the higher scale is adopted.

PERCEPTION

THERE are many subjects of common interest to philosophy and medicine: but if he is a physician the Manson lecturer, required by the terms of his appointment to consider some such subject, may well doubt his ability to reach the standard of subtle and recondite profundity manifest in philosophical writings. Dr. Russell Brain [1] has, however, succeeded in illuminating a problem of basic importance for the philosopher—the nature of perception, especially in its causal aspects. Neurologists, he points out, usually adopt physiological idealism as their epistemological theory: for them the only independently necessary condition for the awareness of sense-data is an event in the cerebral cortex. But, besides the familiar arguments against idealism, it is possible to object to this, as Russell Brain does, that the peculiar phenomena of cortical representation during visual perception make simple "projection" of cerebral events an inadequate explanation: "when we perceive a two-dimensional circle we do so by means of an activity in the brain which is halved, reduplicated, transposed, inverted, distorted and three-dimensional." But realism too has its difficulties, implicit in Brain's (probably rhetorical) hope that a realist philosopher will give an account of the "ontological status of a black sense-datum when it is not being perceived and, in particular, its relationship to its non-existent substratum in the physical world."

By way of hallucinations and the phenomenon of "phantom limb," which further illustrate this crux, Brain passes to the rôle of the body in perception, and instances a number of observations hard to reconcile with any variety of critical realism. Awareness of externality is clearly the cardinal problem: and spatial relations, upon which this depends, are primarily perceived in a somatocentric way. The body is well adapted to the task of spatial discrimination, through its apparatus for the integration of impulses conveyed from different sense-organs to the cerebral cortex. Russell Brain holds that the most likely explanation of the relationship between sense-data and the nervous system is that a sense-datum is a neural event which is conducted from the surface of the body to the surface of the brain but which carries with it some characteristic of the physical stimulus which excited it. In his conclusion, which takes account of the "successiveness" of the stimulus event, he adopts a realist position in so far as he denies that even secondary qualities are generated by our brains or minds: "in sensing them we are perceiving the four-dimensional texture of the external world." This is a thoughtful and stimulating essay which shows how significant for the philosopher can be the observations and reflections of the neurologist.

DEATH AFTER CURARE

AN inquest was held at Hammersmith on Sept. 9 on a patient who died after an operation in which curare was employed. A woman of 70 years had been admitted to hospital two days after the onset of symptoms of acute appendicitis. An hour after receiving morphine gr. $^1/_6$ and atropine gr. $^1/_{100}$, she was anæsthetised with 'Pentothal' 1 g. and was given 'Intocostrin' 9 c.cm. Oxygen was administered during the operation, which revealed an acutely inflamed but unruptured appendix, with much induration of the surrounding tissues and a small adjacent collection of pus. The appendix was removed, the pus mopped out, and the wound closed in layers. The first alarming signs—cyanosis and shallow respiration—appeared after the end of the operation, which had taken 43 minutes. The patient recovered somewhat with oxygen and carbon dioxide, but relapsed and, despite the injection of 'Coramine' 1 c.cm. and 'Veritol' 1 c.cm., died 35 minutes later. Necropsy confirmed the presence of early peritonitis, which was most pronounced in the right iliac fossa; there was some dilatation of the terminal loops of the ileum, suggesting early paralytic ileus. The left lung was almost completely collapsed and there was considerable collapse of the posterior halves of the right upper and lower lobes; there were one or two adhesions in both pleural cavities and the lungs showed pronounced terminal congestion. The heart muscle was a little friable, but only early atheromatous changes were found, and there was no valvular disease. Early toxic changes were seen in the spleen and liver. The kidneys were remarkably healthy for a patient of this age, although albumin had been found in the urine before operation. The pathologist considered that death was due to toxæmia and had been accelerated by respiratory failure due to curare. A verdict of death by misadventure was returned.

PENICILLIN IN WOUNDS

THE topical application of sulphonamides to wounds has proved a disappointment, and, though there is not unanimous opinion on this point, it is widely held that the presence of a sulphonamide powder in a flesh wound may actually delay healing. In sharp contrast to this, there has never been a doubt that penicillin as a topical application is of great value, for it has the advantages over the sulphonamides that it acts in the presence of pus, that its effect is not weakened by large numbers of bacteria, that it is a much more powerful bacteriostatic agent than any sulphonamide, and that it is very soluble in tissue fluids. In the early stages of its use, penicillin was recommended as a topical application because this method was more economical than systemic administration at a time when supplies were short; and many surgeons believed that, valuable as it was used thus, its effects would be greater still when easement in the supply position permitted free systemic administration. This belief has not been borne out in practice, and the paper by Florey, Turton, and Duthie in this issue gives scientific foundation for the clinical impression that locally applied penicillin is as effective in preventing wound infection as it is when given parenterally.

Florey and her colleagues collected samples of wound exudates after penicillin had been given either by local application or by injection. The difficulties they encountered in the assay of the penicillin content of these exudates and the methods they used to overcome them need not detain us here. It was shown that whereas 100,000 units of penicillin injected intramuscularly yielded for a minimum of 8 hours a wound exudate which inhibited the test organism, a similar dose implanted in the wound yielded exudates with inhibitory concentrations for at least 48 hours. It might be argued from this observation that locally implanted penicillin remained in the wound cavity but might fail to reach organisms lying in the wall, but this argument is defeated by observations on the duration of inhibitory activity in the blood and urine. There was little difference in the time over which inhibitory levels were maintained in the blood whether penicillin was given locally or parenterally, but in the urine inhibition persisted in half the cases for twice as long after local application as it did after intramuscular injection. Penicillin is therefore readily absorbed from wounds and must traverse the walls of wounds (inhibiting meanwhile organisms lying in its path) to gain access to the blood and urine.

All this is of great importance in its practical application to wound treatment. Locally implanted penicillin is of

1. Neurological Approach to the Problem of Perception. *Philosophy*, July, 1946, p. 133.

greater value, unit for unit, than injected penicillin in the control of wound infection—a conclusion which all patients will welcome if it means that the 3-hourly injection régime can be avoided. It is clear, also, that so far we have not put nearly enough penicillin into the wounds we have treated and have therefore had to waste it by supplementary systemic administration. Some practical points await elucidation. Can one put into a wound a large enough dose of penicillin to sterilise it with certainty at a single stroke? Do the tissues show a marked resentment to pure powdered penicillin in quantity, and would healing be impeded by excessive exudation? If a single sterilising dose proves impracticable, what is the best method of implanting penicillin into a sutured wound at, for example, 24-hourly intervals? It seems that despite the vast experience of the past six years, the last word on the best method of treating wounds with penicillin has yet to be said.

TEST FOR THREATENED ABORTION

THE presence of pregnandiol in the urine can be determined qualitatively by a colour reaction which is neither particularly involved nor time-consuming; and Guterman [1] now claims that this can be used as a diagnostic test for pregnancy with an accuracy comparable to that of the Friedman test. He suggests, moreover, that the reaction is an accurate aid to prognosis in certain complications of pregnancy, notably threatened abortion.

Pregnandiol is the excretion product of progesterone, and it appears in the latter half of the cycle, ceasing one to four days before the onset of menstruation. If fertilisation occurs the corpus luteum persists and the excretion of pregnandiol continues. In normal pregnancy the excretion of pregnandiol follows a fairly well-defined pattern. At first it is comparable to that in the latter half of a normal menstrual cycle, but about the ninth to twelfth week the excretion rises sharply to reach a peak two weeks before delivery; it then drops sharply, and pregnandiol has completely disappeared from the urine twenty-four to forty-eight hours after delivery. It is well known clinically that the corpus luteum begins to degenerate about the third month of pregnancy, after which double oöphorectomy can be carried out without necessarily disturbing the pregnancy. It is probable that the placenta assumes the function of secreting progesterone from about the twelfth week onwards; and the commonest time for abortion corresponds to the stage at which the corpus luteum is regressing and the placenta is beginning to take over its function. During this transitional period pregnandiol excretion is liable to drop to a low level; and a drop into the danger zone may well herald the onset of threatened abortion. The test could thus forewarn the clinician, who could take evasive action by ordering rest, sedative drugs, and possibly progesterone by injection.

Guterman's colour reaction [2] consists briefly in adding concentrated sulphuric acid to the pregnandiol extracted from the urine; a positive reading is indicated by a deep yellow or orange, which represents 0·4 mg. pregnandiol per 100 c.cm. of urine, or roughly 6–10 mg. in twenty-four hours—the normal amount in early pregnancy. He studied 73 patients with threatened abortion; among these the pregnandiol colour reaction with concentrated sulphuric acid was persistently negative in 39, of whom 38 aborted. The reaction was persistently positive in 34, of whom 30 did not abort. Out of the 73 there were 5 wrong prognoses; but in 3 of the 4 positives that aborted there was good reason for it—placenta prævia in two and a large fibroid in the third. The test is most useful up to the third month. Thereafter with the excretion of pregnandiol rising from 20 mg. to 50 mg., a positive reading may persist for the first twenty-four hours after fœtal death. Guterman offers no explanation of the pregnancy which continues despite a persistently negative colour reaction. The great advantage of the method is its cheapness and speed; a result can be obtained on the day that the specimen reaches the laboratory. It is hoped that English workers will try it out; if it is found to be as good as Guterman claims, it should prove useful in the treatment and prognosis of threatened abortion.

1. Guterman, H. S. *J. Amer. med. Ass.* 1946, **131**, 378.
2. *J. clin. Endocrin.* 1944, **4**, 262.

HOSPITAL CATERING IN MIDDLESEX

BY way of experiment, the Middlesex County Council have decided to appoint a catering officer to one of their hospitals.[1] The appointment is in the first instance to be temporary, though not with any fixed limit of time, and is to carry a salary of £750 a year, rising by annual increments of £25 to £850. In a report to the public-health committee, Dr. H. M. C. Macaulay, county medical officer of health, notes that existing arrangements present many of the drawbacks discussed by King Edward's Hospital Fund for London.[2] Thus hospital catering comes under the dual control of the steward, who undertakes the buying and supervises the porters who distribute the food to the wards, and the matron, who supervises both the kitchen staff and the nurses. The matron may have the help of a housekeeping sister, whose short course of training, planned in days when hospitals were smaller, is mainly administrative, does not include cooking, and seldom covers nutrition or the relation of food to health.

Dr. Macaulay found the matrons ready enough to be relieved of the responsibility of catering; but the stewards, though agreeing that it should be under one person, were uneasy over the proposed appointment of a catering officer. They feared the results of divided control of staff, especially porters, and of stores, since food would have to be separated from other goods; and they concluded that the person responsible for catering should either be the steward or else that the catering officer should work under him.

It is doubtful whether this is the right arrangement. As the King's Fund point out, stewards have little expert knowledge of food, cooking, and the science of nutrition, and their general administrative duties do not leave them time to visit markets and interview travellers. They have to depend on the long-term contract, the written order, and the telephone in buying food; Dr. Macaulay, in fact, noted that the contract purchase was much too common. Yet a day-to-day first-hand knowledge of markets is needed for clever buying of seasonal foods, and a balanced diet can only be provided by a man or woman who understands nutrition and is free to juggle with the commodities at his disposal. Much, of course, must depend on the quality of the caterer appointed; experienced caterers are scarce, and until more have been found or trained it may be well to go cautiously. In deciding to appoint one catering manager, Middlesex County Council leave themselves free to experiment with stores arrangements and in other directions.

In addition, food service subcommittees are to be appointed in all the council's hospitals, made up of the medical director, members of the medical staff, and the officers responsible for hospital feeding, including the matron, and the dietitian and caterer where these exist. These committees will be able to reconcile the financial, medical, nursing, dietetic, and administrative interests concerned, and to deal with complaints about food. It will be interesting to see whether they develop on the lines set out by the King's Fund, as technical and

1. Report of the Public Health Committee to Middlesex County Council, July 31.
2. Second Memorandum on Hospital Diet, London, 1945.

professional committees, analogous to hospital medical committees, advising their hospital boards, and regularly consulted by them before any decisions are made to reduce expenditure on kitchen staff or provisions. Economies of these kinds can be expensive, whereas increases in kitchen salaries have on occasion been more than counterbalanced by savings on waste. The classic example is that published by the King's Fund in 1943 of a hospital which raised the total wages of kitchen staff from £1000 to £2000, and enjoyed a fall in the total costs of catering from £20,000 to £14,000.

TESTOSTERONE AND ANGINA PECTORIS

MEDICAL propaganda is not without its risks, especially in the hands of an enterprising journalist. Testosterone for angina pectoris is an example of a comparatively untried treatment which has been prematurely popularised in this way. In the U.S.A. many people with angina are said to be either treating themselves with the drug or urging their doctors to prescribe it. That its worth is as yet unproved is confirmed by the latest report from America. Levine and Sellers [1] gave 25 mg. of testosterone propionate intramuscularly twice or thrice a week and 10–15 mg. of methyl testosterone sublingually every day to 21 men with angina pectoris; 11 showed no improvement and only 2 showed "marked improvement." Of the 10 patients who had male climacteric symptoms (precordial discomfort) in addition to angina pectoris 6 reported that these symptoms were much improved. Other workers [2] have reported similar results—failure to relieve angina pectoris, but relief of chest symptoms attributed to the so-called male climacteric. There seems to be good reason for the conclusion of Riseman [3] that testosterone should be classed among agents of no value in angina pectoris.

SILICOSIS AND ALUMINIUM TREATMENT

LAST year we drew attention [4] to the patenting by Canadian investigators of the aluminium treatment for silicosis. It now appears that the patent does not apply to Great Britain and that research-workers in this country are free to experiment with the method. The subject has been considered by the councils on industrial health and on pharmacy and chemistry of the American Medical Association which in April issued the following report [5]:

1. In experimental animals the *prophylactic* use of aluminium inhibits the toxic action of relatively pure quartz.
2. In man, industrial dust exposures often involve mixtures of various minerals in addition to quartz and other environmental variables to which experimental animals are not subject. Therefore human silicosis usually develops more slowly and is often modified in type. Only prolonged unbiased observation, with adequate control cases, will demonstrate whether the prophylactic results obtained with animals are applicable to man.
3. Animal experiments have demonstrated that administration of high concentrations of amorphous hydrated alumina unfavourably influences resistance to tuberculosis. While this result has not yet been reported for metallic aluminium, caution in the application of all aluminium therapy to human beings is recommended.
4. The use of aluminium might appear as an easy short-cut to healthful working conditions, thus saving large expenditures for ventilation and other control methods. Actually there is no substitute for the accepted methods of dust control.
5. If industry indiscriminately treats all employees with aluminium dust there may be aggravation of tuberculosis or other pulmonary conditions.
6. The *therapeutic* use of aluminium in man appears to relieve symptoms in a very small number of cases in which silicosis develops rapidly. Experience in some groups is more favourable than in others.
7. In view of these considerations it is recommended that the general application of aluminium therapy in industry be delayed until adequately and impartially controlled clinical observation demonstrates its effectiveness in preventing or alleviating silicosis in man. In the meantime, there should be no slackening in the control measures that have been found effective in reducing the incidence of dust diseases in industry.

We agree heartily with this opinion and repeat that the "results of treatment and prevention of silicosis by the aluminium method, while suggestive, are not yet convincing, and much more work by independent and untrammelled observers is needed to establish its efficacy." We hope too that the freedom of this country from the effects of the Canadian patent will not result in the indiscriminate establishment of aluminium inhalation chambers at factories or other places where there is risk of silicosis. The only established method of preventing the disease is by seeing that workers do not breathe the dust of free silica.

FATE OF THE NERVE HOMOGRAFT

TRIALS by Seddon and Holmes [1] of nerve homografts for bridging gaps in injured peripheral nerves indicate that, despite its success in cats, rabbits, and monkeys,[2] the method is ineffective in man. Barnes and his colleagues [3] have also made a careful investigation of homografts in 8 cases of peripheral-nerve injury where the gap between the divided ends of the nerve could not be bridged by any other method; in no case was there any recovery of neural function. At varying intervals after insertion, when it was apparent that no recovery was occurring, the wound was explored and the graft inspected. In 3 cases the graft was removed and studied histologically 140, 355, and 904 days after insertion. In all 3 cases regenerating nerve-fibres crossed the suture line and penetrated the graft for varying distances, the greatest being 25 mm. In the graft there was necrosis of the fascicles and some fibrous replacement, the extent of which appeared to depend on the time that the graft had been in place; in the third case, examined at 904 days after insertion, there was dense fibrous tissue and no evidence of the original graft elements.

Barnes and colleagues point out that the reaction to a homograft differs fundamentally from the reaction to an autograft. The fibrous replacement of a homograft appears to be due to a reaction of the host's tissues; with an autograft the architectural characteristics of the graft are maintained, and fibrosis results from the proliferation of its connective-tissue elements. Why a homograft undergoes necrosis and fibrous replacement is still uncertain; Barnes and colleagues suggest that it is the result of "active acquired immunity"—a view originally expressed by Gibson and Medawar [4] in relation to skin homografts. Seddon and Holmes think that where the gap is short, as in the rabbit, the tissue reaction may not occur until outgrowing fibres have reached the peripheral stump, and that in man, where the gap may be long, the immune reaction attains its greatest intensity long before the fibres have had time to traverse the gap.

Until more is known about the mechanism and control of the host's acquired immunity, the nerve homograft will find no place in the surgery of peripheral-nerve injuries.

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2. Goldman, S. F., Markham, M. J. *J. clin. Endocrin.* 1942, **2**, 237. McGavack, T. H. *Ibid*, 1943, **3**, 71.
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4. *Lancet*, 1945, i, 441.
5. *J. Amer. med. Ass.* 1946, **130**, 1223.

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Reconstruction

HEALTH EDUCATION
ITS PROBLEMS AND METHODS *

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HEALTH education is a comparatively new subject. It has not yet been formulated in doctrine and pedagogic methods, as has been done with the older disciplines, such as botany and chemistry. To say this is not to disregard the work of those devoted medical men and administrators, such as Heberden, Fothergill, Smellie, Snow, and Chadwick and Simon, who laid the basis of scientific hygiene and gave it practical expression in public-health legislation.

The labours of the early hygienists involved convincing the public so completely that their discoveries were correct that the result was a general demand for legislative action and an acceptance of the laws when they were made. This meant instruction in the requirements for health, and it is the democratic method. But a glance at the history of preventive medicine or hygiene in modern times is enough to show us the main grounds for the claim that health education is a new subject.

The preoccupation of hygiene is with the prevention of disease—and very properly so—while the preoccupation of the new health education is with the promotion of health. The difference is that between a negative and a positive point of view. It is true that health education could not have developed as an idea without the prior creation of a firm foundation of preventive medicine, but it is an extension from the older concepts of the hygienists and sanitarians, and it has its separate contribution to make to national welfare.

The time seems ripe to attempt at least an elementary analysis of the general concept and to formulate principles for its further development. The following views are presented as no more than a hypothesis upon which a thesis may later be made. They are far from complete, but their purpose will be accomplished if they only act as catalysts to stimulate discussion among other workers in the field.

DEFINITION

It is of first importance in any discussion to be definite about the meaning of the terms used; so we must make a semantic examination of the word "health." This is not easy, for health is a state of being and, as a biological phenomenon, is in a continual condition of flux. Some time ago I looked up the definition of health in all the dictionaries and textbooks at hand, and could not find a single definition which satisfied the criteria laid down in formal logic. For example, to say that health is "wholeness or soundness of body and mind" does not really take one any further. At last it appeared that the method of classical logic was inadequate to supply the required answer. It was necessary to apply the logic of the continuum as, for example, used by Bogoslovsky.

For the purposes of this dynamic logic we will postulate that we can only consider health by also considering its opposite, disease. This pair of contrasting concepts may be regarded as opposite poles joined by a line along which we can measure the distance of any point from health at the one end, or from disease at the other. Any scale of gradations can be chosen. This is what is meant by a logical continuum. It is not a far step to see that the ultimate of disease is death and (applying the method of contrasting opposites) the ultimate meaning of health is life in the fullest and most complete and perfect sense of the word.

But a complication must be added if the model is to be adequate. Health and disease are not a simple pair of contrasting opposites like heat and cold. They are made up of immense numbers of components involving the body, the mind, and the spirit. Thus the imaginary line of the continuum becomes a rope of innumerable strands. At first sight this may seem a tortuous and perhaps pointless piece of speculation, but it does provide a basic model on which to found the reasoned structure of the principles of health education. We cannot indeed escape the necessity for such a model, and it is surely not contentious to hold that, if real advances in this subject are to be made, the pragmatic method, which has served its part, must be replaced by sound first principles.

Health, then, is a state which can be measured. In practice it is quite common to find approximate measurements being made. The medical examination of Service recruits, the much more exacting annual flying board for pilots, the life-assurance examination, and mass nutritional surveys are all examples of such approximations. These would all appear crude if compared to the total tests and measurements which modern medicine and psychology could apply, were there sufficient time and staff to do it. But they are enough for their especial purposes.

If a population large enough to give statistical significance is examined by such methods, a norm or average can be established which is a measure of the so-called "normal" health of the group within the limits of the measurements. But this is not to say that such a normal is the *best* or even a proper state of health for such a population. It is hardly necessary to point out that any such standard norm for a group selected from the British or any other people would fall far below the norm which could possibly be attained by attention to the rules of healthy living, good dentistry, complete nutrition, individual education in place of conveyor-belt methods, and so on. This is still true despite the enormous betterment in national health and fitness, expectation of life, stature, and the like, which have been brought about by preventive medicine in recent years—and which, we may well be proud to say, continued to improve during the war.

THE FIRST BASIC PRINCIPLE

It can be postulated, then, that such a norm of health exists for any population, and any deviation below this norm can be called negative, any deviation above, positive. The validity of this concept is demonstrated further by applying to the measurements a Gaussian curve, or indeed a frequency-distribution surface, although I shall not here extend this argument. But in the doctrine of positive health we have the first basic principle which is the essence of the new attitude in health education. It is that health is more than just the state of not being ill or of having no complaints or disabilities; moreover "ordinary" health can be improved, though preventive medicine alone is not enough. The idea of positive health indeed points the way to constant improvement. The fullest use and enjoyment of life is only possible through the fullest use and enjoyment of health. This is at once true of body, mind, and spirit, which leads to the second basic principle of sound health education.

THE SECOND

This is the principle of holism, which I have found best expounded in that most important book *Holism and Evolution*, by General Smuts. To put it in the simplest way, if we talk about man in the physical sense, everyone will agree they understand what is meant; but if we ask whether the term "man" includes

* A Chadwick lecture given in London on Oct. 30, 1945.

his mind, or still more his soul, the argument starts. Yet from the holistic point of view we must regard man as a triad of body, mind, and spirit, just as psychologists (of the classical school at least) treat the mind as a triad of will, emotions, and intellect. But these are coexistent and interdependent. They cannot be separated one from the other except for dialectic convenience. They are not autarkic entities, for this would deny the principle of solidarity. Similarly, a study of anatomy without some physiology, especially neurophysiology, would be completely meaningless; while physiology could not be studied at all without at least an elementary knowledge of anatomy, for structure and function are inseparably related. Taking this circle method of categorising one stage further, the life of man could be described as a complex of the vegetative, motor, intellectual, moral, and reproductive—and these merge at some points. Part of the reproductive life of man is vegetative, part of it is concerned with morals and so on.

The main point is that, while we admittedly sectionalise knowledge and observations, this is only a matter of convenience, a sort of intellectual shorthand. "Separate" sciences are really closely enmeshed together. Advances in one produce alterations in the others, and there is a fluid equilibrium between them. So, too, the health of man is a whole thing and conterminous with his life. In studying it this should always be remembered, though commonly it is disregarded. For example, there is the type of fallacy we may call unitarian, such as is held by the faddist who has a diet cure for all ailments, or the person who treats every ill as imaginary, the so-called Christian Scientist.

It is necessary, then, for health education to be concerned with more than the inculcation of habits of cleanliness, temperance, exercise, and the like. The old saw "*mens sana in corpore sano*" has its corollary, "*corpus sanum in mente sana.*" Equally it must be remembered that the moral outlook is intimately connected with the health of both body and mind.

THE THIRD

The third principle of health education is not easy to name satisfactorily, but for present purposes we may call it the principle of motive or aim. It is designed to provide the force or energy for carrying out whatever procedures may be necessary to obtain health. The principle shows that in planning health education it is not sufficient to instruct people how to improve their personal or community health. It is necessary at the same time to convince them that it is really worth paying the price in effort, time, and perhaps money to obtain these benefits. This may at first sight appear so obvious as to be out of place in such a discussion, but unfortunately this is not so. Ask anyone if they want to be healthy, and the unhesitating reply is that they do. If this question is followed by a supplementary query about what they are now doing to promote their health, the answer is seldom so prompt.

It is true that some people will reply that they brush their teeth after meals and take open-air exercises when they can, and so on, and, in an occasional instance, if one has chanced on a faddist such an inquiry may open floodgates of enthusiasm. But only an insignificant proportion of the population make any effort to improve their physical and mental health and efficiency, unless illness has brought home to them the handicaps of disease.

Health education, then, must not only instruct but also convince people that health is worth having. The fact is obvious, as everyone will admit; but it is one thing to accept the validity of a general statement intellectually, and quite another to accept it emotionally as well. If our instruction is to produce the best results, it must create converts to the idea and imbue them with the fervour usually associated with the phenomenon of conversion. The formula then is:

(1) health is worth having,
(2) ordinary health can be improved by the expenditure of effort, and
(3) the expenditure of this effort pays real dividends.

I do not apologise for hammering at this point, obvious though it may seem. It is a common enough experience for people to be fired by the enthusiasm of a physical-culture expert on the radio, or perhaps a writer in a women's paper who promises beauty, charm, and a handsome husband for, say, five minutes' deep breathing a day. The course of exercises or massage or whatever it may be is started at once and kept up with fervour for at least three days. How reminiscent this is of the parable of the seed that fell on stony ground.

THE FOURTH

The fourth principle of health education is that of use. We must use our faculties, or they gradually fade. The Indian fakir may hold his arm above his head for years, and the muscles atrophy and the joints ankylose so that he cannot lower it even should he wish. A small boy may attain some competence at the piano in three or four years and then give it up, only to regret as an adult that he is just able to pick out "Swanee River" with one finger. These are examples of atrophy and disuse.

Few people develop and use their physical and mental powers in the most efficient way, and improvement is nearly always possible. The fact that athletes train specially before a big event is evidence of this. One can learn to walk a tightrope, or perform the difficult gyrations of the ballet dancer, if one sets one's mind to it. This does not mean that everyone should practice acrobatics or aspire to dance "Petroushka." It is instanced as an example of how physical capacities can be expanded (naturally, variations in physical and mental endowments make some people more fitted for a given activity than others). It is equally true of the mental faculties, whether one tackles the solution of mathematical problems or the harder task of swaying the House of Commons by impassioned eloquence. A combination of application and practice will improve one's facilities for dealing with either contingency.

This principle can be taken a step further, for it must be applied equally to the soul. Admittedly this is an unsatisfactory terminology, but the point to be made is that no person is completely healthy unless he has a sound moral discipline. Whether this be entirely from without, or from the wells of a man's own conscience, or a combination of the two, is irrelevant. The essence of the matter is that this moral discipline must exist. It has been remarked with surprise that during the war there was a decrease in neuroses, and the anticipated increase of mental ill health did not develop. Though it is easy to fall into the fallacy of post hoc, propter hoc, I am convinced that this reduction sprang from the same origin as did both the increase in the obvious unselfishness of people, and the warmer spirit of neighbourliness which was experienced especially in the bombed areas. The stern necessities of the time imposed a stronger moral discipline, and it is my opinion that this brought with it an improvement in mental and perhaps also physical health.

An obvious example of the value of moral discipline is in the realm of sex, where control is particularly difficult because of the deep roots of the instinct, and because of the repressions which have followed inevitably from the development of our culture. No-one of experience will deny that the sex aspects of life affect health in many ways, and equally those experienced in dealing with these problems will agree that the appeal to expediency is inadequate to determine healthy sex behaviour.

The rôle of moral discipline cannot be neglected; whether it is religious or strictly ethical is a matter for the individual about which one has no right to be dogmatic. It is, however, perfectly legitimate to insist not only that it is important but also that it is essential.

METHODS OF PRESENTATION

Despite an extensive search I have been unable to find any study which takes a comprehensive view of the methods of health education. The nearest is a book by Williams and Shaw entitled *Methods and Materials of Health Education* (New York, 1937), but it does not go into the detail which seems desirable. We need an evaluation of the relative effectiveness of the different methods of propaganda, from lectures to health weeks, particularly in respect of their impact on different age-groups or social groups and their applicability to the type of message which has to be given. A study of this nature is urgently needed. Techniques exist for carrying out such an investigation and have been developed widely in America in the field of merchandising research. Some information of this kind has been collected in relation to the Ministry of Health's successful campaign for diphtheria immunisation, but we need more general research.

A system of classification should be the first step in planning a campaign of health education, whether it be extensive or intensive. Different systems of classification may be used; for example, we may divide the problem into one of school and adult education. The former falls into three subdivisions of infant, elementary, and secondary, and university and technical college groups. The adult education would subdivide into general, comprising city- or nation-wide campaigns, and special, covering the instruction of small groups such as St. John ambulance detachments, Women's Institutes, or patients attending a maternity and child-welfare centre. A second type of classification, parallel with the first, categorises the methods of instruction: oral (lectures, discussions, radio), visual (posters, advertisements, pamphlets, cinema, and exhibitions), and a comprehensive class of "health weeks." One might include in this list the provision of amenities, such as swimming-baths, gymnasia, and sports grounds; but the implications of this are wider than the strict field of health education. A third system of classification, which would be useful in devising a scheme for health education, would be to enumerate the people and organisations involved in conveying the message—doctors, teachers, sanitarians, societies, and associations of various kinds.[1]

In the absence of an analysis of actual observations an opinion carries little authority; but, if only to invite contradiction, I say that the oral approach is more effective in adult education than is the visual; radio and lectures appear more effective instruments than do advertisements or posters. The success of Sir Wilson Jameson and of Dr. Charles Hill on the air has been outstanding. The position of the cinema, however, is anomalous, because it combines both types of instruction, yet in this medium the visual element predominates over the spoken. There are great potentialities in the development of health-propaganda films, but the standard of technical achievement in this field has not advanced so quickly as it might well have done. Admittedly the techniques are in the difficult stage of formulation, but with two exceptions the standard of health films I have seen is poor. The main reason appears to be that they have been made for non-commercial purposes under the direction of a committee of some society or association.

If the health film is to have an effective future, its structure must be regarded far more as a matter for professionals than has been the case in the past.

1. See Kennedy, W. P. *Hlth Educ. J.* 1945, **3**, 60.

THREE LINES OF ACTION

There are three practical lines of action which are essential for making the most of health education.

The first is the provision, especially in the small centres of population, of more swimming-baths, gymnasia, and sports facilities. These are the workshops of health. In a recent visit to Germany I was impressed again by the way in which small towns were supplied with these amenities. Some hymn-writer once complained that it was not right that the devil should have all the best tunes. Equally we should not allow our fascist enemies to be able to claim that in such ways they did more for the people's health than does the stronghold of democracy.

The second point is the necessity for training more teachers in biological science and methods. Hygiene is an obligatory course in American schools, and many feel that this country lags deplorably in neglecting this study. But, unless fully trained teachers with a biological outlook are available, it is futile to introduce the subject. More harm than good would result if the ordinary teachers were given a *Reader in Hygiene* to go through with their classes. Prof. Lancelot Hogben has more than once put forward the demand that the universities' biological departments should review their instruction and train more students in general biology. The aim would be dual—to provide more biology teachers for schools, and to give all university students some knowledge of the science of life as an integral and essential part of cultural education. The educationist who would disagree with this proposal would be indeed a bold man.

Finally, there is no doubt in my mind that the churches should be coördinated more closely with the aims of national health. It has been shown that, from the holistic point of view, one must consider the moral aspect of human life with the physical and mental, and the point needs no amplification. It need only be added that the community group of the church congregation provides an admirable nucleus for concerted action. People of like conviction associate together easily, and the connexion with the church is advantageous in many ways. Within the church and outside it many voices are growing increasingly insistent that the church should pay a more vital contribution to the nation's life. Participation in health education is not merely another way in which this could be done. I submit that it is an essential duty for the churches to interest themselves in this matter, for life and health are a single whole, and no health education can be complete unless it includes in its ambit the physical, mental, and the moral activities of man.

Obituary

KARL NARBESHUBER

M.D.

Obermedizinalrat Karl Narbeshuber, who has died at Gmunden, Austria, in his 79th year, was a former president of the Austrian Medical Association. A true Austrian and a friend of the British, he was no doubt a marked man in the eyes of the Nazis, and no sooner did the Anschluss come than they took their revenge, treating him with cruelty and indignity. Hauled out of his bed on the first night he was thrown into prison, his life was threatened, his head and beard shaved, and he was deprived of his civil rights, property, and practice, and separated from his family. When Austria was freed he returned to his native town of Gmunden and once more devoted himself to his duties as Stadtarzt. But age and the privations of war had affected his health and he died on August 28.

A lovable man of wide learning and an exceptional linguist Dr. Narbeshuber did much for the British prisoners during the first world war. He often visited London, and many English doctors have enjoyed his agreeable hospitality in Austria.

J. A. H. B.

Special Articles

BRITISH-SWISS MEDICAL CONFERENCE

THE conference organised by the Swiss Academy of Medical Sciences and the Royal Society of Medicine opened in the hall of the ethnological museum of the University of Basle on Sept. 16. Of the 280 doctors present more than 150 had come from the United Kingdom. Prof. A. GIGON, secretary-general of the academy, who first proposed a conference of this kind, introduced Prof. KARL WEGELIN, the academy's president, who said that the aim, as at last year's Franco-Swiss conference in Geneva, was to foster international relations. Welcoming the British visitors he recalled the ancient political and cultural bonds between the two countries which had remained unbroken since the seventh century. For Switzerland he expressed satisfaction at the end of the intellectual isolation enforced by the war. Bundesrat ETTER, on behalf of the Swiss Federal Council, paid a tribute to British tenacity in the war and recalled what had been done since then to strengthen the links between his country and Britain. He mentioned in particular Switzerland's help in the difficult post-war period—for example, she had invited 400 British children to stay in the country. Other speakers at the opening meeting were Mr. T. M. SNOW, the British minister in Berne, Monsieur PAUL RUEGGER, the Swiss minister in London, Prof. EDGAR BONJOUR, rector of Basle University, Regierungsrat Dr. MIVILLE, representing the authorities of Basle, and Lord AMULREE, representing the Minister of Health, who recalled the world's debt to Switzerland for the International Red Cross and for her fine conception of political liberty. Prof. J. B. HUNTER, Prof. J. H. DIBLE, and Dr. ALAN DRURY, F.R.S., of the British organising committee, emphasised the need for collaboration between the two countries and expressed thanks for Swiss hospitality.

After the formal opening Sir HUGH CAIRNS read a paper in German on Investigations on Head Injuries in Britain during the Second World War. Other papers were given in English with a simultaneous translation into German.

The afternoon session, under the chairmanship of Sir LEONARD PARSONS, was opened by Prof. LUZIUS RUEDI, who spoke on Acoustic Trauma, of which he distinguished four types which could be classified according to loss of function into two groups: the first group comprised noise trauma, report trauma, and certain blunt head injuries, and the second explosive trauma. He went on to describe an ear defender which he had designed, containing a resonator; its effect was to damp down frequencies between 2000 and 7000 cycles per second without seriously interfering with hearing. Repeated experiments had proved the complete efficiency of this defender which he suggested could be usefully applied in industry.

CIRCULATORY FAILURE

Dr. JOHN MCMICHAEL (London) said that the old "back-pressure" view of cardiac failure was based on the mistaken idea that the veins are inert tubes. Thirty years ago Starling showed, by means of his heart-lung preparation in the dog, that the most important single factor determining cardiac output is the venous inflow; up to a certain point elongation of the cardiac muscle increases its capacity for work, but beyond that point output falls. Harrison, in 1935, suggested that the output of the heart might not be very much lowered in heart failure, and in 1938 Dr. McMichael reached much the same conclusion. In the early stages of failure the resting output may not be significantly lowered, but the capacity to increase output is diminished. Only later does the output fall, and then usually to not less than half the normal resting value. The measurement of right auricular pressure by a ureteric catheter, first practised by Cournand in New York, has proved a safe and effective means of estimating cardiac output and filling pressure, and has been employed without mishap in over 500 cases by Dr. McMichael and his colleagues. The new method has confirmed that in the ordinary forms of heart disease, from valvular defects or hypertension, the resting output is maintained and the first rise of venous pressure takes place when the output is only slightly below the normal average. This rise is thus not the back-pressure effect of a falling output but a compensatory mechanism to maintain the optimum output as long as possible. In the later stages of failure the venous pressure is considerably raised and the cardiac output reduced to about 3 litres a minute. In the failing heart digitalis reduces the venous pressure and increases the cardiac output, though in the normal heart the reduction of venous pressure is accompanied by a fall in output. In auricular fibrillation rate-reduction is not of primary therapeutic importance; the major benefits of digitalis are achieved by reducing the venous pressure, and a mechanical reduction of venous pressure will produce as great an improvement as digitalis.

Discussing the conditions in which a high cardiac output is required to oxygenate the tissues, Dr. McMichael said that Sharpey-Schafer has shown that when the hæmoglobin falls below 30% the cardiac output may need to be doubled and this can be accomplished only by a high venous pressure and a simultaneous increase of pulse-rate. At this stage the patient's condition is precarious, and venous congestion and œdema may be pronounced. Digitalis will lower venous pressure and cardiac output, so reducing the supply of oxygen to the tissues and making the patient worse; transfusion, on the other hand, will raise the right auricular pressure but reduce the cardiac output, and this may result in death from heart failure, owing to pulmonary œdema. If transfusion is necessary to save such a patient's life it must be given slowly, possibly combined with digitalis. The danger lies in raising the venous pressure, which is set at the optimal level, so the anæmic patient should be treated with liver or iron, as far as possible avoiding transfusion. In cor pulmonale the output is usually high for a reason similar to that in anæmia—i.e., the available oxygen in the arterial blood is considerably reduced. Here digitalis is not only useless but dangerous. High-output failure has recently been observed with generalised Paget's disease, in a man of 66. The blood-flow through the normal skeleton, measured by Prof. O. G. Edholm with the plethysmograph, is about 100 c.cm. a minute, whereas in Paget's disease the total skeletal flow is between 3 and 4 litres a minute. The circulatory state is thus a result of the enormous increase in skeletal circulation.

The classical pre-war conception of shock has been modified; the view that blood is pooled or trapped in some part of the vascular system has been discarded. Hæmorrhage is the major factor in war wounds; hæmoconcentration does not occur except in burns and crush injuries and some types of abdominal injury. Wallace and Sharpey-Schafer have shown that, after the loss of 1000–1200 c.cm. of blood, full blood-dilution is not attained for some 40 hours. Blood-volume may be reduced in chronic anæmia, and this state is associated with an increased cardiac output. In hæmorrhage the pressure falls in the great veins, the cardiac output falls, the pulse-rate is accelerated, and the peripheral resistance is increased. After this first phase there may be a vasovagal reaction, owing to sudden vasodilatation in the arterioles of the skeletal musculature, with reduction in pulse-rate and blood-pressure. Recovery from this reaction, whose purpose is obscure, may be hastened by 'Methedrine.' D. W. Richards has shown that in the average case of shock the cardiac output seldom falls below 3 litres a minute; the deep fall in blood-pressure is due mostly to lack of vasoconstriction, for which hitherto ill-defined factors in addition to the vasovagal reaction may be responsible. Oxygen is worthless as a means of overcoming the defects of sluggish blood-flow in shock. Recent observations suggest that in shock with overwhelming infections the regulation of venomotor tone may be impaired and a suprarenal cortical mechanism may be involved somewhere in the chain of events. Other types of non-surgical shock—e.g., the collapse of diabetic coma and coronary thrombosis—should be approached by the new methods.

Observation suggests that peripheral vasodilatation and a high cardiac output are present in the early stages of diabetic acidosis.

ŒSTROGENS IN CANCER

Prof. E. C. DODDS (London) recalled the steps which led to the synthesis of stilbœstrol, hexœstrol, and dienœstrol as the result of collaboration between Sir Robert Robinson and his colleagues in Oxford and Professor Dodds's own department at the Middlesex Hospital. Animal experiments have shown that these three substances can replace all the known activities of the naturally occurring œstrogens. They have now been widely used clinically for the treatment of menopausal symptoms, amenorrhœa, and dysmenorrhœa, and for the termination of lactation. Their great advantage lies in the fact that they are active by mouth and cheap to produce. The possibility of using œstrogens in the treatment of carcinoma of the prostate was first mooted by Huggins and his colleagues in 1941. Castration for the relief of prostatic carcinoma was originally advocated by John Hunter, who observed that the gland would shrink when the testes were removed. However, the operation had so many objections from the patient's point of view that it was rarely performed. In the four years from 1939 to 1943 Huggins treated 69 patients with advanced carcinoma of the prostate by castration combined with the administration of œstrogens. The synthetic œstrogens were found to be perfectly suitable for this purpose. Œstrogens were administered to patients who did not obtain a long remission of their symptoms after castration and to those in which the serum-level of acid phosphatase, though considerably reduced, did not drop to normal. In most cases the treatment relieved pain and frequency of micturition, and improved the patient's general condition; in some cases there was a reduction in size of the primary tumour and the secondary deposits. Other workers in Britain and America have treated carcinoma of the prostate with œstrogens alone and have confirmed Huggins's findings. About 95% of cases respond in some degree, but the improvement is not always maintained and many cases will have to be classed eventually as delayed failures. No serious worker in this field would claim that synthetic œstrogens will cure carcinoma of the prostate, since if treatment is interrupted the disease begins to progress again as before. But the treatment is more than mere palliation; the benefit obtained, even if only temporary, constitutes a definite arrest if not a regression of the disease. Side-effects reported from the administration of œstrogens include swelling, tenderness, or soreness of the breasts, nausea, vomiting, and occasionally soreness of the testes. As a rule these effects are not serious enough to require cessation of therapy and they are generally far outweighed by the benefits obtained. The dosage of synthetic œstrogens is 1 to 5 mg. per day.

The exact mode of action of œstrogens in carcinoma of the prostate has still to be worked out. The changes in the serum-level of acid phosphatase indicate that the metabolism of the malignant cells is interfered with. This enzyme is present in large quantities as a secondary sexual characteristic in the adult prostate, and its presence depends on the activity of androgens. The serum-level of acid phosphatase was shown in 1936 to be abnormally increased in some men with metastatic carcinoma of the prostate, and in 1941, Huggins demonstrated that the level can be reduced either by orchidectomy or by the administration of œstrogens. He also pointed out that in many cases a malignant prostatic tumour is due to hypertrophy of adult epithelial cells which are acted on by androgens. He therefore deduced that if the activity of androgens could be inhibited, either by removal of the testes or by the administration of œstrogens, then the growth of these cells would be interfered with and the tumour and possibly the secondaries would regress. A possible explanation for the occasional failure of œstrogen therapy is that these tumours may be due to the malignant development of other cells over which androgens have no control. A further explanation is the existence of an extragonadal source of androgens, possibly in the adrenal cortex. It is still doubtful whether, in addition to the inhibition of androgens, the synthetic œstrogens exert some definite controlling influence on the malignant cells themselves. Biopsies on cases before and after treatment with stilbœstrol have revealed characteristic changes in the cells, different from those caused by irradiation.

Until the action of synthetic œstrogens in prostatic carcinoma is explained it is impossible to forecast the likelihood of success in carcinomas of other parts. Some success has been obtained in carcinoma of the breast—of 168 cases reported by various workers, 41 were improved, and in 6 the improvement was "spectacular"—and again the question arises whether the improvement is due to a change in the endocrine balance or to the specific action of the drug on a certain type of cell. A committee has been set up by the Royal Society of Medicine and the British Empire Cancer Campaign to investigate a large number of cases of carcinoma treated with synthetic œstrogens and to follow them up over a long period. The report of this committee cannot appear for some years, but it is hoped that it will yield valuable information on the type of case most likely to be benefited and the reasons why such benefit is to be expected.

A VISIT TO FINLAND

W. P. GURASSA M.B. Lond. F. L. JACKSON M.B. Lond.

WHILE on a visit to Stockholm, in March of this year, we were assisted by the British Council to visit Helsinki, so that we could see something of the medical work there and meet some of the students and young physicians.

The journey across the Baltic was an entirely new experience. The sea was frozen almost all the way over, so that even with the assistance of icebreakers progress was slow. Several times the ship jammed in the ice and we arrived at Abo many hours late. But the weather was wonderful—cold and crisp with brilliant sunshine. This, with the spectacle of myriads of tiny islands, made the journey a delight.

The train journey to Helsinki from Abo was not so pleasant. We left Abo early in the morning, without any breakfast. Finnish restaurant food is bad. We were offered some tiny scraps of rye bread with a little fish roe on them, but could not face them, so we sustained ourselves with some sugar which we had brought from Sweden. Later, when the train stopped for a quarter of an hour at a station we ate some potato, which in our then famished state seemed extremely good.

At Helsinki we were met by the assistant professor of radiology from the General Hospital and two students, one of whom was a Swede who spoke fluent English and acted as our guide during our short stay. We were taken immediately to see Professor Holsti, the professor of internal medicine, who entertained us generously, both at the hospital and at his home. He spoke excellent English, having studied for some years in America, and in true American fashion had prepared for us a very full programme designed to show us as much as possible.

At 8.30 on the first morning we attended the radiology department, where we saw some films showing opacities in the lungs of patients with typhus, early in the attack before the appearance of the rash; these opacities are fleeting, and should be sought specifically. Another interesting film of the chest showed the characteristic ground-glass appearance of asbestosis. We were impressed by the quality of the work and the enthusiasm of the staff.

Next we were conducted round the Polyclinic by Professor Holsti. We saw several cases of Buerger's disease, one in a patient of 17 years, and were told that it is common in Finland. Another condition of which we heard much was dibothriocephalus infestation, and we were each presented with specimens of the worms to bring back to England. This, however, was probably unnecessary, since after eating some of the

fish obtainable in Finland—raw—we probably now harbour sufficient of the parasites ourselves! The morning concluded with visits to special departments for the treatment of cancer, chiefly by radiotherapy, and the newly formed allergy clinic under the direction of Dr. Erikson-Lihr, the first of its kind in Finland.

A national scourge in Finland is tuberculosis, the annual mortality-rate being 17 per 10,000. Dr. Severi Savonen, who is in charge of the tuberculosis services in Finland, told us that the war had brought a halt to the previous decline in the mortality-rate. As elsewhere in Scandinavia, B.C.G. inoculation is widely used, on a voluntary basis. Infants are inoculated, where possible, in the obstetric clinics soon after birth, and special homes are provided for the isolation of infants from open cases. Savonen believes that inoculation produces excellent results and does not give rise to ill effects. At Christmas time, money for anti-tuberculosis work is raised by the sale of coloured stamps which are stuck on the letters in addition to postage stamps.

Later, Professor Holsti initiated us into the mysteries of the Finnish steam bath (sauna), which is widely acclaimed as responsible for the toughness of the Finns, endowing them with a spirit of unbounded energy and stubborn determination (sisu). Many people have their own steam baths, and Professor Holsti's was in a rough wooden shack in his garden. In the corner burned a fire, and water drawn from a near-by trough was cast on to it so that clouds of steam billowed into the room. It is the custom to lie outstretched on wooden shelves and perspire freely. From time to time one washes with cold water, or beats oneself with a sheaf of leafy twigs which have been dipped in cold water. Then the heat increases. When one feels sufficiently relaxed one runs outside and rolls in the cold snow for a minute or two. This closes the skin vessels and facilitates drying. We dried without this severe preliminary act, but watched amazed while the professor's son and our Swedish guide performed it.

Next morning we visited the neuropsychiatric institute at Lappvik, where we were conducted round the wards by Dr. von Bagh who addressed us in French. This institute is over 100 years old, but its construction is good. The wards and corridors are light and airy, and, as in most Scandinavian clinics, there are few patients in each room (3–6). We saw many cases of disseminated sclerosis, and it was claimed that fairly good temporary results were obtained by pyretotherapy. Prefrontal leucotomy has recently been introduced in Finland, being used particularly for the treatment of chronic obsessional states. We saw the first case so treated at this hospital.

We learnt something of the poor food situation both from personal experience and from accounts given to us by medical men. Bread is of the poorest quality, dark, coarse, and bitter, and is strictly rationed. Milk is rationed to 600 c.cm. per person per week, butter to 500 grammes a month, and no other fat is obtainable. Meat is rarely seen. The staple diet consists of potato, bread, and fish. There is, however, a large black market in food for those who can afford it. Most of the people look thin and ill clad, and Helsinki, once proudly called the "White City of the North," shows signs of neglect and dilapidation.

On our last evening we were entertained to dinner by the Medical Association. We gave them some account of our medical studies in England, and many of them expressed a desire to visit England later on. We have brought back many pleasant memories of Finnish hospitality.

The Finns look with confidence and determination to the future—their "sisu" is no myth—and they will strive hard to restore prosperity to their land.

ARMY REFRESHER COURSES IN GERMANY

AT the end of the late war the university clinic at Göttingen, with its 2000 beds, was found to contain a remarkable selection of clinical material. In the ensuing months Major J. M. McFie and Major H. C. McLaren, the medical and surgical specialists attached to a nearby casualty clearing station, paid repeated visits to the clinic, with which they were so impressed that they suggested that refresher courses should be held there for medical officers, particularly those on general duty; such courses, they thought, might encourage post-graduate study. The proposal was warmly supported by the director of medical services, and the consulting physician and surgeon, 21 Army Group; and the first course was held from Nov. 18 to 24, under the direction of Major McLaren, who was later succeeded by Captain P. E. H. Jones.

CLINICAL TEACHING

The clinical teaching was given by the university staff. Few of these spoke fluent English and most officers had difficulty in following explanations in German; direct interpretation was tedious and sometimes misleading. A German-speaking specialist officer, R.A.M.C., was therefore appointed chairman-interpreter. Case-notes were abstracted and translated into English, and the translation was circulated with the original notes in German, which, with even slight knowledge of the language, provided a good deal of information.

Cases were chosen with straightforward clinical signs to illustrate common disorders. In the medical and surgical clinics each officer was allotted a long case, with twenty minutes for examination, followed by five minutes in which he summarised his findings before the whole class, and a further five minutes for the professor's comments. Short cases were also shown. Midwifery and gynæcology were handled on much the same lines. Post-mortem demonstrations were included; and for a short time each day the Germans demonstrated their own recent advances. The morning break and a further period at the end of the day were used for discussion; time at the clinic was often saved by deferment of individual questions until these meetings.

The German method of teaching differs from the British. With the British method interest is sustained by the discussion of history, symptoms and signs, and differential diagnosis, and by the liability of anyone suddenly to be asked a question. By the German method the diagnosis is often given first and followed by a discourse in which the grounds for the diagnosis are discussed. Much the same results are achieved in the end by the two techniques. For the courses the British method was used.

OPEN LECTURES

The last afternoon was usually occupied with a lecture or demonstration by either the consulting physician or surgeon, or a medical officer with special knowledge of some subject. These were open lectures which might be attended by anyone, including sometimes nurses from the clinic; as many as 150 have been present. The arrangement that has proved most satisfactory has been for the lecturer to speak slowly and clearly in English, and for each listener to have a German translation in front of him. Experience has shown that translation of German case-notes into English is best undertaken by an Englishman, but that the German version of a lecture to be given in English should be made by a German.

Medical officers attending the clinic have had the chance of seeing German methods and of obtaining clinical instruction in aspects of medicine which during their service they had had little opportunity of studying. The reading of textbooks, which has been increasingly practised since the end of the war, has been given added impetus by these courses, which have been greatly appreciated; and the German staff has worked hard to make them successful. Seven courses have been held at Göttingen, and they are being continued at Hamburg, which is more readily accessible. In addition, courses in midwifery are being held for nursing officers. It is intended that these courses shall be retained as a permanent feature of training in the B.A.O.R.

In England Now

A Running Commentary by Peripatetic Correspondents

DURING the war one had either to "stay put" or to keep moving round the world at an enormous pace. After nearly four years of the former, I spent the later part of the war in almost incessant travel. I gather that we itinerants were generally spoken of as "swans"—i.e., creatures who flit aimlessly from place to place sticking their long necks out. One's journeys ("really necessary" or otherwise) were often brightened by unexpected meetings with old friends. For instance, when I arrived at a general hospital in North Africa the first officer I met greeted me by my christian name—much to my surprise, for I certainly did not recognise the prosperous, mature individual who spoke. I discovered that we had been new boys at the same prep. school together, and that he had changed inwardly a good deal less than in outward appearance. And the O.C. of the same hospital turned out to be our own family physician, a territorial with whom I had lost touch since his call-up in 1939.

Then there are the people one is always meeting. One eminent medical major-general has done even more "swanning" than I have. Within a period of eighteen months our orbits have touched, quite without premeditation, at Prestwick airport (he en route for the U.S.A.; I on my way home from Africa), London, Manchester, Colombo, Melbourne, Delhi, and finally back in London again. I am convinced that if I ever reach the North Pole I shall find him squatting there. Then there are the others that one just misses. I have been trying to meet one scientist for years, and have been within a week of him in every continent of the globe.

It is often impossible to avoid the use of such clichés as "it's a small world." I remember meeting one American major at a laboratory in the heart of the Rockies. A month later we met again, this time at Myitkyina, on the Irrawaddy, in Burma, after he had crossed the Atlantic and I had crossed the Pacific.

* * *

Yes, as I was saying when you cut me off on Sept. 7, the practitioner in the Medically Overcrowded Area (M.O.A.) is perhaps less like a vulture than like that aged man a-sitting on a gate, of whom the poet sang:

> I shook him well from side to side
> Until his face was blue.
> "Come, tell me how you live," I cried,
> "And what it is you do."

True, neither a Royal Commission nor anyone else has, in so many words, asked him; but there can be no doubt of the shaking. It continues with increasing violence and perhaps can be taken to imply the question. Anyhow by the time the cyanosis has reached ante-mortem intensity it will be hard to give an articulate and dispassionate reply. That hour is not far distant. Better try now.

The essential feature of a M.O.A.—at least of mine—is that although it contains a fairly intimate mixture of citizens of every social and economic class a good number are what is called "educated"; some have comfortable incomes and some have inherited that sane and comely fashion of living which made Maurois call the English gentleman "la type la plus sympathique du monde." The combination of all this with the famous medical overcrowding has an almost wholly beneficent effect on the quality of medical practice. Comparatively speaking there is time for good work, rewards for doing it, and effective penalties for not doing it. Our all-round competence is, I am sure, less than that of many of our colleagues in country towns, to whom I take my hat right off; we are not their equals in resourcefulness, nor, I suspect, in power of endurance; they would beat us hands down at surgery, and I judge that they are better at team-work—your typical M.O.A. doctor works alone—but there are provinces of medicine in which I believe we hold the field.

It is fashionable to assert that the whole profession takes little or no interest in personal preventive medicine; it never sees the healthy patient and seldom even the early symptom; its concern is solely with declared disease. How different things will be when we have health centres! Perhaps they will, but in the meantime all these things which the whole profession neglects to do it does in fact daily, hourly, and as a matter of course in the M.O.A.

To set aside half or three-quarters of an hour for discussion of Susan's aversion to food and Willie's to sleep, for the terminal or annual overhaul of three children returning to school; to determine whether or why Mr. Smith has grown thinner, or why Miss Jones has been coughing for four weeks; to give Mr. Brown the once-over because he hasn't seen a doctor for several years—all the variations on these and kindred themes make up, except in seasons of epidemic, a large proportion of our daily work.

Now I am far from asserting that this is indeed the medicine of the future. For the practitioner it is exacting, difficult, rather tedious, full of pitfalls, and not very rewarding either in cash or in things discovered or things prevented. It can never be a main fountain of health, and for the patient it has potentialities for ill as for good. But it is the medical reformer's white-headed boy, it is perhaps the chief characteristic product of the M.O.A., and when the reformer has had his way with us the M.O.A. and all its works will be gone. Forsooth, a pretty paradox! But each man kills the thing he loves; and perhaps reformers are no exception.

What else do we do? The doctor's daily job, with perhaps six hours over in the week to divide between reading, writing, committees and societies, the family, and the cultivation of a garden or an art. Six? Well, perhaps eight, and, being on good terms with our professional neighbours, we get a yearly holiday without importing a locum. What really attracts us to the spot? Not fortune-hunting, but, this excluded, it is anyone's guess. My own is that if we were examined the greatest common factor in our make-up would be a certain slowness—we are not quick thinkers or quick workers; we must have time. Unquestionably we are individualists, with the qualities and defects of that species. Probably most of us set rather a high value on the pleasant manners and way of life to which most of us have been brought up and prefer a small income in a place where our wives and children can enjoy these things to a large one where they cannot. We may believe, too, that we can do our best work where we are; and we may be right.

What of our patients—the citizens of the M.O.A.? Are they privileged? I think they are; but not, as the planners preach and possibly believe, by receiving some costly drugs or magic treatments denied to others. They have, and exercise, free choice of the most genuine sort; they reap the very real benefits of competition. Each of us knows that if he lets his patient down that patient can turn to his neighbour. It is very salutary knowledge. They enjoy the almost priceless boon of being able to ask for an appointment to discuss any matter in which they think we can help them. To extend this last benefit to "insured persons" without much more encouragement than any government of the last 35 years has given must seem to most people impracticable. It seems so to me; but most men do not readily divide themselves, no-one can stop the diffusion of excellence, and there can be no doubt that all the citizens of the M.O.A. have some share in the refreshing fruits of medical overcrowding.

Nor, I think, can diffusion stop there. So long as there is somewhere a standard of excellence, there will be a tendency everywhere to attain it; destroy the standard and the tendency must cease.

Perhaps our manner of practice in the M.O.A. has no excellence, but if it has look your last on it, for it is scheduled for demolition. The shaking or "softening-up" by gently persistent public detraction and by alternate promises of sweets and smacks is well advanced. On the Appointed Day all our patients, I suppose, become "panel patients" and we can take our choice. We can try to maintain our standards under the familiar conditions of government contract practice with this egregious addition, that whereas it must clearly be both illegal and wrong to take fees from our own patients it will be legal and, in the eyes of authority, positively meritorious to see other men's patients behind their backs, give them an "independent opinion," and lift a fee for it. The whole foundation, in fact, economic and ethical, of our manner of practice will on that day be *bouleversé*.

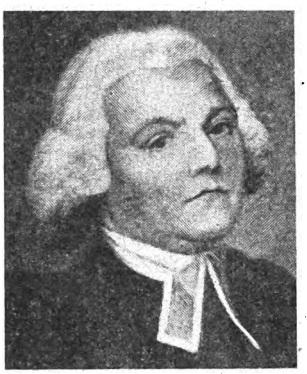
But we have a choice. We can reject the sweets, accept the smacks, and take, bow in hand, to the merry green wood, outlawed for sabotage. A grim choice.

But think of the M.U.A.—the Medically Undercrowded Area. So I will; and I will think of their houses. I am shocked at the inequality of housing. Some live in mansions, some in hovels; but I have a plan. On an appointed day all who live in houses better or worse than an approved middle shall be housed in prefabs. Then, all their dwellings being alike demolished, the specially good brick, stone, timber, and tiles of the mansions can be used to fortify and increase the stock from which the approved middling houses in which all shall hereafter live are to be built. When all are in them, there being none better all will have the best.

What? You do not like my plan? You cannot bear that a house architecturally good and beautiful should be destroyed? You think it is part of our common inheritance, that it has value as a pattern? You don't think the bricks and stone of the mansions will go very far? You think they will be scarcely detectable? Sentimental dreamer! Hide-bound Tory! Enemy of the People! Upholder of privilege! Fascist reactionary! *Bourgeois!*

* * *

As I was doing a locum near, I went on pilgrimage to Selborne. I met the vicar, who told me a story of Gilbert White (see portrait), who was a small and precise man. When he was a subproctor at Oxford he found an undergraduate lying drunk and naked in the street and next morning he lectured him but did not punish him because even in his cups he had folded his clothes neatly by his side.



I touched the limes White planted to hide the carnage of the butcher's shop, I trod reverently on his grandfather's grave in the chancel of the village church, I admired the window—except its garish top—put up to his memory, mosaiced with many birds, and then went out to his own grave in the churchyard. It was pleasantly untended, hawkbit flowered on it and there were two thriving colonies of red ants. He would have liked that. I let them sting me, striving at a molecular continuity and kinship. May the peace that comes from the things of the earth, which he got and gave—and gives—be with him still.

* * *

I wonder how many people are making full use of the results of war-time research to increase their comfort when on holiday in Britain. Our biting insects and mites may not be the vectors of disease (and anyhow this year's weather has not encouraged cold-blooded creatures to breed) but many a holiday has been ruined by midges, gnats, or harvest-mites. D.M.P., or dimethyl phthalate, was well known to the troops in south-east Asia and elsewhere as an insect repellent, but how many have thought of it at home? And many who have had to go through the whole drill of smearing their clothes with D.B.P. in scrub-typhus areas have never thought of doing anything like that when they are attacked by harvest-mites. Yet one can protect oneself pretty thoroughly from these creatures by smearing a couple of c.cm. (or should we say ml. ?) of either benzyl benzoate (any of the anti-scabies remedies containing it will do equally well), or of dibutyl phthalate on one's socks and perhaps round one's trouser bottoms. The remedy remains effective for several washes, so one application at the start of the harvest-mite season should do the trick.

HOSPITALS DAY.—This year hospitals day in London is to be Oct. 8. All who can help are asked to write at once to the appeal secretary of their local voluntary hospital, or to Lord Luke, chairman of Hospitals Day, 36, Kingsway, London, W.C.2.

Public Health

Typhoid at Aberystwyth

THERE are now further details of the outbreak of typhoid fever at Aberystwyth. Several people in the town were taken ill on July 22, 23, and 24, with headache, pyrexia, and cough; and on July 26 the first case of typhoid was identified. During the next few days the condition was diagnosed serologically in several further people whose history appeared to incriminate ice-cream sold by a particular vendor. A spot-chart kept at the Public-health Department indicated clearly that, apart from water, ice-cream sold by this man was the only foodstuff common to all patients admitted to hospital. The milk-supply in the town is zoned; and the fact that all the patients happened to belong to different zones was a great help in ruling out milk as the source of infection.

The county medical officer of health arranged for the isolation of all cases of typhoid, either in the local hospital or in hospitals in South Wales, and an ambulance service was organised. These arrangements worked smoothly.

The sale of ice-cream by the suspected vendor was stopped on July 29; his blood gave a positive Widal reaction to *Bact. typhosum* (H) at a dilution of 1 in 320, and to (O) at 1 in 80; it also reacted to Vi at 1 in 80. Specimens of fæces grew no enteric organisms, but *Bact. typhosum* was grown from the man's urine and was later found to be of type C. He was admitted to an isolation hospital for further investigation and treatment. By this time *Bact. typhosum* had been isolated from the other patients; they were all of type C.

Cases of typhoid have since been identified in the neighbouring district and elsewhere in the country in people who had lately been to Aberystwyth and partaken of ice-cream, many of them naming the particular seller. Altogether 76 cases have been notified in other areas.

The course of the outbreak is illustrated by the weekly notifications from Aberystwyth.

Week ending ..	July 27	Aug. 3	Aug. 10	Aug. 17	Aug. 24	Aug. 31	Sept. 7
Cases notified ..	1	43	29	18	10	1	3

So far only one case has been reported with an onset more than 23 days after the sale of ice-cream by the carrier was stopped. This patient was a contact with his wife who had been ill for some days before calling in a doctor. Up to Sept. 8 only one other contact appears to have contracted the infection.

The diagnosis of cases and the tracking of carriers has been much facilitated by the presence of an Emergency Public-Health Laboratory in the local hospital. The immense value of such a laboratory in remote areas has been clearly demonstrated.

Infectious Disease in England and Wales

WEEK ENDED SEPT. 7

Notifications.—Smallpox, 0; scarlet fever, 668; whooping-cough, 1824; diphtheria, 284; paratyphoid, 42; typhoid, 21; measles (excluding rubella), 1321; pneumonia (primary or influenzal), 292; cerebrospinal fever, 33; poliomyelitis, 19; polio-encephalitis, 5; encephalitis lethargica, 0; dysentery, 86; puerperal pyrexia, 136; ophthalmia neonatorum, 74. 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 Sept. 4 was 843. During the previous week the following cases were admitted: scarlet fever, 42; diphtheria, 38; measles, 17; whooping-cough, 27.

Deaths.—In 126 great towns there were no deaths from measles or scarlet fever, 2 (0) from enteric fevers, 6 (0) from whooping-cough, 2 (0) from diphtheria, 31 (0) from diarrhœa and enteritis under two years, and 5 (2) from influenza. The figures in parentheses are those for London itself.

Bradford reported the 2 fatal cases of an enteric fever.

The number of stillbirths notified during the week was 236 (corresponding to a rate of 26 per thousand total births), including 34 in London.

Letters to the Editor

B.C.G.: THE NEXT PHASE

SIR,—Your timely leader of Sept. 14 raises a number of points of practical significance. As one who has recently visited the Scandinavian countries,[1] where I had a unique opportunity for seeing the work myself, I may perhaps make a few preliminary observations. I hope to publish my experiences more fully later.

I found the enthusiasm for B.C.G. in Norway, Sweden, and Denmark widespread, and most people were convinced of its efficacy as a valuable adjunct in the control of tuberculosis, although several public-health experts emphasised that vaccination should in no way interfere with established anti-tuberculosis measures. I was struck, too, with the little control work done on B.C.G. in any of the three countries, and, while I can understand and appreciate the difficulties encountered in this connexion, I hope that in this country we shall have an opportunity for remedying this defect in order to produce reliable statistical evidence of the value of immunisation. Such control work as I saw—admittedly the figures were comparatively small—was convincing; but I agree with your statement that "only the most carefully compiled figures in significant quantity will satisfy the statisticians."

Although we rightly look to chemotherapy for striking results in the future I think it is true that in this country a somewhat neglected field of preventive medicine has been protection against tuberculosis by active immunisation in tuberculin-negative subjects, more particularly among persons in areas of high tuberculosis morbidity and mortality—e.g., children of tuberculous families, students, nurses, and other young employees in general hospitals and sanatoria where exposure is great and protection difficult.

Taking into account the difference in the clinical features of tuberculosis in this country from those I noted in Scandinavia I felt that their work was highly encouraging. Few will question Heimbeck's original assertion—for which he deserves the highest credit—that tuberculin-negative nurses show a higher incidence of tuberculosis than those who are tuberculin-positive. I was privileged to see with him in Oslo a further extension of this work which more than corroborated his earlier observations.

Nothing that I saw impressed me more than the work of Prof. Arvid Wallgren, now professor of pædiatrics in Stockholm, who has certainly been the pioneer of B.C.G. vaccination in Sweden, having started his work in Gothenburg in 1926. His confidence in the clinical value of B.C.G. remains undaunted although he recognises its limitation and admits that it is not of use except in primary lung tuberculosis. Unfortunately even Wallgren has, however, had little opportunity for control work.

With regard to the respective merits of B.C.G. vaccine and the vole-bacillus vaccine of Wells, which you rightly suggest is running B.C.G. very close, Wallgren's observations to me are not without interest. He urged, from his own experience of vole vaccine, that it would be of the greatest scientific interest and value if we in this country were to use it. He gave me the impression that it would eventually supersede B.C.G. I think there is good evidence for the belief that both methods of inoculation (*a*) are harmless to humans, (*b*) increase resistance to tuberculosis, and (*c*) are of value only in tuberculin-negative subjects. B.C.G. has stood the test of time in many countries and its harmlessness has been established by its practical application on a large scale in many parts of the world. Nevertheless, there is good evidence that the vole-bacillus vaccine has the following advantages over B.C.G.: (*a*) it is apparently a more potent immunising agent; (*b*) its virulence is more stable (the varying virulence of B.C.G. in Norway, Denmark, and Sweden was noteworthy, and I was told on more than one occasion that some of the strains were losing their virulence); and (*c*) there is reason to believe that tuberculin allergy following vaccination with it was greater and occurred earlier than that following B.C.G.

Let me add a word about the method of administration of the vaccine. Wherever I went in the three countries the intracutaneous method devised by Wallgren was regarded as the quickest, most reliable, and practical; and it afforded a more accurate measure of the dosage. All observers were emphatic that complications such as significant abscesses never arose when the injection was truly an intradermal one but did arise when the technique was bad and some of the solution had been injected subcutaneously. I was given, especially in Denmark, an opportunity of assisting at the B.C.G. vaccine clinic and I can corroborate this view from what I saw. Such authorities as Herzberg in Oslo, Wallgren in Stockholm, Anderson in Gothenburg, and Winge in Copenhagen strongly favoured this method. The so-called transcutaneous method, either by scarification or multiple puncture with the Birkhaug-Rosenthal instrument, seemed to meet with little favour for a variety of reasons which space will not permit me to deal with here, and I had an excellent demonstration of it by a great authority.

From these impressions I think one is justified in urging that enthusiasm should be tempered with caution. Wisely handled there is little doubt that immunisation should prove a useful weapon. We have a unique opportunity for starting afresh with adequate control experiments and filling in the gaps which Continental and other workers, often through lack of opportunities and no fault of their own, have omitted. We must furnish sound statistical proof, beginning for preference with a selected group of the population who are exposed to unusual risks of tuberculous infection. May I, therefore, strongly support your plea that the Ministry of Health set up, as soon as practicable, an authoritative committee under the auspices of a body such as the Medical Research Council to institute a clinical trial of what they regard as the most effective method of tuberculosis vaccination?

London, W.1. PHILIP ELLMAN.

TREATMENT OF MENINGITIS

SIR,—Dr. Gaisford's letter of August 17 should serve as a useful corrective to over-enthusiasm. Whenever a new remedy is discovered for any particular malady, there seems to be a regrettable tendency to discard the older and often well-tried remedies. Recent examples of this appear to be syphilis and perhaps meningitis, particularly cerebrospinal fever. In the latter, it is surely a retrograde step to employ intrathecal therapy unnecessarily. What then are the indications?

Possibly the greatest triumph of the sulphonamides has been in the treatment of cerebrospinal fever, including acute and chronic meningococcal septicæmia, and the great majority of cases—95% according to Dr. Banks (Sept. 7)—respond excellently. With the exception of cases of sulphonamide intolerance and those rare cases of the ordinary types of the disease which fail to respond to sulphonamides, there is no real indication for the use of penicillin, at any rate intrathecally, in the non-fulminating varieties of cerebrospinal fever.

The fulminating varieties can be divided, perhaps a little arbitrarily, into those cases which are often dead within a few hours—Waterhouse-Friderichsen syndrome—and the type with well-marked meningitis which progresses to a fatal termination in about twenty-four hours. I have no experience of the use of penicillin in the former type of case, but its efficacy by whatever route it is administered (and it should certainly be given) would seem doubtful. In the second type of fulminating case, if after a few hours on combined sulphonamide and systemic penicillin therapy the patient's condition is still rapidly deteriorating, then, in accordance with the evidence so far available, intrathecal penicillin is indicated. I have not had cause to regret this, and two such injections are usually sufficient. It is important to remember, however, that such cases comprise a very small percentage of the total.

Similarly, penicillin is indicated in pneumococcal, streptococcal, and staphylococcal meningitis; and, in those cases which do not soon show improvement on systemic administration of the drug, the intrathecal route is again indicated. I have successfully employed

1. My visit was sponsored by the public-health committee of the county borough of East Ham, for whom I act as consulting physician for tuberculosis and diseases of the chest, and to whom I am greatly indebted.

this method in pneumococcal meningitis when, despite previous sulphonamide medication, the general condition continued to deteriorate. Obviously, as few intrathecal injections as possible should be given and one hopes that heroic procedures such as trephining the skull for the intraventricular injection of penicillin will not be embarked on indiscriminately.

It seems then that the indications for intrathecal penicillin are strictly limited and uncommon, and that the mere fact of the cerebrospinal fluid being opalescent or turbid or the cell-count increased are no indications for such therapy. The immediate risks are obvious—for example, the introduction of penicillin-resistant organisms—and the possibility of delayed sequelæ, such as postmeningitic headache, should not be forgotten. Clearly, much judgment and skill are required in deciding when this route of administration is advisable.

Royal Naval Auxiliary Hospital, Barrow Gurney, Bristol. J. L. FLUKER.

EFFECT OF PHOSPHATE ON CARBOHYDRATE ABSORPTION IN SPRUE

SIR,—Many will learn with regret, on reading his letter of Sept. 14, that Professor Maegraith has had to abandon his experimental work on sprue. I take this opportunity of making one comment. In both his letter and the preliminary communication referred to [1] he gives the impression that impaired phosphorylation as a factor in the pathogenesis of sprue was an idea emanating from himself, whereas the arguments supporting this belief were put forward by me four years ago,[2] though doubtless Professor Maegraith has overlooked the point.

London, W.1. HUGH S. STANNUS.

CIRCULATION IN THE KIDNEY

SIR,—The preliminary communication by Trueta and his colleagues in your issue of August 17 (p. 237), and their demonstration of a diverted renal circulation following upon stimulation of afferent nerves, is at once interesting and important. The investigators are to be congratulated on their new technique, which has made their observations possible, as much as on the results so far described, and it is to be hoped that the histological investigations will be such as clearly to demonstrate, in the rabbit, the presence and character (or absence) of vasa recta and the other non-glomerular blood-channels which have been described.

It is indeed strange to read in your leading article (p. 239) that "the arrangement and functions of the vasa recta . . . have been relatively neglected," when, until this present claim of Trueta and his colleagues, it has been generally agreed that the work of Huber (1906–07), Gérard (1911), Traut (1923), and MacCallum (1926) had disproved such non-glomerular medullary supply described by Ludwig (1852), Virchow (1857), and Golubew (1893)—just as the röntgenographic studies of Katzenstein (1911), Liek (1915), and Gross (1917) had disproved the existence of large arteries arching over the pyramids, the arcuate arteries of von Ebner (1899).

In 1889 Bradford demonstrated vasoconstriction within the kidney, and resulting shrinkage, on stimulation of the splanchnic nerves, and similar reflex contraction by central stimulation of the cut sciatic nerve and vagus, and confirmed the earlier observations on the relation of the splanchnics to the output of urine by Claude Bernard (1859), and Cohnheim and Roy (1883). Burton-Opitz and Lucas (1908) showed that section of the splanchnics increases the blood-flow through the kidneys, whereas stimulation decreases the flow; and Burton-Opitz (1908) showed that the right and left splanchnics were distributed to the right and left kidneys respectively. In the frog, Bieter (1930), confirming the work of Richards and Schmidt (1924–25) and Richards (1925), recorded that stimulation of the sympathetic fibres to the kidney, and of the central end of a cut sensory nerve, such as the sciatic, produced great vasoconstriction throughout the kidney: the majority of active glomeruli stopped, showed stasis and gradual emptying of the capillaries but no inflow of red cells, while "The glomeruli which do not stop as a result of splanchnic stimulation sometimes appear to show a flow at an increased speed, as if a certain amount of arterial blood must get into the kidney regardless of the number of glomeruli that are open for flow." Andrews (1927) noted anuria in dogs following the release of tight ligatures from the leg, and Bieter repeating this in the frog noted reduced glomerular capillary activity, an effect which was removed by section of the splanchnics. Bieter (1935) observed that "it is likely that in the frog the vasomotor control of the kidney vessels is not as highly developed as it is in mammals and man, and consequently, ascending the scale, the effects would possibly be more powerful."

When it is recalled that in human cases of severe renal cortical necrosis, in which even the columns of Bertini are involved, the medulla is not necrotic and a great many of the deep (juxtamedullary) glomeruli show no stasis, that they and their wide efferents (which pass to the medulla direct) are in fact functioning, it is not unnatural to conclude that this reduced or diverted (medullary) circulation may well be maintained by these glomerular efferents—without requiring the existence of vasa recta or of the corticomedullary arteriovenous shunts described by Steinach (1884) and Spanner (1938) to explain the viability of the pyramids and the anuria.

Like circumstances obtain in the rabbit in experimental renal cortical necrosis. In the normal rabbit kidney 5–7% of the contained blood is present in the glomerular capillaries where it is changed about 5 times per second and has a probable velocity of 1–2 mm. per second. Thus if 85% of the glomeruli are involved in the necrotic process of renal cortical necrosis, the remaining 15% (large juxtamedullary glomeruli) can accommodate the whole normal glomerular capillary volume, simply by all of their capillary loops coming into play, should the minute-volume remain unaltered (personal observations on glomerular circulation). The circuit-time in this "medulla-diverted" circulation will be reduced too, for the deep glomeruli and their efferents are largest and egress is free, resulting medullary blood-channels are short and wide vis-à-vis the cortical capillary rete. In other words, from a consideration of the hæmodynamics of the renal circulation in the rabbit, it is possible to suggest that the degree and character of the altered renal circulation, as outlined by Dr. Trueta and his colleagues, and the "redistribution of blood-flow within the kidney" discussed by Professor Maegraith (p. 213), could be maintained by a circulation via the deep (subcortical or juxtamedullary) glomeruli only, the cortex being relatively avascular, by vasoconstriction of the peripheral arterial vessels in response to afferent (sciatic or other) stimuli.

But vasa recta and their loops are described, and we await with interest the first clear demonstration of these vessels (in situ), and possibly also of other non-glomerular supplies and shunts which from time to time have been described.

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MYTH AND MUMPSIMUS

SIR,—Many of us must be grateful to Dr. Forbes for his destructive article in your issue of August 31. I have often thought that destructive thought is a valuable property. The vast accumulations of rubbish, many of them monuments to the more foolish moments of great men, need a great deal of shaking; and I do not think Dr. Forbes has gone nearly far enough.

He writes that there is only one criterion for the value of any therapeutic procedure—does it work with patients? Many theoretically sound treatments fail because they work only if the patient is isolated in an artificial environment. Take the magic bullets of Ehrlich and their later modifications. In actual practice this treatment sometimes failed, perhaps by the accidents of treatment but often by default or irregular attendance for the long and tedious courses of injections. Because of these limitations the magic looked shabby in the light of day. The failure in many cases was due to the fact that a man was primarily a lorry driver, a hotel clerk, or a commercial traveller—in other words, a human being—and only secondarily a patient with syphilis.

Any treatment that fails to recognise the human animal as a whole and its place as a social unit tends to partial success. The immobilisation of young children for long periods seems a sorry sort of treatment for a living creature; it fails in that it treats a part by maltreating the whole. Activity is an essential part of health, and far more care should be taken not to prescribe unnecessarily restrictive measures; nor should a man be taken off work without the most careful consideration. He often does better if he stays at work.

The same applies to diets. A man should enjoy his food because enjoyment is an essential part of good digestion. Very few diets are enjoyable. Is it not a fact that what we are really enduring in our ordinary dietary is not lack of calories but unmitigated English cooking? Why does the gastric-ulcer patient have his meat minced? A more horrid food than minced meat cannot be imagined, and given a reasonable set of teeth the natural act of chewing suffices; chewing, moreover, promotes digestion.

The trouble in gastric-ulcer diets is partly due to simple-minded arguing from pathology. Here, we say, is an ulcer in the stomach, it must not be irritated by pips, fruit skins, stalks, meat extracts, alcohol, or tobacco. But patients are often willing to experiment and some find beer, as well as other supposed irritants, gives them no discomfort. Many manage a practically normal diet except for greasy foods. Arguing from pathology, well-lubricated greasy foods should slide harmlessly over an ulcer. They apparently do not. Nevertheless, pathology is a valuable corrective in medicine. Unfettered by it Freud trampled on the fairy stories of Greece and raised some extraordinary myths. Worse still, the psycho-analytical school is becoming respectable—it even appears in the Brains Trust!

It seems a pity to blow up some of these picturesque ruins, but it may be necessary; besides it gives healthful pleasure to those who cannot stand bunk, especially when buttressed by authority.

Oxford. G. WHITWELL.

CALF SERUM FOR TRANSFUSION

SIR,—No doubt war-time conditions prevented Dr. Massons, of Barcelona, having access to my paper on despeciated bovine serum (*Brit. med. J.* 1944, i, 73) to which you refer in your annotation. A material somewhat similar to P.C.P. was produced in the department of surgery, University of Liverpool, by the addition of formalin and ammonia to bovine serum. The essential difference in the final production of the solution is, however, that in despeciated bovine serum the heating process is taken to 72° C only, while in P.C.P. the solution is heated to 100° C. Experiments which we did showed that the agglutinins are destroyed at 72° C, associated with changes in the globulin fraction. At this temperature the changes in the albumin fraction are small and the material still exerts an osmotic pressure of 120–160 mm. of water compared to the figure of 150 mm. of water found for pooled citrated plasma. Material heated above this temperature shows a steady decrease in the osmotic pressure until at 100° C it has none at all. The readings were taken by the micro-method of Krogh and Nakazawa against mammalian Ringer solution. It is thus difficult to see how P.C.P. can have any more beneficial effect than normal saline.

The original reason for the preparation of despeciated bovine serum was to produce a substitute for human plasma that would have been of value had the supplies of human plasma not been sufficient to meet war-time needs. When it was apparent that human material was available in sufficient quantities, further production of despeciated bovine serum was stopped. It was administered safely, however, to over 200 patients by myself and others in amounts of one pint or more, the largest volume given to one patient being 16 pints. I would reaffirm that despeciated bovine serum prepared by the Liverpool method is non-toxic, non-antigenic, free from antibodies, of an equivalent osmotic pressure to citrated human plasma, retained in the circulation, and eventually metabolised.

Liverpool. F. RONALD EDWARDS.

LATENT PERIOD IN KALA-AZAR

SIR,—The following case well illustrates the fact, pointed out by Armstrong,[1] that there may be a long latent period before kala-azar produces symptoms. This seems to be fairly well known, but is nowhere else emphasised in the published work. Manson-Bahr[2] suggests six months as the upper limit of the incubation period, and Strong[3] and Scovel[4] suggest four months as the maximum; but none of these authors draws attention to the further latent period which may occur before symptoms appear. Manson-Bahr notes that the disease may remain latent for many months in artificially infected dogs, and Sweeney et al.[5] describe a case with a "presumptive latent period of two years," as in the present case.

A private, aged 26, served from April, 1940, to December, 1943, in Eritrea, Egypt, Libya, Palestine, and Syria, and from December, 1943, to February, 1944, in Italy. His disease probably originated before December, 1943, after which date he was stationed north of Naples.

In the summer of 1945 he noted that his belt seemed tight on exercise, but otherwise he felt perfectly fit. In October, 1945, he was admitted to hospital with a history of coryza for about a month, and of headache, shivering, and sweating for several days.

He was thin and pale, with a yellowish tinge to the skin, and had a swinging temperature rising to 100°–103° F every evening, accompanied by profuse sweats. A large tumour was present in the left hypochondrium extending to below the level of the umbilicus. The nature of this tumour remained in doubt, it being considered to be either the spleen or the left kidney. An intravenous pyelogram did not help, because no dye was excreted on the left side; and an attempt at ascending pyelography was unsuccessful. The liver was not palpable, and no enlarged glands were felt.

Blood-count: red cells 2,030,000 per c.mm., Hb 48% (14·5 g. per 100 c.cm.), colour-index 1·1; white cells 2650 per c.mm. (polymorphs 50%, lymphocytes 25%, monocytes 10%, eosinophils 1%, myelocytes 3%, myeloblasts 3%, unclassified 2%). Plasma protein 7·55 g. per 100 c.cm.

Sternal puncture gave a marrow count of polymorphs 8%, myelocytes 40%, metamyelocytes 3%, lymphocytes 0, monocytes 0, normoblasts 6%, premyelocytes 6%, myeloblasts 4%, erythroblasts 33%, megaloblasts 0. No Leishman-Donovan bodies were seen.

Other investigations all proved negative, and further blood-counts and sternal punctures showed a similar picture, Leishman-Donovan bodies still being absent from marrow smears. Patient's condition altered little, and the high evening temperature and profuse sweats continued.

In view of the continued doubt in diagnosis, laparotomy was done on Nov. 23, after transfusion with packed cells. The tumour was found to be a grossly enlarged spleen. No other abnormality was found in the abdomen. Splenic puncture

1. Armstrong, T. G. *Brit. med. J.* 1945, ii, 918.
2. Manson-Bahr, P. H. Manson's Tropical Diseases, London, 1945, p. 156.
3. Strong, R. P. Stitt's Diagnosis, Prevention, and Treatment of Tropical Diseases, Philadelphia, 1944.
4. Scovel, F. G. *Ann intern. Med.* 1944, **21**, 607.
5. Sweeney, J. S., Friedlander, R. D., Queen, F. B. *J. Amer. med. Ass.* 1945, **128**, 1020.

was done, but no Leishman-Donovan bodies were found either on direct examination of the biopsy specimen or on culture.

On Dec. 18, as there was no improvement, it was decided to treat the case as kala-azar, and a course of stilbamidine 0·075 g. followed by 0·15 g. daily to a total dosage of 2·25 g. was given. The sweating began to decrease after six or seven days, but the temperature did not respond till the thirteenth day of the course, when it dropped suddenly and thereafter remained low.

On Dec. 25 culture of marrow blood in Lache-dextrose sloppy agar with defibrinated rabbit blood at 24° C grew "distinct leptomonas forms of Leishman-Donovan bodies, fresh preparations showing characteristic motility."

Progress was slow but excellent, the anæmia improving and the spleen decreasing in size. In February, 1946, patient was given a course of urea stilbamidine. In March his general condition was most satisfactory, the spleen being just palpable and the anæmia clearing well. In April, 1946, he reported numbness of forehead, cheeks, and lips, but was otherwise well.

The chief points of interest in this case are the long latent period, the difficulty in diagnosis, and the dangers of Vth nerve involvement when stilbamidine is used.

A. P. NORMAN.

Hospital for Sick Children, Great Ormond Street, London.

*** L. E. Napier, writing in the *British Encyclopædia of Medical Practice* (London, 1938, vol. VII, p. 342), mentions a patient who developed symptoms of kala-azar after being away from any endemic area for 18 months.—ED. L.

CHILDREN WHO SPEND TOO LONG IN BED

SIR,—Dr. McCluskie, in his letter of Sept. 14, replying to my criticisms of his article, has so far retracted as to say that the time of sleep required by a child may vary by "an hour, or more, or less": this period of an hour was not mentioned in the original article. He reaffirms his statement, with which no-one will disagree, that many children spend too long in bed: but he does not explain how the mother with two or more small children, and little or no domestic help, can follow the "detailed directions" which he thinks necessary for sleeping as well as feeding.

He has also failed to produce any evidence for the dogmatic statements in his article that "if a baby has an hour too much sleep during the day it will certainly cry during the night," and "variation by even 15–30 minutes from the amount of sleep each particular child requires at each month produces violent change of behaviour." If "years of experience with children" lead him to these conclusions, I can only assume that his experience has been limited to dealing with rather unusual children. A perceptive mother recognises that external factors such as the activities of the day, physical and mental, produce variations in the amount of sleep required: and I think it a facile assumption that the behaviour disorders which Dr. McCluskie describes can be so directly related to lack or excess of sleep. In his *Contributions to Analytical Psychology* Jung says that "the neuroses of children are rather symptoms of the parents' mental condition than a genuine disease of the child."

I should be glad to know the signs and symptoms of "a nation-strangling matriarchy."

London, W.11. CATHERINE STORR.

SIR,—Dr. McCluskie gives good advice concerning hours of sleep for children. One cannot make a child sleep to suit one's convenience. I suggest that, if he wakens early, the child might be encouraged to play quietly with some toys, after being made comfortable, until his mother is ready to dress him and give him his breakfast. I consider that an average baby of a few months requires more sleep than Dr. McCluskie prescribes. A baby wakened too long before his feed will get tired and fretful. A contented baby soon learns to adjust his own sleeping hours to his individual needs. He will lie playing with his hands, and later practising making new noises, and a busy mother will be unaware when he wakened or fell asleep again. He should be as happy in his pram as anywhere, though he will enjoy a regular kicking time to exercise his limbs; this time can be increased in length to correspond with his abilities.

Eastbourne. JOAN BRIGDEN.

EPIDEMIC THROMBOPHLEBITIS

SIR,—There seems little doubt that the condition described by Lieut.-Colonel Manson-Bahr and Dr. Charters (Sept. 7, p. 333) is the tropical primary phlebitis described in 1941 by one of us [1] as occurring in Northern Rhodesia. Since then this disease has been studied further, and our observations on 71 cases will shortly be ready for publication. Manson-Bahr and Charters state that they find no histological cause for the thrombosis. The histological appearances in the vein wall described in 1941 were acknowledged then as obviously abnormal (A. C. L.) but the interpretation of these and of a subsequently observed chronic case with giant cells (cf. Manson-Bahr's case, p. 334) was at last made clear by a recent opportunity to study what is certainly the essential lesion. It had come to be appreciated (A. C. F.) that only a short stretch of the vein was primarily involved, and microscopy of this zone has now revealed a peculiar form of inflammation characterised by extreme proliferation of young capillaries in the disrupted media of the vein, and by the presence of phloxinophil intracytoplasmic inclusions.

Luanshya, Northern Rhodesia, and Department of Pathology, University of Glasgow. A. C. FISHER. A. C. LENDRUM.

ROYAL COLLEGE OF PHYSICIANS OF LONDON

SIR,—A letter in the *British Medical Journal* of August 31 (p. 313) has focused attention once more on the statutes, by-laws, and regulations of the Royal College of Physicians and the justifiable discontent which they arouse.

As is well known, the present regulations do not allow members to take any part in the running of the college. In fact, they are specifically debarred from doing so under by-law 118, which says ". . . they shall not be entitled to any share in the Government, or to attend or vote at General Meetings of the Corporation." Surely this state of affairs is quite out of date, and in view of the great changes now taking place the time is ripe for the college to broaden its representation with a view to ensuring that members obtain a voice in its counsels and deliberations on common-sense, democratic lines.

The college, instead of remaining a mere academic institution, should become a living force, capable of exercising a profound influence for good on various medical, social, and educational problems confronting us and pressing urgently for solution.

The first step in this desirable aim must surely be the provision of facilities for adequate representation by the members, who should be given every encouragement to form their own standing committee, &c., and take an active part in the management of the college. Obviously one of the important tasks of any newly elected committee should be to go into the question of the revision of the existing regulations concerning the election of fellows.

C. ANDERSON.
M. N. PAI.
Sutton Emergency Hospital. D. SHAW.

EFFICACY OF THE PENICILLINS

SIR,—Your leading article of Sept. 14 directs attention to the desirability of ensuring that penicillin used in medicine shall, as far as practicable, consist only of penicillin II (G). For some time past we have been fully conscious of this, and, by the choice of appropriate media and precursors, together with the use of selective extraction procedures, we have secured approximately 90% of penicillin II (G) in our product. As a further precaution, our vials are now filled so that, within the limits imposed by existing assay procedures, we believe them to contain the stated content of penicillin II (G)—i.e., if a vial is claimed to contain 100,000 units of penicillin, it contains not less than that number of units of penicillin II (G), and any small proportion of penicillin IV (K) which may be present is additional. In this manner the practitioner is assured of the full dosage of the penicillin on which he relies for therapeutic efficacy.

H. JEPHCOTT
Managing Director,
Greenford, Middlesex. Glaxo Laboratories Ltd.

1. Fisher, A. C. *S. Afr. med. J.* 1941, 15, 131.

Notes and News

CRICHTON ROYAL FELLOWSHIPS

TODAY some inside knowledge of the working of a modern psychiatric hospital is essential for the consultant, and many established specialists have been spending a busman's holiday visiting their colleagues at the Crichton Royal, Dumfries. To fill this gap and to hasten the fuller training in psychiatry lately recommended by the Royal College of Physicians, the board of directors of the Crichton Royal have set up three fellowships, in addition to the ordinary staff of the hospital. The fellows will receive training in all branches of clinical psychiatry, including fever treatment, prolonged narcosis, electric convulsion therapy, insulin therapy, and leucotomy. They will have opportunities to work in the outpatient and child-guidance clinics, to join in the work of the psychiatric social worker, and take part in home and follow-up visits. Each fellow will be attached to one of the senior psychiatrists who will be responsible for his instruction, and later patients will be allotted to him. He will also attend all clinical staff meetings and become familiar with the management of different wards, the legal problems of psychiatry, and routine psychological testing. The fellowships, which carry a salary of £400 a year in addition to residential emoluments, will in the first instance be tenable for one year from Feb. 1, 1947. Forms of application may be obtained from the physician superintendent of the hospital and should be returned not later than Dec. 16.

ART FOR THE ILL

Adrian Hill, an artist, had tuberculosis, and during his long boring convalescence found how quickly he could make the hands of the clock move by sketching in pencil or water-colour. When he got up he shared this device for passing the time with his fellow patients, and, partly no doubt owing to his own ability to instruct and interest, found many who could equal his pleasure in making pictures, if not his technical skill. He has written a likeable book (*Art versus Illness*, George Allen and Unwin, 10*s*. 6*d*.) about this small start in a new type of occupational therapy and its considerable developments. He found a starved taste for pictures in many unlikely quarters, and in others a bent for original work which needed only opportunity to grow. His experiment seems likely to become an accepted part of treatment in some sanatoria and should be seriously considered in all. His amusing and constructive little book, illustrated with many of his own drawings and those of his patient-pupils, is well worth reading with this idea in mind.

DELINQUENCY ON THE SCREEN

THE approved schools usually carry on their constructive work without much publicity, but their achievements are so notable that they should be widely understood. *Children on Trial*, a Crown Film Production now showing at the Academy Cinema, furthers this end and also adds to the high reputation of British documentaries. The stories of three delinquent young people are outlined without any emotional emphasis, and the result is not only moving but intensely interesting—far more so, indeed, than the average thriller. The delinquencies are not understated, the extenuating circumstances kept in perspective, the approved school with its scope for growth of mind, body, and spirit presented fairly. The cast includes only two professional actors, one of whom plays the delinquent girl, the other the headmaster of the approved school. The other actors are taking their natural parts, the boys being played by Liverpool and Birmingham schoolboys. The boy playing the main delinquent has a natural economy of expression and gesture which could not be bettered. Doctors should try to see this informative film.

Family Planning Association

The association is holding a conference on Infertility, on Sept. 21 and 22, at the National Institute for Medical Research, Hampstead, N.W.3. At 3 P.M. on Saturday, the 21st, Dr. Mary Barton will speak on the Biology of the Cervix, and Dr. G. I. M. Swyer on the Rôle of Hyaluronidase in Fertilisation. There will be demonstrations at 5 P.M., and afterwards Dr. Audrey Smith and Mr. A. S. Parkes, F.R.S., will read a paper on Antigenic Properties of Spermatozoa. On Sunday, the 22nd, at 11 A.M., Dr. Margaret Hadley Jackson and Mrs. C. Harvey will speak on Experience with A.I.H., Dr. Muriel Rose on the Prognostic Value of Semen Examination, and Dr. Raymond Cross on Habitual Abortion. Further particulars may be had from the secretary, 69, Eccleston Square, London, S.W.1.

University of Edinburgh

Mr. D. M. Douglas has been appointed lecturer in experimental surgery in the university, and deputy director of the Wilkie Surgical Research Laboratory. He has also been elected to the staff of the Royal Infirmary as an associate assistant surgeon.

University of Glasgow

Dr. Thomas Anderson, physician superintendent of Knightswood Hospital, Glasgow, has been appointed full-time lecturer in infectious diseases in the university. The lectureship which the university has set up after consultation with the city corporation is the first full-time one in this country and carries with it the title of visiting physician to Knightswood Hospital, so that the holder may have adequate clinical material for teaching and research. Dr. Anderson will also become consultant in infectious diseases to the corporation. The salary scale of the lectureship is to be £1200–£50–£1500.

Dr. Anderson, who graduated M.B. at the University of Glasgow in 1928, held a resident appointment at the Western Infirmary and later became deputy physician superintendent at Ruchill Fever Hospital. He was elected F.R.C.P.E. in 1940, and obtained his M.D. with honours last year. His published work includes papers on the use of chemotherapeutics in infectious diseases, particularly pneumonia.

Royal College of Obstetricians and Gynæcologists

On Sept. 27 the honorary fellowship of the college will be conferred on Mr. Victor Bonney in recognition of his services to British gynæcology.

Travelling Fellowships

The Medical Research Council have awarded Rockefeller medical fellowships for 1946–47 to the following:

SHEILA T. E. CALLENDER, M.D. St. And., M.R.C.P., graduate assistant, Nuffield Department of Clinical Medicine, Oxford.

C. E. DENT, M.B. Lond., M.R.C.P., research assistant, medical unit, University College Hospital, London.

A. M. JONES, M.B. Manc., M.R.C.P., Leverhulme research scholar (Royal College of Physicians), University and Royal Infirmary, Manchester.

A. M. MACDONALD, M.D. Edin., F.R.C.P.E., department of pathology, Edinburgh University.

J. E. MORISON, M.D. Belf., lecturer in morbid anatomy, Queen's University, Belfast.

F. T. C. PRUNTY, M.D. Camb., M.R.C.P., lecturer in chemical pathology, St. Thomas's Hospital medical school, London.

F. F. RUNDLE, M.D. Sydney, F.R.C.S., surgical specialist, R.A.M.C., lately chief assistant and registrar, Westminster Hospital, London.

JOHN SWINNEY, M.C., M.D., M.S. Durh., assistant surgeon, department of urological surgery, Newcastle-on-Tyne General Hospital.

The council have also awarded a Dorothy Temple Cross research fellowship in tuberculosis to:

T. F. JARMAN, M.D. Durh., assistant tuberculosis physician, Welsh National Memorial Association.

International Society of Medical Hydrology

This society is holding its first post-war meeting at Buxton from Oct. 4 to 6. The speakers will include Dr. J. van Breemen (Four Causal Factors of Rheumatic Disease in Connexion with Medical Hydrology), Mr. R. Whittington (Plasma Viscosity), Dr. Victor Ott (Present Swiss Concepts of Rheumatism and Physical Medicine), Dr. Abraham Cohen (Physostigmine in Rheumatoid Arthritis), and Dr. Louis T. Swaim (American Concepts on Arthritis). Further particulars may be had from Dr. Donald Wilson, 28, The Circus, Bath.

Service Prizes

The R.A.M.C. Prize Funds Committee announce that the following prizes are open for award in 1947 after a lapse of some eight years due to the war:

Leishman Memorial Prize.—A silver medal and £30 for the best work in any branch of medicine, surgery, or the allied sciences, or in connexion with the general duties of the R.A.M.C. or of the Army Dental Corps.

Alexander Memorial Prize.—A silver medal and £70 to the officer who during the year has done most to promote the study and improvement of military medicine, surgery, hygiene, or pathology.

Parkes Memorial Prize.—A silver-gilt medal and £60 to the regular serving medical officer who has done most to promote the study of naval or military hygiene.

The Alexander and Parkes prizes are not open to officers on the staffs of the Royal Naval Medical School, the Royal Army Medical College, or the Army School of Hygiene. In making these two awards first consideration will be given to original articles published in a medical journal, and part authorship will not justify the recommendation of an officer for these prizes.

Recommendations should be sent through the usual channels, with copies of original articles and reports, to reach the hon. secretary of the committee, R.A.M. College, Millbank, London, S.W.1, by Dec. 31.

Middlesex Hospital

The annual dinner will be held at the Savoy Hotel, London, W.C.2, on Friday, Oct. 4, at 7.30 P.M.

Nutrition Society

The society is holding a conference on The Work and Aims of the Food and Agriculture Organisation on Saturday, Sept. 21, at 10.30 A.M., at the London School of Hygiene, Keppel Street, London, W.C.1. The speakers will include Sir John Orr, F.R.S., director-general of F.A.O.; Mr. D. Lubbock; Dr. P. Lamartine Yates; Dr. W. R. Aykroyd; and Miss E. Fautz.

Medical Society of the L.C.C.

There will be a clinical meeting of the society on Thursday, Oct. 3, at 3 P.M., at Dulwich Hospital, S.E.22, when the staffs of Dulwich and St. Olave's Hospitals will demonstrate cases.

Association of Industrial Medical Officers

The annual general meeting of the association will be held at the London School of Hygiene, Keppel Street, W.C.1, on Friday, Oct. 18th, at 5 P.M., and will be followed by a dinner at 7.30 P.M. On Saturday, the 19th, at 10.30 A.M., Dr. Donald Hunter and Dr. R. S. F. Schilling will speak on Industrial Medicine in the U.S.A.

St. Thomas's Hospital

Dr. A. L. Crockford has been appointed secretary of the medical school in succession to Dr. R. J. C. Thompson, who has resigned.

Brazilian Honour

The Brazilian order of the Southern Cross has been conferred on Sir Alexander Fleming, F.R.S., who presided over the Inter-American medical congress which met in Rio de Janeiro this month.

Return to Practice

The Central Medical War Committee announces that Dr. Kenneth O. Black, 27, Weymouth Street, W.1 (Langham 3336), has resumed civilian practice.

Births, Marriages, and Deaths

BIRTHS

DUTTON.—On Sept. 10, in Manchester, the wife of Captain G. C. D. Dutton, R.A.M.C.—a daughter.

HACKETT.—On Sept. 8, the wife of Dr. C. J. Hackett, of Wendover, Bucks—a son.

HIBBERT.—On Sept. 13, in Liverpool, the wife of Dr. Geoffrey Hibbert—a son.

HUSTON.—On Sept. 7, the wife of Lieut.-Colonel John Huston, R.A.M.C., of Edinburgh—a daughter.

LILLICRAP.—On Sept. 12, at Lincoln, the wife of Dr. Charles Lillicrap—a son.

LOGIE.—On Sept. 9, at Aberdeen, the wife of Mr. Norman Logie, F.R.C.S.—a son.

MARRIOTT.—On Sept. 11, in London, the wife of Dr. Ian Marriott—a son.

MAY.—On Sept. 8, at Chatham, the wife of Surgeon Lieut.-Commander R. T. May, R.N.—a son.

PORTER.—On Sept. 6, at Woking, the wife of Dr. H. L. Porter—a son.

SMITH.—On Sept. 7, in London, the wife of Dr. J. F. Smith—a son.

VICARY.—On Sept. 12, Dr. Patricia Vicary (née Shaw), the wife of Dr. Peter Vicary, of London, W.14—a son.

WYNNE.—On Sept. 7, the wife of Dr. Roger Wynne, of Banbury—a daughter.

YUDKIN.—On Sept. 7, the wife of Dr. Simon Yudkin—a daughter.

MARRIAGES

AMBROSE—CLAVERING.—On Sept. 11, in London, Gordon Ambrose, L.M.S.S.A., to Sheila Clavering.

BENNETT—MELLING.—On Sept. 7, at Baylham, Harold Stanley Bennett, M.B., R.A.F.V.R., to Barbara Hunter Melling.

REID—SHARPE.—On August 31, in Calcutta, Grainger Wilson Reid, lieut-colonel R.A.M.C., to Ruth Hilda Sharpe, Q.A.I.M.N.S./R.

WALKER—JONES.—On June 14, in Nairobi, D. O. Walker, major R.A.M.C., to Mary Jones, Q.A.I.M.N.S./R.

DEATHS

BEEVOR.—On Sept. 15, at Burnham, Bucks, Charles Ferrier Beevor, M.A., B.M. Oxfd.

GOLDEN.—On Sept. 8, at Ilford, Michael Bruce Howard Golden, M.R.C.S.

GRAY.—On Sept. 12, at Dalkeith, Midlothian, George Douglas Gray, C.B.E., M.D. Edin., late lieut.-colonel R.A.M.C.

HILL.—On Sept. 8, at St. Mary Bourne, Hampshire, Alfred Arthur Hill, M.D. Durh.

HOWIE.—On Sept. 7, Mary Evelyn Howie, M.B. Durh., of Gosforth, Newcastle-on-Tyne.

PATON.—On Sept. 9, at St. Albans, Herts, Richard Reid Kirkwood Paton, M.B. Glasg., D.P.H.

SLAYTER.—On August 22, in Madras, Edward Wheeler Slayter, C.M.G., D.S.O., M.B. Edin., late colonel R.A.M.C., retd., of Halifax, Nova Scotia.

STREET.—On Sept. 8, at Crowborough, Ashton Street, M.B. Camb., F.R.C.S., lieut.-colonel I.M.S., aged 82.

WILSON.—On Sept. 10, in Cardiff, James William Albert Wilson, M.D. Belf.

Medical Diary

SEPT. 22 TO 28

Monday, 23rd

ROYAL COLLEGE OF SURGEONS. Lincoln's Inn Fields, W.C.2
3.45 P.M. Prof. R. A. Willis: Experimental Production of Tumours.
5 P.M. Dr. N. F. Maclagan: Basal Metabolism.

Tuesday, 24th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Prof. R. A. Willis: Statistical Study of Tumours.
5 P.M. Dr. L. E. Glynn: Nutritional Factors, Hepatotoxic Agents, and Liver Function.
MEDICAL WOMEN'S FEDERATION
8.30 P.M. (B.M.A. House, W.C.1.) Dr. Henriette Lohr: Medicine in Holland under German Occupation.

Wednesday, 25th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Prof. F. Wood Jones, F.R.S.: Development and Structure of the Palate.
5 P.M. Dr. L. E. Glynn: Nutritional Factors, Hepatotoxic Agents, and Liver Function.
UNIVERSITY OF GLASGOW
8 P.M. (Department of Ophthalmology.) Dr. J. B. Gaylor: Electroencephalography in Retinal Disease.

Thursday, 26th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Dr. D. V. Davies: Development of Joints in General.
5 P.M. Prof. W. G. Barnard: Selection of Site and Specificity of Reaction in Inflammation.

Friday, 27th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Prof. H. A. Harris: The Nerve Plexuses of the Limbs.
5 P.M. Prof. G. Hadfield: The Reticuloses.
BIOCHEMICAL SOCIETY
11 A.M. (University of Liverpool.) Short communications.

Appointments

BICKFORD, B. J., M.B. Lond., F.R.C.S.: surgical registrar, Liverpool Chest Surgical Unit at Broadgreen Hospital.

GOLDMAN, H. P., M.B. Glasg., M.R.C.P.: physician, Bolton Royal Infirmary.

INGHAM, ARTHUR, M.B. Manc.: physician, Bolton Royal Infirmary.

MOORE, THOMAS, M.D., M.S. Durh., F.R.C.S.: surgeon, Duchess of York Hospital for Babies, Manchester.

PROBYN-WILLIAMS, R. C., B.M. Oxfd: examining factory surgeon, Wotton-under-Edge, Gloucester.

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Dr. E. H. VAN SOMEREN.—A footnote in a recent book of memoirs states that Dr. van Someren, who practised in Venice from 1898 to 1913, suffered from melancholia and committed suicide in Venice. His obituary notices (see *Lancet*, 1913, i, 793; *Brit. med. J.* 1913, i, 589) make it clear that he died at Syracuse after a short illness at the age of 41; he was a diabetic and died in coma after contracting influenza.

PERFORATED PEPTIC ULCER
TREATED WITHOUT OPERATION *

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IT has long been a rule of surgical practice that perforated peptic ulcer should be treated by immediate operation to suture the perforation and drain the peritoneal cavity. It is, however, questionable whether all cases of perforation should be lumped together indiscriminately in this way. The gravity of the crisis depends not so much on the fact of the perforation as on the likelihood of a fatal peritonitis. But the factors which determine this issue—the interval between perforation and treatment, and the amount and character of the leakage from the stomach—vary within the widest limits. Automatic surgical intervention takes no account of this variation, nor does it recognise the existence of the natural defence mechanism within the peritoneal cavity.

It must not be forgotten that the peritoneum, with its copious blood-supply and lymph drainage, its endothelial cells and phagocytes, is specially adapted to overcome infection. It can sterilise and absorb a considerable quantity of infective fluid, provided the contamination is not repeated before the peritoneum has had time to recover from the damage suffered in the process. To state this is to put the problem of perforated ulcer in its proper perspective. Obviously if an infective peritonitis is already established as the result of delayed treatment or gross flooding of the peritoneal cavity there is no alternative to the classical operation, since drainage is essential. But if the contamination which has taken place can be checked at the source without operation, before it has overcome the peritoneal defence, no drainage is necessary, and the patient will recover spontaneously.

A method of achieving this is described here, the effect of which is to reduce the problem in any one case of perforated ulcer to an assessment of the degree of leakage that has taken place. The decision to interfere surgically will depend on this assessment, but in the great majority of cases it will not be necessary, as the present case-reports show.

DEVELOPMENT OF THE CONSERVATIVE METHOD

It will perhaps be useful to describe how I came to make this departure from established practice.

In operating on early perforations in the usual way, I repeatedly found that the peritoneal fluid was sterile on culture, and therefore I began to dispense with the drainage-tube more and more, without encountering any case of delayed peritonitis as a result. But the crucial experience was that from time to time there occurred cases in which I opened the abdomen only to find the perforation already sealed off by adhesion to a neighbouring viscus, usually the under surface of the liver. The firmness with which the adherent surfaces were applied to each other, and the difficulty in separating them to suture the perforation, suggested that this was in fact unnecessary. When a similar case occurred later, therefore, I left the sealed-off perforation undisturbed without any untoward sequelæ, but it was obvious that I had performed a useless operation, having neither drained the peritoneal cavity nor sutured the perforation.

I collected 8 cases of this nature and found that the factor common to them all was that the patient's last meal had been eaten some time before the perforation—i.e., the stomach was relatively empty at the time. Consequently, not without trepidation, I tried to reproduce this condition in early cases by substituting gastric aspiration for operation, relying on the peritoneum to deal with the fluid that had already escaped, and on local adhesion to seal off the dried-up perforation.

The results were satisfactory beyond my expectation. Since January, 1945, 28 consecutive cases have been treated in this way; 24 patients made an uneventful recovery, 3 died from causes unconnected with the treatment, and 1 died who might have been saved by immediate operation, if I had had the experience at the time to recognise the limits of applicability of the conservative method. With the experience that has been gained and is now recorded, such an error in the selection of treatment should be avoidable in future.

CLINICAL PROCEDURE

At King George Hospital, Ilford, when a case of perforated ulcer is received, the decision whether to apply conservative treatment or to operate is made in the receiving-room (see below). If conservative treatment is adopted, the patient receives morphine gr. 1/4 intravenously, repeated if necessary, and sucks a lozenge of amethocaine gr. 1. When thereby his pain and anxiety are dulled and his throat has become insensitive, his stomach is emptied with a large stomach-tube attached to a Senoran's gastric-suction bottle. The tube is then withdrawn, and the patient is sent to the ward. When he has been made as comfortable as possible in bed, a small stomach-tube is passed through the nose and fixed in position, and the stomach is aspirated at half-hour intervals with a 20 c.cm. syringe. The quantity of fluid withdrawn plus three pints in the twenty-four hours is administered rectally, subcutaneously, or intravenously. Small sips can be given, provided they are aspirated out again at once; otherwise nothing is allowed by mouth for the first day. Chemotherapeutic agents may be given by injection if necessary.

The treatment is continued during the second twenty-four hours, but now hourly aspirations are followed by drinks of 1 oz. of water. A mixture of milk and water is substituted on the third day, and the tube is removed when the fluid chart indicates that the amount taken by mouth is passing into the intestine and is not collecting in the stomach. Subsequent treatment is exactly as for acute non-perforated ulcer, with graduated diet, oil, powder, &c.

On this régime pain diminishes rapidly, and the patient is generally comfortable within twelve hours or so. It is interesting to observe the disappearance of the signs progressively from the left lower abdomen towards the epigastrium and right flank, where tenderness may persist for some days. The indwelling tube is a source of discomfort to the patient, but is usually gladly borne when it is explained that the alternative is an operation.

There is usually very little constitutional disturbance, and the pulse-rate remains about normal. Ileus may be expected in the not-so-early perforation, for which it may be necessary to continue the aspiration longer than usual. The limiting factor in the selection of cases is implied in this consideration and will be discussed further. If proper judgment has been exercised, a serious ileus should not develop.

The treatment throws little more strain on the nurses than if the patient had been operated on, but it does require from them an appreciation of the fickleness of stomach-tubes. A dry aspiration should never be accepted as evidence of an empty stomach, unless a small drink by mouth can be immediately withdrawn through the tube.

CASE-RECORDS

The case-records include only unequivocal perforations with full-scale rigidity and tenderness, some being confirmed by the radiological demonstration of gas under

* Read before the Society of British Gastro-Enterologists, November, 1945.

the diaphragm. Three cases of doubtful perforation or limited leakage from an ulcer that occurred during the period of the experiment are not included in the list. There was one case of mistaken diagnosis during this time: a man, aged 56, subject to dyspepsia, who had had a sudden continuing pain four hours previously. There was generalised tenderness and rigidity of the abdomen, and he was treated by aspiration on a diagnosis of perforated ulcer. Persisting abdominal signs and a steady rise in pulse-rate, however, led to operation on the second day, when a tense gall-bladder was found and treated successfully by cholecystostomy. Two perforations in the series (case 6 and case 9) were also subjected to operation on the second day because of persisting generalised abdominal tenderness. In each of these the perforation was found to be sealed, but collections of sterile fluid in the pelvis and right flank were successfully drained. It may or may not have been necessary to do this, but the point to be made from these cases and that of the acute cholecystitis is that, if an expectant attitude is maintained in the management of the patients, no harm need result from the delay in operation.

In the early cases of the series one was, naturally perhaps, too ready to interfere and perform an intercurrent operation. Thus in case 3 one of my assistants inserted a suprapubic drainage-tube, which unfortunately gave rise to a fatal mechanical obstruction of the small gut in the pelvis. Another patient died from a pulmonary embolus on the fourth day of conservative treatment (case 10). Necropsy showed a sealed perforation, and a collection of sterile fluid in the right flank, besides the fatal clot. A third fatality was a man, aged 65, admitted twenty-four hours after perforating, too ill to be operated on (case 15). He was treated by aspiration for eleven hours in the vain hope that he would recover sufficiently for operation. Necropsy showed a sealed lesser-curve ulcer. None of these deaths was due to the treatment; indeed in case 3 the fatal issue must be attributed to the substitution of operation and drainage, though this was accidental.

In case 16 the method was a tragic failure. The patient, a huge unruly Irishman, had drunk two pints of beer after his perforation and was quite uncontrollable in the ward, drinking his mouth-wash and pulling out his stomach-tube. Obviously he should have been operated on, but this was put off till too late. He developed a loculated peritonitis and a severe ileus, which proved fatal on the fifth day. The case indicates the two chief contra-indications to the conservative method of treatment in an early case—inability of the patient to accept the treatment quietly; and the presumptive presence of large quantities of fluid (in this case beer) in the peritoneal cavity. The same consideration would apply when the stomach is dilated behind an obstruction, such as a stenosing ulcer, unless treatment has been prompt. Too much must not be asked of the peritoneal defence, and a limit must be recognised to the applicability of the treatment from this point of view. That this limit is fairly wide is suggested by the fact that the 28 cases were consecutive, though manifestly the sequence should have been interrupted by one case for operation.

CASE-REPORTS

CASE 1.—Man, aged 49; long history of duodenal ulcer; perforated 4 hours. Gastric aspiration for 10 hours. Pain and tenderness diminished. Assistant (P. H.) operated "to make sure perforation was really sealed." This was confirmed, and 10 oz. of sterile fluid was removed from peritoneal cavity. Recovery.

CASE 2.—Man, aged 31, with 6 years' history of duodenal ulcer; perforated 3 hours. Conservative treatment. Rigidity and tenderness subsided in 2 days. Patient went home in 3 weeks.

CASE 3.—Man, aged 57, with 3 years' history of duodenal ulcer; perforated 7 hours, 2 hours after a meal. Pain and tenderness subsided with 48 hours' aspiration, but abdomen was rather distended. Pulse-rate 100–110.

Assistant (R. E. R.) operated on diagnosis of ileus after 2 days. Suprapubic incision only; 2 oz. of sterile fluid removed. Drain inserted. Patient improved for 2 days, then distension increased, and patient looked worse. Pulse-rate slowly rose. Patient improved with Miller Abbott tube but continued ill.

Operation (H. T.) after 7 days. Obstruction of small gut in pelvis, dilated above and collapsed below an adherent kink where suprapubic tube had been. This was freed, but patient died 6 hours later.

At necropsy perforation was found to be securely sealed by liver. No intraperitoneal collection of fluid. Death from toxæmia of intestinal obstruction due to the drainage-tube.

CASE 4.—Man, aged 52, with 10 years' history of duodenal ulcer; perforated 3 hours, $^1/_2$ hour after a meal. Pain disappeared after 12 hours' aspiration. Tenderness gone in 3 days. Home in 4 weeks. Uneventful recovery without operation.

CASE 5.—Man, aged 61, with 15 years' history of duodenal ulcer; perforated 5 hours, soon after a meal. Poor physique, chronic bronchitis and emphysema. Dyspnœa on exertion. Enlarged prostate and chronic retention.

Pain and tenderness subsided with 48 hours' aspiration. Distension amounting to ileus persisted 5 days and then subsided. He recovered after some anxiety regarding the ileus. A very poor operation risk.

Twelve months later he was operated on for recurrence of symptoms: duodenal ulcer with membranous adhesions to liver. Gastro-enterostomy. Recovery.

CASE 6.—Man, aged 24, with 2 years' history of dyspepsia; perforated 2 hours, having had a meal 2 hours before. Patient improved with 18 hours' aspiration, but tenderness and rigidity remained diffuse. Operation (H. T.) therefore undertaken as precaution. Pyloric region adherent by fibrin to liver, not disturbed. Two ounces of peritoneal fluid—sterile. No drain. Patient did well as regards abdomen. Post-operative persistent fever and cough. Sputum contained tubercle bacilli. Radiography showed tuberculosis of left apex. Patient was last heard of in a north Irish sanatorium, doing well.

CASE 7.—Man, aged 35, with 15 years' history of duodenal ulcer; perforated 4 hours. Pain-free after 24 hours' aspiration, home in 2 weeks. Uneventful recovery.

CASE 8.—Man, aged 23, with 4 years' history of duodenal ulcer; perforated $1^1/_2$ hours. Pain-free after 24 hours' aspiration, abdomen soft in 48 hours. Uneventful recovery.

Subsequent recurrence of ulcer. Operation 4 months later. Membranous adhesions between ulcerated duodenum and liver. Gastro-enterostomy. Recovery.

CASE 9.—Man, aged 45, with 4 years' history of duodenal ulcer; perforated $3^1/_2$ hours, 1 hour after a meal. Patient improved after 28 hours' aspiration. Persistent general though diminished rigidity and rising pulse-rate indicated operation (H. T.). Perforated duodenal ulcer found sealed off by liver. Peeled off and sutured. Collections of fluid in pelvis and right flank each drained with tube. Fluid sterile.

Patient did well. Operation was probably necessary to drain the fluid. Nothing was lost by 28 hours' delay. Fluid was sterile, and ulcer sealed off.

CASE 10.—Man, aged 36, with 18 years' history of duodenal ulcer; perforated $1^1/_2$ hours, 3 hours after a meal. Pain subsided in 6 hours. Tenderness persisted in right flank, where a fullness indicated a fluid collection. This persisted 4 days, and local drainage was decided on. While being prepared for operation, patient "went black" and died instantly.

At necropsy pulmonary artery and right auricle were found filled with curled up ante-mortem clot from deep iliac and inferior caval veins. Death from pulmonary embolism. Sterile collection of clear yellow fluid in right subphrenic space. No peritonitis. Duodenal perforation well sealed off by liver.

CASE 11.—Man, aged 36, with 1 year's history of duodenal ulcer; perforated for 2 hours, 1 hour after a meal. Pain-free after 6 hours' aspiration. Tenderness gone in 2 days. Uneventful recovery.

CASE 12.—Man, aged 26, with 2 months' history of dyspepsia; perforated for 3 hours, $^1/_2$ hour after a meal. Pain-free after 24 hours' aspiration. Tenderness in right flank persisted 4 days. Given penicillin as temperature was 102° F. Uneventful recovery. Radiography showed pyloric ulcer.

CASE 13.—Man, aged 67, with history of chronic bronchitis, angina of effort, 10 years' history of dyspepsia; ulcer perforated for 3 hours, 9 hours after a meal. Pain-free in 24 hours. Tenderness gone in 3 days. An ill man on admission. Doubtful if he would have survived operation. Steady recovery on aspiration.

CASE 14.—Man, aged 47, with 18 months' history of duodenal ulcer; perforated for 2 hours, 4 hours after a meal. Pain lasted 2 days on aspiration. Tenderness in right flank persisted 6 days—subsided. Steady recovery, though slower than usual.

CASE 15.—Man, admitted moribund, aged 65, with chronic phthisis, chronic retention of urine, repeated melæna, 12 months' history of failing health, 10 years' history of dyspepsia; ulcer perforated for 24 hours.

It was intended to operate on this patient if he could be improved sufficiently. Aspirated 11 hours until death. At necropsy two ulcers were found, one on middle of lesser curve, and one prepyloric, which had recently perforated and been sealed off by liver. Thin peritoneal fluid, not cultured. Tuberculous lungs, degenerate myocardium.

Case 16.—Man, aged 50, with 10 years' history of dyspepsia; perforated $2^1/_2$ hours. Patient had drunk two pints of beer to relieve pain. Pulse-rate 120. Uncontrollably restless, fought the nurses, pulled out his stomach-tube, drank his mouth-wash. Tenderness diminished under treatment, but abdomen became distended and remained so. After enema on third day patient had another sudden pain and condition deteriorated. Re-perforation diagnosed.

Operation (C. A.) in extremis. Suprapubic drainage of pouch of pus. Patient died 3 hours later. Necropsy showed anterior duodenal ulcer, not adherent. A ring of fibrin round it and on the under surface of the liver suggested that the two surfaces were adherent at one time and had separated again. Dilated intestines. Loculations of pus in various parts of abdomen. Death from peritonitis and ileus.

I should have operated on this man in view of the beer he had drunk and his resistance to the treatment.

CASE 17.—Man, aged 26, with 3 years' history of duodenal ulcer; perforated for 4 hours, 2 hours after a meal. General tenderness persisted 48 hours before resolving. Pulse-rate 112, slowly decreased. Residual tenderness in right flank subsided after 6 days. Rather delayed resolution followed by steady recovery.

CASE 18.—Man, aged 41, with 12 years' history of duodenal ulcer; ulcer perforated 2 hours before admission, while patient was at luncheon. General pain disappeared in 4 hours. Tenderness in right side lasted 24 hours. Uninterrupted recovery.

CASE 19.—Man, aged 32, with 4 years' history of duodenal ulcer; perforated for $1^1/_2$ hours, 3 hours after a meal. Pain gone in 24 hours, tenderness gone in 48 hours. Uninterrupted recovery.

CASE 20.—Man, aged 46, with 16 years' history of duodenal ulcer; perforated 6 hours. Pain subsided in 24 hours, tenderness gone in 4 days. Uninterrupted recovery.

CASE 21.—Man, aged 63, with hyperpiesis, dyspnœa, and cyanosis, and 2 years' history of dyspepsia; perforated $4^1/_2$ hours. Pain subsided in 3 days. Patient nearly died of heart-failure in first 3 days. Diagnosis of perforation proved by gas under right dome of diaphragm; patient could not have survived operation.

CASE 22.—Man, aged 65, with chronic bronchitis, dyspnœa, 30 years' history of duodenal ulcer; perforated 2 hours. Tenderness subsided in 3 days. Uninterrupted recovery.

CASE 23.—Man, aged 28, with no history of previous dyspepsia; perforated for 1 hour, 4 hours after a meal. Pain subsided in 6 hours, tenderness gone in 2 days. Uninterrupted recovery. Radiography showed duodenal ulcer.

CASE 24.—Man, aged 23, with 7 years' history of duodenal ulcer; perforated for 5 hours, 1 hour after a meal. Smooth rapid subsidence of pain. Uninterrupted recovery.

CASE 25.—Man, aged 31, with 10 years' history of duodenal ulcer; perforated for 1 hour, $^1/_2$ hour after tea. Pain subsided in 2 days. Tenderness persisted 3 days, with slight degree of ileus. Slow but steady recovery.

CASE 26.—Man, aged 36, with 16 years' history of duodenal ulcer; perforated for 3 hours, 6 hours after a meal. Pain gone in 6 hours, no tenderness after 3 days. Uneventful recovery.

CASE 27.—Man, aged 50, with 10 years' history of dyspepsia; perforated while visiting wife in hospital. Gas below diaphragm. Pain gone in 24 hours, no tenderness after 4 days. Uneventful recovery.

CASE 28.—Man, aged 65, with 20 years' history of dyspepsia; perforated 8 hours, 1 hour after a meal. Low vitality; cold and collapsed. Pain subsided in 12 hours, tenderness in 3 days. Uneventful recovery. Gastroscopy on 10th day showed a healing lesser-curve ulcer at the incisura. Doubtful if he would have survived operation.

MORTALITY AND MORBIDITY

Several of the patients were very poor surgical risks indeed and would have stood little chance with operation. Cases 5, 13, 15, 21, and probably 22 and 28 may be placed in this category without postulating any post-operative complications in the others.

Mr. Ian Soutar, my house-surgeon, investigated the hospital results under the old régime to compare with those we were obtaining, and to sustain our wavering morale after the tragedy of case 16. He found that in the preceding five-year period there were 77 perforated ulcers of less than twenty-four hours' duration, the average time being five and a half hours. Of these patients 14 died, a case-mortality of 18%. More than half the deaths were due to heart-failure or to pneumonia, an interesting comment on the bad-risk cases that were *not* operated on in my series. The postoperative morbidity-rate *among the survivors* was 46%, half of these being from pulmonary disease, and a quarter being associated with wound infection, breakdown, or subsequent hernia. It is obvious that there is a great deal to be gained by not operating if this can be achieved.

The 24 patients who recovered left hospital in 2–4 weeks. If it be conceded that the pulmonary embolus, the intestinal obstruction, and the moribund patient may be excluded from consideration of the mortality incurred by the conservative method of treatment, the result is 1 death in 25 cases. As a first series, these figures are promising, and they may be improved by further experience if a repetition of case 16 can be avoided.

DISCUSSION

If these early results are confirmed by further experience, it will seem that, in a district where the medical organisation is good, most patients with perforated ulcer admitted early to hospital need not be submitted to operation. Surgical intervention should be reserved for late cases, patients with pyloric stenosis and gastric dilatation, and those who have ingested a large quantity of fluid just before or after the perforation.

For sparsely populated districts, ships at sea, or any case where trained surgical help is not immediately available, the treatment described above, or a modification of it, may be given by a general practitioner or a nurse, or on board ship possibly by an untrained person, if a stomach-tube and syringe are available. Gastric aspiration should certainly be used in any case of perforation that has to wait long for a surgeon.

In this series all the perforations except two were duodenal; it remains to be seen whether gastric perforations behave similarly.

SUMMARY

Early perforations will seal themselves if the stomach is emptied and kept empty by aspiration.

Gastric contents in the peritoneal cavity will be sterilised and absorbed if the leakage is not gross and the contamination is not repeated.

Of a consecutive series of 28 perforations treated by gastric aspiration instead of operation, 24 patients recovered. Of the 4 deaths, 3 were not related to the conservative method of treatment.

It is suggested that the technique described is worthy of extended trial in early cases, operation being reserved

for cases with gross flooding of the peritoneal cavity or late cases with established peritonitis.

The conservative method can be applied where surgical help is not available.

My thanks are due to the nursing staff of King George Hospital, Ilford, for their enthusiastic coöperation in this work; and to the resident surgical officers, Mr. R. E. Raynaud and Mr. Charles Allen, to the surgical registrar, Mr. Philip Hopkins, and to my house-surgeons, Mr. Ian Soutar and Mr. M. J. Whelan, on whose clinical judgment and reports I largely relied in the management of my cases.

SENSITIVITY TO PENICILLIN

ANAPHYLAXIS AND DESENSITISATION

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ONLY a few cases of skin sensitisation to penicillin have been reported up to now in the medical journals available in the Middle East. Pyle and Rattner (1944) reported one case of epidermal sensitivity, and Binkley and Brockmole (1944) two cases. Silvers' case (1944) was in a chemist engaged in penicillin research. Criep (1944) reported a case of acquired allergy to penicillin after repeated intramuscular injections; generalised urticaria developed on the resumption of injections after an interval of ten days. Two patients who had been treated with penicillin sprayings for skin affections were admitted to a military hospital in the Middle East because their skin condition had worsened while under treatment. On examination they were found to be skin-sensitive to penicillin.

One of them, the subject of this report, was given an intramuscular injection of 15,000 Oxford units of penicillin and responded with a violent anaphylactic shock. He willingly submitted to experimental investigations and attempts to desensitise him with injections and later by oral administration of penicillin. The second patient was unwilling to undergo extensive experimental investigations, and will not be referred to further. Importance is attached to the first case not only because desensitisation was successfully produced but also because it was done by the oral administration of penicillin.

CASE-RECORD

Bombardier A, aged 30, gave no history of serious general diseases or accidents. He had always had a dry scalp and thin hair. About 14 years ago he had a mild rash in his groins for a few days. In England the summer sun regularly caused some dryness and peeling of the skin of his face. There was no history of asthma, hay-fever, eczema, or migraine in him or his relations, nor of any idiosyncrasy. He had spent six months in the M.E. before his admission to hospital. The sun in the M.E. did not affect his skin more than it used to in England. In June, 1944, some fissures appeared on the webs of the left foot with irritation. When these had been present for 3 weeks he showed them to the M.O. of his unit, who ordered three-hourly sprays of penicillin 200 units per c.cm.; this spraying was done five times daily for a week, without noticeable benefit. The skin subsequently cleared with bland ointments.

In October, 1944, he had an abscess over the left jaw, and penicillin sprays were again used for three days before incision. Two weeks later a rash broke out on the lower part of his face and on his left foot. He was admitted to the skin department of this hospital, where he was treated for two weeks as for seborrhœa with ointments of zinc oxide, castor oil, olive oil, and lime water, and the foot and face cleared. On Dec. 4, 1944, when on duty, his foot condition recurred and he was admitted to the regimental sick-quarters for ten days, where his foot was again sprayed five times daily. At the end of this time the condition of his foot had worsened and an eruption had broken out on his face.

CONDITION ON ADMISSION

On admission to the hospital on Dec. 14 he was noted to be an active, intelligent, fair-haired, and slightly bald man, weighing 143 lb., B.P. 120/85 mm. Hg, with no discernible visceral or nervous disease. The blood-count and urine were normal. His face, forehead, and the front of his neck were red. There was a mild œdema of the upper lip and round the nose and eyebrows, and a vivid small papulomacular rash on his cheeks and the front of the neck. The dorsa of the left toes and foot were red, slightly swollen, and shiny. No fungi were found microscopically in scrapings from the affected skin areas. This history suggested an abnormal response of his skin to penicillin applied externally.

PATCH TEST

A solution of penicillin containing 200 units per c.cm. was applied on scarified and unscarified areas on his back. A fourfold pad of lint was soaked in penicillin and applied five times daily at 3-hr. intervals through a windowed occluding square of 'Elastoplast.' As a control, on two other areas the pads soaked in penicillin were left unchanged until taken off. The scarified area where the pad was changed three-hourly became red, mammillated, and moist—i.e., positive—after 21 hrs. All the others, changed or unchanged, became equally positive 48 hrs. from the first application.

INTRADERMAL TESTS

An intradermal test was carried out with 0·2 c.cm. of saline containing 4 units of sodium penicillin. This produced a red blush with a paler central weal after 3 hrs. The local erythema persisted for over 2 weeks. The same amount of normal saline injected intradermally into the other arm produced an erythema which disappeared after 48 hrs.

SPRAY TESTS

To confirm the diagnosis we sprayed the patient's face and foot with a solution of penicillin containing 200 units per c.cm. three-hourly. After five sprayings his face became vividly red, swollen, and covered with an oozing fragile vesicular eruption. He complained of a severe local itching and burning sensation. The foot reacted similarly but not so much.

ANAPHYLACTIC SHOCK

On the 17th the patient was given an intramuscular injection of 15,000 units of sodium penicillin (American manufacture) in a surgical ward. Aseptic precautions were observed, and the solution was taken from a rubber-capped bottle which was in use also for other patients. Just before the injection his pulse-rate was 64 per min., temperature 97·4° F, and white-cell count 8000 per c.mm. (polymorphs 71%, eosinophils 6%, lymphocytes 20%, and monocytes 3%). Fifteen minutes after the gluteal injection his pulse-rate rose to 80, and he complained of a throbbing in his face; five minutes later he complained of breathlessness, the pulse-rate became very quick, and soon afterwards he was restless, very pale, cold, and covered with a cold sweat, and then his bed was shaken by a violent rigor; his teeth chattered, his breathing was shallow, and his pulse thready and its rate uncountable; he slowly recovered, being tired and weak for a couple of days. His white-cell count about 3 hrs. after the shock was 10,200 per c.mm. (polymorphs 58%, eosinophils 3%, lymphocytes 29%, and monocytes 10%). His temperature remained normal.

Six hours after this injection into the buttock, the patient's face swelled, reddened, and oozed all over. His right eye, which was already showing mild conjunctivitis, became very red and weeping, with some photophobia.

SENSITIVITY AFTER SHOCK

A penicillin patch test was again applied as before to determine whether this notable unexpected anaphylactic shock from the penicillin had desensitised him. The tested areas were irritating and pink—i.e., moderately positive—on the next day and became markedly positive on the third day. On Jan. 17, 1945, a limited area of his face was again sprayed at 3-hr. intervals with the 200-unit solution of penicillin. This produced a severe local reaction, the skin becoming red, swollen, and moist, a condition which lasted eleven days.

ACTINIC REACTIONS

On Jan. 10, 1945, Bdr. A casually exposed himself to the M.E. winter sun. Approximately 2 hrs. later a moist red rash appeared behind his ears. As an experiment, squares of his back were exposed to the sun on the afternoon of Jan. 11 through windowed black paper; next day the sites

which had been exposed for $^1/_2$ hr. were brown, 1 hr. pink, and 2 hrs. red. A small area of the back exposed to an ultra-violet lamp on Jan. 14 gave a mild erythematous reaction after a $^1/_2$-min. exposure at a distance of 2 ft.; an equally blond patient did not react to twice this dosage.

DESENSITISATION

Shock in penicillin therapy raises two questions: (1) whether a penicillin-sensitive patient in immediate need of injections of this drug, and having reacted with an anaphylactic shock to a full injection dose, can be even temporarily desensitised with injections of small and increasing doses of penicillin at short intervals, given in the Bezredka style to prevent serum shock, so that full-dose therapeutic injections can be started without delay; and (2) whether a patient can be desensitised by continuous administration of small doses of penicillin for a longer period.

In an attempt to find an answer to the first question 100 units of American sodium penicillin was injected under the skin with the intention of repeating the injection a short time later, intramuscularly, with increasing doses. After 25 min. the patient, Bdr. A, experienced shock similar to that caused by the first injection of 15,000 units, but less intense and less prolonged.

It is probable that starting with smaller doses we could eventually inject a full dose without incident, but such a technique would require a long time, many injections, and much discomfort for the patient. The problem of urgency could not be solved in this way. It remained to try the oral route used by Lieut.-Colonel C. J. H. Little and Captain G. Lumb, of the Central Pathological Laboratory, M.E. Their communication (Little and Lumb 1945) was published after our experiment had started with Lieut.-Colonel Little's counsel.

Fifteen minutes before the administration of penicillin, 4 oz. of milk mixed with one teaspoonful of sodium bicarbonate was given to the patient to drink. Fifteen minutes later American sodium penicillin 15,000 units in 2 oz. of milk, beaten up with a raw egg and a little sugar added for flavour, was given by mouth.

On Feb. 23 the first dose of penicillin was given by mouth. After $1^1/_2$ hrs. the patient complained of a burning sensation on the face. About $2^1/_2$ hrs. after the dose the face became pink and later turned red. The redness gradually increased in intensity and spread down the neck, and a mild œdema of the cheeks and eyelids appeared. The colour of the face returned to normal 10 hours after the first dose, but the skin of his rt. ear was irritating and discharging; during this time the patient was in bed and out of the sun.

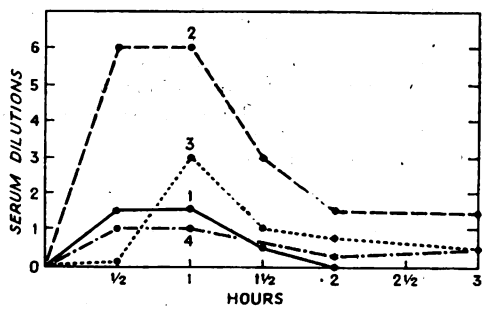
Next day, before having his second dose, the exuding dermatitis round the rt. ear had increased, and the redness of the whole face had reappeared, with more fine scaling as compared with his condition before the treatment began. The temperature and pulse-rate continued normal, and the general feeling good. The blood-count did not vary. On this 2nd day the patient had three doses orally of penicillin 15,000 units each at 3-hr. intervals. After each dose the same skin reactions were noticed as after the first.

Two days after the beginning of the desensitisation treatment, after four doses of 15,000 units in all, the face was very sore and the rash had extended gradually to the whole of his face. The area of exudative erythema increased, and there was much more scaling of the forehead and scalp. The temperature and pulse still remained normal, but the white-cell count rose to 16,000, with an unchanged differential count. In the next 24 hrs. the patient received eight doses of 15,000 units at 3-hr. intervals. He then, Feb. 26, complained of general malaise and was a little drowsy. The orbits, cheeks, ears, and lips were very swollen and red. The ears and the angles of his mouth were moist and fissured. The rest of the face, neck, scalp, and upper part of the sternum were papular, red, and scaling. The rt. foot, the one which was initially sprayed with penicillin, was now red and moist. The groins and scrotum were slightly red.

The daily doses were subsequently decreased to four given at 3-hr. intervals as before and then gradually again increased to eight as the symptoms subsided after ointments. On the 12th day of oral penicillin, March 3, the face, foot, and groin were dry and peeling. The patient then had eight doses of 15,000 units daily, without any other discomfort than a transient mild diarrhœa and frequent micturition. He was well enough to be up. The white-cell count gradually decreased to remain about 9000, with a normal differential count, until the completion of desensitisation. Frequent analyses of the urine showed no abnormality.

On the 13th day of treatment, March 7, the patient received a subcutaneous injection of American penicillin 100 units without showing or feeling any reaction. The next day he received an intramuscular injection of 15,000 units without any general effect. There was a slight soreness and an increase of peeling on the face within 24 hrs. The 3-hourly full oral doses were continued for another 5 days and then stopped.

To estimate progress, penicillin spray with the 200-unit solution was again tried on the patient's face on March 13. After four applications the face became red, sore, and irritating. Although this reaction was much milder than before desensitisation was started, the skin was still sensitive. American penicillin 15,000 units was injected the next day, to see if such a dose could still be tolerated without anaphylactic shock. No ill effect was observed.



Bacteriostatic power of serum after oral administration of 15,000 units of penicillin. Curve 1: three days after start of desensitisation course. Curve 2: sixteen days later. Curve 3: after completion of desensitisation course. Curve 4: control.

Because of the partial state of skin desensitisation, oral penicillin was resumed at the rate of six daily doses of 15,000 units each, at 3-hr. intervals, so as not to disturb the patient in the night. This was continued for a further 11 days, without producing any general or skin symptoms. The desensitisation treatment had now lasted 30 days. The penicillin sprays on Bdr. A's face were repeated on March 16 and again were followed by puffiness of the eyelids, reddening of the cheeks and neck, and exudation on a very small area below the ear lobules.

On April 4 Bdr. A's face was sprayed with a solution containing 10 units of penicillin per c.cm. to ascertain the degree of remaining sensitivity of the skin after 30 days of desensitisation therapy. There was no reaction.

On April 9—i.e., 2 weeks after oral penicillin was stopped—his face was again sprayed with the 200-unit solution five times at 3-hr. intervals. Only a mild peeling and two small areas, about $^1/_4$ in. across, of dried-up exudate were noticed under each ear lobule the following morning; so small a reaction needed no treatment.

Walking in the sun for about 1 hr. next day provoked a peeling and slight redness of the ears and round the nose. Small squares of his back, exposed for $^1/_2$ hr., 1 hr., and 2 hrs. to the M.E. midday sun of April now gave the same reaction as on a normal blond control patient. Experimental exposures of small squares of his back to a quartz mercury-vapour lamp gave a very faint erythema after $^1/_2$-min. exposure. With continued exposures of his face to the sun the intensity of the actinic reaction gradually decreased, and on April 25 his face did not react to a 3-hr. exposure to the sun.

PENICILLIN CONTENT OF BLOOD-SERUM

Estimations of the penicillin content of the blood-serum were carried out for us. The first estimation was done in the blood drawn off 3 days after the beginning of the desensitisation treatment. Bdr. A had already had thirteen doses of 15,000 units each of penicillin. The estimation was repeated on 3 consecutive days (see figure, curve 1). Another estimation was made 16 days later, just before oral penicillin was stopped and 5 days after the patient had been tested with an intramuscular injection of 15,000 units, without producing anaphylactic shock (see figure, curve 2). The final estimation was made on April 13 after the last spray test on the face, 2 weeks after the end of oral treatment with penicillin; so, to make the conditions similar to those at the previous blood estimations, Bdr. A was given another nine doses of sodium penicillin, 15,000 units each, at 3-hr. intervals before the test (see figure, curve 3). The control (see figure, curve 4) was also given nine doses of sodium penicillin by mouth before the test.

These estimations were made for us by Lieut.-Colonel Little, R.A.M.C., on blood samples taken off $^1/_2$ hr., 1 hr., $1^1/_2$ hrs., 2 hrs., and 3 hrs. after oral administration of the

drug. The slide-cell method was used for estimations given in curves 1 and 2, and the petri-dish cover-slip, substituted for the ordinary slide-cell, for the estimations given in curves 3 and 4. The test organism was the Oxford *Staph. aureus*. The following dilutions of serum were used: undiluted serum, the 1 : 2 solution, 1 : 4, and 1 : 8. When bacteriostasis was complete in one dilution and distinctly partial, as compared with the control, in the next highest, it was assumed that bacteriostasis would be complete in a dilution half-way between the two.

DISCUSSION

The skin reactions to penicillin, however used, externally, intramuscularly, or orally, were limited to the areas initially treated with penicillin—i.e., face, neck, and foot. The rest of the skin remained clear throughout all the investigations and desensitisation treatment, except for the positive patch tests on the back and the intradermal test on the arm. The fact that the face reacted much less after the last test spray on April 9 with the 200-unit solution than after the previous one on March 27 with a solution of the same strength, although the patient had no further desensitisation treatment by the mouth, could perhaps be explained by abolition of the residual sensitivity of the skin of the face by the two sprayings before the last one—i.e., the antepenultimate with the 200 units per c.cm., and the penultimate with the 10 units on April 4.

Our aim in this case was primarily the desensitisation of the allergic patient, yet this record may perhaps contribute a little to the question of absorbability and therapeutic effectiveness of penicillin when given by the mouth, a special research on which work has since been published (Little and Lumb 1945). We searched for but failed to find microscopically any fungi, although the foot lesions led us to suspect antecedent epidermophytosis. We could not obtain trichopytin vaccine to test this possibility. Jadassohn et al. (1937) thought there was a common antigen in all the fungi present besides the specific ones; but Feinberg (1944) found that persons clinically sensitive to penicillin spores did not give a positive skin reaction to the penicillin drug. This was confirmed by Criep (1944), whose patient with penicillin urticaria gave a negative result to a patch test with penicillin extract.

The curves shown in the accompanying figure can probably be explained on the assumption that the antibody and antigen interact to form a compound which is slowly eliminated from the body, a reaction which is reversible, leading to disintegration of this compound. Thus, the difference between curves 1 and 2, showing the penicillin content of the blood-serum in progressive stages of desensitisation three days and nineteen days respectively after the start of desensitisation treatment, can be explained in the following way. In curve 1, the sensitivity being still at its height, antigen-antibody linkage and consequent bacteriostatic neutrality of the compound in the serum are the predominant factors, the reversible reaction, the disintegration of the compound into its constituents, playing in this stage a secondary rôle only. Curve 2 represents the total amount of penicillin coming into circulation after absorption from the intestinal tract as well as from disintegration of the antigen-antibody compound.

Curve 3 represents the free penicillin content of the blood at a later stage, when there was still a very mild skin sensitivity after the treatment with penicillin had stopped 2 weeks previously. This curve shows no free penicillin present in the $^1/_2$-hr. specimen; it had been taken up by the remaining antibody-antigen; but, owing to the great dilution of this compound, and as the antibodies at that stage were less numerous, it immediately underwent disintegration, and the freed penicillin gave, with the penicillin absorbed from the intestines, the conspicuous peak shown in the 1-hr. specimen. This curve is so much above the level of curve 4 given by the control patient that this additional factor—i.e., the freeing of the penicillin administered an hour previously—must be taken into consideration.

SUMMARY

The case is recorded of a patient who became sensitive to penicillin in the course of ordinary dermatological treatment with penicillin spray.

Anaphylactic shock followed an intramuscular injection of penicillin.

Oral administration of penicillin brought about complete desensitisation, abolishing superficial skin hypersensitivity and the shock effects of parenteral penicillin.

Actinic sensitivity developed and faded pari passu with penicillin sensitivity.

An explanation is offered, in terms of antigen-antibody theory, of the differences found in the penicillin content of the blood during desensitisation and in a control.

A grateful note must be made of the assistance given us in counsel and practice by Colonel M. T. Findlay, A.M.S., and Major A. Kirshner, R.A.M.C., pathologist to the hospital.

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TREATMENT OF INFANTILE PELLAGRA

ASSESSMENT OF THE VALUE OF PROTEIN HYDROLYSATES

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IN previous publications we drew attention to the syndrome of malnutrition in African infants and children. In its acute form this expresses itself as a characteristic dermatosis, with varying grades of œdema, hypoproteinæmia, steatorrhœa, or diarrhœa. The case-mortality can be very high and this is related to the severity of the fatty change in the liver which appears essentially in the early stages of the disease. By carefully selecting comparable cases, on the criterion of the extent of the fatty change in the liver, it became possible, by serial biopsies, to assess the value of different forms of therapy on the liver and on the course of the disease (Gillman and Gillman 1945a, b, c, d).

In our hands gastric extract ('Ventriculin,' P.D. CO.) has thus far proved to be the most satisfactory form of treatment in this disease in which the case-mortality may fluctuate between 40% and 60% over a number of years. This finding has since been confirmed by Trowell and Muwazi (1945) on a small series of cases.

The lack of constant supplies of gastric extract made it possible to treat only a limited number of cases at a time. While waiting for further supplies we were constrained to use other forms of therapy. As a consequence, groups of cases were treated intermittently in different ways over a period of three years. Protein hydrolysates only became available to us about nine months ago. The following is a résumé of the various therapeutic measures adopted in 161 infant pellagrins.

All cases received the standard dietaries recommended for infants and children according to their age and weight. Supplements were added as follows:

(*a*) *Vitamins:* Thiamine 60 mg.; nicotinic acid or amide 100 mg.; riboflavine 2 mg.; brewers' yeast 4 g.; 15,000 units vitamin A and 1500 units of vitamin D as fish-liver oil.

(*b*) *Liver extracts:* By mouth, liquid extract of liver (B.D.H.) By injection, 5 c.cm. crude liver extract (Lilly) intramuscularly twice daily.

(*c*) *Dried stomach:* Ventriculin 5 g. by mouth twice daily for four to six days.

(*d*) *Dried stomach+vitamins:* 'Ventron' (P.D. CO.) two capsules three times daily. Each capsule contains: ventriculin concentrate gr. 5 (equivalent to 1 g. original ventriculin); thiamine 20 I.U.; riboflavine 5 Sherman units; and iron and sodium citrate gr. 2 (0·13 g.).

(*e*) Details of the *protein hydrolysates* and the mode of administration are mentioned in the text.

RESULTS

The results with the various forms of treatment used are summarised in the table.

RESPONSE OF 161 INFANT PELLAGRINS TO VARIOUS FORMS OF TREATMENT IN COMBINATION WITH A FULL DIET

Treatment	Total cases	Improved	Died
		%	%
Diet alone	10	6 (*60*)	4 (*40*)
Diet and vitamins	36	8 (*22*)	28 (*78*)
Liver extract (injection) ..	10	7 (*70*)	3 (*30*)
Oral liver extract+vitamins ..	15	4 (*27*)	11 (*73*)
Protein hydrolysate	20*	6 (*30*)	12 (*60*)
Dried stomach	50	47 (*94*)	3 (*6*)
Dried stomach+vitamins ..	20	13 (*65*)	7 (*35*)

* Two of these cases deteriorated so rapidly that treatment was changed.

Dried Stomach.—The case-mortality (6%) among the 50 cases receiving ventriculin is by far the lowest recorded for this malnutritional syndrome. In the small number of cases that die, even after ventriculin, the histological appearances of the livers differ in some important respects * from the most severely fatty livers of infants previously described (Gillman and Gillman 1945a, b, c, d).

Ventriculin breaks the vicious cycle operating in malnourished infants. This is evident from the sudden diuresis and the gradual disappearance of fat from the liver. Once this is achieved further treatment with ventriculin is unnecessary and the infant is capable of utilising effectively the constituents of a hospital diet.

Although gastric extracts have, thus far, proved successful in our hands, it is very likely that the vicious cycle may be broken by other methods, which remain to be discovered.

Dried Stomach and Vitamins.—The addition of vitamin concentrates and iron (thiamine and riboflavine) to ventriculin, as in the preparation ventron, significantly diminishes the effectiveness of the gastric extract, for the case-mortality among the ventron-treated cases was 35%. This chance finding was virtually forced on us by the fact that ventron, for a time, was the only form of gastric extract available to us.

Liver Extract by Injection.—In the absence of ventriculin, liver extract by injection is the treatment of choice. The case-mortality with this was 30% (see table).

Oral Liver Extract+Vitamins.—When liver extract is administered by mouth in combination with vitamins (thiamine, nicotinic acid, and cod-liver oil) the case-mortality rises to 73%. In a group of children treated with vitamins in conjunction with the hospital diet the case-mortality rose to 78%, the highest yet recorded by us for this syndrome. Most of these cases were treated by other physicians attending at the hospital. They were either unaware of the value of liver extracts and ventriculin or they were unable to obtain these products and therefore persisted with large doses of vitamin concentrates given orally and parenterally.

It may well be that the extremely high mortality was due to the massive doses of synthetic vitamins administered to these malnourished infants (up to 120 mg. thiamine and 300 mg. nicotinic acid daily, together with cod-liver oil). This we suspect from the fact that vitamins, added to ventriculin or liver extracts, were associated with an increased case-mortality (see table).

Protein Hydrolysates.—Our results with protein hydrolysates were most disappointing. Having read the numerous reports eulogising the value of these hydrolysates we had hoped that our cases might have responded to this new form of treatment.

The only reason for persisting with protein digests in the face of such discouraging results is that, from time to time, new preparations became available and it was thought that one of these might ultimately prove useful. Three different types of protein hydrolysates were used in the following manner:

(*a*) A local casein digest: 1 g. three times daily as a broth (8 cases).

(*b*) 'Pulvesco': a whale-meat digest kindly supplied by Dr. B. A. Dormer, chief tuberculosis officer for the Union. As directed, the children received one teaspoonful of this powder three times daily, together with 'Casec' feeds (5 cases).

(*c*) 'Pronutrin': an enzymatic digest of casein (7 cases). Our patients received the recommended dose—2 g. of pronutrin per kg. of body-weight per day. The dose was gradually increased, as recommended, to 4 g. per kg., which was given in 500–1000 c.cm. of 5% glucose saline. The total volume of fluid was administered by intragastric drip, only 50–100 c.cm. being allowed to enter the stomach in an hour. This small amount of fluid was run in every alternate hour, day and night.

All the 8 patients treated with a locally prepared casein hydrolysate died within three to five days. Our experience with the last 3 cases of the series discouraged us from further trial of this product. These were admitted on the same day and were treated concurrently. For no apparent reason 2 developed temperatures of 105° F within 24 hours. No cause for this unusual pyrexia could be discovered at autopsy. We were led to suspect that the therapy, at least in part, was a contributing factor, especially as a similar instance of hyperpyrexia following the administration of protein hydrolysates has recently been described (Curreri et al. 1945).

Five cases were treated with pulvesco. Slow recovery was noted in 2 of these cases, while the remaining 3 died.

Pronutrin was also unsatisfactory in the 7 cases treated. Two cases, initially considered mild, both on clinical grounds and on the basis of the liver structure, deteriorated so rapidly that after four to six days the treatment was changed in the interest of the patients. Of the remaining 4, 1 recovered rapidly and the other 3 very slowly; 1 patient died.

The recent literature contains reports of the ineffectiveness of the majority of protein hydrolysates in the treatment of hypoproteinæmia in dogs (Madden et al. 1945). Severe hypoproteinæmia with œdema and anæmia has even been *produced* in pigs by feeding casein digests in a particular dietary setting (Cartwright et al. 1945). In the light of these findings the 60% case-mortality in our series of cases treated with protein digests is not difficult to understand.

DISCUSSION

It is clear from our findings that the administration of protein hydrolysates to infants with nutritional hypoproteinæmia, &c., fails to raise the plasma proteins, fails to resolve the œdema, and in fact appears to increase the mortality significantly above that observed in patients treated by graded increases in the diet alone. Only occasional cases appear to be capable of utilising these digests of casein. In the majority, the administration of these drugs appeared to aggravate the condition.

In this regard, the observations by Daft and collaborators (1938) are pertinent. These workers reported that "overloading" hypoproteinæmic dogs with plasma resulted in toxic symptoms with the excretion of greater

* Description of these differences is beyond the scope of this note but details will be made available in a monograph on malnutrition now in preparation.

quantities of nitrogen than could be accounted for by the amounts of protein in the administered plasma. It appears that "overloading" is a purely relative term. It may well be that our cases were incapable of utilising hydrolysed casein by virtue of the extensive liver damage present, and, more especially, because their metabolic apparatus could not adjust itself sufficiently rapidly to utilise these concentrates. If "overloading" were indeed responsible for the untoward results obtained then it is clear that criteria are needed for determining the dosage of protein hydrolysates to be administered to each case. Until such time as these criteria become available we feel that the administration of protein hydrolysates remains hazardous and is therefore contra-indicated.

Disease represents a particular homœostasis with its own peculiar regulatory mechanism which may have no counterpart in health. If the homœostasis in disease is altered by tampering with any one mechanism without understanding the basic character of the new homœostasis, then, quite clearly, such treatment can be expected to be attended by disaster.

Thus a disease, initiated by malnutrition and showing signs and symptoms regarded as vitamin deficiency, may be aggravated by the administration of vitamins. This is suggested from our results in the table. Similarly, the hypoproteinæmia observed in our cases may be an expression of a new homœostasis emerging in chronic malnutrition; administration of hydrolysates in these circumstances may also prove harmful. Treatment of a single symptom or sign of a disease in which there is widespread disorder of metabolism can often be irrational.

The success of ventriculin, in our opinion, is not due to the addition of a factor the absence of which from the diet originally caused the disease. Ventriculin is apparently able to cause such a radical alteration in the entire homœostasis that the malnourished infant can now take advantage of the essential constituents of a good diet.

SUMMARY

The results obtained with various forms of therapy in 161 cases of infantile pellagra are recorded.

The effectiveness of ventriculin in the treatment of this syndrome has been confirmed in 50 cases.

The addition of vitamin concentrates to ventriculin significantly detracts from its effectiveness as a therapeutic agent.

Vitamin concentrates in combination with liver extracts or ventriculin, or with a full diet, are contra-indicated in the treatment of this form of chronic malnutrition.

Since the administration of protein hydrolysates may result in toxic reactions, and very rarely promotes recovery, we consider this form of therapy hazardous. Until satisfactory criteria are established for determining the dosage in each case, such concentrates, in our opinion, are contra-indicated in the treatment of the acute episodes in the course of chronic malnutrition in African infants.

We wish to acknowledge our indebtedness to the Students Medical Council of the University of the Witwatersrand for a generous grant which made the continuance of this work possible. Thanks are also due to Dr. Wunsh and Dr. Kessel, resident medical officers, and to Sister Spikin for assistance in the wards.

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EARLY OVULATION

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THE theory of ovular menstruation supposes that menstruation depends on ovulation and the formation of the corpus luteum half-way through the normal menstrual cycle of 24–35 days (Schroeder 1928). That menstruation can take place without a preceding ovulation was established for the macaque monkey by Corner and Allen (1929), Bartlemez (1933), Sharman (1944), Sevitt (1943), Rock (1939), and others. Therefore there are probably both ovulatory and non-ovulatory menstrual cycles.

The question arises whether ovulation, when it takes place, always does so between the 14th and the 16th days or can happen at any time during the normal cycle. Teacher (1935), correlating the ages of very young fertilised ova found accidentally at operation or at necropsy with the previous menstrual history, concludes that fertilisation, and therefore presumably ovulation, can take place on any day of the cycle except during menstruation. Evidence that ovulation can take place on any day of the first fortnight of the menstrual cycle, including the last days of menstruation, has been obtained by correlating the menstrual dates and date of operation with the state of the endometrial biopsy material and of the removed ovaries.

The development of the endometrium during the early part of the ovular menstrual cycle is under the influence of the œstrogenic hormones (follicular hormone, œstrin), secreted, at least in part, by the developing graafian follicle. The endometrial changes following ovulation and the formation of the corpus luteum are produced by the luteal hormone, progesterone. These later changes are characteristic histologically, and their finding in a uterine curetting or an endometrial "punch" from the fundus uteri can be taken as strong circumstantial evidence of the presence of a corpus luteum and therefore of a recent ovulation. When the ovaries are also examined and a corpus luteum is found, there can be no doubt that ovulation has taken place.

ESTIMATION OF DAY OF OVULATION

Case	Menstrual periodicity (days)	Duration of menses (days)	Day of biopsy*	Estimated age of secretory stage of endometrium (days)	Day of ovulation*
3	28	6	9	1–3	6–8
4	28	?	9	2–4	5–7
5	28	4–5	13	2–3	10–11
6	21	10	6	2	4
7	21	?	5	1–2	3–4
8	29	7	12	2	10
9	28	6	6	1	5
10	28	?	14	3–4	10–11

* Since start of previous menstruation.

The terminology of the endometrial phases is confused, and in this paper the simple classification of the histologist is used (synonyms in parentheses);

Stage 1: menstruation.
Stage 2: non-secretory, early and late (regenerative, follicular, interval).
Stage 3: secretory, early and late (luteal, progravid, premenstrual, post-ovulatory, differentiative).

In the menstrual and case histories that follow, the days are reckoned from the first day of the previous menstruation.

In these ten cases there is evidence that ovulation took place earlier than the mid-menstrual period. In two (cases 1 and 2) the ovaries were available and

corpora lutea were found. Correlation between the estimated ages of the corpora lutea and the endometria with the dates of operation and menstrual history showed that ovulation took place on the 10th or 11th day and the 6th day of the respective cycles.

CASE 1.—A multipara, aged 49, with menorrhagia. Hysterectomy performed on the 14th day of 26-day cycle; menses 4 days.

Findings.—(1) Hæmorrhagic, well-developed, cytologically normal corpus luteum in the left ovary (1·5 cm. × 1 cm.).

(2) The endometrium presented long tortuous closely packed glands, rather dilated and containing secretion. The columnar-cell nuclei were basal, and the cytoplasm contained secretory granules or vacuoles. Well-marked spiral arterioles were present; and, though the stroma was dense and spindle-celled, it was evident that a developed secretory stage was present (fig. 1).

In this case the corpus luteum was at least 3 or 4 days old, probably older, and ovulation must have taken place at the latest on the 10th or 11th day of the cycle.

CASE 2.—A 4-para, aged 27, with menorrhagia and pain in the right iliac fossa. Curettage and right salpingo-oöphorectomy performed on the 7th day of 28-day cycle; menses 4–5 days, heavy with clots.

Findings.—(1) A recently ruptured graafian follicle or young corpus luteum in the ovary (1·5 cm. in diameter). The stigma or point of rupture was still visible. Microscopically, early infolding was present, with an early luteal-cell development from a hyperplastic granulosa-cell layer and theca interna (fig. 2).

Fig. 1—Section of endometrium from case 1, showing (1) long convoluted closely packed glands containing secretion; (2) basal position of nuclei and secretory activity of cytoplasm; and (3) spiral arterioles in spindle-celled stroma.

(2) The curetting showed straight oval or round glands. Cytologically the nuclei were placed basally, but there was no more than a suspicion of secretory activity in the cytoplasm (fig. 3). The stroma was round-celled and oval-celled, containing developed spiral arterioles.

In this patient, the absence of secretory activity in the endometrium, together with a corpus luteum certainly no older than 24 hours, proves that ovulation took place on the 6th day of the cycle, or 36 hours after cessation of the menstrual flow.

Circumstantial evidence of early ovulation was found in eight other cases. Correlation of the date of biopsy and menstrual history was made with a conservative estimate of the time since the secretory stage was initiated.

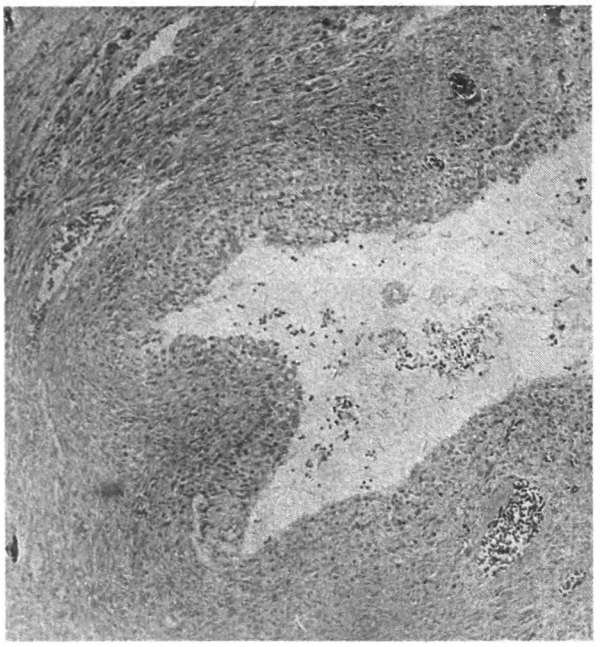

Fig. 2—Section of recently ruptured graafian follicle or very young corpus luteum from case 2.

Even assuming that the endometrial change to secretory activity takes place on the same day as follicular rupture, which is doubtful (see case 2), it seems that the ovulations had taken place between the 3rd and 11th days of the various cycles. The accompanying table shows how the day of ovulation was estimated. The age of the secretory stage was always estimated conservatively; hence the final column in the table is meant to give, not the actual day of ovulation, but the latest day of the cycle on which it could have occurred.

CASE 3.—An unmarried girl, aged 17, with dysmenorrhœa and menorrhagia. Curetted on 9th day of 28-day cycle; menses 6 days.

Findings.—Early secretory, partially dilated and tortuous glands, some of which contained secretion; œdematous round-celled stroma; a few spiral arterioles.

CASE 4.—An unmarried woman, aged 33, with recent hæmorrhage lasting 5 weeks. Curetted on 9th day of present cycle, her usual periodicity being 28 days.

Findings.—Secreting well-dilated tortuous glands, some more differentiated, showing "saw-teeth" appearance and containing secretion; basal nuclei in a columnar epithelium with secretory granules; stroma shows early pseudodecidual change, with numerous well-marked arterioles (fig. 4).

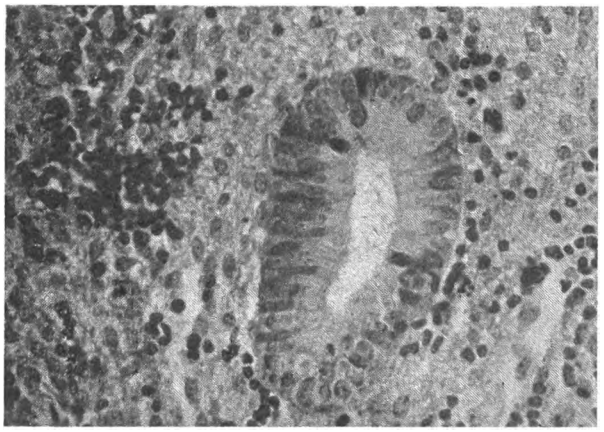

Fig. 3—Section of oval tubular endometrial gland, showing mitotic figures in two cells (from case 2).

Fig. 4—Section of secreting endometrium, showing convoluted glands containing secretion (from case 4).

CASE 5.—A 3-para, aged 37, with excessive postmenstrual leucorrhœa. Piece from fundus removed on 13th day of 28-day cycle; menses 4–5 days.

Findings.—Glands mostly moderately dilated and somewhat tortuous, with eosinophil granular vacuolated cytoplasm and basal nuclei. Some are smaller and are round straight tubes not secreting. Stroma cells are in an early pseudodeciduous condition; spiral arterioles fairly numerous and well developed.

CASE 6.—A 2-para, aged 28, with menorrhagia and vaginal discharge. Piece from fundus removed on 6th day of 21-day cycle; menses 10 days—i.e., while still bleeding.

Findings.—Most glands convoluted and contain secretion; cytoplasm secreting and nuclei basal—i.e., early secretory stage. Some are non-secreting straight tubes. Stroma very œdematous, and well-developed spiral arterioles seen (fig. 5).

CASE 7.—A 3-para, aged 28, with menorrhagia. Piece from fundus removed on 5th day of 21-day cycle.

Findings.—Most of the glands were moderately dilated, some secreting and others not. Stroma œdematous in superficial layers, but nuclei densely stained and round: some thick-walled blood-vessels present, but most of the spiral arterioles thin-walled and mainly in the spongy layer.

CASE 8.—A primipara, aged 38, with metrorrhagia. Last period, heavy with clots, lasted 7 days. Piece from fundus removed on 12th day; menses started 17 days later.

Findings.—Early secretory endometrium, with moderately dilated and fairly tortuous glands; basally placed nuclei in secretory cytoplasm; stroma round-celled, with much œdema; thick-walled spiral arterioles mainly in deeper layers (fig. 6).

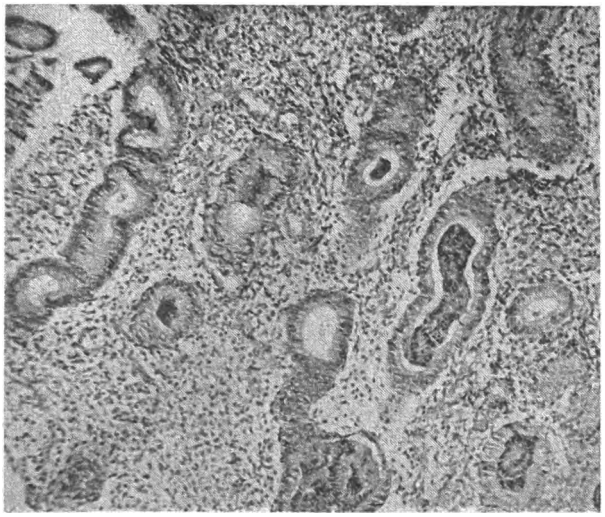

Fig. 5—Section of endometrium from case 6, showing most of the glands in early secretory phase.

CASE 9.—A 2-para, aged 30, with yellow discharge since miscarriage $2^1/_2$ years ago. Cervical erosion present. Piece from fundus removed on 6th day of 28-day cycle; menses 5–6 days—i.e., just ceased.

Findings.—Mostly straight tubular glands, but cytoplasm shows the secretory vacuolated change with basal nuclei in a columnar epithelium. Some glands rather dilated, others show early convolution. Stroma presented no luteal effects. This is a very early secretory phase.

CASE 10.—A 4-para, aged 38, with vaginal discharge. Curetted on 14th day of 28-day cycle.

Findings.—Most glands are in the late secretory stage; some, however, are very convoluted but not secreting; stroma round-celled and œdematous; numerous spiral arterioles.

DISCUSSION

The ten cases cited were selected from sixty-two case-specimens of routine biopsy and operation material for which an accurate menstrual history and clinical details were available. It appears, therefore, that "premature" (or, more correctly, early) ovulation is not uncommon. In two cases ovulation occurred towards the end of the menstrual flow, when one would normally expect to find a reparative non-secretory phase of activity in the endometrium; but, instead, a secretory and therefore presumably luteal stage is seen. In the other cases ovulation took place on various days after cessation of the menstrual flow. It follows that there is no "safe" period in the first half of the menstrual cycle.

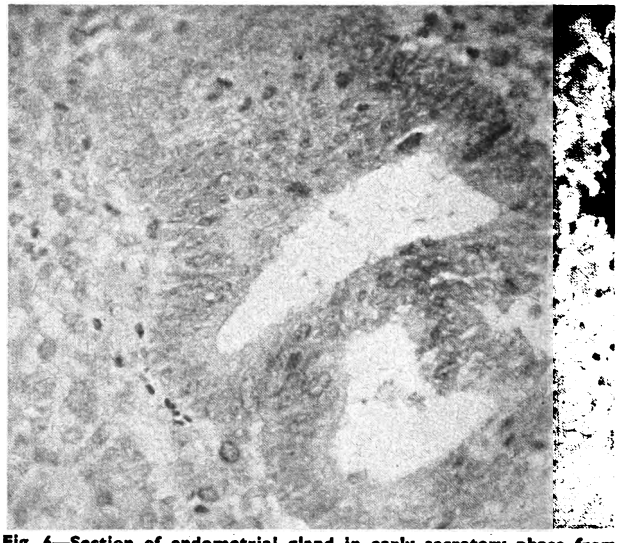

Fig. 6—Section of endometrial gland in early secretory phase from case 8, showing (1) swollen stroma cells and (2) mitoses in gland cells.

SUMMARY

Correlation between the menstrual history and day of operation of ten patients with the findings of a secretory and therefore presumably luteal endometrium, during the first fourteen days of the menstrual cycle (and the finding of corpora lutea in two of these cases), supports the belief that ovulation can occur on any day of the first half of the cycle.

My thanks are due to Prof. O'Donel Browne and Dr. N. Falkiner for supplying the operation and biopsy specimens; the late Mr. C. Hoppenkopper for preparing the sections; Mr. W. Kampf for the photomicrographs; and Prof. J. T. Wigham for his criticism and advice.

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EMPIRICAL TESTS OF LIVER FUNCTION

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APART from tests of specific liver functions, such as the synthesis of hippuric acid, excretion of dyestuffs, &c., certain empirical tests have been devised which all depend mainly on excess of gamma globulin in serum (Kabat et al. 1943), though other minor factors may be concerned, since the various tests do not always give identical results. The object of the tests is threefold: (1) to distinguish between jaundice of parenchymatous origin and that due to obstruction of the bile-ducts; (2) to assist in the diagnosis of hepatitis without jaundice; and (3) to follow the course of toxic liver disease and aid in its prognosis. The present paper attempts to assess the relative value of some of these tests: Britton's (1945) modification of the Takata Ara tests; the cephalin-cholesterol flocculation test (Hanger 1939); the thymol turbidity test (Maclagan 1944); and the colloidal-gold test (Gray 1940).

Opinions about the value of these tests vary. Magath (1940) reports that, though the Takata Ara test was often positive in advanced cirrhosis, it was frequently negative in early cases; and, though many writers report negative findings in jaundice due to duct obstruction, others, including Magath, find a high proportion of positives. Further, it is generally agreed that this test may be positive in many conditions where the liver is not involved, including in one series 27% of mental cases (Ornstein 1937). It is therefore clear that the Takata Ara test fulfils none of the objects set out above, and this appears to be Magath's view.

The cephalin-cholesterol flocculation test is more satisfactory than the Takata Ara, though the reagent varies greatly in sensitivity and probably in composition. Thus, one sample may be unstable with the sera of normals and cases of toxic jaundice, and stable with bile-duct obstruction; another may be stable in normals and unstable in bile-duct obstruction (Pohle and Stewart 1941); and a third preparation may be stable in normals and in duct jaundice and unstable in toxic jaundice, in which case the typical flocculation as described by Hanger (1939) and by Nadler and Butler (1942) are obtained. The latter writers report that fresh cephalin-cholesterol preparations gave numerous false positives, and that typical results were only obtained with aged material. On the other hand, Mateer et al. (1943) found that fresh preparations were alone reliable. This variability constitutes the main drawback of the test, which has been of considerable value in the hands of some workers.

The thymol turbidity test, according to Maclagan (1944), gives a high proportion of positives in toxic hepatitis and is usually negative in obstruction of the bile-ducts. Unlike other tests it also permits of a quantitative assessment of the strength of the reaction and hence of prognosis and progress in cases of hepatitis. According to Maclagan, thymol turbidity roughly parallels the colloidal-gold test but is less likely to be positive in infections and in rheumatoid arthritis. Colloidal gold was not used in the present work but a colloidal suspension of Scharlach red, which is easier to prepare and probably gives similar results. Details of these tests are given in the appendix below. Responses to various tests are shown in tables I and II, together with the albumin-globulin ratios, which were often estimated in parallel.

RESULTS

Normals.—Here cephalin-cholesterol flocculation (C.C.), colloidal Scharlach red (C.R.), and thymol turbidity (T.T.) were almost always negative or at most weakly positive. Maclagan gives the range of T.T. as 0–4 units; in my series 96% of normals were less than 3 units, with one result of 4 and another of 5 units. The Takata Ara test (T.A.) gave so many false positives that according to these data it has no positive value; possibilities of its having a negative value will be considered later.

Parenchymatous Liver Damage.—This has been classified as follows. (1) Catarrhal jaundice, an acute infection sometimes proceeding to subacute hepatitis. (2) Subacute and chronic hepatitis, with little or no fever, but malaise, persistent moderate jaundice, and sometimes ascites; death may result in a few weeks or months, or the condition may proceed to cirrhosis. (3) Cirrhosis, which may obviously follow the preceding, or the stage of active hepatitis may be unobtrusive; cirrhosis then appears to be primary, with gastritis, hæmatemesis, or ascites as its salient features; jaundice, if present, is not severe.

Table I shows that in catarrhal jaundice positive findings are the rule, and the albumin-globulin (A./G.) ratio was less than 1·5 in 11 of 18 cases. In 4 cases there were negative or doubtful findings; these patients were already improving or began to improve during the fortnight which followed the test. In one case alone all

TABLE I—SUMMARY OF FINDINGS WITH EMPIRICAL TESTS IN VARIOUS CONDITIONS

Condition	Test	No. of cases	No. of reactions graded as				
			O	±	+	++	+++
Normals	T.A.	50	34	11	4	1	0
	C.C.	50	45	4	1	0	0
	T.T.	50	49	1	0	0	0
	C.R.	50	49	1	0	0	0
Catarrhal jaundice ..	T.A.	18	0	1	4	3	10
	C.C.	18	4	1	1	2	10
	T.T.	14	5	2	2	2	3
	C.R.	18	4	1	2	3	8
	A./Gd.	18	7	3	5	2	1
Toxic hepatitis (subacute and chronic)	T.A.	11	0	0	0	1	10
	C.C.	11	0	0	1	3	7
	T.T.	11	0	0	3	1	7
	C.R.	11	0	0	1	3	7
	A./Gd.	11	0	1	5	0	5
Cirrhosis	T.A.	3	0	0	1	2	0
	C.C.	3	0	0	2	1	0
	T.T.	1	0	0	0	0	1
	C.R.	3	0	0	0	1	2
	A./Gd.	3	0	1	2	0	0
Jaundice due to duct obstruction	T.A.	28	10	3	5	7	3
	C.C.	27	23	1	1	1	1
	T.T.	19	18	1	0	0	0
	C.R.	28	21	1	1	0	5
	A./Gd.	26	16	6	1	3	0
Acholuric family jaundice	T.A.	3	3	0	0	0	0
	C.C.	3	3	0	0	0	0
	T.T.	3	3	0	0	0	0
	C.R.	3	3	0	0	0	0
	A./Gd.	3	3	0	0	0	0
Nephritis with blood-urea above 100 mg. per 100 c.cm.	T.A.	3	1	0	0	1	1
	C.C.	3	2	1	0	0	0
	T.T.	3	3	0	0	0	0
	C.R.	3	3	0	0	0	0
	A./Gd.	3	2	1	0	0	0
Nephritis with blood-urea below 100 mg. per 100 c.cm.	T.A.	18	4	0	5	5	4
	C.C.	18	12	1	2	2	1
	T.T.	18	17	1	0	0	0
	C.R.	18	12	0	1	5	0
	A./Gd.	18	10	7	1	0	0
Neoplasms without jaundice	T.A.	10	7	0	0	1	2
	C.C.	10	10	0	0	0	0
	T.T.	10	10	0	0	0	0
	C.R.	10	8	0	0	2	0
Other conditions not listed above or in table II	T.A.	30	17	4	8	1	0
	C.C.	30	28	1	1	0	0
	T.T.	19	19	0	0	0	0
	C.R.	30	27	1	1	0	1
	A./Gd.	12	10	1	1	0	0

T.A. = Takata Ara; C.C. = cephalin cholesterol; T.T. = thymol turbidity; C.R. = colloidal Scharlach red; A./Gd. = albumin-globulin ratio deficit.
For albumin-globulin ratios, O = 1·5 or more; ± = 1·5–1·2; + = 1·2–1·0; ++ = 1·0–0·8; +++ = 0·8 and less. The explanation of the symbols for other tests is given in the appendix.

* In receipt of a grant from the Graham Research Fund.

tests were consistently negative, though jaundice remained intense for nine weeks and then gradually faded. Pain was slight throughout, and the diagnosis remains obscure. On the whole it seems probable that, if signs have not begun to improve within a fortnight of a negative result being obtained, the jaundice is due to gross obstruction. In any case it will be apparent that the tests may sometimes be negative at a time when jaundice is still severe, and, on the other hand, that jaundice may improve while empirical tests remain unaltered or even intensify.

In subacute and chronic hepatitis, well-marked positive findings were invariable, and the A./G. ratio was below 1·2 in 10 of 11 cases. There were only 3 cases of cirrhosis, and C.C., T.T., and C.R. were negative in 2, while the less satisfactory T.A. was positive in all 3. Table I suggests that in parenchymatous jaundice C.C. and C.R. are the most satisfactory tests, with the much simpler T.T. a close runner-up. It is worthy of note that Maclagan (1944) reports 100% of positives for the colloidal-gold and T.T. in 13 cases of cirrhosis, though in a later paper (1945) he reports 2 negative cases. He classifies the parenchymatous group into infectious hepatitis and cirrhosis, and it is possible that a proportion of subacute cases is included with cirrhosis, in which case a high proportion of positives is to be expected. It would be unwise to draw conclusions from 3 cases, but at least the possibility exists that increase of gamma globulin together with the resulting positive empirical tests is associated with the activity of liver damage rather than with its extent.

Jaundice due to Obstruction of Bile-ducts or Hepatic Ducts.—In two-thirds of the cases T.A. was positive; it therefore has no positive value in differential diagnosis. On the other hand, it was positive in all cases of parenchymatous jaundice, and the tentative suggestion is made that a dead negative T.A. by Britton's method (1945) indicates duct obstruction, more especially when the associated jaundice does not clear within a fortnight of the test. With regard to the other tests, positive findings with one or other were recorded in 7 of 28 cases. Of 21 negatives one was a case of suppurative cholangitis; another had been severely jaundiced for eight weeks; while a third had been bronze-green for over a month. It follows that long-standing intense jaundice does not necessarily result in positive findings with C.C., T.T., and C.R. tests. The findings in the 7 positive cases are shown in table II (nos. 1–7). It will be seen that T.T. was low in all, and this suggests that a reading of more than 10 units is strongly against obstruction of the ducts. C.C. was positive in 3 and C.R. in 5 of the tabled cases, and all these had serious complications. Therefore, though negative tests do not exclude serious complications, positive findings suggest that such complications may be present. Of 8 cases of carcinoma of the liver with jaundice, T.A. was positive, and T.T. negative in all. Hence, T.A. is useless in distinguishing between carcinoma and hepatitis, whereas a positive T.T. makes carcinoma of the liver unlikely, and a negative T.T. indicates that hepatitis is probably absent. C.R. was positive in 4 cases, 2 being primary growths of the liver and 2 secondary; C.C. was positive in only 2 cases, both secondary.

The findings of other observers in cases of duct obstruction vary. Hanger (1939) finds that C.C. is negative or at most weakly positive in all cases. Nadler and Butler (1942), using an aged reagent, had 20 negatives and 7 weak positives, whereas Mateer et al. (1943) found that they could only rely on a relatively insensitive unripened preparation, and that even so half their cases of gall-stones gave positive findings. So, too, Pohle and Stewart (1941) found, in 23 cases, 5 weak, 9 moderate, and 4 strong positives. With regard to T.T. and colloidal gold, Maclagan (1944) found only 3 slight positives. Once again it will be seen that Maclagan's simple test, though not infallible, is least likely to mislead in the differential diagnosis of jaundice. Hanger (1939) reports low A./G. ratios (less than 1·5) in 7 of 17 cases of duct obstruction; in the present series low ratios occurred in 10 of 26 cases.

In acholuric familial jaundice all tests were negative, and it seems clear that empirical tests will help to distinguish between hepatitis and other conditions causing jaundice, assuming that the obstructive jaundice is not associated with some independent disease which gives positive findings.

Nephritis.—It is clear from table I that T.A. gives many positives; C.R. was less affected, and very strong reactions, in contrast with what occurs in hepatitis, are not found. C.C. gave fewer positives than C.R., and T.T. again proved most satisfactory, giving only 1 weak positive in 20 cases. The results of the tests were not correlated with the A./G. ratio or blood-urea level.

Neoplasms without Jaundice.—These were mostly negative; 2 cases with metastases in the liver were positive with T.A. and C.R., and negative with T.T. and C.C. (table I).

Anæmias.—Five severe cases of microcytic anæmia were all negative. Most of the macrocytic anæmias gave positive T.A. tests, but only 3 gave positives with C.R. and C.C., and the reactions were weak. In these 3 cases macrocytosis was associated with hepatomegaly in one, with nocturnal hæmoglobinuria in another, and with an increase in the marrow plasma-cells (8%) in the third, and liver damage may well have existed in all (table II, cases 17–24). T.T. was negative in 7 cases, and weakly positive in 1 case. Maclagan (1944) reports 3 weak positive T.T.s, and 6 moderate or strong colloidal-gold tests in 8 cases of pernicious anæmia.

Splenic Anæmia.—One case had normal hippuric-acid excretion; a second patient had undergone splenectomy, which had much decreased the incidence of hæmatemesis. Both cases gave positives with all four tests (table II, cases 15 and 16).

Poisons.—A case of early carcinoma of the parotid poisoned with sulphonamides (table II, case 25) had agranulocytosis and slight hæmolytic jaundice; except for T.T., all the tests were positive, and perhaps this case should have been included in the toxic-jaundice group; the same is probably true of case 26 receiving arsenicals for syphilis. In still another case receiving arsenicals, severe anæmia and agranulocytosis were present and the empirical tests were all negative.

Bacterial Infections.—Of 13 cases, 9 were positive to T.A., 2 to C.C., and 4 to C.R.; 1 was rather weakly positive to T.T. Maclagan (1944) gives 8 positive colloidal-gold tests in 12 cases, and 4 weak positive T.T.s in 8 cases. In table II cases 27–39 show that there is no correlation between empirical tests, A./G. ratio, and sedimentation-rate.

Rheumatoid Arthritis.—This group is interesting because of the frequency of positive findings recorded by Maclagan (1944). In the present series (table II, cases 40–44) T.A. was positive in 4, C.C. in 1, C.R. in 3, and T.T. weakly positive in 1 of 5 cases. Here too there was no correlation between these tests, A./G. ratio, and sedimentation-rate.

Tuberculosis.—Apart from the T.A., other tests were negative in this assorted group. In case 48 A./G. was very low, and the sedimentation-rate very high, but C.C., T.T., and C.R. were negative (table II, cases 52–57).

Lymph-gland Involvement (table II, cases 52–57).—Apart from T.A., empirical tests were negative or weakly positive in various conditions, including Hodgkin's disease and lymphogranuloma inguinale. Case 54, probably lymphogranuloma inguinale, gave positive tests. There were no cases of infectious mononucleosis in my series, but Maclagan (1944) reports 3 strong positive T.T. and colloidal-gold tests in 4 cases. It is interesting to note the frequency of low A./G. ratios in these glandular cases, due to increased globulin rather than to low albumin.

Sarcoids and Myelomata (table II, cases 8–14).—The liver was large in only 2 of 4 cases of sarcoid, and in no case was there clinical evidence of hepatic deficiency. But empirical tests were always positive and A./G. ratios low. In myelomatosis, on the other hand, though A./G. was still low, empirical tests were negative in 2 cases, whereas T.A. and C.R. were strongly positive in one.

Other Conditions (table I).—These were mainly arterial degeneration and non-malignant intestinal disorders; T.A. is often positive but hardly more so than in normals. Other tests were largely negative. Included in the series are 5 cases of hyperpiesia without nephritis, 1 each of starvation, pulmonary embolus with ascites, Milkman's disease, and polycythæmia vera; all these were negative. An apparent neurotic gave weak positives with T.A., C.C., and C.R. Not included in table I are 3 cases of ulcerative colitis, of which 2 gave negative tests and 1 gave consistently positive tests and had an A./G. ratio of 1/1. There were no cases of cardiac failure in this series, but Maclagan (1944) reports 3 weak positive T.T. and 5 positive colloidal-gold tests in 13 cases. He also reports 6 negatives and 1 weak positive T.T. in 7 cases of amyloidosis. It will thus be seen that there are various conditions in which empirical tests may be positive; the implications of this are considered later.

DISCUSSION

In my hands Britton's (1945) modification of the T.A. proved too sensitive, giving slight or moderate positives in non-hepatic conditions. Other modifications of the T.A. give fewer positives in non-hepatic lesions but are more often negative in frank hepatitis. On the whole, therefore, the T.A. was not considered a satisfactory test. C.R. was negative in about 80% of cases of jaundice due to obstruction of the ducts; C.C. gave 8% of strong and 8% of weak positives; and T.T. gave only 5% of weak positives. The A./G. ratio was usually low in hepatitis; a low ratio in duct obstruction usually indicated severe infection or extensive metastasis; it did not seem to be induced by the remote effect of blockage on liver-cells, even when this was prolonged. It therefore seems that in uncomplicated cases C.C., T.T., C.R., and the A./G. ratio will usually help to distinguish between jaundice of parenchymatous and duct origin. But the coexistence of such complications as cardiac failure, nephritis, rheumatoid arthritis, sarcoidosis, and lymphogranuloma

TABLE II—DETAILS OF EMPIRICAL TESTS ON VARIOUS CASES

Case group	Case	Clinical details	T.A.	C.C.	T.T. (units)	C.R.	A./G.	E.S.R. (mm. in 1 hr.)
Obstructive jaundice with positive tests	1	Carcinoma of liver, comatose	+++	..	..	+++	1·0	..
	2	Carcinoma of liver, extensive	+++	O	..	+++	..	..
	3	Carcinoma of liver, secondary lung	±	O	0	O	2·2	..
	3a	As 3, but six weeks later	++	++	1	+	1·8	..
	4	Suppurative cholangitis	++	++	3	+++	1·2	..
	5	Cholæmia	+++	++	5	+++	0·7	..
	6	Gall-stones and fever	+	O	8	O	1·5	..
	7	Carcinoma of pancreas	++	O	0	±	1·3	..
Sarcoids	8	Liver large	++	±	..	±	..	..
	9	Liver not large	++	+	..	+++	1·1	..
	10	Liver large, bony rarefactions	+++	++	30	+	1·1	..
	11	..	++	+++	8	++	0·9	..
Multiple myelomatosis	12	Bence-Jones proteinuria	++	O	1	++	0·24	..
	13	Bence-Jones proteinuria	O	O	1	O	0·28	..
	14	Bence-Jones proteinuria	O	O	1	O	1·4	..
Splenic anæmia ..	15	Hippuric-acid synthesis normal	±	+++	10	+++	1·7	..
	16	Old splenectomy	+++	±	8	±	1·5	..
Macrocytic anæmia ..	17	Refractory to liver and iron	+++	+	3	±	0·96	..
	18	Refractory to liver and iron	O	O	1	O	2·0	..
	19	Refractory to liver and iron	+	O	1	O	2·4	..
	20	Refractory to liver and iron	O	O	3	O	1·3	..
	21	Refractory large liver, target cells	+++	±	..	±	..	..
	22	Pernicious anæmia	+	O	0	O	1·0	..
	23	Pernicious anæmia	+	O	0	O	1·9	..
	24	Pernicious anæmia	±	±	7	++	2·0	..
Poisoning	25	Sulphonamide; v.d. Bergh 2 units	+++	++	3	+	1·6	..
	26	? N.A.B. ? toxic jaundice	+++	+++	27	+++	0·9	..
Bacterial infections ..	27	Pneumonia	+++	+++	9	+++	1·6	30
	28	Pneumonia, interlobar effusion	O	O	1	O	2·1	50
	29	Pneumonia	+	O	2	O	..	..
	30	Pneumonia	O	O	0	±	..	35
	31	General peritonitis, high fever	±	O	1	O	..	..
	32	Infective endocarditis, icterus	+++	O	..	++	1·1	..
	33	Gangrene of chest wall	±	O	1	O	1·1	..
	34	Abortus fever	+	O	0	O	..	18
	35	Appendix abscess	+	±	0	O	..	..
	36	Bronchiectasis, urobilinuria	++	O	1	++	..	..
	37	Salpingitis, ulceration of cervix	O	O	4	O	1·8	44
	38	Pyrexia ? cause	+	O	0	O	..	63
	39	Pyrexia ? cause	O	O	1	O	1·7	16
Rheumatoid arthritis	40	..	+++	O	3	+++	..	26
	41	..	+++	O	2	+	..	28
	42	..	±	O	0	O	1·9	50
	43	..	+	±	9	++	1·1	35
	44	..	O	O	3	O	1·2	36
Tuberculosis	45	Phthisis	O	O	..	O	..	..
	46	Phthisis	+	O	2	O	..	..
	47	Phthisis	O	O	0	O	..	20
	48	Phthisis, enteritis	++	O	1	O	0·5	69
	49	Phthisis, empyema	O	O	0	O	..	42
	50	Peritonitis	O	O	0	O	..	20
	51	Knee	++	O	0	O	1·4	10
	52	Spine and cervical glands	++	±	3	O	1·5	36
Disorders of lymph-glands	53	Lymphogranuloma inguinale	++	±	2	O	1·1	..
	54	Sterile inguinal abscess, healed	+++	+++	6	+++	1·1	..
	55	Lymphadenoma	±	O	0	O	1·3	..
	56	Lymphadenoma	±	±	0	O	1·2	51
	57	Lymphatic leukæmia	O	O	1	O	..	..

E.S.R. = Sedimentation of 100 mm. column in 60 minutes.

inguinale might give confusing results. The complicating malady, however, is not likely to cause much difficulty since clinically it will be fairly evident. But this is not the case when jaundice due to duct obstruction is complicated by cholecystitis, subphrenic abscess, empyema, or poisoning by sulphonamides used in the treatment of infection. In all these conditions T.A., C.C., and C.R. may be strongly positive, though the high figures for T.T. encountered in hepatitis (10 units or more) are not likely to be met. There are no cases of hepatitis without jaundice in the present series, but other data suggest that empirical tests could not do more than lend support to a clinical diagnosis.

As regards choice of tests, in so far as T.T. is much easier than the others it is to be preferred, and it gives a simple and quick pointer to the nature of obscure jaundice and a quantitative measure of the degree and change of liver-cell damage. There seems to be no special advantage in using C.R., nor presumably in colloidal gold, though both are superior to T.A. The difficulty with the C.C. test lies in the preparation of a reagent of the right sensitivity. When this can be obtained, the test is probably superior to T.T., but in my experience two of three reagents prepared were too sensitive and rather unsatisfactory.

With regard to the origin of the empirical tests, cataphoretic studies (Kabat et al. 1943) show that these depend on increased gamma globulin. The cause of this increase is less clear. According to Gray and Barron (1943) the inability of the liver to form enough albumin is compensated by increased production of beta and gamma globulin or, if these fail, alpha globulin. It is, however, difficult to understand how, when albumin formation fails, the liver succeeds in producing greatly increased quantities of globulin. On the other hand, Bing (1940) has shown that hyperglobulinæmia occurs in many different bacterial, virus, and protozoal infections which all have in common much reticulo-endothelial or plasma-cell reaction. Another possible source of gamma globulin is the lymphocyte (Kass 1945).

In the present series increase of serum-globulin above the normal maximum of 3 g. per 100 c.cm. was observed in several instances, including 2 cases of rheumatoid arthritis with serum-globulins of 3·37 and 3·1; two cases of sarcoidosis with globulins of 4·22 and 3·96; 2 cases of Hodgkin's disease with globulins of 3·0 and 3·53; and 2 cases of lymphogranuloma with serum-globulins of 3·39 and 3·17 g. per 100 c.cm. In none of these cases was there evidence of liver involvement, and it seems likely that the site of globulin formation was elsewhere. This observation also applies to 2 cases of multiple myelomatosis (in one, albumin was 2·29 g. and globulin 8·36 g. per 100 c.cm.; in a second, albumin was 2·38 g. and globulin 9·92 g. per 100 c.cm.). In both, the figures suggest that albumin was reduced to a very low level to compensate for the excessive production of globulin. In 4 cases of hepatitis the A./G. ratios were 2·04/5·11, 3·46/4·34, 4·41/4·41, and 3·67/6·30. Here also it is perhaps possible that part at least of the increase in globulin is derived from an extrahepatic source and may compensate for deficient production of serum-albumin by the liver. If this compensation was osmotic, then, owing to its larger molecule, a relatively larger amount of globulin would be needed to compensate for the absence of a given weight of albumin. In these circumstances the total protein of a globulin-compensated serum would be greater than that of normal serum, a finding which is common in hepatitis and is illustrated in the 4 cases mentioned above, where the total serum-protein was 7·15, 7·80, 8·82, and 9·97 g. per 100 c.cm.

SUMMARY

The rating of several empirical liver tests in order of usefulness in the differential diagnosis of jaundice was: thymol turbidity, cephalin-cholesterol flocculation, colloidal Scharlach red (or colloidal gold), and Takata Ara.

If a case diagnosed as toxic jaundice gives negative empirical tests, it will probably begin to clear within a fortnight. Failure so to improve, with persistence of negative tests, suggests that the diagnosis is probably incorrect.

In obstruction of the hepatic ducts or bile-ducts the colloidal red is negative in 80% of cases and the cephalin-cholesterol flocculation in about 90%, whereas thymol turbidity rarely exceeds 10 units, even when the jaundice is long-standing and severe. When cases of duct obstruction give positive empirical tests, serious complications, such as metastases and infection, are commonly present, though extensive liver metastases may accompany negative tests.

Besides hepatitis, positive empirical tests may also be given by myelomatosis, sarcoidosis, certain types of adenitis, rheumatoid arthritis, sulphonamide poisoning, and infections with certain bacteria, protozoa, and viruses. If any of these maladies accompany simple duct obstruction, the positive tests may suggest that parenchymatous damage is present.

APPENDIX ON METHODS

Blood was collected in the morning, kept for three hours at 37° C, and then at room temperature. In the afternoon, serum was separated without hæmolysis, and the tests were put up immediately.

Takata Ara modified by Britton (1945).—Readings are as follows:

O = no change in any tube, or a cloud in tube 3, with or without a fine amorphous precipitate.
± = small gelatinous precipitate in tube 3 only.
+ = moderate or bulky precipitate in tube 3 only.
+ + = heavy flocculent precipitate in tube 3; some precipitation in tube 2.
+ + + = heavy precipitate in tubes 2 and 3. (Though exceptionally strong reactions sometimes occurred with precipitation in tube 1, no special record was made of these.)

Cephalin-cholesterol Flocculation (Hanger, 1939).—Recorded as follows at 24 hours:

O = no change.
± = fine granularity without precipitation.
+ = granularity with some precipitation.
+ + = granularity with heavy precipitation.
+ + + = complete precipitation with clear supernatant fluid.

Thymol Turbidity (Maclagan 1944).—Recorded in table I as follows:

O = 0– 4 arbitrary units.
± = 4– 8 units.
+ = 8–12 units.
+ + = 12–20 units.
+ + + = 20–40 units.

Colloidal Scharlach Red.—A saturated solution of the dye in alcohol is kept at 37° C; 10 ml. of this in a clean conical flask and 50 ml. water in a second flask are warmed to about 55° C and the water quickly added to the dye solution. The mixture is then boiled first in the bath and then over gauze till the final volume is about 20 ml. The volume is then made up to 75 ml. and 0.35 ml. Evans blue (0·2%) is added. For use, 0·5 ml. of the reagent is added to 0·5 ml. of serum diluted to 1/2, 1/4, and 1/8 with saline (0·85%). Results are read next day. If the serum is icteric, an identical control series may be put up at the time of reading to facilitate identification of colour changes. In the case of sera, readings are as follows:

Non-icteric sera		*Icteric sera*
O = purple or violet	=	orange or dirty green.
± = blue tinged with violet in 1 tube only	=	dirty green in 1 tube only.
+ = sky blue in 1 tube only	=	bottle-green in 1 tube only.
+ + = ,, ,, 2 tubes only	=	,, ,, 2 tubes only.
+ + + = ,, ,, 3 tubes	=	,, ,, 3 tubes.

Sedimentation-rate was observed after an hour in a 100 mm. column of citrated blood.

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PERFORATION OF THE AORTA

BY SWALLOWED BONES

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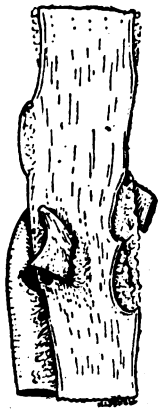
THE anatomical relations and infective contents of the œsophagus make its perforation often fatal. Most of the cases, resulting from malignant ulceration, terminate with mediastinitis. However, when a foreign body becomes impacted in the œsophagus, usually at or just below the tracheal bifurcation, there are three possible sequelæ: (1) ulceration of the œsophagus, leading later to a cicatricial stricture; (2) perforation of the œsophagus, with subsequent mediastinitis and/or pyopneumothorax; and (3) perforation of the œsophagus and the aortic arch. The second of these sequelæ may precede the third. The history and post-mortem findings of two recent cases are reported here.

CASE-RECORDS

CASE 1.—A well-built man, aged 22, on leave from the Army, complained, after taking a mouthful of chicken on Dec. 27, that something had stuck in his throat. He ate no further dinner, and about 4 P.M. the same day sought advice at his local hospital. The pharynx and larynx showed no trace of a foreign body, and at the doctor's suggestion he swallowed a crust of bread without apparent difficulty. Four hours later he reported again at the same hospital, complaining of pain in the chest and of difficulty in breathing. Further examination revealed no abnormal physical signs, and the doctor advised him to return again in the morning if he felt no better. He lay in bed all next day (Dec. 28). Pain in the midline of the back, localised to a small area over the sixth thoracic vertebra, was first noted on this day, and he was "unable to swallow anything."



Sketch showing perforation of aorta by chicken bone (case 1). Œsophagus has been opened from behind.

He returned to duty on the 29th and "went sick." He was admitted to hospital that evening, when radiography of his chest showed no abnormal shadow. Next day, his temperature being 100° F, he was œsophagoscoped. After passing 23 cm. the instrument came upon an œdematous swelling. No foreign body was located, but it was considered unwise to attempt passing the instrument further, even if possible. A small hæmatoma was encountered 2 cm. proximal to the area of œdema.

A small hæmatemesis took place on Jan. 2, and a further 6 oz. of bright red blood was vomited at 12.30 A.M. on the 3rd. Three hours later the patient said he was going to be sick and tried to sit up, but fell back. The face blanched, severe air-hunger set in, and he died within 5 minutes.

At *necropsy* I found an irregular quadrilateral plate of chicken bone, whose sides measured approximately 2, 2, 3, and 3 cm., firmly lodged in the œsophagus, just below the bifurcation of the trachea (see figure). The anterior wall of the œsophagus was deeply congested and swollen. One angular corner of the bone had made a rent 1·5 cm. long in the anterior wall, but there was only slight inflammation in the circumœsophageal tissues at this point. Another sharper corner of the bone had pierced both the left posterolateral wall of the œsophagus and the contiguous aorta at the beginning of its descending portion. The tear in it was 8 mm. long, and there was almost no inflammation in the region. Clotted and fluid blood was found in the stomach and intestine. Apart from exsanguination, other organs presented no abnormal features.

CASE 2.—A housewife, aged 46, came to the hospital complaining that she had just swallowed a fish bone. Laryngoscopy and pharyngoscopy showed no foreign body. Radiography of a barium-cotton-wool swallow was negative. Two days later she was examined by the throat specialist, as the pain in the chest and back persisted. Again no foreign body was seen in the pharynx or larynx, and radiography again showed nothing abnormal.

Six days after swallowing the bone she vomited, for the first time, about half a pint of bright red partially clotted blood. She then fainted and was found on the floor in a collapsed state. On admission to hospital about two hours after the hæmatemesis she was pale and sweating. Examination by indirect laryngoscopy showed no foreign body. During the evening, and on four subsequent occasions during the next two days, she vomited more blood. On the day after admission œsophagoscopy was performed, but no foreign body or ulceration was discovered. After a final hæmorrhage (about 20 oz. vomited) she died next evening.

At *necropsy* a small area of œdema and congestion was found in the external aspect of the posterior wall of the œsophagus extending upwards from the level of the tracheal bifurcation. The mediastinal tissues immediately related to the under surface of the bifurcation and along the right bronchus showed early gangrene. Infection had tracked down interstitially from above. On opening the œsophagus from behind there was seen a recent oval ulcer $^1/_2$ in. long and $^1/_4$ in across, involving the entire thickness of the anterior wall of the œsophagus. It was about 4 in. below the level of the cricoid cartilage, though above the tracheal bifurcation. The ulcer communicated directly with the adjacent aorta, which had a tear in its wall $^1/_4$ in. long and situated just below the origin of the left subclavian artery. No foreign body could be found in the œsophagus, lungs, or mediastinum. A prolonged search was also made in the main branches of the aorta without finding any foreign body. Blood was found adhering to the ulcer and in the œsophagus. The rest of the alimentary tract contained large quantities of blood, both fresh and altered.

DISCUSSION

Several fatal cases have been reported, including those by Grey Turner (1910), Watson-Williams (1937), and Decoulx and Omez (1939). Many records can also be found of successful removal of a foreign body, in earlier years by œsophagotomy and nowadays by œsophagoscope. In the fatal cases the minute size of the foreign bodies, the length of time elapsing between the accident and the patients' coming under medical supervision, and the failure of radiography to demonstrate the foreign body seem to be important considerations. Grey Turner and Watson-Williams each report a case in which the bone was not found at the autopsy. In my case 1 radiography did not reveal the bone, and in case 2 the bone was never found. The time factor is very variable; commonly there is a 4–10 days' interval between the accident and a fatal aortic perforation. In Grey Turner's case the interval was 22 months.

The characteristic sign of injury to the aorta has been vomiting of blood, which occurs at short intervals but in increasing quantities until the final hæmorrhage. Watson-Williams believes that a prick perforation of the œsophagus leads to infection and necrosis of the arterial wall, and rupture finally ensues from intra-aortic pressure. This was a possible mechanism in one of his cases, where the fatal hæmorrhage closely followed the removal of the bone through the œsophagoscope. In my case 1 it seems that, owing to the size and sharp angle of the bone, pressure from the pulsating aorta aided penetration. There was no macroscopic inflammation in relation to this perforation. Even if the bone had been seen through the œsophagoscope on Dec. 30, the chances of removing it were almost nil. In case 2 it is considered that the bone may have been vomited or swallowed at any time after the aorta had been injured.

Decoulx and Omez report a very unusual case whose course was aggravated by a second accident. A miner, aged 37, continued at his work after swallowing a chicken bone. Ten days had gone by when, at work, he received a crush injury of the chest, which was followed by vomiting of blood. He died two days later from further hæmatemeses.

Diagnosis, without immediate endoscopy, presents many difficulties in these cases. In some, radiography will localise an opaque foreign body, but many foreign bodies are not dense enough to be visible—e.g., fish bones. That a patient with a fairly large object impacted in the

œsophagus can swallow solids is undoubted, and this fact cannot be too strongly emphasised. Many years ago Grey Turner cited the cases of a woman who took her ordinary food for three days despite the presence of a plate of false teeth in her gullet, and that of a child who had remained well nourished although a halfpenny was lodged in the œsophagus for one year and ten months.

During the course of a lifetime every practitioner sees scores of patients who have swallowed various articles, and many of these complain of pain in the chest. It is generally believed that very few objects swallowed in this way become impacted, and consequently œsophagoscopy is not often undertaken. But Chevalier Jackson (1940) states that "in the College of Physicians of Philadelphia there are nearly 4000 objects, each of which has been removed from the air and food passages of patients at the bronchoscopic clinics of Philadelphia." The cases reported here and others described in the literature may serve to show why we should become more "œsophagoscope conscious."

My thanks are due to H.M. Coroners, North London and West London, for permission to publish the cases, and to Mr. E. Stanley Lee for his help in compiling the history in case 1.

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Reviews of Books

An Introduction to Clinical Neurology

GORDON HOLMES, M.D., F.R.S. Edinburgh: E. & S. Livingstone. Pp. 183. 12*s.* 6*d.*

THE distinctive feature of the British tradition in neurology is the intimate relationship between clinical neurology and neurophysiology. Everywhere clinical neurology is based upon neurophysiology, but nowhere else has neurophysiology been so much enriched by the work of clinicians. There is no more distinguished example of this than Dr. Gordon Holmes, whose work has contributed so much to our knowledge of the physiology of sensation, vision, and the cerebellum. Many, therefore, will welcome this book in which he makes available to a larger circle the teaching which generations of students at the National Hospital have valued and enjoyed. It is, as the title states, an introduction to clinical neurology, based upon the interpretation of neurological symptoms and signs in terms of anatomy and physiology. The main functional divisions of the nervous system are dealt with in turn, the motor system, muscle tone, convulsions, sensation, the reflexes, the visual system, speech, the sphincters, the autonomic nervous system, and the mental state, to mention the more important. The student beginning neurology will find here the necessary foundations of the subject, and the practising neurologist will enjoy the lucidity of the exposition.

The Surgical Teaching of Abdominal Operations

(4th ed.) J. L. SPIVACK, M.D., associate professor of surgery, University of Illinois. Springfield, Ill.: Charles C. Thomas. London: Baillière. Pp. 710. 55*s.*

THIS handsomely printed book has been considerably revised, yet remains an encyclopædia rather than an eclectic account of practical methods. Even so, there are omissions. Nine methods of gastropexy, an operation of doubtful value, are described, yet there is no account of the difficult dissection of the duodenum which is so often called for. Professor Spivack's ingenious methods of cholecyst-gastrostomy and the formation of an artificial anus are interesting. He is against aseptic methods of anastomosis for the stomach. The book will be read by experienced surgeons with much profit and entertainment.

Pediatric X-Ray Diagnosis

JOHN CAFFEY, A.B., M.D., associate professor of pediatrics, Columbia University, N.Y. Chicago: Year Book Publishers. London: H. K. Lewis. Pp. 838. 75*s.*

THIS is the first textbook in English on the use of X rays in the diagnosis of children's diseases and is an elaboration of Dr. Caffey's well-known section in Ross Golden's loose-leaf *System of Radiology*. The author was clearly a pædiatrician before becoming a radiologist, and while some of the finer points of radiological technique are missing, their loss is more than balanced by his excellent clinical judgment. In every section of this book the radiological appearances are assessed with the clinical and pathological findings, and where one preponderates suitable emphasis is laid on it. Rare diseases are but briefly mentioned and most of the text and illustrations deal with the common and important diagnostic problems. A striking commentary on the different values of X-ray diagnosis in children and adults is that the gastro-intestinal tract occupies only 60 pages while neurology gets 160, the bones 200, and the chest 200. The illustrations are well selected and enhanced by the addition of beautiful anatomical and pathological drawings. The book is the work of a practical man, demonstrating facts as he found them in over twenty years' experience in a children's hospital. It will be of great value to all radiologists, relatively few of whom have the opportunity to work in a large children's department. It should also prove a revelation to the many pædiatricians whose radiological outlook, in this country at least, has been limited by indifferent equipment.

Chemistry and Physiology of Hormones

Editor: FOREST RAY MOULTON. Washington: American Association for the Advancement of Science. Pp. 243.

THIS book, to quote the foreword, grew out of a research conference held at Gibson Island, Maryland, in 1943. There are 18 authors, workers in the fields in which they write. The policy has been to give résumés of the well-established findings on the various subjects, without excluding discussion of current work. Whilst the publication should be of value as a reference book for endocrinologists and teachers—there are some 1200 references—the more general reader, by intelligent selection, can read it with profit and pleasure. An index would have helped readers of both kinds. The 18 articles cover most of the known hormones and endocrine glands and the relationships between them; but some account of the synthetic hormones of the stilbœstrol type might well have been included. Our knowledge of the mode of action of insulin, conservatively estimated by Lukens, has since been increased by the observation of Price, Cori, and Colowick that insulin and anterior-pituitary extract are antagonistic to hexokinase. W. T. Salter, writing on euthyroidism and thyroid dysfunction, emphasises the clinical value of determinations of the level of protein-bound iodine in the blood.

L'hypertonie de décérébration chez l'homme

PIERRE MOLLARET, médecin des hôpitaux de Paris, professeur agrégé à la Faculté de Médecine, chef de service à l'Institut Pasteur; IVAN BERTRAND, directeur à l'École pratique des Hautes Études et de l'Institut de Neurobiologie (Salpêtrière). Paris: Masson. Pp. 155. Fr. 180.

THIS study of decerebrate rigidity (or, as the authors prefer to call it, "decerebrate hypertonia") is built round the detailed observation of a single case, in a man of 34 who fell a victim to Economo's encephalitis at the age of 17 and was nursed for the rest of his life in the Salpêtrière. During this long time he lay in a condition of mutism and paralysis in extension, voluntary movements being limited to the eyelids and upward movements of the eyes. The strict localisation of the lesions of this case to the substantia nigra, the commissure of Forel, and the red and dentate nuclei, combined with this clinical picture, leads the authors to argue in favour of Sherrington's original conception of decerebrate rigidity. The historical background and physiology of the neurological condition are traced, in the course of which the authors criticise the more recent attempts by British neurologists to amplify and, as they consider, confuse Sherrington's conception.

THE LANCET

LONDON: SATURDAY, SEPT. 28, 1946

Mothers in Jobs

"An employer should not dismiss a woman simply because she marries or because she is pregnant but only if, for medical or other reasons, she is no longer fitted to her job and if no alternative work can be offered her."

P.E.P., in a somewhat optimistic broadsheet,[1] support the right of the mother to go to work if she wants to. Probably most British women regard a job as something to fill the interval between school and marriage, and accept as their serious work the task of rearing their children and looking after their homes; and if the State looked on this work as comparable in value with any other kind of work, the time and energy which mothers devote to it would not be limited by the earning capacity of the husband. Nevertheless if some accessory services—such as day nurseries and help in the home—were provided on an adequate scale, mothers might be released to share in industrial work, anyhow for part of their time. The war brought some changes on these lines. Family allowances recognise the value of children and so, indirectly, of mothers; day nurseries gave mothers more freedom for work when their services were acutely needed; and the usual discovery was made that women have deft fingers. In fact "there was found to be a greater reserve of ability among the unskilled and semi-skilled than had been imagined. This applied with particular force to women workers—married or single—who had in the past been confined mainly to the unskilled occupations." All the same, in an effort to fulfil its two purposes of raising a new generation and of providing labour and goods for this one, the State makes conflicting demands on women. If there is to be a labour shortage, as many women as possible must be helped to share in industry; yet a long-sighted policy would favour the bearing and rearing of children, for this will automatically lessen man-power shortage in the future. In this situation P.E.P. advise that women who want to work outside their homes must be allowed to do so by the removal of restrictions, occupational bars, and other impediments. If the principle of equal pay for equal work is accepted, women will cease to be "cheaper" than men and so may find their opportunities reduced in some occupations; in others they will no doubt hold their own, or perhaps gain ground. P.E.P. are concerned to reduce the conflict between motherhood and employment, and to remove the economic necessity which forces poorer mothers to remain at ill-paid work when they should, and would rather, be with their children.

Experience in industry shows that most pregnant women give up work between the 26th and 28th weeks, and comparatively few stay till the later stages of pregnancy. Of 83 women followed up, only 18 had returned to any sort of work 17 months after confinement. In 1931 three-quarters of all married women at work were in domestic service, the textile industry, and the clothing, distributive, and catering trades—all of which use much cheap casual labour. And though the war gave all women the chance of earning good pay, a return to normal peace-time conditions will again drive expectant mothers mainly into poorly paid and insecure jobs, chiefly because the service they have to offer is uncertain. Yet it has been shown quite clearly that properly safeguarded factory work is not harmful to pregnant women, and indeed may be specially suited to them because they can be supervised and transferred to appropriate types of work as need arises. Moreover, "factory or office work may be less exacting than looking after a house, attending to children, and standing in queues"—though many women combined both duties during the war. The main danger to the working mother is this double burden of job and housework, which may leave her no time to seek proper antenatal care. Some firms, during the war, arranged for antenatal care to be given in the factory, and found that women reported their pregnancies earlier to the factory nurse than they would have done to an outside clinic. P.E.P. feel that when the National Health Service is in action it would be better to encourage women to make full use of the outside maternity service rather than to duplicate such services inside factories. This can only be achieved if the mother has no fear of dismissal when she reports pregnancy, and if she is given time off to attend the clinic. At present medical supervision of mothers in direct relation to their work is unusual; yet it is essential, and can only be done properly by a doctor who understands the kind of work she is doing. The suggestion that the local antenatal clinic should hold sessions in or near the factory seems specially promising, and official food supplements might well be issued at the factory.

Apart from care and supervision, the working mother needs financial security and sufficient help with her child and her housework. She is at present entitled to the same maternity services as any other mother (some free, some paid for at fixed rates), and—under National Health Insurance—to free supervision by her panel doctor during pregnancy and after lying in. She has no statutory period of leave, and no maintenance allowance while she has to stay away from work. Under the Factory and Public Health Acts she may not be employed in industry during the first four weeks after delivery, but this rule is difficult to enforce and often ignored. She gets a single cash benefit of £2 (£4 if her husband is also insured) under the N.H.I. scheme; and sickness benefit, though not officially granted for pregnancy, is usually paid during the lost six weeks if a claim is made. Under the N.H.I. Acts, sickness benefit may not be paid "in any circumstances whatever" during the four weeks after confinement. Some 20% of married and 30% of unmarried mothers draw sickness benefit at some time in the three months after childbirth. Benefit rates are only a fraction of the amount needed for full maintenance of mother and child, so the temptation is strong for the needy mother to work up to the time of her confinement and to return to work as soon as she gets up. The Washington Convention of the International Labour Office in 1919 laid down as a minimum 12 weeks' maternity leave and cash benefits sufficient for "full and healthy maintenance for mother and child"; but this ruling was never ratified in Britain. In any case the period is much too

1. Planning, no. 254, August 23, 1946. From P.E.P. (Political & Economic Planning), 16, Queen Anne's Gate, S.W.1.

short for the best interests of the child. The Royal College of Obstetricians and Gynæcologists have suggested that the mother should be free from all outside responsibilities for the first six months of the child's life—a view which is as strongly supported by psychological as by physiological findings. The introduction, under the National Insurance Act, of a weekly maternity benefit of 36s. for 13 weeks, to be paid on condition that the mother abstains from work, will do something, but clearly not enough. P.E.P. would like an extension of the period to be considered at once. Moreover, for the mother who has no husband to supplement it, the rate is too low, even when family allowances are taken into consideration. A National Assistance Service, to inquire into individual cases, is thought to be the solution; but the word "assistance" in the title of an official body has now an unpleasing sound in many ears. Public Assistance, carrying on the old poor-law stigma, is not always administered with tact and consideration. A special children's allowance to be paid to mothers with no source of income but their own earnings would meet the case better. The development of nursery schools of the best type and the growth of home-help services are also essential if mothers are to take part in industry without detriment to their main career; for the old sneer about the woman's place being the home gains a different significance once we realise that the output of the home compares favourably with that of the workshop—that children, in short, are more valuable than commodities.

Salicylates in Acute Rheumatism

THE generally accepted view of the action of salicylates in rheumatic fever is that they cause the fever and the arthritis to subside but do not affect the fundamental course of the disease or the development of endocarditis and valve lesions. It is still uncertain whether their febrifuge effect is merely that of an antipyretic acting on the temperature-regulating centre, or whether it is more complex and in some way specific to rheumatic fever. Doubt has also been expressed as to whether the joint effect is anything more than analgesic, seeing that in the natural course of the disease a given joint is swollen and painful usually for only a few days. Recent work in America has attacked these problems afresh, but as yet no finality has been reached.

In 1943 COBURN [1] attracted considerable attention for a claim that sufficiently high doses of salicylate suppress the rheumatic inflammatory process and may prevent lasting cardiac damage. With a new chemical method he was able to determine salicyl radicle concentrations in blood. To maintain a plasma salicylate level of 35 mg. per 100 c.cm. a daily dose of 10 grammes or more of sodium salicylate is necessary, and to reach that level quickly the early doses must be given intravenously. Of 38 patients with rheumatic fever so treated—young men from the American Navy—all are said to have escaped valvular heart disease, while of 63 similar cases treated with only enough salicylate to relieve the symptoms 21 developed valve lesions. Unfortunately the details, and especially the duration, of subsequent observation are not stated, and the conclusion must be accepted with reserve. Yet the case-records, showing relief of symptoms in a few hours with intravenous salicylate, the fall of temperature in 1–2 days, and the return of blood-sedimentation rates almost to normal in a week or two, are impressive. In some severe cases salicylate levels of 60 mg. per 100 c.cm. were reached, and except in one patient who developed a toxic psychosis the only untoward effect mentioned was mild tinnitus. At Johns Hopkins Hospital MURPHY [2] tested COBURN's claim by making a careful study of 12 patients with acute rheumatism receiving doses of salicylate large enough to maintain plasma salicylate levels of over 30 mg. per 100 c.cm. in nearly every case. The diameters of 24 swollen joints were accurately measured: 4 had decreased before salicylate therapy was begun; 2 decreased within twenty-four hours, 3 in forty-eight hours, 6 in up to five days, 2 after five to eight days, and 5 not at all in twenty-one days; 2 joints became involved for the first time on the fifteenth day of continuing salicylate therapy. Furthermore these patients developed various fresh rheumatic lesions during the intensive salicylate treatment, such as nodules on tendon sheaths, pneumonitis, teno-synovitis, and episcleral nodules; and some of these were confirmed by histological study. MURPHY concludes by doubting the accepted view that salicylates promote the subsidence of rheumatic joint inflammation. WÉGRIA and SMULL [3] compared 21 cases of rheumatic fever given salicylates in doses that promptly established and maintained 35–50 mg. salicylate per 100 c.cm. blood, and 19 cases treated with smaller doses. They could see no difference in the duration of the attack or in the behaviour of the sedimentation-rate of the two groups. Of toxic reactions, in the "adequately treated" group they describe tinnitus and deafness as common; vomiting as infrequent; hyperpnœa and tachycardia as occurring at levels of blood salicylate over 50 g. per 100 c.cm. MANCHESTER, [4] from an American naval hospital, accepts COBURN's view of the effectiveness of salicylates in suppressing inflammation and preventing cardiac residua, and describes in greater detail the toxic effects of continued high dosage. Hypoprothrombinæmia develops early, but is not severe and does not progress. Delirium can be caused by rapid intravenous infusion, raising the blood salicylate level too quickly. Hyperpnœa is due to acidosis and can be prevented by the simultaneous administration of alkali. JAGER and ALWAY [5] report on 26 cases of acute rheumatic infection treated with a long and intensive course of salicylates. Their results are not uniformly favourable, since both raised sedimentation-rates and other evidences of rheumatic activity persisted in many patients. Nor, as they say, is their follow-up adequate.

So far, then, the American evidence is conflicting. The advocates of intensive salicylate therapy write from naval hospitals, and it may be that rheumatic fever behaves somewhat differently in picked young men, so that results in them are not comparable with those in mixed general hospital patients. There seems no need as yet for doctors on this side of the water to depart from their time-honoured practice of giving salicylates by mouth in rheumatic fever, in doses just large enough to induce tinnitus, for at least as long as the fever and the arthritis last, and of

1. Coburn, A. F. *Bull. Johns Hopk. Hosp.* 1943, **73**, 435.
2. Murphy, G. E. *Ibid*, 1945, **77**, 1.
3. Wégria, R., Smull, K. *J. Amer. med. Ass.* 1945, **129**, 485.
4. Manchester, R. C. *Ibid*, 1946, **131**, 209.
5. Jager, B. V., Alway, R. *Amer. J. med. Sci.* 1946, **211**, 273.

hoping that rest and general measures will mitigate the cardiac damage. It seems possible, however, that succinate will replace salicylate. GUBNER and SZUCS[6] treated 65 cases with an average of 4·5 g. of sodium salicylate daily, and compared these with 55 cases receiving a similar amount of the calcium double salt of benzoic acid and succinic acid benzyl ester together with ascorbic acid. The succinate group showed a shorter clinical course, a much lower incidence of carditis (as shown, for example, by prolongation of the P–R interval), and an apparently lower incidence of valvular disease developing within one to six months. Succinic acid acts as a catalyst in some biological oxidations, and there is enough evidence of derangement of tissue oxidations in rheumatic fever to make its trial plausible on metabolic grounds. The clinician will await further experience.

Surgery of the Œsophagus

THE widening scope of surgery in the treatment of diseases of the œsophagus is illustrated by the spate of technical modifications and the increasing size of published series, compared with the isolated protocols of a few years ago.

Malignant disease comes in for most attention, and CLAGETT[1] now reports 54 operations for carcinoma of the cardia of the stomach or lower œsophagus using the thoracic approach. Of these growths, 24 were inoperable but no complications resulted from the thoracotomy. In the other 30 the growth was resected and continuity restored, with only 5 deaths. It should be noted that only 3 of these were defined as œsophageal carcinomata, the remaining 27 being growths of the upper stomach. CLAGETT also records 2 resections for benign conditions. The virtue of this route in the approach to high gastric lesions has been clearly established. Lesions in the middle third of the œsophagus lend themselves less readily to operation. It has been shown that by mobilisation of the stomach well up into the chest, after incision of the diaphragm, an œsophago-gastrostomy as high as the arch of the aorta is practicable.[2] Most of these anastomoses have been performed on the left side, though IVOR LEWIS[3] has had good results with a right-sided thoracotomy and anastomosis after preliminary abdominal mobilisation of the stomach.

Some benign strictures and high growths cannot be dealt with in this way, and continuity between pharynx and stomach can then be established only by some form of extrathoracic gut or skin tube method. With stricture, excision of the œsophagus is unnecessary, and an artificial gullet is the method of choice; the same applies to total removal of the œsophagus after the Torek and pull-through types of operation. The skin funnel operation has the disadvantages that the funnel is inert, and may become lined with and clogged by hair. Jejunal or gut loops, if properly constructed, convey food from the pharynx to the stomach without artificial assistance, but their length is limited by the distance to which the mesenteric blood-vessels will reach. YUDIN[4] in a series of 80 cases used a skin tube in 6 instances and a jejunal loop in 16; in the remaining 58 patients the two methods were combined. A recent modification mainly applicable to strictures consists in using an isolated jejunal loop as a free subcutaneous graft. LONGMIRE and RAVITCH[5] have shown that a long segment of gut can be exteriorised and placed subcutaneously, with its blood-supply initially left intact. The gut is then in stages surrounded by skin flaps to make a tube, and the mesenteric vessels are gradually and increasingly constricted until the gut-skin tube is viable. After division of its original blood-supply the tube is moved, again in stages, to the front of the sternum, where it is ultimately united to the cervical œsophagus and stomach. This procedure is tedious, involving many operations, but only the initial abdominal operation need be regarded as a major undertaking. The method ensures that an adequate length of jejunum is available for the artificial œsophagus; and it overcomes the principal objection to the usual operation, in which the length of bowel is determined by the mobility of the mesentery. Localised strictures in the lower œsophagus are more easily dealt with; failing gradual dilatation, they can usually be treated by a plastic operation on the lines of a pyloroplasty. With severe or long narrowings, an anastomosis between stomach and œsophagus through a small diaphragmatic incision will by-pass the stricture satisfactorily. CLARK and ADAMS[6] have practised one form of this operation in 5 cases; in 3 no known ætiological factor was established, while in another case the stricture appeared to be associated with generalised scleroderma.

For the many young people with œsophageal stricture or cardiospasm the chances of cure by radical surgery should be carefully considered before the patient is condemned to a life of dilatations or bougie swallowing. Furthermore, the difficulty in differentiating between carcinoma and some forms of stricture makes it imperative to consider thoracotomy in any case of doubt.

6. Gubner, R., Szucs, M. *New Engl. J. Med.* 1945, **233**, 652.

1. Clagett, O. T. *Proc. Mayo Clin.* 1945, **20**, 506.
2. Garlock, J. H. *Surg. Gynec. Obstet.* 1944, **78**, 23.
3. Lewis, I. *Brit. J. Surg.* 1946, **34**, 18.
4. Yudin, S. S. *Surg. Gynec. Obstet.* 1944, **78**, 561.
5. Longmire, W. P., Ravitch, M. M. *Ann. Surg.* 1946, **123**, 819.
6. Clark, D. E., Adams, W. E. *Ibid*, 1945, **122**, 942.

MEDICAL STUDENTS AND THE BILL.—The British Medical Students' Association sent a questionary on the National Health Service Bill to 10,106 students in medical schools in England, Wales, and Scotland. Of the 3801 (37·6%) who replied, 17% were definitely opposed to the principle of a comprehensive National Health Service, while over 80% were in favour. As to whether the present Bill will improve the medical services opinion was almost evenly divided. A small majority preferred the hospitals to remain under present administration, and a large majority disapproved of the transfer of voluntary hospital endowments to a new fund for redistribution.

Assuming that there is to be a service, opinion was strongly in favour of practitioners and specialists being allowed to conduct private practice along with their work in the service, as is proposed by the Bill. The combination of salary and capitation fees was approved (64%), though 18% favoured capitation fees alone and about 12% salary alone. The prohibition on the sale of N.H.S. practices (as proposed by the Bill) was accepted by 53% to 40%, but the power of the Medical Practices Committee to prohibit a doctor from practising in a particular area was not approved (47% for, 50% against). Nearly 60% disagreed with the composition of the local executive councils: where a reason was given it was that the councils should include more professional men.

Despite this disagreement about details, and uncertain approval of the Bill as a whole, over 60% of the students who answered the questionary expressed a willingness to work in the new National Health Service, provided remuneration is suitable and the regulations made by the Minister are acceptable.

Annotations

THE BASLE MEETING

LAST week's British-Swiss medical conference (see p. 464) was more than once likened to a peace conference; and, as at peace conferences, much of the most important work was done outside the formal meetings. Workers in both countries were eager to hear, at first hand, what had been done in the long period of segregation, and were often astonished at the parallel developments in the war years. The papers themselves, to which the *Schweizerische medizinische Wochenschrift* devoted a special number in English, gave an excellent symposium of recent advances in both countries. It may be hoped that the visitors learnt something of the example by the Swiss Academy of Medical Sciences in its preparations for the meeting. The papers themselves were all read in English with simultaneous translation, through earphones, into German—a device whose excellence has been equalled, Sir Heneage Ogilvie remarked, only at the Nuremberg trials. Delegates might perhaps have found it easier to make contact with one another if each had worn a rosette bearing his name; and it might have been an advantage to discuss each paper after it was read rather than at a single discussion in the evening. But these are small points.

Swiss doctors are eager to hear more of British medicine; it was therefore disappointing to find that, despite demand, the leading bookshops, though stocking American works, had been unable to obtain British textbooks, and, in particular, textbooks of medicine. The value of sending British publications to other countries is not solely commercial; and it is to be hoped that the precedent of the *British Medical Bulletin*, which is readily obtainable overseas, will be applied to books before the habit of buying those published elsewhere has become too firmly established.

At the banquet given by the academy, Prof. Karl Wégelin, the president, emphasised the strength of the bonds between Switzerland and Britain. Dr. Peter, president of the Basle council, spoke with eloquence of the feeling in that city, so near the frontiers that the sounds of war in both France and Germany had been heard. The Swiss people had, he said, been sustained by the spirit of the British, who had preserved democracy for Europe and the world; the best hope for the future lay in closer personal relations, and it was such meetings as the present that helped to foster international understanding. Professor Lutz, dean of the medical faculty at Basle University, called for an objective approach to international affairs; and Dr. Leuch welcomed the guests on behalf of the Swiss federation of doctors. Sir Heneage Ogilvie, replying for the visitors, showed a knowledge of Switzerland which gratified his countrymen no less than their Swiss hosts.

EXTRANEOUS CAUSES OF UTERINE BLEEDING

WHEN faced with a case of menorrhagia or epimenorrhœa, the average clinician thinks of organic pelvic disease, whose existence he proves or excludes by pelvic examination. If he finds the genital tract clinically normal, the condition is labelled as functional or endocrinopathic bleeding, and there the matter may rest. It is important to realise that there are other causes of bleeding and that organic disease, if present, may not necessarily be the primary cause of the hæmorrhage.[1]

Benign myometrial or adnexal lesions can hardly be considered as primary factors in uterine hæmorrhage, though they may aggravate bleeding by interfering with hormonal control or the dynamics of the pelvis. It is, moreover, questionable whether it is fair to blame an endocrinopathy for all or many of the uterine hæmorrhages which are attributed to that cause. The influence of the central nervous system is well known: fright, fatigue, sexual excess, change of environment, or emotional shock often lead to irregularities in menstrual function. The menstrual rhythm may also be disturbed by physical agents, such as change of climate or of weather, and the effects of high altitude; thus waitresses working on the Jungfrau-joch had to return to lower levels because of severe menorrhagia. Not only the pituitary and the ovary but other endocrine glands affect menstruation. Hypothyroidism in 75% of cases leads to menorrhagia, whereas hyperthyroidism as a rule results in hypomenorrhœa or even amenorrhœa. Diabetic women tend to suffer from ovarian degeneration, but if stabilised with insulin menstrual function remains normal. Infectious diseases and upper respiratory infections such as the common cold, influenza, and pneumonia may delay the onset of a period.

Blood dyscrasias must also be considered: more than 50% of women with idiopathic hypochromic anæmia have menorrhagia. Essential thrombocytopenic purpura may be suggested by severe uterine bleeding at the menarche. Secondary thrombocytopenia from such causes as malignant disease, leukæmia, septicæmia, arsenical poisoning, and X rays and radium must not be forgotten; pseudo-hæmophilia is a further cause of menorrhagia, and idiopathic hypoprothrombinæmia and hereditary telangiectases are among the rare causes. Deficiency of vitamins B, C, and K has often been suggested as a possible cause of excessive uterine bleeding; and various types of heart disease and chronic nephritis must not be overlooked.

The gynæcologist confronted with a case of menorrhagia should recall that he is not dealing with an isolated region between the umbilicus and the perineum, and that curettage and endocrine treatment are not the final answer for every patient with functional bleeding.

1. Frank, I. L. *Amer. J. med. Sci.* 1946, **210**, 787.

SNAGS IN PROTECTION OF PRACTICES

A CORRESPONDENT complains that, being an insured person, when his family doctor returns after 7 years in the Forces he must give up his present doctor for at least a year, whether he goes back to his old doctor or not. This is quite true. Men who have served in the Forces expect reinstatement in their jobs when they are released, and the scheme for the protection of practices is an attempt on the part of doctors to secure that those of their colleagues who have been on national service can return to their jobs on release. Schemes vary in detail, but broadly speaking they provide that doctors who have joined—and this covers the great majority of insurance practitioners—will refuse to accept on their own behalf any patients of an absentee doctor until a year after the absentee's return or a year after the termination of the emergency, whichever is earlier. They have agreed that if a patient of an absentee doctor applies for treatment they will tell the patient that they will attend only on the absentee's behalf. They are also required to display in their surgery a printed notice intimating that during the absence of a doctor on Service his patients will be attended by a home doctor in the neighbourhood and on the return of the absentee they will be expected to seek any advice required from him.

If our correspondent has removed from the district in which his old doctor practised he can transfer permanently to the list of another doctor by using part "B" of his medical card; otherwise, if he wants to transfer to another doctor he should ask his old doctor to sign part "C" of his medical card consenting to an immediate transfer. If the doctor signs—but he is not compelled to do so—this will absolve other acting practitioners from their pledge so far as that particular insured person is concerned. The Medical Benefit Regulations provide that an insured person may transfer at the end of a quarter if, not later than the last day of February, May, August,

or November, he has given notice to the Insurance Committee in writing of his desire to transfer, whereupon he will be entitled to transfer as from the end of March, June, September, or December next following, but such transfer can be effected only if the new doctor agrees to accept him. If our correspondent tries to take advantage of this regulation, his present doctor will probably tell him that he must wait until his old doctor has been back for a year.

The protection of practices scheme is supposed to apply in exactly the same way to private patients, but these do not hold medical cards and when applying for treatment they often omit to explain that they are really patients of an absentee doctor.

MEGALOBLASTIC ANÆMIA IN CHILDREN

ANÆMIA with high colour-index and large red-blood cells does occur in infancy and childhood, but the frequencies of its causes are quite different from those in adult life. The commonest cause in childhood is nutritional deficiency, either primary or secondary to cœliac disease; Blackfan and Diamond [1] have seen it in acute infections in infants with temporary achlorhydria; hæmolytic syndromes, like erythroblastosis fœtalis and familial acholuric jaundice, and leukæmias are not uncommon causes. There has been much argument about the incidence of true pernicious anæmia before adult life and the evidence has been reviewed by Peterson and Dunn.[2] They point out that the following criteria are essential for establishing the diagnosis of pernicious anæmia in childhood: macrocytic anæmia, gastric achlorhydria resistant to histamine stimulation, megaloblastic change in the bone-marrow, a specific response to liver treatment, and the necessity for continued treatment to prevent a relapse. Examined by this strict standard, every case but two reported up to 1942 failed to qualify; not a few had free HCl in the gastric juice, others showed no relapse after liver treatment was stopped, some were clearly nutritional cases, and in many the evidence was inadequate or rested primarily on post-mortem changes.

Pohl [3] described the case of a girl of 13 years who was studied for 4 years and presented all the features of pernicious anæmia; Dedichen [4] reported a macrocytic anæmia in a child of 13 months in whom repeated relapses were observed over a period of 3 years whenever liver treatment was stopped. Peterson and Dunn describe a case of their own, in a child of 13 months who was admitted because of diarrhœa and pallor; the red-cell count was 810,000 per c.mm., hæmoglobin 2 g. per 100 c.cm., colour-index 0·82, white cells 62,000 per c.mm., with 90% lymphocytes and 8% "smudges," and reticulocytes 14%. It is not surprising that pernicious anæmia did not figure in their original differential diagnosis; the child was transfused and not given liver until 3 months later, when it produced a surprisingly good effect. The patient relapsed several times; during her fourth relapse, 3¼ years later, the bone-marrow proved to be megaloblastic; gastric achlorhydria had been noted previously. It was found that the girl had an iron-deficiency, and when this was remedied she improved remarkably and the blood-count became normal. Nine months later a mild normochromic anæmia was remedied by increasing the dose of liver extract; the white cells were then normal and with normal distribution. That such an extraordinary case should be reported as pernicious anæmia emphasises the diagnostic difficulties that arise in children; yet, apart from the absence of macrocytosis and the curious lymphocytosis, the case conformed to all the criteria given above, and the lack of macrocytosis is attributed to the iron-deficiency.

1. Blackfan, K. D., Diamond, L. K. Atlas of the Blood in Children, London, 1944.
2. Peterson, J. C., Dunn, S. C. *Amer. J. Dis. Child.* 1946, **71**, 252.
3. Pohl, C. *Mschr. Kinderheilk.* 1940, **84**, 192.
4. Dedichen, J. *Acta med. scand.* 1942, **111**, 90.

Davis [5] has described 3 cases of macrocytic anæmia in children. The first was in an underdeveloped girl of 13 years who had a megaloblastic marrow and, at first, free acid in the gastric juice; she was treated, but 3 years later was seen in a relapse when she had achlorhydria and responded to a purified liver extract used for treating pernicious anæmia; it is clear that had she been seen for the first time at the age of 16 she would have been regarded as a case of pernicious anæmia. His second patient was a boy of 14 years who had achlorhydria and megaloblastic marrow; a purified liver extract was ineffective, but proteolysed liver by mouth and a crude liver extract parenterally produced a remission after which no further treatment was needed. The third patient, a girl of 3 years, resembled the second, but gastric acid secretion was present. Neither of these patients would be classified as pernicious anæmia. Recently Zuelzer and Ogden [6] in Detroit have drawn attention to a macrocytic anæmia in infants aged up to 18 months that they found to be quite common, and they give details of 25 cases. The bone-marrow, aspirated from the femur, was typically megaloblastic, gastric achlorhydria was present in some; the anæmia was severe and clinically the patients had pallor, fever, vomiting, diarrhœa, and sometimes petechiæ. All except 5 of the infants responded rapidly to liver extract or to folic acid, and so far these have not relapsed; the 5 exceptions died from complications, mostly infective.

From all this evidence it can be deduced that a macrocytic anæmia with megaloblastic change in the bone-marrow is fairly common in infancy and childhood. It should be distinguished from other forms of macrocytic anæmia, since most of the patients respond to liver extracts; ordinary crude extracts should be used and not the purified extracts specially designed for the treatment of pernicious anæmia, like 'Anahæmin'; Zuelzer and Ogden's results suggest that it will be worth while to try folic acid for these patients. It is doubtful whether true relapsing pernicious anæmia of adult type does occur before puberty, and the outlook for the children who seem to have the disease is relatively good, since they nearly all show a lasting response to liver, and if they weather the original crisis they will recover permanently. It seems reasonable that the name "megaloblastic anæmia," which describes the main diagnostic features of the disease without confusing it with pernicious anæmia, should be adopted.

MECHANISM OF PAIN

IN his founder's lecture at the annual congress of the Chartered Society of Physiotherapists on Sept. 14, Prof. G. W. Pickering spoke of the pain mechanism in man as consisting of three essential parts: the sensory nerve-ending or receptor, the nerve-fibre or conductor, and the brain or cortical analyser. Receptors were very numerous in the skin and liberally provided in the deep fascial and muscular structures, but rather few in the subcutaneous tissues. The parietal layers of the serous membranes were well supplied, but the visceral layers and the viscera themselves not at all, though perhaps there was some evidence that the pains of angina and peptic ulcer do arise directly in the organs concerned. Periosteum and ligaments were sensitive, spongy bone slightly so, compact bone and joint surfaces insensitive; arteries possessed more receptors than veins, and the meninges were profusely studded with them, whereas the brain itself had none.

The tissue changes which produced excitation of these receptors might be physical, a deformation of surface producing alteration in configuration and tension; or chemical, like the pain of claudication due to the accumulation of metabolites in muscle-fibres, peptic-

5. Davis, L. J. *Arch. Dis. Childh.* 1944, **19**, 147.
6. Zuelzer, W. W., Ogden, F. N. *Amer. J. Dis. Child.* 1946, **71**, 211.

ulcer pain from stimulation by acid, and the continued pain of burns. It was the analyser's function to receive these impulses after transmission, to relate them to past experiences, and to form an image for purposes of description. Sir Thomas Lewis had shown that the quality of pain arising in the skin surface was always the same whether the stimulus was pinching, pulling, or burning. With the skin anæsthetised and the deeper structures stimulated, the subject could always tell that the pain was not arising in the skin though he could not localise it to fascia or bone. Thus, from the point of view of quality, there were only two kinds of pain—one from the skin, and one from beneath the skin. Visceral pain was not distinguished in quality from ligamentous or muscular pain, and any other "qualities" were due only to mental associations and could be excluded by eliminating visual and other factors. The intensity of a pain was largely determined by the behaviour of the analyser. Hence the racial range of susceptibility, the emotional influence which produced the painless mutilations of religious ecstasy and the exaltation of pain by apprehension, and the effects of suggestion on the state of inhibition or excitation of the cortical analyser. It was interesting to speculate how much the beneficial results of physiotherapy were due to such suggestion. One of the most fascinating problems of pain was the phenomenon of reference. Skin pain was accurately localised, while visceral pain was not. It was to explain the fact that visceral pain did not correspond closely to the organ of origin that James Mackenzie introduced his conception of the viscero-sensory reflex with enhanced excitability of the particular cord-segment involved. More recently, Kellgren's[1] work on the segmental reference of pain excited from the interspinous ligaments had thrown further light on the whole subject.

In a sense, said Professor Pickering, it might be more reasonable to ask why pain was so well localised in the skin at all, rather than why visceral pain was referred. The answer probably lay in the increasing knowledge and experience gained by the cortical analyser in development, an education associated with visual knowledge of events in local areas of the body surface. This educability of the analyser was well shown in the fineness of touch acquired by the blind. With the deeper structures such an education was obviously impossible; there was much less correlation with outside influences, and the pain was felt over a wide area determined by the segmental nerve-supply.

PLAGUE VACCINE

DURING the last half century over forty million doses of plague vaccine have been issued by the Haffkine Institute in Bombay. These have been used in different parts of India whenever plague has appeared in epidemic form and it is claimed that thereby several million lives have been saved. The method of preparation of this vaccine has varied from time to time, especially in the last fifteen years, but during most of this period a broth vaccine killed at 65° C, as first introduced by Haffkine, was used; later, lower temperatures were used for killing the organisms.

The claim for the prophylactic value of this vaccine was based first on animal experiment, and then on the extensive field experience in the plague-stricken areas in India and elsewhere in the East. Statistics collected in India indicated that the vaccine reduced the chances of exposed persons becoming infected to a quarter and the chance of dying of plague to an eighth of what they would otherwise have been, whereas in Java it was claimed that the infection-rate was reduced to a third or a half. In 1907 Strong, working in the Philippines, used living avirulent vaccine with success, but he did not pursue this line of work because of the practical disadvantages of such a vaccine, and nearly forty years later his opinion on its impracticability on a large scale is unchanged. The value of the Haffkine vaccine began to be questioned in the early 1930s. Figures from Madagascar, Central Africa, and elsewhere seemed to indicate that the vaccine was useless, and the methods of obtaining the data on which the favourable claims had been based in India were severely criticised by statisticians. This led to a reinvestigation of the living avirulent vaccine, more particularly by Girard and Robic in Madagascar in 1933 and in the following year by Otten in Java. Animal experiments reveal a much higher protective value for the living vaccine than is ever obtained by killed vaccine; ten million doses were given in the Dutch East Indies up to 1941 without producing a single case of plague, and a tenfold reduction in the death-rate from plague was reported in those vaccinated.

It is now generally agreed that the living avirulent vaccine is more efficacious than any killed vaccine, and only the difficulties of its preparation and distribution have prevented its general adoption. The dangers inherent in the preparation of a living vaccine, especially in tropical countries, are obvious. There is apparently no danger that these avirulent organisms will regain their virulence, but if the vaccine is kept too long it loses its protecting property. The safe limits are between the 5th and 15th day after preparation; this is far too short a period to allow distribution in a large country such as India or among the far-flung fighting forces of the United States in the late war, to take two examples. The U.S. Services therefore used a killed vaccine, and they chose one containing 2000 million organisms per ml., of which 0·5 ml. was given as the first dose followed by 1·0 ml. a week to ten days later; "booster" doses of 1·0 ml. were given periodically when the danger from infection was imminent.

THE BASIC NURSING COURSE

WE have often put the case for a two-year course in practical nursing for all entrants to the nursing profession, to be followed—for those who wish to apply for senior posts or to specialise—by a much stiffer training, demanding a higher standard of theory than the present curriculum. We believe this would have the double advantage of reviving interest in nursing technique and research, and of developing to the full the abilities of every type of student, whether her bent is practical or academic or both.

It is encouraging to learn that the County Councils Association have now endorsed this policy. The *Public Assistance Journal*[1] announces that the association's executive council has accepted the following resolutions previously passed by the Association of County Medical Officers of Health:

1. There should be a basic training of two years for all nurses, some of which period should be spent in nursing the chronic sick. The training should be essentially practical.
2. After that training and on passing their appropriate examinations, the designation should be "Qualified Nurse."
3. 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 settled later.

The proposal that every nurse should spend some time with chronic patients is particularly valuable, for it is precisely where the doctor and surgeon can do least that the nurse can do most. She should be encouraged to recognise and use her important opportunities for improving our care of such patients.

DR. T. WATTS EDEN, consulting obstetric physician to Charing Cross Hospital, and consulting surgeon to Queen Charlotte's Hospital and the Chelsea Hospital for Women, died on Sept. 22 at the age of 83.

1. Kellgren, J. H. *Clin. Sci.* 1939. 4. 35.

1. Sept. 6, p. 693.

Special Articles

WORLD PROBLEMS OF NUTRITION

F.A.O. CONFERENCE AT COPENHAGEN

FROM OUR CORRESPONDENT

THE Food and Agriculture Organisation held its second annual conference at Copenhagen from Sept. 2 to 13. Its principal work was to consider the proposal of the director-general, Sir John Boyd Orr, F.R.S., for the establishment of a World Food Board. This board would attempt to stabilise prices of agricultural commodities in the world market, providing the necessary funds; to establish a world food reserve equipped for any emergency that might arise through failure of crops in any part of the world; and to coöperate with organisations concerned with international credits for industrial and agricultural development and with trade and commodity policy. The conference appointed a commission to sit at once and draw up a detailed plan for the board. This is to be submitted to an adjourned meeting of the conference early next year.

The standing advisory committee on nutrition, whose chairman is Lord Horder, in its first report to the director-general recommended governments to keep a careful watch on the food situation in their countries, for which purpose, it says, diet surveys are of great value in assessing dietary defects and formulating food-supply requirements. F.A.O. should ask nutrition experts in the various countries to study the methodology of diet surveys with the ultimate aim of securing comparability of results and perhaps evolving standard types of survey. On school feeding the committee recommended that F.A.O. should study school-feeding programmes in different countries, covering all ages, with reference to the type of food-supplies, organisation, cost, and effects on health. Information about successful methods of school feeding may assist governments to develop satisfactory programmes, particularly where school feeding has not been organised.

The committee laid stress on the need for studying milling, processing, fortification, and preparation of cereals in relation to nutrition. It suggested that F.A.O. should study a number of staple cereals, such as wheat, rice, maize, and rye, to ascertain the effect of these operations on their nutritive value. The relation between extraction-rates and vitamin-B_1 content of wheat calls for investigation. The "fortification" of wheat-flour or bread includes the addition of vitamins, calcium salts, skim-milk, and other kinds of flour, such as soya-bean flour. Information about the methods adopted by different countries for conserving or enhancing the nutritive value of wheat-flour would be of value to other countries. Parallel problems of rice-processing should also be examined. Highly milled raw rice is poor in vitamins, notably B_1, and investigation is needed to decide which methods—e.g., under-milling, parboiling, and enrichment—are likely to be most satisfactory in the rice-eating countries. The effect of household methods on the nutritive value of rice should likewise be studied; for instance, the washing of raw rice may remove a considerable proportion of certain nutrients. There seems to be a relation between the processing of maize and the incidence of pellagra; the F.A.O. nutrition programme should therefore include a survey of the methods of milling, processing, and preparing maize.

Perishable foods, such as milk, vegetables, and fruits, also call for special attention if their nutritive value is to be safeguarded; and further study is required on the utilisation of whole-fish meal and the inclusion in canned meat of ground fresh bone.

EDUCATION IN NUTRITION

This subject has three main aspects: (1) the training of specialised workers; (2) the instruction of persons able to help in the campaign for improving nutrition; and (3) the education of the people with the object of improving their dietary habits. In studying and attacking nutrition problems the lead must be taken by a "core" of specialised nutrition experts. To accelerate progress systematic instruction in food and nutrition, both theoretical and practical, must also be given to administrators, agricultural experts, food technologists, teachers, nurses, and social workers. The committee agreed unanimously that the teaching of nutrition in various curricula, especially medicine, is unsatisfactory. University authorities and others concerned with higher education should give nutrition a place in their curricula in keeping with its importance. The position of the doctor, the committee point out, is unique: his opportunities of teaching and applying the principles of nutrition are unequalled by those of any other member of the community. His training in nutrition should therefore be thorough, and progress is not likely to be made here until nutrition holds a conspicuous place in the medical curriculum approved by the statutory bodies which control it in the various countries. The principles of nutrition should be inculcated in the child at home and at school, and for the teaching of sound dietary habits to children school feeding is useful. Similarly, the organised feeding of workers is a valuable means of teaching adults.

The education of housewives is of great importance, and one means of providing it is through courses in domestic science, which should be introduced in countries where they do not exist. Voluntary groups, properly guided, can do a good deal to spread a knowledge of nutrition among the general public. Advertisements educate the public, and therefore advertisement of the nutritive value of food products should be controlled. In countries deficient in food the emphasis in education should be laid on the best means of utilising available supplies; in those with a surplus the need for consuming diets of the highest standards should be stressed.

The war experience of countries with comprehensive control plans—amounting almost to large-scale human feeding experiments—contains valuable lessons.

NATIONAL COMMITTEES

At the outbreak of the war national nutrition committees or councils existed in over thirty countries, many as a result of stimulus by the League of Nations. Only a few of these are still effective. The committee recommended, therefore, that a comprehensive report should be prepared on their present situation. Such committees may be identical with the F.A.O. national committees, but in many countries this is neither possible nor desirable, though the two committees should be closely associated. The nutrition committees must be guided by trained nutrition workers, have adequate facilities and financial support for research, and be able to influence their governments. They must have the coöperation of governmental and other agencies—e.g., ministries, labour unions, domestic science organisations, and charitable societies—that are anxious to improve the nutrition of the population and possess the necessary means and personnel. Besides merely urging governments to establish committees F.A.O. should study realistically the conditions necessary for their satisfactory operation.

F.A.O. must know where to seek effective collaboration from nutrition organisations and workers, and an index of these throughout the world should be prepared. The staff of the nutrition division should establish contact with workers in various countries.

Nearly all practical nutrition problems will also concern the World Health Organisation. The committee recommends that a joint nutrition committee should be set up between the two bodies, which should consult together about the choice of their nutrition staff.

NUTRITIONAL STANDARDS

The nutrition committee of the conference, which has some common membership with the standing advisory committee, accepted its recommendations and suggested certain directions in which they could be implemented. It pointed out, for instance, that the expression of food commodities in terms of nutrients requires the use of appropriate tables on food composition. This does not mean a single international figure for each food, for there are real differences in the nutritive value of foods in different parts of the world. Nevertheless, the values used by countries in preparing statistical material for international consideration should be derived by com-

parable methods and represent the nutritive value of food at the same stage in the flow from the farm to the mouth of the consumer. Most of the data now available on the nutritive value of foods refer to products as brought into the household (retail level) and provide information on the proportion of inedible material and the moisture content and nutritive value of the edible portion at this stage. The nutrient content of the edible portion may be considerably higher than that of the same portion of food "as eaten," because of waste and nutritive losses—both visible and invisible—during household storage, preparation, and serving of foods. Data on the composition of food as eaten will be increasingly necessary as correlations are sought between the results of dietary surveys and appraisals of the nutritional status of individuals and population groups. Accordingly the nutrition committee recommended that F.A.O. should arrange for joint consultation of experts in nutrition and food statistics from various countries who should develop the principles on which average food-composition figures used by individual countries should be based, and explore the means whereby comparability of data for international use can be attained, including, if necessary, the revision of tables now used for this purpose.

UTILISATION OF CEREALS

In addition to the study of the preparation of cereals recommended by the standing advisory committee, the nutrition committee draws attention to a broader aspect of the question: the utilisation of cereals, cereal products, and other plant products as human food or animal feeding-stuffs in such a manner that the nutritional needs of the population shall be best met. The best method of utilisation will differ in various countries, depending on the nutritive value of the cereals and products in question, the efficiency of their conversion by animals into human food, the relative cost of plant and animal products and their acceptability to the consumer, and the nutritive value of the diet of the population, particularly of the low-income groups. The committee accordingly recommended that F.A.O. should study the best utilisation of plant products for human consumption, either directly or through the animal; and the most economical and satisfactory balance between the production of meat and milk and between poultry-meat and eggs. Such studies would assist governments to plan their food policies so that food-production would be adapted to the physiological requirements of the people.

Rapid progress has been made in recent years in the chemical and microbial synthesis of foods and nutrients, such as yeast, fats, and vitamins. It is highly important that synthetic processes which may contribute to the improvement of nutrition and the alleviation of food shortage and dietary deficiency should be investigated and, if found advisable, their development stimulated. The committee heard a report from a representative of the forestry committee on the possibility of obtaining food by the saccharification of wood, and considered that the question of using saccharified wood for the production of food yeast should be further explored.

The committee pointed out that the national nutrition organisations recommended by the standing committee must be adapted to the governmental machinery of each country. Countries which contain a number of component units, such as federated states or self-governing communities, are urged to establish a central representative nutritional organisation. It recorded its opinion that the scientific evidence at present available does not indicate that, given similar environmental conditions, the physiological requirements of food for optimal growth, health, and physical efficiency are different for the peoples in the various parts of the world. It stressed the urgency of investigating food-supply targets.

The conference accepted both reports and passed them to the secretariat for action. The immense amount of correspondence, digestion, recording, and circulation which they involve is only a fraction of the whole work of the permanent staff of F.A.O.

THE OUTLOOK

An observer cannot help asking to what extent, when these voluminous surveys and advisory documents come into the hands of governments and other bodies in various parts of the world, their precepts will be put into practice, and how much of them will be neglected or suppressed. Though some of the less controversial advice may be followed, what weight will they carry when they conflict with political tendencies and commercial or national interests? Though the secretariat has done wonders in a short time, this vast programme of work must necessarily take years to execute. Even the World Food Board, the urgent need for which is admitted by all, cannot possibly under the most favourable conditions come into activity before next summer, and if the blue-print of the preparatory commission excites substantial controversy, its establishment must be correspondingly delayed. World events already move with dreadful speed, and that speed is accelerating. The obvious danger is that they will outstrip the organisation's good intentions and heroic work.

BRITISH-SWISS MEDICAL CONFERENCE

(*Concluded from p.* 431)

PHYSIOLOGY OF THE KIDNEY IN INFANCY

Prof. R. A. McCANCE (Cambridge) said that before birth the internal environment can be satisfactorily regulated by the placenta; indeed babies, normally developed in other ways, may be born with functionless urinary tracts. Little is known about the function of the kidney before birth; but it has been proved that the kidney of the newborn infant does not immediately assume all the functions it will perform in later life. The non-protein nitrogen of the blood may be higher for a few days after birth than later, and the uric acid in particular is raised. The serum shows signs of acidosis and may contain very high concentrations of potassium. In infants under 3 months, as in other young mammals, water is excreted less freely than at a later age. After the age of 1–2 years the urea-clearances of children are of the same magnitude as those of adults. A baby's urine is never highly concentrated; in the first few days of life the specific gravity averages 1012–1015, and the osmotic pressure 450 milli-osmols per litre, and in the later weeks and months the urine is usually very dilute. Even when an infant aged 14 days is deprived of water and the urine volume falls, concentrated urine is not normally produced; nor is the infant's normal dilute urine concentrated by injections of posterior pituitary hormone. It has been demonstrated, however, that a hypertonic urine is excreted, even by premature infants, if the salt-intake is sufficiently increased; these hypertonic urines are not a sign of good renal function.

Infants respond to the intravenous injection of sodium chloride (1 g. per kg. body-weight in 10% solution) and the oral administration of urea (1·7 g. per kg. body-weight with a minimum of water) by showing a moderate diuresis, a rise in the urinary osmotic pressure, and (despite this) a poor elimination of the test dose; the responses are obviously complicated, but it is clear that the normal infant's kidney can be very ineffective in the early days of life. In babies the glomerular filtration-rate is less than half that in adults; in the human infant, as in some other mammals, the rate depends on hydration, and quite mild dehydration may cause gross abnormalities in the serum chemistry, so that renal damage may then be erroneously diagnosed. Urea-clearances of infants in the first 14 days of life are far below those of adults when compared on the basis of surface area; on the whole the clearances probably vary with the minute volumes of the urine. The clearances approach adult level towards the end of the first year. These findings are supported histologically by the tall columnar cells which cover the glomerular tuft in fœtal life; these cells prove an effective barrier to ultrafiltration and are replaced by the thin pavement epithelium found in adult life. The excretion of diodone has recently been found to be very low in babies a few days old, and the creatinine clearances to be no higher than the inulin clearances. The ability to form and excrete ammonia, however, seems to be fully developed at birth.

Sodium, potassium, and chloride clearances are all lower in the infant, and especially the premature infant,

than in the adult, which explains the premature infant's liability to œdema; thus the premature infant should not be given much sodium chloride. The administration of 0·9% saline as a source of fluid for a baby is bad therapy, since it presents the kidney with the task of excreting a hypertonic solution—a task it can perform only if the serum has already become grossly abnormal.

HIGH ALTITUDE IN THE TREATMENT OF TUBERCULOSIS

Dr. J. E. WOLF (Davos) regretted that the development of collapse therapy has led to a certain neglect of climatic treatment at altitudes of 4000–6000 feet. Climatic treatment can plainly never completely replace surgical collapse therapy, particularly for the cavitating form; indeed high-altitude treatment increases the scope of surgery, since the patient may be made fit for collapse therapy by first having this conservative treatment. Recent statistics have shown the advantages of continuing both methods. Tuberculosis must be treated as a general disease with local manifestations. The mechanism by which high altitude helps to increase immunity is not clear; a mountain climate, though it stimulates body metabolism, also has a certain sedative action; it has, moreover, a stimulating psychological effect.

Four climatic factors benefit the body's biological reactions: (1) diminution of atmospheric pressure; (2) ultraviolet radiation; (3) dryness of the air; and (4) diminution of the cooling power. The metabolism of respiration, circulation, and hæmopoiesis are certainly stimulated; but there is evidence that pathologically increased metabolism—for example, in Graves's disease—is reduced at altitudes of 4000–6000 feet. Similarly the increased basal metabolism sometimes associated with tuberculosis is reduced at the same time as the increased blood-sedimentation rate and blood-globulin are lowered. It has also been shown that thyroxine injected into animals at high altitudes has only a quarter to a tenth of the effect that it has in the lowlands. The influence of altered vitamin metabolism must also be considered; at high altitudes the blood-cholesterol increases, no doubt because of the intense ultraviolet radiation. When the blood-cholesterol rises there is an associated increase in the blood vitamin A. Both vitamins influence tuberculosis; when vitamin A is deficient, the incidence of infection rises. At Davos it has been found in tuberculous patients that the blood vitamin A is decreased, the diminution varying with the gravity of the infection. It has also been shown that in the first few weeks after the change to a high altitude the vitamin A and D values increase together, even with cavitating disease, provided there is still a possibility of reaction. Some of the benefit from high altitude may be derived from its effect on the vegetative nervous system and from its encouragement of blood acidosis, in place of the alkalosis usually associated with tuberculosis.

The clinical results of high-altitude treatment have shown that it is strongly indicated in almost all forms of surgical tuberculosis. With pulmonary tuberculosis cases must be more carefully selected; the treatment should not be adopted where the general condition is grossly impaired or the lung-area greatly reduced. All other forms and stages of pulmonary tuberculosis are, generally speaking, suitable for the treatment; it is sometimes contended that the exudative forms should not be submitted to high altitudes, but in Dr. Wolf's view this is a mistake.

CELLULAR ADAPTATION TO EFFORT, ALTITUDE, AND OXYGEN DEFICIENCY

Prof. ALFREDO VANNOTTI (Lausanne) pointed out that the effects of severe muscular effort and exposure to high altitudes are, in most respects, the same. The muscle persistently submitted to effort reacts by dilatation of reserve capillaries, the formation of anastomoses, and later possibly the formation of new capillaries; this capillary adaptation is probably related to effort-acidosis. The myoglobin content in muscles submitted to 2–3 weeks' daily faradic stimulation is 10–35% more than in control muscles. It is now held that cellular respiration is regulated by two catalytic systems. One, made up of pigments based on hæmins, activates the arterial oxygen; while the other is based on the activity of hydrogen transporters, the deshydrases, and is largely built up from the vitamins of the B group. With acute effort the muscle-content of dissociated iron increases, while with chronic effort there is a rise in muscle oxydase, myoglobin, and cytochrome C. With acute effort there is increased utilisation in the muscle of aneurine, riboflavine, and nicotinic acid; but when hypertrophy ensues from chronic effort, there is a rise in the muscle content not only of myoglobin but of oxydase, cytochrome, active iron, and vitamins of the B group.

Ascent to high altitudes results immediately in a temporary increase in red blood corpuscles, attributed by Barcroft to splenic contraction; then often the number of red cells falls rapidly, apparently through hæmolysis. Regeneration follows, with reticulocytosis and the formation of macrocytic red cells, rich in iron. Hæmoglobin and more especially myoglobin levels continually rise; but whereas hæmoglobin has been observed to be formed with radioactive iron 6–8 days after injection, myoglobin and cytochrome are not synthesised with it until after 3–4 weeks. The organism's adaptation to high altitudes is thus slow; the initial hæmolysis can be attributed to an attempt to mobilise iron for the rapid synthesis of cellular hæmins. With stay at high altitudes the spleen enlarges and there is some hypertrophy of the adrenals, especially of the adrenal cortex.

AMPUTATIONS

Mr. GEORGE PERKINS (London) said that to satisfy the needs of the limb-maker it may be necessary to perform two operations—a provisional amputation followed later by a definitive one. The provisional amputation should be performed as low as possible, since the wound will probably not heal without infection; there is no need to go above the level of existing infection. The technique does not differ from that in the definitive operation, except that the deep fascia and skin are not sutured. Healing is quicker if the skin-edges are sewn together for 2 cm. in the centre so as to cover the raw end of the bone; but even this partial closure may not be safe with recent infection. For the definitive amputation primary healing should, ideally, be assured; but it may be necessary to accept the risk of infection from a terminal ulcer. Experience from the first world war has shown that end-bearing stumps do not last; the circulation in long stumps, moreover, often becomes defective. The sites of election now favoured by the Ministry of Pensions' surgeons are below or above the elbow, and below or above the knee. The short stump, though desirable, must be long enough to remain inside the socket of the prosthesis when the joint above is placed at a right-angle, and long enough to contain the insertion of the muscles that control the joint. A below-knee stump should measure 10–14 cm. from the knee-joint to the end of the tibia, and an above-knee stump 28 cm. from the top of the great trochanter to the end of the femur. At Roehampton the Syme amputation has been condemned, owing to the difficulty of fitting a comfortable prosthesis, which in any case is unwieldy compared with that fitted after a below-knee amputation. The optimum length for a below-elbow stump is 18 cm., measured from the tip of the olecranon to the end of the ulna, and for an above-elbow stump 20 cm., measured from the acromion process to the end of the humerus. The technique for definitive amputation is based on two considerations—the operation is performed by all manner of surgeons, and the needs of the limb-fitting surgeon must be met. The ideal criteria for the stump are: (1) the scar is not exposed to pressure; (2) the scar is not adherent; (3) the skin is not infolded; (4) there is no redundant soft tissue; (5) there is no projecting spur of bone; (6) the stump is not tender; and (7) the wound heals by first intention. After the operation the limb must be prepared to receive the prosthesis by shaping the stump, strengthening the muscles, regaining movement at the joint above, and reconnecting the brain to the stump. Finally, the patient must be taught to use the prosthesis.

CAROTID LIGATION IN INTRACRANIAL ANEURYSM

Prof. H. KRAYENBÜHL (Zürich) emphasised the differences of opinion on the safety of carotid ligation. He has undertaken the operation in 35 patients, ligating in each case the common and internal carotid arteries, with more or less extensive periarterial sympathectomy;

usually the artery has been compressed by hand for 20 minutes on the day before operation. Recurrent subarachnoid hæmorrhage has been the most common indication for operation. The results with infra- and supra-clinoid arteriovenous aneurysms have been uniformly good. Of 20 patients submitted to operation for bleeding supraclinoid saccular aneurysm, 6 died; among the 24 patients with saccular infra- and supra-clinoid aneurysm, postoperative flaccid hemiparesis has occurred in 4; but in 3 of these the disturbance has cleared almost completely.

PRIMITIVE TUBERCULOSIS, PRIMARY INFECTION, AND "PREMUNITION"

Prof. E. GRASSET (Geneva) recalled that tuberculosis is seen in virgin stocks in its original uncomplicated forms. Primitive stocks may be attacked by acute infection at any age; indeed its spread may assume the form of an epidemic. Usually this type of infection results in early death. It may be spread by the lymphatic system from a primary focus in the lung; or the lymph-glands may be infected. In other patients the primary focus in the lung is the principal lesion, resulting in rapidly progressive pulmonary disease, and terminating in caseous bronchopneumonia or secondarily disseminated pneumonia. In some the spread of infection may be temporarily checked in the tracheobronchial lymph-glands. Pulmonary infection can be evaluated only by radiography; quite advanced lesions may be associated with few symptoms and no signs on auscultation, a good general condition, and a negative sputum. The lesion sometimes spreads through the lung in a compact mass; but it may spread rapidly in wide zones of one or more lobes. In children, and in some adults, the tracheobronchial lymph-glands are greatly enlarged, and the submaxillary and cervical glands may be grossly swollen and tender; in other cases all lymphatic glands are affected. After several weeks of this first phase, the infection enters a new and dramatic stage, with a gradual rise of temperature or sudden rigors and profound toxæmia. The picture becomes more clearly one of pulmonary infection, with cough and increasing expectoration; and a lobar or broncho-pneumonia may be simulated by the profuse, often bloodstained sputum, which, however, contains numerous tubercle bacilli. With rapid spread and cavitation, the condition deteriorates rapidly and the patient may die within 3 months, death often resulting from repeated or massive hæmoptysis and occasionally from meningitis. Necropsy shows that the lesions are mainly exudative with little or no fibrosis; in the same lung there may be different forms, such as massive caseous pneumonia in one lobe and fine nodules in the other. Elsewhere, as in the spleen, similar caseating lesions are found; and the larynx, pharynx, and intestinal tract may be ulcerated. This process is to some extent comparable to the juvenile type of infection seen after primary infection in some European children. In Europe today the acute, rapidly fatal, exudative type of lesion is unexpectedly common among the war-stricken populations. The best hope of control lies in "premunition" with B.C.G. vaccine or the vole-bacillus vaccine of Wells.

ARTERIAL INJURIES

Mr. J. J. MASON BROWN (Edinburgh) divided arterial injuries into those that arise indirectly from a missile passing through nearby tissues, with arterial contusion and traumatic arterial spasm; and those in which the vessel is wounded directly by the projectile. The purpose of treatment is to restore the peripheral circulation, or, if this is impossible, to promote the development of a collateral circulation. Moreover, the limb must be so placed as to minimise the effects of ischæmia while the blood-supply is still depleted. The lumen may be restored by vein grafts or artificial cannulæ, followed by heparinisation. For success the circulation must be restored soon after the injury; later restoration may result in fulminating toxæmia through the absorption of products of disordered metabolism from the previously ischæmic limb. It should be realised that, though the peripheral pulses may be impalpable, there may still be sufficient flow of blood through the injured vessel to maintain the limb's nutrition until collateral circulation has developed. Primary surgery will abruptly interrupt the circulation; initial treatment should, wherever practicable, be conservative, to allow time for the development of collateral circulation, though a traumatic aneurysm often develops. The type of operation must depend on an assessment of the condition discovered at the operation; simultaneous ligation of the accompanying vein should be undertaken in primary surgery or in operations performed before the collateral circulation is established. Sympathectomy or sympathetic block, though of value in emergency ligations, is unnecessary when the collateral circulation is established. With false aneurysms hæmorrhage at operation should be controlled by a tourniquet; but in operations on aneurysmal varices no tourniquet should be used. When a tourniquet cannot be used it is important to gain control of the artery above and below the lesion. An intravenous drip should be set up before the operation is begun, and fresh blood should be at hand. Secondary hæmorrhage, thanks to the sulphonamides and penicillin, is now a rare complication. After operation the limb should be placed about 6 in. below the heart-level and constricting bandages should be avoided; a sterile towel is a suitable covering. The limb can be exposed to room temperature. Venous stasis can be avoided by raising the head of the bed. Care of the skin is essential.

EXPERIMENTAL DIABETES MELLITUS

Prof. F. G. YOUNG, D.SC. (London), said that the central problem of the cause of diabetes remains unsolved. The effects of pancreatectomy on carbohydrate metabolism are much more pronounced in carnivorous than non-carnivorous animals; the resultant diabetes can always be controlled by insulin. The influence of the pituitary gland is exerted largely by the secretions of its anterior part; but the posterior lobe also exerts a significant, though ill-defined, influence on carbohydrate metabolism. It is possible that the posterior pituitary secretion acts by influencing the secretions of the anterior part in the same way as adrenaline affects the adrenal cortical secretion. The diabetic condition in the dog during continued administration of anterior pituitary extract differs from that following pancreatectomy in that it is extremely unresponsive to insulin and is associated with increase in body-weight and nitrogen-retention; moreover, the liver glycogen is high rather than low. There is experimental evidence of an antagonistic action between insulin and anterior pituitary extract. In dogs a permanent or so-called metahypophyseal diabetes has been produced by large amounts of anterior pituitary hormone; here irreparable damage is done to the insulin-secreting mechanism of the islets of Langerhans owing almost certainly to over-work under the influence of the pituitary extract. The growth-promoting factor of the anterior pituitary also inhibits carbohydrate oxidation. Diabetes can be produced by the intravenous injection of alloxan, which causes acute necrosis of the islets of Langerhans, possibly through over-work exhaustion. Dietetic experiments suggest that the major cause of diabetic ketosis is a high-protein intake of meat rather than fat. Anterior pituitary extract occasionally stimulates regeneration of the insulin-secreting cells, but it is not yet possible to apply this therapeutically. The effect of œstrogen has been tried, in view of its known capacity to depress the gonadotropic factors of the anterior pituitary; œstrogen is, in fact, effective in alleviating postmenopausal diabetes, but there is no evidence that it exerts a direct action or that the action is mediated by the anterior pituitary.

Human diabetes is not a single syndrome with one cause. Some hold that the diabetic diathesis is inherited as a recessive mendelian character, and that the incidence of the condition has risen since the latent islet defect was revealed, because of the opportunities for consistent over-eating under conditions of modern civilisation. The anterior pituitary is almost certainly concerned in the origin of some cases; under certain conditions other glands, including the adrenals and the thyroid, may be implicated.

EXPERIMENTAL RADIOTHERAPEUTICS

Dr. J. S. MITCHELL (Cambridge) ascribed recent additions to our knowledge of the therapeutic action of X and gamma radiations largely to the influence of cytology and cytochemistry, genetics, and radioactive tracer methods. There is now a better understanding of the

significance of chromosome breakage and of the dependence of the biological efficiency of different radiations on specific ionisation. The therapeutic possibilities of high-energy (20–50 Mev) beta and gamma radiations in the treatment of cancer and related diseases should be more closely examined. At present the 50 Mev betatron appears to be the most suitable instrument for application in radiotherapy as a source of high-energy gamma radiation. The advances which led to the atomic bomb provide a new way of preparing large amounts of radioactive isotopes which should become widely used in medicine as: (1) radioactive tracers for the study of metabolic processes and in pharmacological investigations; (2) artificial gamma-ray sources in radiotherapy; and (3) agents such as P^{32} and I^{131} with therapeutic possibilities depending on the selective concentration of the radioactivity of suitable isotopes in particular cells and tissues. Hevesy, using radiophosphorus (P^{32}) as a tracer, showed that the synthesis of thymonucleic acid is inhibited by therapeutic doses of X irradiation, thus providing convincing confirmation of previous work using ultraviolet photomicrography, and the Feulgen reaction. Great caution must be exercised before any radioactive material is introduced into patients on account of the possible risk of long-term deleterious effects. The most promising substitute for radium is now thought to be radiocobalt (Co^{60}), with a half-life of 5·3 years. Of the selectively absorbed radioactive isotopes, P^{32} and I^{131} may prove the most useful in therapeutics; interesting results have been reported with P^{32} in the palliative treatment of chronic myeloid and lymphatic leukæmia and lymphosarcoma, and in polycythæmia. The value of fast neutron beam therapy in cancer and allied diseases is still an open question; evidence is accumulating to indicate that the biological action of fast neutrons differs in some ways from that of X and gamma radiations.

NATIONAL HEALTH SERVICE

A SPEECH BY MR. BEVAN

ADDRESSING the Society of Medical Officers of Health at their annual luncheon in London on Sept. 20, Mr. ANEURIN BEVAN, Minister of Health, said that though the armies were still arrayed on the battlefield of the National Health Service Bill they were becoming, he hoped, increasingly listless. All must unite to carry out whatever Parliament finally decided; any other course was anarchy. When the Bill became law the main task would begin—the administrative task, so much harder than the legislative. It would be impossible to frame regulations properly without the help of representatives of the various branches of the medical profession. His own purpose had been to follow with fidelity Lord Dawson's principle—to create an apparatus of medicine and leave the profession to exercise it in freedom and independence. Parliament must create the apparatus but it was for the profession to decide how to use it.

By medical officers of health, Mr. Bevan continued, the Bill had been criticised because it put hospital midwifery under the regional hospital boards while domiciliary midwifery remained under the local authority—an arrangement described as dichotomy. But all the serious difficulties of incoördination in the past had arisen because the hospitals had been owned by different groups. Doctors would in future move quite freely between hospitals and clinics. The M.O.H. and the hospital doctor must in future join fully in their work, having no occasion for jealousy. The unity of the scheme was determined by the right of the individual citizen to the use of all services of whatever kind, and the difficulties raised, which were theoretical and slightly pedantic, would in practice fall to the ground. "We are now facing," said Mr. Bevan, "a very critical year," and he wanted to make all possible use of the great experience of health workers. One of the great dangers was over-centralisation, and the more decentralisation could be arranged, the better for the service.

In conclusion the Minister defied anyone to point to any country more ambitiously striving to raise the standards of life of the citizen. In every direction there was in this country a renaissance. "I believe that we shall win our way through, but there is a frightful shortage of every kind of worker." This shortage made it essential to have complete coöperation between all engaged in the same task, and he appealed to medical officers of health as experts in that kind of coöperation.

Replying as president to Mr. Bevan's toast of The Society, Prof. J. JOHNSTONE JERVIS (Leeds) said that the Bill was not perfect: no legal instrument was perfect. Nevertheless it was incontestably the greatest thing that had been done in social medicine in any age or country. It should be given a fair chance to justify itself, and nothing was to be gained by adopting a hostile attitude. "We and our colleagues may be relied upon to play the part allotted to us in an earnest desire to carry it to a successful issue." On the eve of his retirement, however, Prof. Johnstone Jervis wished to pay a tribute to "a very great English institution"—local government. And he could not but deplore the present tendency of Government departments to encroach on the province of local authorities, the latest example being in the National Health Service Bill. If the health services of this country had today attained a high degree of perfection the credit was largely due to the inspiration, enterprise, and hard work of local authorities. Local government was the keystone of the arch of democracy. However good and effective might be the new authorities set up under the Bill, they could not replace the present local authorities, and he prophesied that in the course of years they would be replaced by local authorities purged of their imperfections. If he might presume to advise the Minister—head of what was once the Local Government Board—it would be to expand, strengthen, and maintain the powers of local government.

SCHOOLING FOR THE SUBNORMAL CHILD

WHAT CAN BE DONE

HANDICAPPED children need favourable conditions if they are to develop their abilities to the full. Special schools provide for children with serious disabilities, but for others special arrangements must be made in ordinary schools. In answer to the questions often asked by authorities who have to make such arrangements, the Ministry of Education have published a useful pamphlet [1] explaining what kinds of children need special educational treatment, how they should be selected, the probable numbers, and the results to be expected, besides giving advice on the arrangement of classes and the qualifications of teachers.

PHYSICAL DEFECTS

Children who may need special treatment are the blind (0·2–0·3 per 1000 pupils) or partly sighted (1 per 1000), the deaf (0·7–1 per 1000) or partly deaf (1 per 1000 upwards), the delicate (1–2%), the diabetic, the educationally subnormal (10%), the epileptic (0·2 per 1000), the maladjusted (about 1%), the physically handicapped (5–8 per 1000), and those with speech defects (1·5–3%).

At any time after the child is two years old the parents may ask to have him examined to see whether he is going to need special educational treatment; the authority is bound to have this done, and to provide special education if the child needs it and the parents wish it. The child need not be attending any school when the request is made. In some cases the earlier special treatment or training is begun the better. Many blind and deaf children between 2 and 5 are already in nursery schools or departments for the blind or deaf, and the decrease of crippling among children of school age is largely due to orthopædic treatment given in the early years. Children seriously disabled by blindness, deafness, epilepsy, aphasia, or physical handicaps can always be given places in special schools. Partly sighted children, if they can benefit from ordinary classes in primary or secondary schools, or in open-air schools, should sit at the front in a good light, and use extra-large paper and soft black pencils. Experiments on lenses to magnify ordinary print are now being made. Many partly deaf children can be given a chance in ordinary schools for six months to a year; if they fail to follow what is said in ordinary school situations and if their own enunciation is not clear and fails to improve they can then go to a special school. Advice on their progress should be sought from an educational clinic for the

1. Special Educational Treatment. Ministry of Education Pamphlet, no. 5. H.M Stationery Office. Pp. 36. 9*d*.

deaf, or from the nearest deaf school. The education authority should provide courses in lip-reading, and if necessary in speech improvement, for such children, who may be collected for the purpose in groups of 5–10 for an hour twice weekly. Where no teacher can be found for a class such children may perhaps be sent for a term to a boarding-school for the partly deaf, to take an intensive course in lip-reading.

Delicate children may need to rest on a stretcher-bed during the lunch-hour. Diabetic children, it is suggested, should live in hostels, under medical and nursing supervision, where their diet can be regulated and they can be taught the reasons for the restrictions placed on it; teachers could report at once to the hostel if a child developed symptoms in school. Large authorities and voluntary bodies are asked to establish such hostels. Aphasic children are rare, but need special schooling; at present they usually have to go to deaf schools for lack of a more suitable place. Children with speech defects should attend classes twice a week, held by a speech therapist working in the school health service.

THE BACKWARD

By far the largest problem is presented by educationally subnormal children, who form 10% of the school population. Under the new Education Act it is not necessary to decide what has caused a child to be backward before giving him educational treatment: that can be discovered during the process of educating him. Children with an intelligence quotient below 55 cannot be educated at an ordinary school; and backward children who are detrimental to the education of others in the class should not be retained on sentimental grounds, but should go to special schools. Thus a steady stable child with an intelligence quotient of 70 may get on all right in the ordinary class, while a nervous child of similar grade might be better with the support of a special school. If there are enough subnormal children in the school they may be grouped in a class; or a class drawn from a group of schools might be arranged, under a teacher who believes in the value of the work.

The maladjusted child of normal intelligence needs the help of the child-guidance team, and local authorities should therefore make proper child-guidance arrangements, or at all events employ an educational psychologist. Sometimes a child can continue to go to his own school while attending the child-guidance centre, or sometimes he will profit by a fresh start in a neighbouring school. Others, whose maladjustment arises in the home, may need to be boarded out with foster parents, or grouped in hostels while still attending ordinary schools. Others again may benefit most from a boarding-school for maladjusted children. Day schools for such children have been established in at least two areas, and have given promising results.

THE TEACHER

The pamphlet ends with a clear-sighted note on the qualities to be sought in teachers of children needing special education. They must not undertake the work to indulge their own maternal and compassionate feelings. The life of the handicapped is hard, and these children must be helped to be self-reliant, optimistic, hard-working, and as far as possible skilled. Their teachers must bring them emotional normality as a pattern, and must be capable of making the most of each child's abilities.

Mr. T. F. DIXON, PH.D., has been appointed professor of biochemistry in the Royal College of Medicine, Bagdad.

MODELS OF THE FOOT.—The Foot Health Educational Bureau has prepared a series of models of healthy feet at all ages from infancy to the adult, and is prepared to supply casts of these at a reasonable cost. They are likely to be of considerable value as visible standards of the normal to those concerned with the preventive care of the feet—doctors and nurses in child-welfare clinics and factory health services, physiotherapists, physical training experts, and others to whom the earliest stages of foot deformity are the most important. The address of the bureau is 90, Ebury Street, London, S.W.1.

In England Now

A Running Commentary by Peripatetic Correspondents

PERHAPS this business of German measles in the third month of pregnancy being related to congenital defects will open our eyes to a whole host of similar relations which are common but fail to be obvious because of the lapse of time between the initial and consequent conditions. With a view to scooping a Nobel prize with an original generalisation on these lines, I composed myself for half an hour's research in my armchair. It was logical, I thought, to assume that the greater the time interval, the more likely would it be for a Great Generalisation to be missed. So I began by looking for adult disorders originating from events in infancy. I chucked this line of thought when it dawned on me after five minutes that much of the field had already been scooped by a bloke called Freud. After a few seconds of despondency my courage returned. I would out-Freud Freud. I would go further back still.

Picture if you can an ovum, a fresh and blooming débutante making her one and only appearance in utero. Alas, however, she differs from other protozoa in that she cannot split in the middle on her own and can only achieve immortality by the sacrifice of her unicellularity. Her chances of doing this are limited to the next forty-eight hours or so. If she has no spermatozoic suitors in that time, then she's had it. Now picture if you can an ovum in her forty-seventh hour. Her protoplasm is pickled, her genes are jiggered, her mitochondria are moth-eaten, and her cell-membranes are slipping up. Altogether, as far as ova go, she's a hag. Then suddenly there is a lashing of tails in the middle distance and a crowd of the boys come charging up the slope. She gasps with relief. She shrieks with joy. She grasps the winner by the scruff of his neck before he can have a chance to see what he's landed with and change his mind. Perhaps it is in such a union that originate those placebos and excuses which are yet undeniable truths—the "constitutional weakness," the "constitutional instability," the "constitutional predisposition."

Yes—I suppose it is rather far-fetched. And anyway—don't you have to make a speech in German when they give you a Nobel prize? Awful fag having to learn German just for that.

* * *

The outstanding impression from last week's conference in Basle is the kindliness of our Swiss hosts, springing from a keen sense of kinship. There are other memories: a drive along the road, divided only by the Rhine, to Rheinfelden, where Dr. Donald Hunter, somewhat incongruously, spoke of industrial medicine; the cleanliness of Swiss towns; the well-stocked shops; the 40-million-franc hospital, constructed during the war, and containing gadgets enough to delight a schoolboy mind for weeks; and the food. To most, the meals, after Britain's austerity and unpolished cuisinerie, was a natural attraction, though Switzerland, with two meatless days a week and noticeable shortages in milk, grain, and sugar, is not the land of superabundance which some have painted. There is, moreover, no excess of consumer goods, and those who plotted to carry off such treasures as coloured china found their way barred. It was pleasing to see in the shops many articles branded "*Made in England*," even though many of them are still unobtainable here. Visitors who did go shopping found some difficulty in distinguishing the 5 and 10 centime coins from the half-franc; the difference in texture and the serrated edge of the half-franc piece was little help to the uninitiated. Incidentally, why does Britain alone still adhere to the vast penny for a piece of such small denomination? Despite the smallness of the country, the dialect differs enormously between different places. In Zürich diction is rapid and clipped, while in Berne, as befits the centre of a large rural area, it is slow and singsong. In Basle the speech is noticeably more elegant, and among the Swiss people the town has a reputation for mordant wit of which other cities stand in awe. But the canton spirit is strong, and the feeling is perhaps no deeper than that between Liverpool and Manchester or between Glasgow and Edinburgh. Certainly in Basle, as elsewhere, the visitor finds nothing but friendliness.

As, with regret, we turned our minds to packing for the homeward journey, we discussed with nervous trepidation the ways of British Customs officials. There were, we found, two schools of thought: according to one, they were wise men with all-seeing eyes, from which naught could be hid; the other contended that the Customs was fair game, and that much could be concealed by the wary traveller. As to which school I heeded—that concerns only myself and my bank manager.

* * *

The Very Senior Medical Officer (V.S.M.O.) was annoyed. One of the station medical officers under his jurisdiction had sent in a submission that married female auxiliaries were securing early release from the Service on the grounds of pregnancy when it was impossible to confirm or refute their claims on clinical grounds alone. The station medical officer contended that the certificates given by the private doctors of these women were valueless so early in pregnancy unless backed by biological tests, and that in any case such early discharge from the Service was not justified at a time of acute woman-power shortage. The V.S.M.O. did not agree; and he did not like the station medical officer. Perhaps his annoyance made him careless. He sent for the relevant orders and after consulting them wrote a minute: "I think that the provisions of Order XYZ are adequate to deal with these cases." The papers passed to the next staff officer, who took the trouble to verify the order reference and then, with a gleam in his eye, wrote that so far as he knew the apparatus mentioned in Order XYZ had never positively been implicated in these cases. When the V.S.M.O. received the papers back he sent again for the orders to find that he should have written "Order XZY" and not "Order XYZ," which bore the full title of *Portable Aiming Teacher*.

* * *

It was the twenty-third time that I had resolved to take up the piano seriously, but the first such occasion on which I realised why it is that concert pianists are invariably portrayed as highly strung, egocentric, temperamental, and generally difficult individuals. It is all a matter of hysterical dissociation. The essential of pianoforte technique is that the falx cerebri should act as an iron curtain, preventing one half of the brain knowing or caring too much about what is going on at the other side. My left hand knows all too well what my right hand is doing—and vice versa. Nor are they satisfied with each other's performance. Each is continually saying to the other, "No, my dear! This is how you should do it." Hence the chord-salad. But take a gross hysteric and put her at a piano. If she has the rudiments then the rest comes just as easily and much more pleasantly than automatic writing. Her bass and treble selves enjoy a glorious independence but watch each other sufficiently out of the corners of their eyes to avoid the effect of a completely split personality.

Tschaikovsky had to conduct clutching his beard for fear his head fell off. If I ever began to become at all proficient at the pianoforte my main preoccupation would be lest my cerebral hemispheres suddenly fell apart. However, I can shelve that worry till the twenty-fourth time.

* * *

The labels on the exhibits at the *Britain Can Make It* exhibition at the Victoria and Albert Museum omit the final despairing cry of the plum-stone prophecy, though they still tantalise the would-be purchaser with their degrees of availability—now, soon, later. All the same it will be worth waiting to have a kitchen tap whose washer can be changed without cutting off the water at the main, or a pair of transparent plastic slippers that will make Cinderella's look like clogs, or an electric toaster that even King Alfred could use. But life in the brave new world will have its own complexities. The ingenious combined stepladder, ironing board, and baby chair, for instance, may set as many problems as it solves, and it would take an experienced sleeper to attempt a night in the air-conditioned bed of the future with its dashboard for automatic temperature control. Twenty-four model rooms show us the homes, schoolrooms and offices of the future, and Mr. Nicolas Bentley's sketches introduce us to their inmates with such convincing detail that we find ourselves congratulating the railway engineer (formerly in the 8th Army and has a houseproud wife and five children), the young doctor (newly set up in practice, but studies social conditions and has a wife who likes outdoor sports and photography), and the middle-aged storeroom clerk (collects stamps, reads thrillers, and is a regular picture-goer) on having solved their housing problems so satisfactorily.

* * *

A radio speaker with a persistent cough can be infuriating to his audience, but they can always switch him off. The situation is much worse for the speaker himself; when he feels a tickling sensation starting in his throat he must go on speaking into the microphone, keep at the correct speed which has been thoroughly impressed on him at the rehearsal, follow his script, and all the time wonder just when the explosion will come. There is a switch on the table marked "Censor" which puts the speaker off the air. I had always imagined it was for interrupting anyone who transgressed the B.B.C. code and inserted a bawdy remark, but I now discover it is for the benefit of the cougher. He pauses at a suitable spot, presses the key, clears his throat satisfactorily, lets go the key, and proceeds hoping that the public is none the wiser. I do not like this technique myself, and having recently to broadcast with an irritating and persistent cough I relied on "syrup codein. phosph." This completely stopped the coughing and I strongly recommend it to others who are too frightened to use the censor switch.

Public Health

Standardisation of Death-rates

THE issue of the civil tables [1] completes, with the previous publication of the medical tables,[2] the Registrar-General's report on 1941. This was one of the most depressing years of the war and some of its depression is reflected in the figures: thus the birth-rate at 13·9 per 1000 was the lowest ever recorded, while the infant mortality of 60 per 1000 related live births was higher than any since 1933. To statisticians and medical officers of health, however, perhaps the main interest of the medical section lies in the introduction of the new method of standardising death-rates.

It has been customary to standardise the crude death-rate in order to take into account the change in the age-structure of the population by applying the age-specific death-rates in the year under review to the standard population of England and Wales in 1901. The use of such a standard population ensured that, in a comparison between two standardised death-rates, the differential effect of ageing of the population on the crude death-rate was neutralised; the influence of other agencies, such as epidemic and therapeutic innovations, on mortality was thus readily isolated. Unfortunately there are some residual difficulties even with this method. In long-range comparisons, for example, the rate of decline in the standardised death-rate will depend upon the actual population used as a standard: thus the decline in mortality from 1901 to 1939 may appear either as 50% if 1901 is used as a standard, or 38% if 1939 is used as the standard population. Similarly in comparing the mortality in more recent years, say between 1938 and 1939, even reversals of the trend of the standardised death-rate can be produced by changing the standard population from 1901 to 1939. It would be more realistic therefore in making such comparisons to use a modern population.

To combine this realism with some balancing of the divergent weighting effects of the population being examined and this new standard, it is proposed to calculate in future the comparative mortality index. The last available stable modern population—that of 1938—is used as one standard reference basis, the other being the particular year under review. The new standard population is made up by averaging, in each age and sex group, the numbers in each of these two populations so as to get a new standard midway between them. To

1. Registrar-General's Statistical Review of England and Wales for the Year 1941. Tables. Part II. Civil. H.M. Stationery Office. 1*s*.
2. Tables. Part I. Medical. H.M. Stationery Office. 5*s*.

this intermediate type of population are then applied the death-rates at ages of (*a*) the given year, and (*b*) 1938, to obtain by adding over the whole age scale the total number of expected deaths in this new standard population at these death-rates. The ratio of the expected deaths in the standard population at the death-rates of the given year to the similar total for the 1938 rates gives the comparative mortality index or C.M.I. The C.M.I. for any year can be compared with the previous one by dividing the former by the latter to obtain a "mortality ratio." Similarly a comparison between the standardised mortality for males and females, based on the average number of both exposed to risk, is given by the "male-female ratio." In this and succeeding reports these various indices and ratios will be given for long series of years so that the trends in mortality can be easily followed.

There are good reasons for these innovations, though they will doubtless cause acute headaches to D.P.H. students. Their practical value should become evident in future reports.

Infectious Disease in England and Wales

WEEK ENDED SEPT. 14

Notifications.—Smallpox, 0; scarlet fever, 791; whooping-cough, 1744; diphtheria, 255; paratyphoid, 33; typhoid, 17; measles (excluding rubella), 1213; pneumonia (primary or influenzal), 284; cerebrospinal fever, 28; poliomyelitis, 22; polio-encephalitis, 1; encephalitis lethargica, 1; dysentery, 68; puerperal pyrexia, 100; ophthalmia neonatorum, 75. 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 Sept. 11 was 861. During the previous week the following cases were admitted: scarlet fever, 52; diphtheria, 20; measles, 20; whooping-cough, 45.

Deaths.—In 126 great towns there were no deaths from scarlet fever, 1 (0) from an enteric fever, 3 (1) from measles, 10 (1) from whooping-cough, 5 (0) from diphtheria, 54 (3) from diarrhœa and enteritis under two years, and 2 (0) from influenza. The figures in parentheses are those for London itself.

Swindon reported the fatal case of an enteric fever. Liverpool had 3 deaths from whooping-cough and 7 from diarrhœa and enteritis.

The number of stillbirths notified during the week was 243 (corresponding to a rate of 26 per thousand total births), including 37 in London.

Medicine and the Law

The Nature of a Charity

A LEGAL training undoubtedly helps judges to decide an issue; but it may be a hindrance when they are obliged first to agree on what they are there to decide. In the case between the Commissioners of Inland Revenue and the National Anti-Vivisection Society, now published by the Research Defence Society,[1] it was agreed at every hearing that the benefits to men and animals of animal experiments have been great, and that the suppression of such experiments would end medical and scientific advances in many directions: but was this relevant? The society had claimed exemption from income-tax on the ground that they were a charitable body; and the commissioners had refused the claim on the ground that the society were not such a body.

A meeting of the Special Commissioners of Income Tax was held in December, 1943, to hear evidence from both sides for the purpose of an appeal to the High Court. Publications of the society were considered, and evidence was given by their director, Dr. R. Fielding-Ould. Testimony on the value of animal experiments was then taken from Major-General L. T. Poole, Sir Edward Mellanby, Dr. R. D. Lawrence, and half a dozen other medical authorities. In their decision, the commissioners, after discussing the possible benefit to morals and education from the society's efforts to abolish vivisection, declared that

> "... if we conceived it to be our function to determine the case on the footing of weighing against that assumed benefit the evidence given before us, and of forming a conclusion whether, on balance, the object of the society was for the public benefit, we should hold, on that evidence, that any assumed public benefit in the direction of the advancement of morals and education was far outweighed by the detriment to medical science and research and consequently to the public health which would result if the society succeeded in achieving its object, and that, on balance, the object of the society, so far from being for the public benefit, was gravely injurious thereto, with the result that the society could not be regarded as a charity."

But in 1895 two forerunners of the society were held (*In re Foveaux*) to be a charity within the legal definition of the word, and this finding—by Mr. Justice Chitty, as he was then—had never been overruled. The commissioners therefore decided that they were bound by the authorities to hold that the society were a charitable body, and to allow their claim.

When the case was heard in the High Court, however, in July, 1945, Mr. Justice Macnaghten held that the evidence proved that the society's main object was the total abolition of vivisection, and that "attainment of that object, so far from being beneficial, would be gravely injurious to the community." He therefore allowed the appeal of the revenue authorities, whereupon the society took the case to the Court of Appeal.

At the hearing in this court, in December, 1945, the judges disagreed. The Master of the Rolls held, with Mr. Justice Chitty in the case cited, that prevention of cruelty to animals is a charitable object, and that the society existed for the purpose of preventing a particular form of cruelty, namely vivisection.

> "... kindness and love towards animals," he said, "are virtues the cultivation of which is conducive to the moral advancement of humanity. I should be ashamed to hold otherwise. The proposition is not made untrue by the fact that human weakness or urgent human need persuades or compels individuals or the community at large to sacrifice the moral benefit. ... I should not care to find myself having to argue with anyone who regarded the practice of operations on living animals as anything better than a lamentable necessity."

In short, the moral value does not disappear merely because humanity has benefited by animal experiments, or because the end is thought to justify the means. He was for allowing the society's appeal.

Lord Justice MacKinnon took the opposite view. He felt that in 1895 Mr. Justice Chitty had failed to decide the very issue before him—"Has it been proved to me, by the evidence to which I have listened, that the purposes of these [two anti-vivisection] societies are beneficial to the community?" Though he held that "to be a charity there must be some public purpose, something tending to the benefit of the community," yet, when he came to give judgment, he said: "The intention [of these societies] is to benefit the community; whether, if they achieved their object, the community would in fact be benefited is a question on which I think the Court is not required to express an opinion." With this Lord Justice MacKinnon could not agree. The intentions of those who support such societies may indeed be charitable:

> "I readily assume that the motive which leads old women to make bequests to this society is concern for the dear dogs. As one who has more than once experienced the grief of losing a beloved spaniel, I can respect and applaud that motive: though I do not think my respect and applause can be expected when it becomes a matter of the dear guineapigs and the dear rats."

But the motive of those who provide the money is immaterial, since the opinion of a donor that a gift is for the public benefit does not make it so in law. He felt that, on Mr. Justice Chitty's reasoning, a society seeking to make the sale of rat-traps illegal, or a society designed to prohibit the sale of insecticides, would be equally charitable. He supported Mr. Justice Macnaghten's ruling, and thought the society's appeal should be dismissed with costs, a view with which Lord Justice Tucker agreed.

The appeal of the society was dismissed with costs, but they were given leave to appeal to the House of Lords. This final appeal has been lodged, but its date has not yet been fixed.

1. *The Fight Against Disease*, 1946, **34**, 1.

Letters to the Editor

DISCREPANT SALARIES

SIR,—I read with amazement the five advertisements from the Middlesex County Council in your issue of Sept. 14. In the three for physicians and one for a surgeon at general and tuberculosis hospitals the salary rose to £1800 and then to £2200 as a special grade. The other advertisement was for a deputy medical superintendent in a mental hospital and the maximum was £850; yet the applicants for all the posts will be, or should be, of about the same professional standing.

Every effort is now being made to unite psychiatry and general medicine, but one of the essentials is an enlightened outlook on the part of employing authorities. When a county council which normally has a progressive medical policy can only assess the value of the brain at less than half that of the body surely something must be very wrong?

E. CUNNINGHAM DAX.

Netherne Hospital, Coulsdon, Surrey.

RELATIONSHIP BETWEEN PRIMARY AND ADULT PULMONARY TUBERCULOSIS

SIR,—The disparagement of morbid-anatomical findings at the Tuberculosis Association's meeting (*Lancet*, Sept. 14, p. 382) cannot, I feel, be allowed to pass without comment. While it is true that a few odd post-mortem examinations, however carefully conducted, cannot solve the problem of the origin of phthisis, it is by morbid-anatomical research, and by it alone, that the actual changes initiating phthisis, and their relationship to preceding tuberculous changes, can be demonstrated. Epidemiological and radiological surveys consciously or unconsciously refer to these changes and are of necessity based on their study and knowledge. There can therefore be no question of one method of approach being more "reliable" than the other or superior to it because of the larger number of suitable cases. The two methods are complementary.

Phthisis appears to develop from the primary lesion either within a *short* interval, by direct bronchogenic spread from a softening primary focus ("primary cavity"), or from small "subprimary" (probably blood-borne) foci, or else, after a *long* interval, by recrudescence. The former, more acute, development is usually seen in young adults, whereas recrudescence is observed in the elderly or middle-aged in whom a calcified (primary or early postprimary) focus may be found in a state of "atheromatous liquefaction" causing decomposition of the calcified material and a break-through into adjacent bronchi. It is the subsequent caseous bronchitis which in this type provides the "prephthisical" focus.

Central Middlesex County Hospital, London, N.W.10. WALTER PAGEL.

GOOSE-SKIN REFLEX IN MALNUTRITION

SIR,—When I visited the orthopædic hospital at Siglap, Singapore, to study various signs of malnutrition, Captain D. J. D. Bell, who was in charge of the hospital, showed me a boy, aged about 10 years, in whom a goose-skin reflex of the abdomen could be produced. The boy had signs of riboflavine deficiency (circumcorneal proliferation of the capillaries and an enlarged magenta tongue), muscular weakness, and other somewhat indefinite signs of mild nerve degeneration, suggesting early beriberi. The skin of the abdomen appeared normal and felt smooth, and no enlarged glands could be seen raised above the surface; but, when the blunt end of a pencil or a finger-nail was drawn lightly over the skin, within a second or two there was well-marked goose skin. The glandular papules did not all appear at once but came up, a few at a time, in two or three seconds. In about half a minute the goose skin started to disappear, the papules fading away more or less in the order in which they had appeared. The skin of the other parts of the body did not show this phenomenon.

I have examined for this sign 111 hospital patients with various diseases. Among them were 14 cases of beriberi in men; in 3 of them the sign was positive. These 3 were early cases; all had mild paresis, and there was pain on pressure of the calves in 2 of them. The 11 negative cases were in later stages of beriberi, and only 1 of these had pain on pressure of the calves. I have found the sign in only 1 other case among these patients, a man with mild spastic paraplegia. This paraplegia was of much the same type as lathyrism and therefore probably of dietary origin due to deficiency of vitamins, aggravated by some toxic substance in the food. In support of this was the fact that his 9-year-old son was lying in the next bed with a more advanced spastic paraplegia. The son did not show the goose-skin reflex. Of the 5 patients showing this sign, all had one or more signs of deficiency of riboflavine, all had swollen fissured magenta tongues indented by the teeth, 2 had patches of superficial erosion of the tongue, and 3 had well-marked circumcorneal injection.

Beriberi is characterised by peripheral neuritis and various degrees of degeneration of other parts of the nervous system. The goose-skin reflex must be due to degeneration of the posterior part of the spinal cord; it cannot be due to peripheral neuritis.

The 3 adults with beriberi had patches of hyperkeratosis follicularis on the abdomen, but only a small proportion of the glands were affected, and these papular enlarged glands remained unaltered when the goose-skin reflex was produced in the unaffected glands.

The only other patients with lesions of the nervous system who have been examined for this sign were 2 with hemiplegia, but the reflex was not elicited.

Fulbourn, Cambs. LUCIUS NICHOLLS.

EFFECT OF PHOSPHATE ON CARBOHYDRATE ABSORPTION IN SPRUE

SIR,—Dr. Stannus (Sept. 21, p. 436) has misinterpreted our intentions. In our preliminary communication (1945, ii, 635) we gave details of experimental results which indicated that there was an upset in intestinal phosphorylation in sprue. In such short communications reviews of the literature are out of place and only essential references should be given. We referred to Verzar, whose pioneer work on phosphorylation was the basis of our research. The idea that intestinal phosphorylation might be retarded in sprue was not new when Dr. Stannus published his interesting essay on the disease. We found it already suggested in the extensive publications of Verzar and his colleagues [1] and in the more recent review on the ætiology of sprue by Leitner.[2] All these works were published before Dr. Stannus's paper.[3]

School of Tropical Medicine, University of Liverpool. BRIAN MAEGRAITH.

PATENT MEDICINES

SIR,—Your leading article of August 24 discusses an old yet ever topical subject. Few will dispute the reasonableness of most of Mr. Linstead's "indictments," but the remedies he offers are somewhat cumbersome. To set up a new Whitehall machinery, with registers, boards, fees, collectors, &c., would put new burdens on the community without achieving the desired results. I suggest that the first aim should be to confine the sale of "patent" medicines to qualified chemists. The pharmacist is a trained person who knows when to refuse a ready-made medicine and when to tell a customer to seek a doctor's advice. One of the main rules of the Chemists' Friends Association, which you mention, is that proprietary remedies of its manufacturer members can be supplied only through qualified chemists. If the medical profession would give a helpful hand to an association such as this, only good could result—without official interference.

Gerrards Cross. S. BROOK.

WOMEN IN MEDICINE

SIR,—In regard to the proportion of women doctors remaining in practice, the figures quoted in your Students' Guide (August 31, p. 307) are misleading. The survey by the Medical Women's Federation was taken in 1944, at which time, I understood, all able-bodied women between certain ages were obliged to work full-time (or part-time if home ties were too great). Only those with full-time home duties were exempt.

London, S.W.12. VIVIAN M. USBORNE.

1. Verzar, F., McDougall, E. J. Absorption from the Intestine, London, 1946; Verzar, F., Laszt, L. *Biochem. Z.* 1935, **278**, 396 (for example).
2. Leitner, Z. A. *Trop. Dis. Bull.* 1942, **39**, 497.
3. *Trans. R. Soc. trop. Med. Hyg.* 1942, **36**, 123.

PERNICIOUS ANÆMIA AND CARCINOMA OF THE ŒSOPHAGUS

SIR,—Nineteen years after the death sentence in pernicious anæmia (P.A.) was commuted to "liver for life" it is now becoming generally recognised that the patient with P.A. is more liable to gastric carcinoma than is his healthy neighbour.[1] The best examples of this concurrence seen here in the past few years were (1) a man with P.A. diagnosed by blood-count, barium meal, test-meal, &c., in July, 1938, who died, aged 37, in September, 1943, three months after laparotomy had revealed inoperable gastric carcinoma; and (2) a woman, first admitted to hospital with P.A. in October, 1933, who died in September, 1942, at the age of 39, after a short history of gastric upset; her neoplasm was proved by necropsy and histology. These two patients were considerably younger than in most of the recorded cases.

I have not been able to find any record of œsophageal cancer in a patient with P.A., and the following presumptive case is reported in the hope that others may look out for such cases.

A man, aged 49, was first sent to this department on March 31, 1938, by Dr. H. T. Cank, of Leyland, for a blood-count. He had had pneumonia in 1932 and 1933, and several attacks of "influenza" since, the last being a few weeks ago and attended by pain suggesting pleurisy. He had long been easily tired, had lost weight, and had recently noted soreness of the tip of his tongue.

His brother was known to the department as a case of P.A., having attended regularly since August 1, 1935, when he was 32 years old. Otherwise the family history was clear of anæmia and cancer.

Apart from clinical anæmia, physical examination was negative. Blood-count showed red cells 2,500,000 per c.mm., Hb 70% (Haldane), C.I. 1·4; white cells 7200 per c.mm. (differential count normal). The mean red-cell diameter was 8·2 μ (halometer).

After treatment with 'Campolon' the blood became normal by April 27, 1938. On a dose of 2 c.cm. every three or four weeks, blood-counts were normal in March and July, 1939. Patient was seen once in 1940, thrice in 1941, and the figures were normal in four counts in 1942 and three counts in 1943, when 'Anahæmin' was being given. A test-meal in November, 1941, showed a histamine-fast achlorhydria. In January, 1943, patient was in hospital for four weeks with a left lobar pneumonia. He left hospital 17 lb. heavier than on admission.

On Jan. 5, 1944, he was readmitted, complaining that for three months he had been regurgitating food about an hour after eating, and that for six weeks he had felt food stick at about the level of the mid-length of the sternum. Despite a good appetite he had lost much weight, and he had sternal pain radiating to the right axilla.

He was wasted, and the right pupil was larger than the left. Blood-count was normal. Radiography of barium swallow showed œsophageal obstruction at the level of the lower edge of the aortic arch (Dr. T. Harrison). Hoarseness had now developed. A Witzel's gastrostomy was done on Jan. 26, but patient died on Feb. 2. Permission for necropsy was refused.

I wish to thank Dr. A. W. Baker and Dr. F. B. Smith for permission to record this case.

R. T. COOKE.
Department of Pathology, Royal Infirmary, Preston.

PSYCHOANALYSIS IN THE NATIONAL HEALTH SERVICE

SIR,—Clause 1 (1) of the National Health Service Bill states: "It shall be the duty of the Minister . . . to promote . . . a comprehensive health service designed to secure improvement in the physical and mental health of the people . . . and the prevention, diagnosis, and treatment of illness . . ." Nevertheless, psychotherapeutic, and especially psychoanalytic, treatment cannot be generally provided since psychiatrists trained in psychotherapeutic methods are only available in numbers sufficient to cope with a minute proportion of the total need. The number of patients being treated by psychoanalysis is indeed small compared to the need, but the number is not insignificant. Psychoanalysis is relatively new, it is time-consuming, and it is costly. Its use in treatment and in research cannot now be successfully controverted. The situation after the passage of the new Bill will be that a branch of the profession will be able to cope with the psychoanalytic treatment of a few hundred patients at one time, and the therapy is one which is known to exist to many. Any Minister of Health would be embarrassed at having to make regulations designating priorities for treatment, and if the selection is left to the individual practitioner there is sure to be heartburning in his medical colleagues who refer him patients. If psychoanalysis is not accepted as a treatment to be provided under the Bill there will be justified resentment among patients who are advised such treatment. If psychoanalysis is accepted in any degree the vast needs for training will become apparent.

At present the official body organises training in psychoanalysis and psychoanalytic treatment under the auspices of a clinic at small fees or free, and arranges publication and library facilities. The present endowment and fees are such that slow development is likely to continue to be possible without State aid. Under the new Bill eventual organisation as a part, for example, of the British Postgraduate Medical Federation, might become possible. Under clause 16 (1) the Minister is able to aid research, and perhaps eventually psychoanalytic research might obtain State subsidy. Nevertheless, it seems to be inevitable, though unfortunate, that psychoanalytic therapy, training, and research will for a time run an independent course.

London S.W.7. W. CLIFFORD M. SCOTT.

DEATH AFTER CURARE

SIR,—With reference to your annotation of Sept. 21, too much discredit is being thrown on a drug which was not entirely responsible for this fatality. With a woman aged 70 years, surely a dose of 'Pentothal' of the magnitude of 1 gramme was more than sufficient on its own for the performance of an appendicectomy lasting 43 minutes; yet to this a dose of 'Intocostrin' of 9 c.cm. (equivalent to 27 mg. of *d*-tubocurarine chloride) was added.

Since pentothal and curare are synergic in action, it seems strange that with these large doses no reference was made to the necessity for controlled or assisted respiration during the operation; reliance seems to have been placed more on 'Coramine' and 'Veritol' than artificial ventilation of the lungs with oxygen when cyanosis was first noted. Surely the cause of death was prolonged hypoxia, with toxæmia as a secondary cause.

May I add a rider that in all cases of gross respiratory depression an unobstructed airway must be ensured and controlled respiration performed before resort is made to respiratory stimulants.

London, S.W.1. E. ASQUITH.

SIR,—Your report on this case raises many issues of great importance. At a time when anæsthetists are attempting to establish curare as a safe and useful drug it is very tragic that such a case should occur. Yet many useful lessons may be learnt from it. Apart from your report the case is unknown to me, and I assume that the facts as reported are correct.

(1) The wisdom of using a new and experimental drug (I am aware some may question the epithet) on such a bad risk case appears to me doubtful in the extreme. It would be very useful if the opinions of my senior colleagues on this could be ventilated in your columns. I use the term "experimental" deliberately, for there is a drug still used by some of us, known as ether, which has been employed as an anæsthetic agent for 100 years on many millions of cases. Any new drug which has been in use for only a few years on a few thousand cases must, by comparison, be termed "experimental."

This appears to me to be an important principle to establish. In an evening paper recently an anæsthetist is reported to have stated that in a certain fatal case curare was used as being the safest possible drug in the circumstances. Compared with ether, it is very doubtful if curare could at present be correctly described as the safest possible drug in any circumstances. Before the value of any anæsthetic drug can be assessed it must be used in hundreds of thousands of cases over a long period. Some drugs have such obvious limitations that their value, or lack of it, is soon discovered. Others, of greater promise, require a longer trial. For example,

1. Leading article, *Lancet*, 1945, ii, 406.

cyclopropane, which appeared at the outset to have such great promise, required five years of trial before it could be said to have passed the experimental stage. Curare, which appears to be of even greater value than cyclopropane, will probably require an even longer trial. I hope that, unlike 'Pentothal,' it will not prove to be a drug "fatally easy" to administer.

(2) When we examine the dosage of drugs used in this case, it would appear that the coroner's verdict was charitable. An old lady of 70, suffering for two days from an acute abdominal infection, and with early peritonitis, was given morphine gr. $^1/_6$ and atropine gr. $^1/_{100}$. I would presume to say that the former drug was superfluous. This was followed by 1 g. of pentothal. In my opinion this was an excessive dose, even had nitrous oxide been the only additional anæsthetic to be given. With curare in a fit subject in first-class condition I personally hesitate to give more than half this dosage. Prescott, Organe, and Rowbotham (*Lancet*, July 20, p. 80) have pointed out the danger of giving two such respiratory depressants together in full dosage. The present case illustrates this danger. I am not surprised that the patient required continuous oxygen.

This was followed by 'Intocostrin' 9 c.cm.—180 units. Presumably this was given intravenously in a single dose. So far as I am aware, 100 units of this drug is regarded by authorities as a maximum single dose even in fit subjects. In any case, we are warned that in the very young, or the very old, or in bad risk cases, this dose must be considerably reduced. I hope that those who are more competent than myself to express an opinion will let us know in your columns whether this dosage should be regarded as excessive.

I have the deepest sympathy with the anæsthetist in this case, of whose identity I am ignorant. "There, but for the grace of God, go I." But I should like to obtain the opinions of my colleagues on the following four principles:

(1) New anæsthetic drugs must be assessed in comparison with ether.
(2) Final assessment cannot be made until many hundreds of thousands of administrations have been recorded. During this period of trial such drugs should be regarded as experimental.
(3) Such experimental drugs should not be given to bad risk cases.
(4) The dosage of such experimental drugs should be carefully regulated according to the published recommendations of senior anæsthetists.

It is only with the object of establishing these principles that, with humility and hesitation, I have sought the hospitality of your columns at such length.

London, W.1. R. BLAIR GOULD.

SIGMOIDOSCOPY IN AMŒBIC DYSENTERY

SIR,—I should like to add a postscript to my article of Oct. 13, 1945 (p. 460). Two points call for revision in the light of subsequent experience.

The first of these concerns technique. I have since found that the most satisfactory method of producing a "clean" lower bowel, whether for the diagnostic purpose of a sigmoidoscopy or for the therapeutic purpose of a retention enema, is by the simple administration of a weak bicarbonate enema, after which a period of 4–6 hours must be allowed to elapse. At the end of this period, regardless of the taking of meals meanwhile, the lower eight inches of bowel are almost invariably clean and "dry," in the sense that all traces of enema fluid have been evacuated or absorbed. An important point, and one often overlooked, is that the evacuant enema must be of just that volume which will produce an effective call to stool: this will be one pint in some, considerably more or less in others. There are still undesirable methods in use involving the exhibition of castor oil, &c., and I have known retention enemata given within a few minutes of the evacuant enema, thereby reducing the strength of the medicament used to quite ineffectual proportions. Such errors in technique not only defeat their object but often involve a sore trial for the long-suffering patient.

Secondly, a point in diagnosis. Recently I have seen a number of cases in which the ulcers are minute: with the ordinary magnifying lens they catch the eye merely as tiny points of extreme congestion. They are scattered in small groups, and frequently only one such group can be found. With a special magnifying attachment, first shown me by Lieut.-Colonel A. M. Khan, R.A.M.C., it is possible to detect the actual tissue loss.

Keighley, Yorks. C. F. J. CROPPER.

NON-SPECIFIC EPIDIDYMITIS

SIR,—Dr. Whitwell's letter of Sept. 7, recalling Slesinger's suggestion that non-specific epididymitis may be due to stress reflux of normal urine, prompts me to describe an experiment carried out at my suggestion by Dr. G. L. Timms, pathologist to Kenya Government Medical Service.

A rabbit was anæsthetised and 5 c.cm. of urine withdrawn by vesical puncture. Of this, a part was cultured and proved sterile. Of the remainder, 0·5 c.cm. was injected into the previously exposed vas deferens on one side. As this was done the epididymis could be felt to inflate with urine. The animal remained clinically normal after this operation; after 10 days the testis and epididymis on both sides were removed and sectioned. They were all normal.

As Handley says (*Lancet*, 1946, i, 779), the reflux theory does not seem very feasible; and this experiment appears to show that normal urine is not an irritant in the epididymis, at least in the rabbit.

London, W.1. F. RAY BETTLEY.

TUBERCULOUS GLANDS AND CALCIFEROL

SIR,—With reference to the treatment of tuberculous glands with high dosage of calciferol (July 20, p. 88), there seems to be some evidence that such treatment, while helpful when sinus formation is present, has a clinically adverse effect on glands which have not broken down. In the absence of more detailed investigation this is little more than an impression, but it would be in keeping with the observation that in the early stages of treatment of lupus vulgaris with calciferol there is not infrequently a local exacerbation of the disease. It would also be in keeping with similar observations on the influence of tuberculin in tuberculous lesions and of arsenic in untreated syphilis. Until further evidence is forthcoming it would appear advisable to use the calciferol treatment with caution when lung tuberculosis is present, since such a reaction in the lung might have disastrous sequels.

London, W.1. H. J. WALLACE.

NEW WORDS ABOUT OLD AGE

SIR,—In your issue of August 10 (p. 214) Dr. Howell discusses "the nomenclature of old age." It would be a benefit to medicine if you would help to get the "new words" fixed in correct form before it is too late.

From *pais* (stem *paid-*) a child, we have "pædiatrics," and from *geron* (stem *geront-*), an old person, we should have "gerontiatrics," *not* "geriatrics." There is no word *geria* in Greek, though there is *eugeria*, meaning a good old age. Gerontiatrics therefore is the word for the medical care of the aged and eugeria is its goal.

Orpington, Kent. H. ST. H. VERTUE.

TECHNIQUE OF PREFRONTAL LEUCOTOMY

SIR,—In order to avoid incision of the grey matter, I suggest that prefrontal leucotomy might be performed through an approach from the midline underneath the angular gyrus by an incision of the corpus callosum in the direction of its fibres. No doubt a special knife would have to be designed and a new technique devised for the new approach.

Taunton. T. F. G. MAYER.

*** We are informed that section from this angle would carry an appreciable risk of damage to the optic nerves.—ED. L.

THE Medical Research Council have received from Sir Leonard Rogers, F.R.S., a further addition to the endowment for research in tropical medicine with which he entrusted them in 1926. The capital value of this fund is now about £15,000, and the income is applicable to special purposes within the general field of tropical medical research.

Obituary

CHARLES FERRIER BEEVOR

M.A., B.M. OXFD

Mr. C. F. Beevor, surgeon to the ear and throat department of the Royal Waterloo and Evelina Hospitals, died on Sept. 15 at the age of 62. A son of Dr. C. E. Beevor, the well-known neurologist, he was educated at Charterhouse, and Magdalen College, Oxford, where he graduated in 1906, taking honours in chemistry in the final school of natural science. Continuing his medical training at University College Hospital, he took his B.M. in 1912, soon afterwards becoming house-physician to Sir John Rose Bradford, and later a house-surgeon at Charing Cross Hospital.

Early in his career he became interested in otolaryngology, and worked in the special department at U.C.H. until 1915, when he went to Egypt with a commission in the R.A.M.C. as an otological specialist at one of the clearing stations, where he remained until he was invalided home in 1918. Not long after this he took up his work again as a specialist and was appointed to the staffs of the Royal Waterloo Hospital and the Evelina Hospital. His successful practice included many friends and colleagues.

"Essentially an individualist," writes M. D., "Charles Beevor hated regimentation and resented interference by red tape with his own individual methods of work. It was, perhaps, largely this peculiarity which militated against his chances of promotion in the academic world of medicine, but his comparative freedom from such commitments gave him more scope to develop his gifts in his own way. His individualism inevitably resulted in faults which sometimes showed themselves to his disadvantage: but in his professional practice it expressed itself as a great kindliness and in a disposition to spare no trouble where his patient's comfort was concerned, and his friends loved him for his loyalty no less than for his good fellowship."

Mr. Beevor leaves a widow and two daughters.

HAROLD FRANCIS LEWIS HUGO

M.C., M.B. LOND.

Dr. H. F. L. Hugo, who died at Crediton on Sept. 14 at the age of 60, had an unusually promising career as a student which suggested that he might have made a considerable reputation had he wished to do so. He elected, however, to become a general practitioner, and for more than thirty years practised at Crediton, to its great comfort and benefit. His work was interrupted by the first world war, when he served with distinction as medical officer to the Devon Yeomanry, by whom he was greatly and rightly beloved. His kindness, firmness, and courage did much to sustain the unit through bad times in Gallipoli and elsewhere.

Like so many good men he was profoundly dissatisfied with himself though infinitely forgiving to others. His patience was inexhaustible, his humour abundant, sometimes betraying his lively Gallic ancestry. As a young man he was a "class" soccer player, and he remained a useful fastish bowler till well on in the thirties. He was, moreover, a good bridge player, though perhaps he got—and gave—as much fun out of golf, which he was wise enough not to take seriously, and billiards or snooker, in which he fluked outrageously. His keen interest in natural history developed with the years. The loss of both his sons in the recent war was a blow from which he never recovered though he did not murmur and continued to work as long as he could.

Many will mourn the passing of a handsome, blue-eyed, shy but friendly, and extremely competent doctor who always refused to make speeches but whose wise guidance was invaluable to the many committees to which he was almost automatically elected. L. N. J.

THE death is announced of Sir JOHN HARRIS, M.D., member of the Legislative Council of Victoria since 1920 and minister of public instruction and public health for the State from 1935 to 1941. He graduated M.B. at the University of Melbourne in 1890 and practised in his native town of Rutherglen, in Victoria, till 1917, when he served as medical officer to no. 1 Squadron, Australian Flying Corps, in Palestine. He was appointed K.B.E. in 1937.

Appointments

CHALMERS, J. A., M.D. Edin., F.R.C.S.E., M.R.C.O.G.: gynæcologist and obstetrician in the North of Scotland and hon. charge gynæcologist, Royal Northern Infirmary, Inverness.
CLEGG, J. W., M.R.C.S., D.C.P.: pathologist, Hospital for Consumption and Diseases of the Chest, Brompton.
DAY, F. M., M.R.C.S., D.P.H., D.T.M.: M.O.H., Hammersmith.
DORE, J. C., M.B.N.U.I., D.M.R.: junior asst. radiologist (diagnostic), Middlesex Hospital, London.
FOWLER, ERIC, B.M. Oxfd: examining factory surgeon, Crowborough, Sussex.
FOX, P. P., M.B. Lpool, D.P.H.: M.O.H. for Chard, Crewkerne, and Langport and asst. county M.O., Somerset.
GRIERSON, A. M. M., M.D. Edin.: deputy M.O.H., Manchester.
HAY, A. B., M.B. Aberd., M.R.C.O.G.: gynæcologist and obstetrician in the North of Scotland and hon. charge gynæcologist, Royal Northern Infirmary, Inverness.
MITCHISON, D. A., M.B. Camb.: asst. to the pathologist, Hospital for Consumption and Diseases of the Chest, Brompton.
MOREL, M. P., M.A. Camb., F.R.C.S.: surgeon, North Devon nfirmary, Barnstaple.

St. Bartholomew's Hospital, E.C.1:
HARPER, R. A. K., M.B. Edin., D.R.: director of X-ray diagnostic dept. (whole-time).
LOUGHBOROUGH, G. T., M.R.C.S., D.M.R.E.: M.O., X-ray diagnostic dept. (part-time).
SIMON, GEORGE, M.D. Camb., D.M.R.E.: M.O., X-ray diagnostic dept. (part-time).

London Chest Hospital, E.2:
BARLOW, DONALD, M.S. Lond., F.R.C.S.: asst. surgeon.
BROWN, A. I. P., M.B. Lond., D.A.: anæsthetist.
LINDAHL, J. W. S., M.CHIR. Camb., F.R.C.S.: asst. laryngologist
MOUNTFORD, L. O., M.B. Camb., D.A.: anæsthetist.
ROSE, ALICE C., M.B. N.Z., M.R.C.P., D.A.: anæsthetist.

Addenbrooke's Hospital, Cambridge:
BERRIDGE, F. R., M.B. Camb., D.M.R.: radiologist.
LLOYD, OSWALD, M.D. Lond., F.R.C.S., M.R.C.O.G.: surgeon to gynæcological and obstetrical depts.
MARTIN, LAURENCE, M.D. Camb., M.R.C.P.: physician.
TRUSCOTT, B. M., M.B.E., M.B. Lond., F.R.C.S.: surgeon.
WRIGHT, G. F., M.B. Camb., D.O.M.S.: ophthalmic surgeon.

Royal Liverpool United Hospital (Liverpool Royal Infirmary):
BAMBER, G. W., M.D. Camb., F.R.C.P.: dermatologist.
MACPHEE, G. G., M.D. Glasg., L.D.S.: dental surgeon.
SEATON, D. R., M.B. Camb., M.R.C.P., D.T.M. & H.: asst. physician for tropical diseases.
WHITAKER, P. H., M.D. Lpool, D.M.R.E.: radiologist.

Colonial Medical Service:
ANTONIO, R. F., M.B. Edin.: M.O., Gold Coast.
ASHE, GEOFFREY, M.B. Manc.: M.O., British Somaliland.
BALEAN, G. T., M.R.C.S.: M.O., Zanzibar.
BEST, A. M., M.R.C.S.: M.O., Uganda.
COOPER, P. R., B.M. Oxfd, D.T.M.: M.O., Nigeria.
EDINGTON, Major G. M., M.B. Glasg.: M.O., Gold Coast.
HANDFORTH, J. R., M.B. Camb.: M.O., Hong-Kong.
MACDONALD, Captain W. H., M.B. Lond.: M.O. (grade II), Western Pacific.
PABLOT, P. J., M.B. Lond., D.T.M. & H.: M.O. (grade I), Mauritius.
SMITH, Lieut.-Colonel G. G., M.R.C.S.: M.O., British Honduras.
STONES, P. B., M.B. Lond.: M.O., Nigeria.
WATERSTON, WILLIAM, L.R.C.P., L.D.S.: M.O., Kenya.
WEST, J. H., M.R.C.S.: anæsthetist, Uganda.

The appointments to the Bradford Royal Infirmary announced in our issue of Sept. 14 were made under the auspices of the Bradford Joint Hospitals Council and are not to the infirmary alone but to all the hospitals in the city.

Births, Marriages, and Deaths

BIRTHS

ASHFORD-BROWN.—On Sept. 14, in London, the wife of Dr. W. H. Ashford-Brown—a son.
HEANLEY.—On Sept. 18, in London, the wife of Mr. Charles Heanley, F.R.C.S.—a son.
MILLS.—On Sept. 17, in Birmingham, Dr. Margaret Mills, D.A., wife of Mr. W. G. Mills, F.R.C.S.—a daughter.
OLIVER.—On August 29, at Sheffield, the wife of Dr. G. B. Oliver—a son.
RUDLAND.—On Sept. 20, at Coventry, the wife of Surgeon Commander R. S. Rudland, R.N.V.R.—a daughter.

MARRIAGES

LIGHT—BELL.—On Sept. 14, in London, Lovell Hillier Benjamin Light, M.R.C.S., to Colyeen Audrey Bell.
LONGLEY—DRURY.—On August 22, at Felpham, John Douglas Brougham Longley, M.R.C.S., to Elizabeth Clara Dru Drury.

DEATHS

BOYCOTT.—On Sept. 17, at St. Albans, Arthur Norman Boycott, M.D. Lond., aged 80.
COOK.—On Sept. 19, John Howard Cook, M.S. Lond., F.R.C.S., formerly of C.M.S. medical department, aged 75.
COOPER.—On Sept. 13, in Maine, U.S.A., Harold Merriman Cooper, O.B.E., M.B. Lond., formerly of Hampton-on-Thames, Middlesex, aged 74.
GILBERT.—On Sept. 12, at Naini Tal, India, Leonard Erskine Gilbert, C.I.E., M.D. Lond., lieut.-colonel I.M.S., retd., aged 72.
HOLMES.—On Sept. 15, at Godalming, Richard Annesley Holmes, M.R.C.S., aged 61.
HUGO.—On Sept. 14, at Crediton, Devon, Harold Francis Lewis Hugo, M.C., M.B. Lond., aged 60.
WATTS EDEN.—On Sept. 22, Thomas Watts Eden, M.D. Edin., F.R.C.P., F.R.C.O.G., aged 83.

Notes and News

WESTMINSTER HOSPITAL AND THE INFANTS HOSPITAL

THE governing bodies of Westminster Hospital and the Infants Hospital, Vincent Square, have agreed to the merging of their two institutions. The Infants Hospital, which has been used during the war as a hospital for officers of the United States Forces, will be reopened as soon as possible as the "Westminster Children's Hospital." A good deal of air-raid damage will have to be repaired before its services can be fully developed, but the bed accommodation will eventually be increased to 140.

The fusion of the two hospitals will make it possible to concentrate all pædiatric services and research at Vincent Square, where Westminster Hospital students will have exceptional opportunities for the study of children's ailments.

This is one of several affiliations being negotiated by Westminster Hospital following the recommendation made in the report of the Ministry of Health survey. The hospital has also recently taken over two convalescent homes with 160 beds situated in the country a short distance from London for the reception of patients in an early state of convalescence where after-treatment and industrial rehabilitation can be conducted.

JOURNALS AND BOOKS WANTED ABROAD

Dr. A. Tudor Hart tells us that the International Brigade Association has had urgent requests from former medical officers of the I.B. Medical Service in the Spanish War, now working once more in their own countries, for current issues of medical journals. "Would some of your subscribers," he asks, "be willing to forward their *Lancet* regularly for a year? If so, will they please write to the secretary, International Brigade Association, 14, Red Lion Square, London, W.C.1, who will let them have a name and address. We have other former colleagues still working in China to whom we should especially like to forward recent and expensive surgical textbooks. May we also appeal for some donations for this object? They should be sent to the same address marked 'Medical Textbook Fund.'"

DENTISTS' FEES UNDER N.H.I.

THE British Dental Association has approved the decision of the General Advisory Dental Council to advise dentists to refuse all dental benefit letters but to treat patients privately at the scale of fees rejected by the Ministry of National Insurance. The representatives of the association will not take part in the work of the Dental Benefit Council until the dispute is settled.

HOSPITALS AND HEALTH CENTRES IN U.S.A.

THE President of the United States has signed the Hospital Survey and Construction Act, authorising Federal expenditure of 375 million dollars during the next five years for the construction of hospitals and health centres, and 3 million dollars for the surveys which must precede such construction. Each State is to develop its own programme for hospitals and health centres, to be administered by State authorities under standards specified by the U.S. Public Health Service. Any State may initiate action by submitting a request to the surgeon-general of this service for funds to carry out an inventory of existing hospitals, and to prepare a plan for the construction necessary to provide adequate care for all the people. In defraying the survey expenses Federal funds must be matched by two to one. Allotments for actual construction will not be made until the State plan based on the survey findings has been approved. Construction allotments to individual States will vary in amount: States with a lower per-capita income, where there is relatively greater need for medical facilities, will receive larger allotments per head. Before any individual project is approved by the surgeon-general, it must be shown that two-thirds of the total cost of construction is available from other-than-Federal sources, and that money can be found to maintain and operate the institution after completion.

In the view of Dr. Thomas Parran, the surgeon-general, "this Act sets for the first time a national policy which makes it clear that hospitals in the future must be planned, located, and operated in relation to the overall health needs of the people. . . . Adequate hospitals, health centres, and related physical facilities are the essential workshops, without which it is not possible to provide even a minimum of modern health and medical services."

R.N. SICK BERTH STAFF

SINCE 1933 the Central Council of the Royal Naval Sick Berth Staff Associations have been helping the men of the Royal Naval Sick Berth Staff to find posts as male nurses on their return to civil life, and through their efforts attendants with suitable qualifications are now registered as Service-trained male nurses.

There are now vacancies on the council, and R.N. or R.N.V.R. medical officers, active or retired, who would be willing to help in this work are asked to write to Surgeon-Captain M. H. Knapp, c/o Medical Department, Admiralty, 64, St. James's Street, London, S.W.1.

SCABIES FILM REVISED

THE M.O.I. film *Scabies* has been revised and is to be reissued early in November by the Central Office of Information under the title *Scabies 1946*. The latter half dealing with treatment has been largely retaken, new shots being inserted, and the commentary has been entirely rewritten.

Starting as before with good close-ups of the habits and development of the mite, the film shows next the characteristic sites of infestation; after this is inserted new material showing the range of drugs available for treatment and their relative efficiency, and then the film goes on as before to show the method of applying benzyl benzoate emulsion. The sequence on the relative merits of treating secondary infection or the infestation first has again been glossed over, but more emphasis is now laid on the importance of treating the whole family rather than the individual.

This new version, which has been shortened to run for 24 min., is an improvement on the old even though some avoidable errors have been retained—for instance, the misleading term "microphotography" where "photomicrography" is intended. It will be screened again with benefit even to those who saw the original version.

FOOD RATIONS FOR THE GERMANS

IT was announced in Berlin last Monday that the basic food ration in the British and American zones of Germany will be raised again to 1550 calories daily for the normal consumer from Oct. 14. The decision to increase the ration at once, although there is no certainty of maintaining supplies till next harvest, has been taken because of the urgency of the situation as depicted in the June report of the tripartite committee of investigation (*Lancet*, 1946, i, 896; July 6, p. 22). This report said that for ordinary consumers the ration of 1550 calories achieved last winter, when supplemented with unrationed foods, barely sufficed to maintain health.

BLOOD-TRANSFUSIONS IN SCOTLAND

IN the quarter ended June 30, 1946, hospitals in Scotland used 4136 pints of whole blood for transfusion, compared with 4094 pints in the previous quarter, and their demands for liquid plasma rose from 839 to 1448 pints. The Scottish National Blood Transfusion Association was able to meet the increased need, 7888 pints of blood being obtained from donors in the June quarter, a rise of 657 pints over the March total.

HOME PRODUCTION OF STREPTOMYCIN

FOUR British firms are to coöperate with the Ministry of Supply, the Ministry of Health, and the Medical Research Council in the pilot-scale production of streptomycin, and it is hoped that preliminary clinical trials will begin before the end of 1946. The firms concerned are Messrs. Boots, Glaxo Laboratories, and the Distillers Company, who are all established penicillin manufacturers, and the Heyden Chemical Company, who are to instal a factory to make penicillin and streptomycin at Ardrossan, Scotland.

Streptomycin will not be released for general medical use until the conditions which respond to it have been clearly established, and the clinical trials will take a considerable time. Meanwhile plans will proceed for large-scale production to meet the demands of the medical profession as a whole. The drug is already undergoing clinical trials in the United States in all types of tuberculosis, dysentery, typhoid, and paratyphoid fever, and certain infections of the urinary tract, particularly those which do not respond to penicillin or sulphonamides. Supplies in America are at present too small for any substantial quantity to be made available for this country.

It seems likely that streptomycin will be more expensive than penicillin on a per-case basis.

Major T. M. PEMBERTON, F.R.C.S., R.A.M.C., has been appointed M.B.E. in recognition of gallant and distinguished service while a prisoner-of-war.

University of Leeds

The inaugural lecture of the faculty of medicine will be given at 3.30 P.M. on Monday, Oct. 14, when Lieut.-General Sir William MacArthur, F.R.C.P., will speak on Insect-borne Disease and English History.

Society of Apothecaries of London

Diplomas in industrial health have been granted to the following: A. Anderson, K. Biden-Steele, M. P. Fitzsimons, G. B. Oliver, G. F. Keatinge. This list replaces that published on Sept. 7 (p. 368).

Welsh National School of Medicine

The opening address for the new session of this school is to be given by Sir Wilson Jameson, chief medical officer of the Ministry of Health, in the Institute of Physiology, Newport Road, Cardiff, on Friday, Oct. 4.

Faculty of Homœopathy

Dr. C. E. Wheeler will deliver his presidential address to the faculty at the London Homœopathic Hospital, Great Ormond Street, London, W.C.1, on Thursday, Oct. 3, at 5 P.M. His subject is to be Looking Before and After.

Royal Medical Society

On Friday, Oct. 11, at 8 P.M., at 7, Melbourne Place, Edinburgh, Sir Henry Wade will give the inaugural address of the 210th session of this society. He is to speak on the Life of an Edinburgh Medical Student 300 Years Ago.

Irish Tuberculosis Society

At a meeting of the society to be held at Newcastle Sanatorium, co. Wicklow, on Saturday, Oct. 19, at 2 P.M., Dr. F. R. G. Heaf will read a paper on Recent Trends in Tuberculosis, Dr. Dorothy Price will discuss whether B.C.G. vaccination is a practical proposition in Ireland, and Prof. F. J. Henry will speak on Surgery in the Treatment of Tuberculosis.

St. Thomas's Hospital

The old students' dinner will take place at Claridge's Hotel, Brook Street, London, W.1, on Nov. 1, at 7.30 P.M. Sir Maurice Cassidy is to take the chair. The number of places is limited to 250, and applications should be sent to the secretaries of the dinner committee, St. Thomas's Hospital, S.E.1.

Royal Sanitary Institute

On Wednesday, Oct. 9, at 2.30 P.M., at 90, Buckingham Palace Road, London, S.W.1, Dr. W. R. Martine, senior assistant M.O.H. for Birmingham, and Mr. R. S. Cross, chief sanitary inspector for Brighton, will open a discussion on the Public Health Aspects of the Manufacture of Ice-cream.

"Anæsthesia"

The first number of this quarterly journal, which Dr. C. Langton Hewer is editing on behalf of the Association of Anæsthetists of Great Britain and Ireland, will appear on Oct. 1. The publishers are George Pulman & Sons, Ltd., Thayer Street, London, W.1.

An Italian Medical Students' Association

An Associazione Studentesca Internazionale has been founded in the University of Padua and has taken the name of the Digamma-Pi Association from Sinclair Lewis's *Doctor Arrowsmith*. It seeks to promote friendship and exchange of information and opinions between medical students all over the world, and would welcome inquiries addressed to it (in any European language or Esperanto) at the Liviano Palace, University of Padua, Italy.

Middlesex Hospital and the New Service

Mr. T. Money-Coutts, treasurer of the Middlesex Hospital, speaking at a meeting of the court of governors reported in the *Times* of Sept. 19, said he looked forward to the future of the hospital under the new National Health Service with confidence and enthusiasm. It had been said that the new Act would change the character of the voluntary hospitals, but he believed that 200-year-old traditions such as theirs had the strength not only to survive but to thrive on changes inherent in the development of our social system. The character of an institution depended not on Acts of Parliament but on the personality and ideals of those who worked for it. For those who had helped the voluntary hospitals in the past the new Act was not a signal for abdication but a challenge, and the Middlesex would continue to depend on the interest of their friends to maintain and improve their standards for treating the sick.

He added that the medical school was flourishing, and that women students will be admitted for the first time in October.

National Hospital, Queen Square

On Monday, Sept. 30, at 4 P.M., Dr. Gordon Holmes, F.R.S., will give the inaugural address of the first post-war course of clinical neurology to be held at this hospital.

Return to Practice

The Central Medical War Committee announces that Dr. W. Lindesay Neustatter has resumed civilian practice at 128, Harley Street, W.1 (Welbeck 3686).

Divine Healing and General Medical Practice

Dr. H. E. Collier will give the first of three monthly lectures on this subject at Denison House, 296, Vauxhall Bridge Road, London, S.W.1, on Wednesday, Oct. 16, at 7 P.M. The lectures are being given under the auspices of the Churches Council of Healing founded by the late Archbishop Temple.

International Hæmatological Conference

The International Hematology and Rh Conference will be held in Dallas, Texas, on Nov. 15. The guest speakers will include: Dr. Philip Levine (Linden, New Jersey), Dr. R. R. Race (London), Dr. William Dameshek (Boston), Dr. Ernest Witebsky (Buffalo), Dr. I. Davidsohn (Chicago), Dr. Louis K. Diamond (Boston), Dr. Ludwig Hirszfeld (Wroclaw, Poland), Dr. Ignacio Gonzalez Guzman and Dr. E. Uribe Guerola (Mexico City), and Dr. J. M. Hill (Dallas). The secretary of the conference is Dr. Sol Haberman, Baylor University Hospital, Dallas, Texas.

Messrs. Ward, Blenkinsop & Co. have moved from Liverpool and their address is now 6, Henrietta Place, London, W.1 (Langham 3185).

A CORRESPONDENT points out that in our annotation of Sept. 7 (p. 352) on hybrid corn, the word dicœcious was used when monœcious was intended.

PENICILLIN IN BILE.—In our annotation on penicillin and sulphathiazole in typhoid fever (Sept. 7, p. 353) the remark that penicillin is concentrated in the bile should read: "Penicillin is excreted in the bile in concentrations similar to, or even higher than, those attained in the blood" (see Rammelkamf, C. H., Helm, J. D. *Proc. Soc. exp. Biol., N.Y.* 1943, **54**, 31).

Medical Diary

SEPT. 29 TO OCT. 5

Tuesday, 1st

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
3.45 P.M. Prof. H. A. Harris: Clinical Anatomy of the Lymphatic System.
5 P.M. Prof. Geoffrey Hadfield: The Reticuloses.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
8.30 P.M. *Orthopædics.* Mr. V. H. Ellis: Injuries of the Cervical Spine. (Presidential address.)

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle Street, W.C.2
5 P.M. Dr. J. E. M. Wigley: Eczema.

Wednesday, 2nd

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Prof. H. A. Harris: Growth of Bones.
5 P.M. Dr. Montague Maizels: Liver Efficiency Tests.

ROYAL SOCIETY OF MEDICINE
2.30 P.M. *History of Medicine.* Sir Arthur MacNalty: Evolution of English Preventive Medicine. (Presidential address.)

UNIVERSITY OF GLASGOW
8 P.M. (Department of Ophthalmology.) Mr. John Foster: An Ophthalmic Tour of Switzerland.

Thursday, 3rd

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Prof. H. A. Harris: Epiphysial Growth Cartilages.
5 P.M. Dr. Montague Maizels: Liver Efficiency Tests.

ROYAL SOCIETY OF MEDICINE
8 P.M. *Neurology.* Dr. Douglas McAlpine: Disseminated Sclerosis. (Presidential address.)

LONDON SCHOOL OF DERMATOLOGY
5 P.M. Dr. G. Bamber: Misuse of Antiseptics and other Medicaments in Dermatology.

EDINBURGH POSTGRADUATE LECTURE
4.30 P.M. (Royal Infirmary.) Mr. J. R. Cameron: Congenital Abnormalities of the Kidney.

Friday, 4th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Prof. F. Wood Jones, F.R.S.: Anatomy of the Skin.
5 P.M. Prof. J. Z. Young, F.R.S.: Nerve Injury and Nerve Regeneration.

Saturday, 5th

INTERNATIONAL SOCIETY OF MEDICAL HYDROLOGY
9 A.M. (Buxton.) Dr. J. Van Breemen: Four Causal Factors of Rheumatic Disease.
5.30 P.M. Mr. R. Whittington: Plasma Viscosity.

CONDUCING TO THE CURE

SOCIAL PSYCHIATRY IN THE TREATMENT OF NEUROSYPHILIS BY INDUCED MALARIA

MAEVE WHELEN
M.D. Lond., D.P.M.
MEDICAL OFFICER I/C MALARIA THERAPY CENTRE, HORTON EMERGENCY HOSPITAL

M. H. BREE
PSYCHIATRIC SOCIAL WORKER

"Life is short and Art is long; the Crisis is fleeting; Experiment risky; Decision difficult. Not only must the physician be ready to do his duty, but the patient, the attendants and external circumstances must conduce to the cure."

THIS famous aphorism of Hippocrates expresses a profound truth. Medicine originated as a social art. Hospitals are the descendants of purely social agencies, the hospices of the early Christian era which gave shelter not only to the sick but to the poor, the aged, orphans, and travellers: later their functions were separated and the hospital caring only for the sick appeared. Sickness was regarded as a social phenomenon, as possession by the devil, as punishment for wrong-doing, and so on. This gradually gave way to the scientific approach to disease and the sick person became an interesting pathological specimen rather than an individual member of the community. We are now entering the era of the synthesis of these two outlooks on sickness, and it is more and more widely recognised that a patient is not only a carrier of a disease process but is also an individual, a person living in a community who reacts upon and is reacted upon by that community. Sir Arthur MacNalty (1943) expressed this well when he said that one of the first steps in public-health reform was the realisation that all forces—medical, environmental, social, and individual—must be used to maintain national health and combat disease.

The work of Canby Robinson at the Johns Hopkins Hospital (Robinson 1939) is further evidence of the need for the collaboration of medicine and social science. He studied some hundreds of patients from the emotional and social aspects and found that two-thirds of them had adverse social conditions relating to their illness, and in over half of these the adverse social conditions were giving rise to emotional disturbances. He concluded that the study of the patient as a whole and as a person was essential to good medical practice, and that a knowledge of a patient's difficulties would often throw light on problems in public health and preventive medicine.

This paper is based upon a personal experience of an attempt to link clinical medicine with practical social science. The range of our experience is necessarily limited by the nature of our work, but we feel there are sufficient aspects of it to show the value of this collaboration.

PRACTICAL APPLICATION

The starting-point of our work is the treatment of neurosyphilis by induced malaria. We do not intend to say anything about the strictly medical side of the treatment—this has been done often and well—but to confine ourselves to what might be called its social aspect.

Before going any further we must say a few words about the types of patients admitted for treatment. Since 1940 our range of patients has included a small proportion of certified general paralytics and taboparetics on leave of absence from their mental hospital for the purposes of treatment; a much larger proportion of relatively early cases who do not require certification to bring them under treatment; tabetics; cases of syphilitic optic atrophy with or without other clinical signs; asymptomatic cases without any clinical signs or symptoms but with cerebrospinal fluid (C.S.F.) positive on routine testing. Most of our patients have acquired syphilis, but some have congenital syphilis and vary from the gross mental defective to the asymptomatic case.

Illness, especially if it is prolonged and serious, always engenders a situation fraught with anxiety, which involves not only the sick person himself but also his family and sometimes his friends. This anxiety, although each case will have its specific factors, is based fundamentally on fear of the illness itself and what it may betoken—actual or potential economic stress and uncertainty about the future. Fear of the illness itself may be aggravated if there is a feeling that there is something mysterious about it and that it is not properly understood. A large proportion of our patients are admitted with $1^1/_2$–2 years' history of vague but progressive symptoms; in some cases there have been repeated visits to the doctor and various hospitals, only to be told there is nothing wrong or to be given a week or two's sick-leave as a placebo. Finally they become so ill that they have to be admitted to hospital, and a thorough investigation reveals the cause of all the trouble. Throughout this time there has been a gradually increasing anxiety, which is often very greatly eased as soon as a definite course of action is proposed.

Emotional reaction to the illness is absent in the grossly psychotic or demented, but it is worth while to remember that it may be present in a patient showing mental symptoms. One of the worst cases of this sort of anxiety we have seen was in a man with mild confusion and severely impaired memory who was aware of his disabilities and knew the nature of his illness. He was a most pathetic object, and, owing to his mental condition, very difficult to help.

Sickness invariably raises economic problems for the patient and his family, and unless these can be quickly and satisfactorily settled they may give rise to a great deal of unnecessary distress. This situation should be dealt with as expeditiously and sympathetically as possible by the medicosocial worker.

Lastly there is the question of the future. This involves not only the outcome of the actual illness but, in many cases, the patient's ultimate re-establishment in the community. It is often very difficult or impossible to give a definite answer. The best one can do is to give a simple and straightforward explanation, bearing in mind the differing degrees of intelligence and understanding of those concerned. This has the added advantage of enlisting their coöperation in the follow-up scheme. In this connexion the question of employment is very important. It is probably true that any job is better than no job, so long as it is within the patient's capacity—i.e., neither too hard nor too easy. In general, the best type of work for a discharged patient is that to which he is accustomed, since the resumption of habitual activities helps to compensate to some extent for a slight degree of deterioration. Unemployment leads to boredom, but has the much more serious effect of making the individual feel unwanted and that he has no niche in society. The discussion of future plans with the patient or his family is often very valuable and much appreciated; and if possible it is better to postpone discharge until suitable arrangements have been made. In many cases, of course, the patient has a job to go back to; but where this is not so, it is sometimes possible to help him to get suitable work or training.

Mental symptoms, if present, may be the cause of a great deal of distress to the patient's relatives. The commonest reaction is, "He isn't mental, is he?" We are quite sure the right way to handle this situation is to explain simply but firmly that the patient is for the time being mentally unbalanced, stressing the irresponsibility for his actions. It is often a help to try to show the kinship between physical and mental illness. There is a

widespread belief among the lay public that mental illness is incurable, and that admission to a mental hospital means incarceration for life. It is often difficult to convince people otherwise, but an attempt should be made. If admission to a mental hospital becomes necessary, permission is more easily given and anxiety allayed if it is pointed out that today mental hospitals are primarily *hospitals* and not places of detention, and that it is possible to ask for and obtain a patient's discharge. If a patient shows much mental instability, it is imperative to make an effort to keep him in hospital until this has cleared up; occasionally it is impossible to do this, and he has to be allowed to discharge himself against advice, with the risk that he may prejudice his future prospects by his unbalanced behaviour, even though the prognosis of ultimate recovery is excellent. If a patient is being discharged with some degree of mental deterioration, it is as well to explain his limitations carefully to a responsible relative and to give some idea as to how to handle him.

What has been said so far, except for the section on mental symptoms, is applicable to most types of serious illness, but in neurosyphilis there is the additional factor of the syphilis with its moral implications. There seems to be a very understandable disinclination among doctors to tell patients or their responsible relatives the nature of the illness. We feel that whenever possible the patient should be told what is the matter; and, in view of the risk of infection of other members of the family and the consequent need of routine testing, it is helpful if the patient can be persuaded to tell his or her marital partner or allow the doctor to do so. In cases where the patient is too ill, mentally or physically, to give consent we usually tell the spouse on our own responsibility. This does not mean that every patient or relative concerned should be told everything; in dealing with a disease like syphilis it is absolutely essential to treat each case individually and to use the utmost discretion. It is important to realise that ignorance about venereal disease may be great, and the implications of tabes, or general paralysis, or even syphilis may be unappreciated. This can lead to difficulties if information is unwittingly broadcast to relatives, friends, or neighbours. We have met this catastrophe more than once.

The knowledge that the disease is venereal, even where there was previous suspicion, gives rise to considerable emotional disturbance in both the patient and his family, with which one must be prepared to deal. The most pressing need is usually an opportunity to "get it off their chests"; this entails giving them a chance to talk about the illness, to ask questions and so on, apart from the time spent on taking a history. There may be great anxiety lest other members of the family are infected or may learn the nature of the illness. It is essential to urge the necessity of doing blood tests and, if necessary, lumbar punctures on all relatives who have run the risk of infection. This in itself may help to allay one type of anxiety. An early reassurance that neurosyphilis is not contagious removes a load of often unexpressed worry. We have known cases where trained nurses have aroused this groundless fear by isolating the patient or taking precautions to protect themselves after learning the diagnosis. In other cases the only thing that can be done is to reassure about professional secrecy, but it must be borne in mind that, although it is possible to guarantee that no member of the staff will give any information, the same cannot be said for other patients and their relatives. We have had several cases where either the patient or his family has learnt the nature of the illness in this way.

The initial shock once over, the atmosphere is often a good deal clearer, and one gets increased coöperation in the treatment, a vital factor in a disease where treatment is long and tedious. Some time ago we had a certified general paralytic whose wife had been an inpatient with syphilitic ulceration of her legs. On discharge she was advised to attend as an outpatient for further treatment. She did so regularly until the blitz made travelling difficult, when she lapsed. She was seen in connexion with her husband's illness and told what was the matter. Her immediate response was, "Why ever wasn't I told this before? Of course, if I had only known it was so serious I should never have left off going for treatment, however difficult it was to get there." If there is any contra-indication to explaining the exact nature of the illness, a partial explanation may prove useful, although this is not accepted at its face value so easily since the Ministry of Health started its campaign against venereal disease. People are now rather apt to jump to the right conclusion!

A point that needs mentioning is the attitude of the staff to V.D. Anyone who feels that it is a moral rather than a medicosocial question should not work in the department. The staff must be able to accept the patient as a patient. This attitude of acceptance can be most helpful, especially in cases where there is considerable emotional reaction to the V.D. A patient of ours was admitted in a great state of emotional upheaval because of this. He was bitterly ashamed of his illness, terrified that his family would get to know what was wrong, and certain that anyone who knew what was the matter would regard him as an outcast. The change in his whole demeanour when he found that he was not looked upon as a pariah but was accepted as a member of the ward community was striking. He was converted from a potentially very difficult patient into one who was coöperative and helpful, and a possible full-blown neurotic breakdown was averted.

The situation engendered by the illness with its anxiety and stress may give rise to a superadded neurosis in the patient or a potential or actual neurotic breakdown in the family. The latter not only produces another sick person but will react adversely on the original patient and still further complicate the family situation.

It is a direct benefit to the community for a sick person to be restored to the best degree of health possible, and every facility should be given for the reabsorption into employment of all the partially disabled, whether physically or mentally handicapped, who are capable of doing useful work. With this end in view it is essential that the liaison between the hospitals and the employment exchanges should be strengthened and expanded. Many adverse social conditions—e.g., the cost of treatment just at the time when the income is lowered, bad housing, congestion, lack of recreational facilities—need to be radically altered for the whole community. Efforts are made to help patients individually, but it must be recognised that, unless these reforms are carried out, any special priority given to one means, under present conditions, that he receives it at the expense of another, who may in his turn suffer through the deprivation.

ILLUSTRATIVE CASES

CASE 1.—Male, married, aged 32, was admitted in April, 1943. For the past three years he had been "making the rounds of the hospitals," feeling something was wrong with him but getting no satisfaction. About six months before admission he began to lose confidence in himself and became afraid he would have an accident and injure his passengers (he was a tram-driver). He found it difficult to convince anyone that he was ill and unfit to drive, though he was eventually transferred to point work, but by then he felt unfit to work at all. Finally his behaviour became so disordered that he was admitted to an observation ward and then transferred to us.

On admission he was at times euphoric and mildly grandiose and at others appreciated what was wrong and was anxious to be treated. He was infected with malaria and had twelve peaks of fever of 103° F or over. Immediately after treat-

ment his mental symptoms became more pronounced, and he was interfering, truculent, and emotionally unstable. This abated pretty quickly and, although still rather uncertain, he responded to a simple explanation about his illness and treatment and agreed to go as a voluntary patient to a mental hospital. The desirability of attending the follow-up clinic after his discharge was also explained to him.

He stayed in the mental hospital from July, 1943, to February, 1944. He was seen by us in November, 1943, at the request of the mental hospital. He then appeared, in view of his negligible degree of dementia and enhanced stability, rather too well adjusted to hospital life; so we recommended that an attempt should be made to find him suitable work or training through the rehabilitation department. He was therefore sent to an aftercare home in February, 1944, and arrangements were being made to place him, when he walked out leaving no address.

In April, 1944, he wrote saying it was nearly six months since his last lumbar puncture, and he thought he was due for another; so could he have an appointment? He turned up on the appointed day showing a remarkable improvement. He said that on leaving the aftercare home he had spent a couple of days putting his affairs in order and had then got a job helping on a crane. When last seen in September, 1946, he had maintained his improvement and was still holding down the same job.

This patient's coöperation was enlisted by giving him a simple individual explanation at a time when he was able to appreciate that this was done in his own interests, and that the situation demanded the coöperation that we believed he could give.

CASE 2.—Male, married, aged 62, was admitted in December, 1942. He was fairly well educated, and had his own small business. He had had lightning pains for about twelve years and had undergone a gradual change in personality during the last five or six years, becoming progressively duller, mildly suspicious, and careless about his bills. From February, 1942, he began to have frequent lapses of memory, lost his business acumen, and made serious mistakes in his estimates. His wife eventually became afraid of his driving a car or handling financial matters and insisted on his seeing a specialist.

On admission he was slow, dull, disorientated, and mildly grandiose. He was infected with malaria, having 13 peaks of fever of 103° F or over. After treatment his mental symptoms suddenly increased; he became acutely hallucinated, confused, and restless. His wife's consent was obtained for his transfer to an observation ward; but action was deferred, as he began to show signs of improvement and then rather suddenly became simple, childish, and well-behaved.

His wife, who knew the nature of the illness and whose blood was negative, was faced with the problem of his business; if he was going to recover, then she wanted to keep it if possible; if he was not going to be fit to direct it again, then she wanted to dispose of it. The position was explained to her as clearly as possible, and it was pointed out that it was impossible to give a definite prognosis. She decided to try to keep the business going for the time being.

When he finally settled down, his wife thought she could look after him at home. Fortunately he was amenable to suggestion and agreed not to touch any business affairs for at least six months but to rest and take things quietly.

Four months later, when he attended the follow-up clinic, he showed a slight improvement. His wife reported that he could make a satisfactory estimate, although he later confused the jobs. He did not attempt to interfere in any way, apparently as a part of his rest treatment.

He was seen again in April, 1944, when his wife reported a steady improvement in business capacity and said they had made a profit of £550 as against a steady loss while he was in hospital. He still, however, showed signs of slight residual deterioration—e.g., a slightly impaired memory and a mild emotional instability. He was last seen in April, 1946, and had maintained his improvement.

This case illustrates the patient's rehabilitation through his family and the importance of suitable employment. The ultimately comparatively successful outcome was due not only to the treatment but also to the able coöperation of his wife, which was enlisted by giving her a good understanding of the situation.

CASE 3.—Female, married, aged 45, a high-grade mental defective, admitted December, 1942. On admission she was emotionally unstable and slightly amnesic. She was infected with malaria and had 12 peaks of fever of 103° F or over. After treatment she became acutely psychotic, declared she was Gracie Fields and broadcast every evening, and was very confused and uncertain. This cleared up fairly quickly, and when she was discharged she was childish and mildly deteriorated but not very noticeably below her original poor level.

Her husband was a thin anxious individual with a fair degree of intelligence. He had been brought up in an institution and then gone into the Navy. He married soon after his discharge, mainly to have a home. He had not known his wife long and soon regretted the marriage. They had two children (now aged 24 and 23) very soon after marriage. About this time he contracted syphilis, had about two years' treatment, and was told he was cured. Unfortunately he infected his wife: she had some treatment and then lapsed. As a result of all this he had a markedly ambivalent attitude towards his wife, expressing remorse for his "crime," resentment at his "bad luck," and anger with his wife for not having continued her treatment, with the result that he had worried for years over the possible later effects on her. Lately he had felt numb on rising and had pain in the back of his head. He and his daughters had tests which gave negative results.

He was given a full and simple explanation about his wife's treatment and prognosis and had special interviews when visiting her and later when he brought her to the follow-up clinic. He became better able to deal with his remorse, resentment, and lack of affection for his wife. While his wife was acutely psychotic he was asked to give his consent to her certification. This produced an intense conflict, as intellectually he could see the benefit to his wife, his daughters, and himself; but his lack of affection and the realisation of the difficulties he would have to shoulder if she came home seemed to offer a method of self-punishment or expiation.

After his wife's discharge he gradually settled down. He clearly appreciated her innate limitations and shouldered all the major responsibilities in the home, but without the self-accusatory and self-punishing colouring which were so much to the fore at first, and the physical symptoms of which he complained while his wife was in hospital have disappeared.

This case illustrates the need to deal with an emotional disturbance in a member of the patient's family. If the obligation to the husband had been limited to testing his blood and cerebrospinal fluid, it is possible that his mental conflict would have resulted in a neurotic breakdown, which would have adversely affected his daughters and his working capacity and would have made the patient's chance of adjustment outside an institution very unlikely.

DISCUSSION

Medicine for a long time has concerned itself mainly with the curing of disease, but now its scope has been enlarged to include the maintenance of health. This entails the consideration of the patient as an individual and not simply as a carrier of disease; Mr. A must be Mr. A and not just a "case of hæmorrhoids." All factors that are adversely affecting him must be considered with a view to their elimination or mitigation, either by enabling him to deal with them himself or by actually removing or altering them by outside interference. In future, not only must the physician be ready to use all the medical knowledge and resources available to him but he will accept, as part of his duty, the obligation to assist "the patient, the attendants and external circumstances" to "conduce to the cure."

"Prevention is better than cure" is a popular and true slogan. It will be more often achieved if all opportunities are utilised. For instance, if a close friend or relation has been exposed to infection or to an emotional situation with which he cannot cope, an attempt should be made to arrest the trouble before it has had time to develop. Case 3 is an example where this was done successfully.

The increasing complexity of medicine means that the doctor can no longer work satisfactorily in isolation

but must be a member (albeit the responsible member) of a team containing medical and non-medical personnel. It is impossible for the doctor, even if he has the time, to deal with all the social aspects of an illness, as he has not the necessary training and knowledge. This side of the illness is far better dealt with by a trained medico-social worker, working in the closest collaboration with the doctor.

Team-work and enlarging the scope of clinical medicine will open up a great field of research, embracing mental hygiene, prophylaxis, and social medicine.

CONCLUSIONS

The emphasis should be shifted from the curing of an illness to the wider conception of the promotion of optimum health. This entails the recognition of each patient as *unique*; a particular individual, in a particular family, in a particular environment.

The wider outlook means that the patient's family is included in the total picture, with the result that incipient trouble in another member of the family is more likely to be noticed and dealt with prophylactically before it further aggravates the situation.

The criterion of successful treatment is the degree of satisfactory functioning of the patient in society. This entails coöperation between medicine and social science.

We wish to thank Dr. W. D. Nicol, medical superintendent of Horton Emergency Hospital, for his interest and coöperation.

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THE USE OF REASSURANCE

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IT is to be regretted that during the last fifty years of scientific progress the management and handling of patients has been neglected in the medical curriculum. The personal, and often intimate, methods of the older physicians are being replaced by highly specialised or materialistic impersonal methods.

The management of patients, though not an exact science, is, or should be, part of a discipline comprising method and technique. It can be studied and improved in the same way as other scientific disciplines. Training in this subject is necessarily more difficult than the simple acquisition of facts. Much depends on the establishment of sympathetic contact with patients, and perhaps yet more on experience. Our only training has been in the hard school of experience over many years. Much time could have been saved and long periods of sickness avoided if the principles of personal therapeutics had been taught in our medical schools.

Six years of military medicine have provided a valuable lesson in the handling of young active patients whose main desire is to get well, as opposed to older folk who often "enjoy ill health" and in whom it can even be a disservice to cure their imagined ailments. Neurosis is just as common in the Services as it is among civilians; but, owing to this desire to get well, it is much more easily treated. I intend here to show how this can be done by reassuring the patient.

VALUE OF REASSURANCE

Reassurance (by which I mean the allaying of the patient's anxiety) is of great value not only in treating neurosis but also in cases of organic disease. Fear of an existing organic disease often produces greater disability than does the disease itself. Silence, except in the gravest maladies or with patients of the lowest intelligence, is inconsiderate and even dangerous. Too few patients are told the cause of their complaint; too little is said of the probable duration of treatment and the ultimate outcome. I have been impressed by the value to the happiness of my patients of a frank explanation of their disease and its prognosis. I have also been depressed by the frequency with which patients who have been previously investigated have received no indication of the nature of their malady. Curiously, this neglect has been most noticeable when the findings have been negative.

After making a diagnosis, whether of organic disease or neurosis, some doctors overtreat patients by useless methods. Lengthy treatment for incurable disabilities is a potent cause of additional ill health. The oft-repeated bottle of medicine, the continued application of physiotherapy, and the weekly certificate are poor substitutes for sympathetic explanation and encouragement to keep at work and make the best of not too bad a job. With young people simple explanation, reassurance, and minor psychotherapy have been so often effective in forestalling serious invalidism and curing existing disabilities that I have thought it worth while to describe here the simple method used. It must be emphasised that simplicity is the keynote. The approach has always been that of the general physician, and no attempt has been made to treat major psycho-neurotic illnesses; nor have psycho-analytic methods at any time been used.

METHOD OF REASSURANCE

The Doctor's Diagnosis.—No patient can have full confidence in his doctor if a complete examination has not been carried out, and no doctor can confidently reassure his patient without having carried out such an examination. Organic disease should only be diagnosed when there is reasonable proof that it is present. It is better to attribute incorrectly a small percentage of organic illnesses to functional causes than to condemn a large number of healthy patients to the fear of a non-existent disease. If a functional disturbance is diagnosed, the doctor should appreciate his good fortune rather than decide (as he too commonly does) that this is yet another piece of medical junk to be thrown on the scrap-heap of disinterest.

The Patient's Diagnosis.—What does the patient consider his malady to be? What organ does he think is diseased? What is his attitude to his condition? What does he fear? Does he fear a progressive illness leading to total incapacity? The answers to these questions are of the greatest value. Without them no real reassurance can be given to a patient with functional disease, for unknown fears cannot be calmed. These questions are as important as a full physical examination; they must be viewed "in daylight," recognised, and frankly discussed. Occasionally the patient will spontaneously voice his fears. More often he must be questioned. It is best to ask a general question such as, "What do you think is the matter with you?" But it may be necessary to put it in specific terms: to a patient complaining of left inframammary pain on exertion "Do you fear your heart is affected?"

A healthy soldier, aged 23, who had been regraded to category B for effort syndrome following diphtheria, continued to complain of dyspnœa, precordial pain, and palpitation on the least exertion. Asked his opinion of the cause, he said that he thought he had permanently injured his heart. Early in the first siege of Tobruk he had been admitted to hospital with faucial diphtheria and told that he must remain at complete rest in bed, as otherwise his heart might be damaged. Unfortunately, owing to extreme pressure on the orderlies, he had to get up to obtain food and to visit the latrines. He was later evacuated to the base and kept at

complete rest for six weeks; but he believed that irreparable damage had been done during the first week in Tobruk.

After specific reassurance his symptoms disappeared and to his great satisfaction he was regraded to category A1.

Other Doctors' Diagnoses.—It is always worth while in complaints of functional origin, especially those referred to the heart, to ask if any doctor has ever told the patient the nature of his illness. Opinions given by doctors always carry great weight with patients and heavily influence their opinion about themselves. A patient who has been told that he has a "strained heart" or "a little weakness of the heart" will be convinced that he has some form of heart disease. His belief will at least modify his attitude to exercise, and at the most will produce a fear—not readily expressed—of sudden death. Previous positive diagnoses are often reported by patients with heart-consciousness or effort syndrome. If such a diagnosis of organic disease remains fixed in the patient's mind and is not discussed, reassurance by a second doctor is clearly useless. Conviction of the absence of organic disease is an absolute essential for reassurance and recovery, and can only be achieved if the final opinion is completely accepted and the original opinion of organic disease rejected. Often the first opinion will be found to have been correct and reasonable, but to have been misinterpreted by the patient; frank discussion, and a statement that the disease which had been present at the time of the previous opinion has cleared meanwhile, will often reassure the patient.

A healthy soldier, aged 23, complained of precordial pain, palpitation, and dyspnœa on exertion. There were no abnormal signs. His regimental medical officer had told him that he had mitral stenosis and should be invalided home. He was reassured but did not get well. On direct questioning, he admitted disagreement with my reassurance; he felt that his own medical officer, who had watched him for a long time, knew his case well. He believed that his medical officer's opinion was correct and mine wrong. He refused to accept my reassurance and retained his symptoms.

Emotional Upset.—It is useful to inquire for emotional upset at or before the onset of illness. Occasionally there has been a severe mental trauma; more often a succession of minor disturbances have exerted a cumulative effect. The following case-record from civil practice is an example of a single mental trauma.

A young man, aged 19, a factory messenger, complained of three months' left inframammary pain, palpitation, and dyspnœa on exertion. These had been so severe that for the last two months his doctor had kept him off duty.

On examination he had no physical signs. He was asked if anything notable had happened to him about the time of the onset of his illness. He replied, "No, I don't think so. Nothing much, except that my girl friend broke off her engagement to me." He was asked casually if he was suffering from a broken heart. He burst into emotional laughter lasting several minutes.

The situation was explained to him, and he was assured that he had no organic disease. His pain on exertion ceased abruptly after the interview. He was given a week's graduated exercises to restore his confidence, after which he returned to work, and six months later he was still at work and had no symptoms.

His illness and two months' incapacity for work could have been prevented by prompt reassurance at the onset.

Such cases are unusual; more often a succession of annoyances have impaired morale and rendered the patient conscious of minor disabilities which would not normally trouble him or induce him to report sick.

Explanation.—If organic disease has been excluded, this must be carefully explained to the patient. It is especially necessary at the outset to gain the patient's coöperation and confidence. The doctor must tell him clearly that he does not believe him to be a "lead-swinger" and must explain to him the nature of functional disease. It is useless to try to reassure a patient by telling him that there is nothing wrong with him. He knows that he is ill; his symptoms tell him so. It is equally unprofitable to tell him that he is imagining his complaint; this will injure his self-respect, suggest that he is malingering, and destroy his confidence in the doctor. The doctor must openly admit that the patient's symptoms are genuine, and must explain the reasons for the symptoms. On his ability to satisfy the patient by explanation will depend the success of treatment.

Men who have had a minor organic illness—e.g., fibrositis of the back—may, under the stress of emotional or environmental factors, persist in complaining of pain after all signs of active disease have disappeared; the pain has become a habit. Sometimes such pains are partly fostered by the continued adoption of a faulty posture originally due to attempts to ease a real pain. The explanation of such a case, followed by a short course (not more than fourteen days) of re-educative exercise, will relieve the patient's symptoms without causing him any loss of self-respect. It must be emphasised that there is no longer any organic disease, and that the treatment prescribed is merely re-educative. The patient should be led to believe that his symptoms are due to lack of confidence in his body, and that he is simply being taught how to cure himself.

In suitable cases, particularly in functional disturbances of the gastro-intestinal tract and of the cardio-vascular system, the mechanism of emotional reaction should be simply explained. The patient should be told how emotion can alter the working of an organ and so cause real discomfort and pain. Examples should be given. It should be pointed out that everyone knows that sudden fear occasioned by a nearby explosion will cause a rise in pulse-rate in normal people. It is common for normal men in the emotional strain of waiting for an examination to experience frequency of micturition. Such examples may be given to illustrate the reaction of emotion. Stomach disorders are more complicated; but, besides mentioning the indigestion that may follow fear and the anorexia that may accompany love, it is useful to explain that direct visual observation of the interior of the stomach has established that its lining membrane becomes congested or inflamed under the influence of severe emotional stress.

In some cases it may be necessary to explain to the patient that a person who believes he has a disease unconsciously focuses his attention on the incriminated organ and becomes, for example, heart-conscious or stomach-conscious. In other words, he becomes unduly sensitive to normal reactions in those organs.

Final Reassurance.—In pure functional disorders it should be stated, emphatically and without any "hedging" or the expression of any doubt, that no organic disease exists. There must be no room in the patient's mind for any doubt about the doctor's opinion. The doctor should also find out if the patient has accepted his opinion. If the patient has not done so, further explanation may be necessary. If, in spite of this, the patient still refuses to accept the doctor's opinion and makes some such remark as "But why do I get this pain?" the prognosis is bad.

OTHER TREATMENT

As a rule, in the absence of organic disease, specific treatments should not be ordered. But in some cases such treatment is useful for saving self-respect, restoring confidence, and maintaining coöperation. In such cases the adjuvant treatment should aim at progress and not rest. Rest in bed is recommended too often and for too long; it fosters the belief in a serious disease. It should be made clear to the patient that the treatment is not meant to counteract a disease but to assist his natural resources. To a man with functional backache graduated exercises are important; being out of training he must readjust himself gradually, and if he does too

much he will become stiff. Barbiturates are invaluable for inducing sleep in anxious and nervous patients. The treatment should be short, rarely more than two or three weeks. If no progress has been made at the end of this time it never will be, and continuance of treatment will merely foster belief in its necessity.

SUMMARY

Reassurance, or the allaying of the patient's anxiety, is of great value not only in neurosis but also in organic disease by removing ill-founded fears.

For reassurance to take effect, the patient must have complete confidence in the doctor, and the doctor complete confidence in his diagnosis. This is best done, in psychogenic cases, by explaining to the patient the mechanism involved.

Adjuvant therapy must be short, to avoid suggesting to the patient that he has a serious disease; and it must be aimed at re-education of the patient.

My thanks are due to Prof. J. A. Ryle for much helpful criticism and advice.

THE POST-HEPATITIS SYNDROME

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Caravati (1944) has described cases of persistent disability following postvaccinial (yellow fever) hepatitis and has designated the condition the "post-hepatitis syndrome."

Benjamin and Hoyt (1945) report a similar series, and during the past two years we have studied a group of soldiers in whom symptoms and usually an enlarged liver have remained after clinical recovery from acute hepatitis. Besides studying the clinical features and making biochemical investigations, we have used the aspiration technique of liver biopsy to study hepatic histology. At the present time, when so many men who have had hepatitis are returning to civilian life, it seems important to report the findings.

Our 20 patients were soldiers of the British, Canadian, and Czechoslovak Armies. All were grade A before contracting acute hepatitis. In 18 the hepatitis was of the simple "infective" type; in 2 it had followed arsenotherapy for syphilis.

The laboratory methods used were the estimation of serum-bilirubin, cholesterol, alkaline phosphatase (King and Armstrong 1934), and total and differential serum proteins. The colloidal-gold reaction (Maclagan 1944), the bromsulphthalein test with a 5 mg./kg. dose and taking 5-min. and 30-min. samples (Helm and Machella 1942), and the intravenous hippuric-acid test (Sherlock 1946a) were also used. Routine urine examination included urobilinogen by Ehrlich's aldehyde reagent, and bilirubin by Hunter's test (Pollock 1945).

Aspiration liver biopsy was performed by the method previously described (Sherlock 1945).

FEATURES OF THE DISORDER

The presenting features were as follows:

	No. of cases		No. of cases
Fatigue	18	Fat-tolerance ..	6
Weight-loss	11	Relapse of hepatitis ..	8
Anorexia	12	Palpable liver ..	16
Abdominal discomfort	10	Palpable spleen ..	3

Preceding Hepatitis and Relapses.—Of the 20 patients 6 had had more than one acute attack of hepatitis; 1 patient was said to have had six. The last acute episode took place 2–24 months previously.

Symptoms.—The usual complaint was lack of energy and exhaustion on minimal exertion. Inability to regain the weight lost during the acute attack was common. Gastro-intestinal symptoms were prominent; some patients had a poor and variable appetite, with sometimes an aversion to fatty foods. The men were very faddy about their diet. Right upper abdominal discomfort, often aggravated by exertion, was occasionally present.

Consumption of Alcohol.—Of the 20 patients 10 confessed to excessive alcohol intake, 6 took moderate amounts, and 4 were almost teetotal.

Mental State.—A detailed psychiatric examination was not attempted. The British patients were on the whole psychologically ill-balanced. They were extremely introspective and unduly apprehensive about their livers. One was an Army deserter, another had just been invalided from the Services with "effort syndrome." The Canadian group showed better understanding of their symptoms. All, however, had been warded together, and a similarity in the wording of their case-histories was often noticed. Moreover, they were in hospital at the end of European hostilities, when there was delay in repatriation to Canada, and it was believed that sick men would receive priority.

General Examination.—Despite the complaint of weight-loss, the general development of the group was excellent. Spider angiomata were not seen.

Hepatomegaly.—The most common positive finding was hepatomegaly. The liver edge, smooth and rubbery in consistence, could be felt on inspiration 2–7 cm. below the right costal margin in the nipple line. Tenderness was not present. Liver tenderness on fist percussion over the right lower ribs (Barker et al. 1945) was not elicited.

Splenomegaly.—In 3 patients the spleen could just be palpated under the left costal margin.

Urine Analysis.—This was usually normal, but 5 patients showed a trace of urobilinogen in an early morning specimen of urine. Hunter's test for bilirubin was consistently negative.

Biochemical Investigations.—In every patient the serum-bilirubin, the total and differential serum proteins, and the bromsulphthalein test were normal. The serum-cholesterol level was high in 7 cases; in 3 of these it was greater than 300 mg. per 100 ml. Slight changes among the other estimations were a serum-phosphatase of 14 units per 100 ml. in one patient, a weakly positive colloidal-gold reaction in two patients, and in a further two cases the excretion of hippuric acid was at the lower limit of normal (0·7 g. as sodium benzoate). The biochemical observations on the whole, therefore, gave essentially normal results. Caravati (1944) found a low fasting blood-sugar level and flat oral glucose-tolerance curves in some of his patients. Glucose-tolerance tests were performed in 5 of our subjects and gave normal results.

Hepatic Histology.—There was no evidence of continuing hepatitis or of cirrhosis. The lobular pattern was not disturbed. The hepatic cells were usually normal and contained their normal complement of glycogen. In 2 instances the glycogen was slightly deficient, and in another there was patchiness of glycogen. Iron was absent both from the Kupffer and the hepatic cells. In one patient who had previously had malaria, there was iron in both situations. In ten sections some excess of fat was seen in the liver-cells. It usually took the form of scattered fine droplets evenly distributed through the lobules. In another case the fat was peripheral. Slight fatty change was the only abnormality encountered with any frequency. The Kupffer cells were normal. In 3 patients, all within three months of the initial attack of hepatitis, excess of fibrous tissue was seen in the portal tracts. The picture here resembled residual portal scarring following hepatitis (Dible et al. 1943).

* In receipt of a maintenance grant from the Medical Research Council, who have also defrayed the expenses of this investigation.

ILLUSTRATIVE CASE-RECORDS

CASE 1.—A British officer, aged 31, was fit until October, 1943, when he had infective hepatitis in Libya. He was jaundiced three months and lost two stone in weight. He was invalided home in April, 1944. Since the hepatitis he had had persistent right upper abdominal discomfort, made worse by exercise. Fatty foods caused nausea and flatulence. Appetite was variable. There was exhaustion on walking only half a mile, and some dyspnœa on exertion. In October, 1944, he was again slightly jaundiced and in bed a week. He was a moderate drinker of alcohol.

On examination (March 10, 1945) he was a tall well-developed man, not jaundiced. The smooth rounded liver edge could be palpated 6 cm. below the right costal margin. Tenderness was not present. The spleen was not felt. Urine analysis was normal. The biochemical investigations were normal. Aspiration liver-biopsy sections showed normal liver histology (fig. 1).

This patient was extremely introspective and worried about his health. He had had advice from many doctors, both Army and private, before the present investigation. Even when he was told that his liver was normal the symptoms persisted.

CASE 2.—A Canadian N.C.O., aged 31, had had infective hepatitis at 16 years of age, when he was jaundiced a month. In September, 1944, in Italy, while having arsenotherapy for syphilis, he again became jaundiced for three weeks. The symptoms were those of acute hepatitis.

Since then he had complained of lack of energy and dyspnœa on exertion. The appetite was poor and there was much heartburn and gastric flatulence. During the jaundice the patient lost a stone in weight; this had not been regained. In May, 1945, there was a further attack of hepatitis; jaundice lasted about a week. The symptoms persisted. Cholecystograms were normal. Patient drank a lot of beer, usually six pints a night, with extra beer and spirits at the week-end; this had continued to the date of this investigation (July, 1945).

On examination he looked well. He was not underweight. The liver was palpable 4 cm. below the right costal margin. The spleen was not felt. Urine analysis was normal. The only abnormal biochemical finding was a serum-cholesterol level of 309 mg./100 ml.

Aspiration liver-biopsy sections showed a slight excess of fat within the hepatic cells at the periphery of the lobules; the portal tracts contained a little excess fibrous tissue and showed some round-celled infiltration (fig. 2).

The repeated attacks of jaundice had made both the patient and his medical advisers suspect permanent liver damage. When the present investigation showed this not to be the case he was much relieved and became symptom-free.

DISCUSSION

In the group studied there is no causal relationship between the slight biochemical and the hepatic histological changes and the symptoms. Similar findings have been observed in patients now symptom-free but within six months of clinical recovery from acute hepatitis. In 10 of 15 such subjects the liver was still palpable. Hepatic sections usually showed portal-tract scars, and in 7 excess fat was present in the liver-cells. A raised serum-cholesterol level is also sometimes found during recovery from hepatitis (Sherlock 1946b). Benjamin and Hoyt (1945) believe that the symptoms may have a psychotic basis; the psychoneurotic patterns observed in our patients were very similar to those recorded by these authors. Acute hepatitis is nearly always an unpleasant experience. It usually lasts a minimum of 3–4 weeks. Convalescence is slow. If the illness relapses, as it did in many of this group, fear may arise of further attacks and of permanent liver damage. This is accentuated if a number of men are warded together and repeatedly examined with a view to determining liver size. The condition has not been seen in civilian patients. It is commoner in those serving overseas. Some men feel the disease may provide an opportunity for repatriation. In the type of person affected the condition is somewhat analogous to "effort syndrome," with symptoms focused on the liver and gastro-intestinal tract rather than the heart.

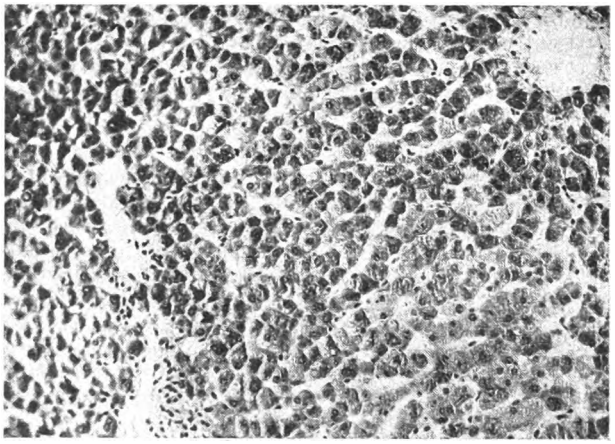

Fig. 1—Normal hepatic structure. Case 1. Best's carmine stain. (×120.)

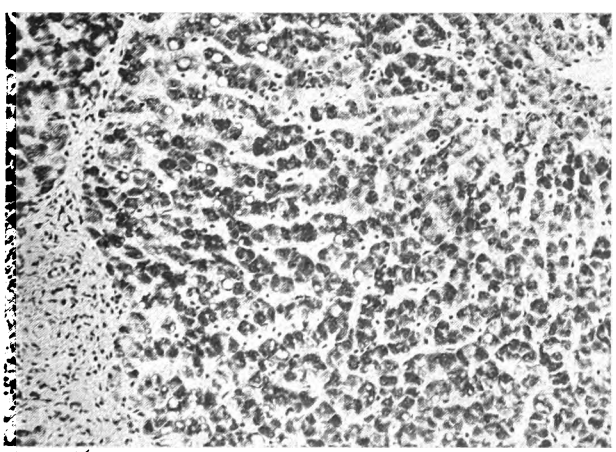

Fig. 2—To left of the figure a portal tract shows increased fibrous tissue and is infiltrated with mononuclear cells; at the periphery of the lobule the hepatic cells show slight fatty change. Case 2. Best's carmine stain. (×120.)

The hepatomegaly may in some instances be related to the histological picture of fatty change and residual portal-tract scarring. A more likely cause is the downward displacement of a normal-sized liver by the diaphragm. Some patients, with practice, become very efficient at "pushing down the liver." On inspiration the lower liver edge has been observed to move down 6 cm. in one of these patients; an impalpable liver is thus easily felt. Similar considerations apply to the spleen. Moreover, a palpable liver, usually but not constantly due to downward displacement, is not uncommon in normal subjects. On ten occasions such a liver has been subjected to aspiration biopsy with entirely normal results.

The importance of the syndrome is in its distinction from the serious organic sequelæ known rarely to occur after hepatitis (Krarup and Roholm 1941, Dible et al. 1943, Rennie 1945). We have studied 6 patients in whom cirrhosis could be related to a preceding acute hepatitis: 1 showed hepatomegaly, splenomegaly, and abnormal results for all the biochemical methods used; 2 were symptom-free and presented only hepatomegaly; the remaining 3 had clinical features and biochemical findings identical with the series now reported. Clinical and laboratory findings cannot constantly distinguish organic from possibly psychogenic sequelæ; but a definite conclusion can usually be reached after study of aspiration liver-biopsy sections. The importance of this method is emphasised. All the patients volunteered for this procedure and usually derived great benefit from the reassurance possible when results were known.

This sequel of hepatitis may be prevented if patients with the same condition are not herded together. Patients apparently recovering normally should not be examined too often. The condition is unlikely to occur with any frequency in civilians. Treatment consists in reassurance after the fullest possible investigation.

SUMMARY

In 20 patients fatigue and gastro-intestinal symptoms arose, usually with hepatomegaly, after acute hepatitis.

Serum-bilirubin, phosphatase, and differential protein estimations, the colloidal-gold reaction, the intravenous hippuric-acid test, and the bromsulphthalein test showed no abnormalities. There was an occasional rise in serum-cholesterol level.

Hepatic sections obtained by aspiration biopsy were usually normal. In some sections slight fatty change in the liver-cells and occasional scarring in the portal tracts could be seen.

No difference was found between these results and those obtained in subjects who had recovered from acute hepatitis and were now symptom-free.

The possible psychogenic basis of the symptoms is discussed.

The palpable liver seems due to downward displacement of the liver edge rather than to enlargement.

The value of aspiration liver biopsy in the diagnosis of this syndrome from post-hepatitis cirrhosis is emphasised.

We are indebted to Major-General A. G. Biggam, and Lieut.-Colonels W. R. M. Drew and W. H. Hargreaves, of the R.A.M.C., and Brigadier Palmer and Major B. N. Fahni, of the R.C.A.M.C., for many of the cases studied; to Mr. E. V. Willmott for the photomicrographs; and to Mr. D. Bull for the histological preparations.

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PATHOLOGY OF POSTANAL PILONIDAL SINUS

ITS BEARING ON TREATMENT

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PILONIDAL sinus, or postanal dermoid, is found chiefly in young adults, especially in the Services, where unhygienic conditions may be important contributory factors (Davies and Starr 1945).

The length of treatment often necessary for cure becomes a special worry when there is a shortage of man-power, and in many papers, particularly in America, the most striking note is dissatisfaction with the uncertain results of treatment (*British Medical Journal* 1944, Peterson and Ames 1944, Sher 1944, Kooistra 1942). Theis and Rusher (1944) even advise against operation for pilonidal sinus on Service personnel wherever possible.

Dissatisfaction with the position is also reflected in the variety of surgical procedures advocated—e.g., the different methods of demonstrating the tracks and excising them when demonstrated, leaving the wounds open to granulate and epithelise secondarily (Goodsall and Miles 1900, Gabriel 1945); the different methods of primary suture; and various forms of flap closure, such as the Estlander rotation flap (Davies and Starr 1945). Shute et al. (1943) review some of the technical methods used.

The unsatisfactory results of treatment have, however, led to no real questioning of the correctness of the standard view of the ætiology—i.e., that pilonidal sinus is primarily a developmental condition on which infection has become superimposed. But there has been some speculation about the origin and nature of the developmental abnormality (Peterson and Ames 1944). It is usually regarded as a sequestration dermoid; hence its alternative name of infected postanal dermoid. This view implies that surgical excision of the congenital track should lead to cure; but often this does not happen. We have therefore reconsidered the developmental theory and sought some other explanation.

THE DEVELOPMENTAL THEORY

The main evidence for the developmental theory is (1) that the postanal site is a recognised site for developmental abnormalities, and (2) that in a fair proportion of cases a dermoid origin is suggested by the presence of epithelial lining, hairs, hair follicles, and sebaceous glands.

(1) *Postanal Site.*—Raven (1935) collected from the pathological museums of London 16 sacrococcygeal cysts and tumours, which most pathologists would consider to be developmental in origin, though they might disagree about the exact derivation. But there is a world of difference between this undoubted developmental condition and a typical pilonidal sinus. The former is situated between the rectum and coccyx, is often first noted in early life, and is rarely the site of secondary infection; whereas the pilonidal sinus is a subcutaneous lesion of the intergluteal cleft, first appears in young adult life, and almost invariably presents as an infected lesion.

Out of 23 cases at the Middlesex Hospital only 2 were of undoubted developmental origin: one in a woman, aged 45, was a typical dermoid cyst extending high up between the rectum and sacrum, lined with skin, hairs, hair follicles, and sebaceous glands, and full of inspissated sebaceous material; the other in a woman, aged 24, was a multilocular cyst in the same position, which had been known to have been present since birth and contained, among other tissues, skin with accessory skin structures and cysts lined with columnar epithelium.

Another reason against assessing too highly the argument that the postanal region is a recognised site for developmental abnormalities is that an uninfected sequestration dermoid in the situation of pilonidal sinus is practically never encountered; whereas, if it were the invariable precursor of an infected phase represented by pilonidal sinus, it should be more common. A postanal dimple is common, but an infective lesion may be directly superimposed on this without the necessity of postulating an intermediate sequestration dermoid.

(2) *Histology.*—The histological appearances of pilonidal sinus have been fully studied and reported. What is usually regarded as the typical picture is a track whose superficial part is lined with squamous *epithelium*, sometimes dilated to form a small cyst, and whose deeper part is lined with granulation tissue only. The usual explanation is that the deeper part of the track has lost its original epithelium as a result of the infection (Kooistra 1942); an alternative explanation is that it is a secondary purely infective track developing from the original developmental track. Sometimes no epithelium is found, the track being lined with granulation tissue only, the assumption on the developmental theory being that the epithelium in this case has been completely destroyed. Of the remaining 21 cases of the

Middlesex Hospital series, in 8 only was an epithelial lining demonstrated on routine microscopical section; in the remaining 13 the track was lined with granulation tissue only.

Hairs are more often demonstrated, sometimes macroscopically but more often microscopically. Kooistra (1942) found hairs in just over half of his 89 cases, and in our series of 21 we found hairs in 10.

The exact incidence of *hair follicles* is more difficult to determine, as it is sometimes difficult to decide whether an odd structure surrounded by granulation tissue represents a degenerated follicle or not; but the frequency is certainly much less than that of hairs. Kooistra (1942) found them in only 9% of his cases. In our series, counting as positive every case in which there was the suspicion of a degenerated follicle, we found follicles in 6 out of the 21 cases. In several of these the suspicious follicle was solitary.

Sebaceous glands are much less common. We found none. Kooistra gives an illustration of one example.

The question for decision is whether the presence of the epithelium and structures derived from epithelium in certain cases is conclusive proof of a developmental origin, or whether there is any alternative explanation of their presence.

Sebaceous glands deep in the track are almost conclusive evidence of a sequestration dermoid. But, as we have already stated, this finding is extremely rare and was not present in our series. Sebaceous glands near the opening of the track on the skin might be derived from the surface skin or a postanal dimple.

An *epithelial lining* is not conclusive evidence of a developmental origin. A downgrowth of epithelium along a track lined with granulation tissue to form a deeper epithelial-lined cyst is a well-recognised pathological process and is one of the standard theories invoked to explain, for example, cholesteatoma of the middle ear, and dental cyst. There is also the possibility of the epithelium being implanted by puncture—i.e., implantation dermoid.

Hairs in the track are not necessarily derived from the lining; they might be surface hairs which have penetrated deeply either primarily or secondarily into an already established infective sinus.

Definite *hair follicles* in any number are strong evidence for a sequestration dermoid, but an occasional hair follicle might be implanted (Muir 1941).

Therefore it is only in a very small proportion of cases of pilonidal sinus that evidence from the presence of epithelium or structures derived from epithelium is conclusive or even very strong evidence of a developmental origin; in most cases there are other possible explanations. In other words, though the evidence for the occasional origin of pilonidal sinus in a sequestration dermoid cannot be denied, in most cases there is no incontrovertible evidence of such origin.

RECURRENCES

The developmental theory assumes that, if there is a recurrence, the original track has not been excised completely. But there is a growing feeling that many recurrences cannot be explained on this basis. Barnett (1944) attributes many recurrences to the situation of the lesion in the intergluteal fold, where debris of clothing, lint, hair, and epithelial scales tends to accumulate. Other surgeons attribute recurrence to failure to control infection or to obliterate dead spaces. Davies and Starr (1945) comment on the frequency with which the local application of acridine compounds to the wound after the primary operation leads to recurrence.

But the histology of the excised recurrent sinus does not differ from that of primary pilonidal sinus. Kooistra (1942) found hairs in the tracks in 9 out of 12 recurrent cases. In one case we excised, apparently completely, a primary track which histologically proved to be lined with granulation tissue, with remains of dead hairs in the walls. A recurrent sinus, longer than the primary, developed and was excised. This too was lined with granulation tissue, with dead hairs along the whole length. We were prepared to admit the possibility that in spite of appearances we had left behind a small portion of the primary track. We found it almost impossible to believe that we had left behind, in the same position as the primary track, another even longer track. In another case section of the excised primary track showed a lining of granulation tissue containing hairs; and section of an excised secondary track developing some years later showed an epithelium-lined track containing hairs. It is difficult to avoid the conclusion that some recurrences at any rate are due to some other factor or factors than the leaving behind of a portion of the primary track at operation. And, if these factors can lead to the development of a recurrent track histologically identical with the primary track, may they not also have been the cause of the primary track?

OTHER POSSIBLE CAUSAL FACTORS

In searching for other possible causal factors, a convenient point to start from is the most characteristic twofold feature of pilonidal sinus—the presence of infection and hairs. Either the infection is primary and the hairs are secondary, or the hairs may be the primary cause of the infection.

Primary Infection.—A primary infective origin is supported by the increased incidence in the Services. The intergluteal fold is a region in which infective debris tends to accumulate, and possibly the special incidence in young adults is related to changes in the sweat and sebaceous secretions at this age. The final factor of infection might be gross trauma, such as a fall (Goodsall and Miles 1900), but is more probably the minor trauma of the rubbing together of the buttocks during exercise. An infective sinus once established, hairs and epithelial debris uld tend to enter from the depths of the intergluteal fold. This would also explain recurrences.

Hairs.—That hairs might be the direct cause does not seem to have been seriously considered. The condition has been noted particularly in hairy people (Gabriel 1945, Barnett 1944), and we have noted it in some people who were more hairy than normal. But this is not necessarily so and in any case is difficult to prove. Kooistra (1942), who accepts the developmental theory, mentions that Warren (1854) had suggested hairs, inverted on themselves in the follicle, as the cause. But, looking up the reference, we did not confirm this but found instead the statement: "It would seem probable that originally the hair was contained in a cyst."

The fact that epilation doses of X rays (Smith 1937, Turell 1940, Sher 1944) may be of value both preoperatively and in the treatment of recurrence is strong evidence for the causal rôle of hair in the recurrent sinus. And hair might also play a causal rôle in the production of the primary sinus by puncturing the skin and either introducing infection alone or carrying in a small piece of surface skin, thus causing an implantation dermoid. Hairs as a cause of pilonidal sinus cannot therefore be dismissed.

SIMILAR LESION IN A BARBER'S HAND

We have recently seen a pilonidal sinus in a barber's hand.

A barber, aged 31, came to hospital with a discharging sinus on the dorsum of the interdigital cleft between the ring and little fingers of the right hand. He attributed it to a hair penetrating the skin at this point while he was cutting a customer's hair. He pulled it out, but a discharging sinus developed and persisted, and at his work other hairs tended to enter the sinus.

On examination a small nodule the size of a pea could be felt just behind the orifice of the sinus, and a probe could

be passed into this nodule from the orifice of the sinus. The sinus and nodule were excised and the skin sutured. The wound healed uneventfully.

The histological picture was exactly like that of a post-anal pilonidal sinus. The sinus led into a cavity lined with squamous epithelium and containing a hair follicle, and the deeper part was a track lined with granulation tissue and containing hair and debris in its walls.

The history of this case and the difficulty of any developmental explanation in this situation are strong evidence that this case is an example of pilonidal sinus due to the puncture of the skin by a hair.

Our patient said that a friend of his, also a barber, had a similar condition, which arose in the same way. So we sought for further examples. Assistants in two well-known London hairdressing firms said that it was not at all uncommon for minor infective lesions to be produced owing to puncture of the skin during haircutting, particularly in the hands. Usually they cleared without serious trouble after the removal of the hair. Occasionally, however, a more chronic lesion resulted, and we were told of one such case in which a legal action followed; but we could not trace the legal records. From our inquiries it is obvious that among barbers hair is well recognised as a traumatic and infective agent.

CONCLUSIONS

Pathology.—Critical analysis of the developmental theory of pilonidal sinus leads to the conclusion that though a small proportion of cases arise in a previously existing postanal dermoid, in the great majority of cases there is no definite evidence of such origin. Moreover, many of the features of recurrence are difficult to fit in with the developmental theory. Alternative possibilities are that pilonidal sinus is primarily an infective lesion, with secondary entrance of hair and debris, or the result of penetration of the skin by a hair, which may also introduce both infection and epithelium. We suggest that these alternative possibilities are more in accord with the facts.

Treatment.—If the developmental theory of pilonidal sinus is relegated to a subordinate place, the rational treatment of the condition demands corresponding adjustment. No longer need such emphasis be laid on the extent of the primary excision, which on the developmental theory led in many cases to a probably unnecessary removal of tissue, with consequent prejudice to the subsequent healing. Though measures short of surgical excision of the track may be successful in cases in which the lining is merely granulation tissue, excision will probably continue to be the standard treatment, because it is impossible to tell clinically whether an epithelial track is present or not and to remove the hairs which are acting as foreign bodies. The main emphasis in treatment becomes transferred to securing healing of a chronic infective condition at the bottom of a fold. If the causal rôle of hairs, both in the primary lesion and in recurrences, is as important as we believe, a preoperative epilation dose of X rays becomes an essential part of treatment. The results of Smith (1937), Turell (1940), and Sher (1944) offer practical encouragement to this point of view.

SUMMARY

The increased interest in pilonidal sinus as the result of the war has emphasised the dissatisfaction of surgeons with the uncertainties of its treatment, which has been reflected in a wide variety of surgical procedures.

We have therefore submitted the accepted developmental theory of pilonidal sinus to critical analysis. As a result, we conclude that, though a small proportion of cases are developmental in origin, the great majority may be acquired infective lesions, hair playing an important rôle in the production both of the primary lesion and of recurrences.

A similar lesion in a barber's hand is described.

The emphasis in treatment should be shifted from attempting a wider eradication by excision to the management of a chronic infective lesion in a fold.

A preoperative epilation dose of X rays to the area should be a routine.

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NICOTINAMIDE METHOCHLORIDE ESTIMATIONS IN SPRUE AND AMŒBIASIS

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THE published results of nicotinamide methochloride estimations in pellagra (Ellinger et al. 1945) seemed to us to justify a similar investigation in active and convalescent cases of sprue, and offered a means of assay of a vitamin-B factor related to sprue.

We intended to include in the investigation amœbiasis, bacillary dysentery, and the chronic non-specific diarrhœas to try to determine the effects, if any, of intestinal infection on nicotinamide excretion; but unfortunately we could not collect any cases of bacillary dysentery or of chronic non-specific diarrhœa.

Methods.—We used the method of Coulson et al. (1944) and Ellinger et al. (1945). For three days 24-hour urines were collected with the patients on ordinary hospital diet. For the next five days the same procedure was continued except that the patients were given 100 mg. of nicotinamide at the beginning of each 24-hour period. Each test therefore lasted eight days. To 2 controls, 2 cases of sprue, 6 of convalescent sprue, and 4 of amœbiasis the nicotinamide was given parenterally. To the remainder—7 controls, 4 cases of convalescent sprue, and 3 of amœbiasis—the vitamin was administered by

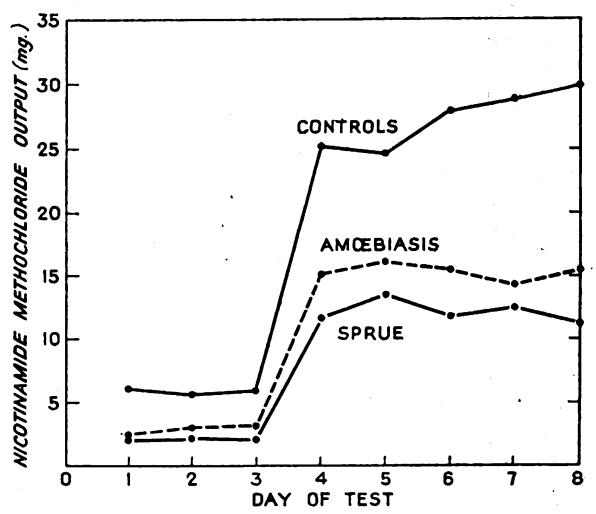

Fig. 1—Average output of nicotinamide methochloride in sprue amœbiasis, and controls.

mouth. All cases of florid sprue (2) and amœbiasis (2) with looseness of the bowels received the nicotinamide parenterally to exclude the possibility of poor gut absorption.

Briefly, the method of determining the amount of nicotinamide methochloride in the urine (Coulson et al. 1944, Ellinger et al. 1945) is as follows:

Nicotinamide methochloride is separated from urine by adsorption on 'Decalso,' from which, after washing with distilled water, it is eluted by potassium-chloride solution, then rendered alkaline, and extracted with iso-butyl alcohol. The fluorescent derivatives thus produced are compared by visual fluorimetry with standards similarly treated.

Results.—The results in controls, sprue, and amœbiasis, given in the accompanying figures (1–4), may be briefly summarised as follows:

(1) The controls produced figures of the same order as those of Ellinger et al. (1945).

(2) There was a subnormal excretion, resting and after test dosing, in patients convalescent from sprue who had had no symptoms for three months or more and had had nicotinic acid, 'Vegmite,' and liver treatment in India. Figures of excretion in this group were slightly higher than those of Ellinger et al. (1945) for pellagra.

(3) The excretion in two cases of florid sprue investigated did not differ from that in the patients convalescent from sprue.

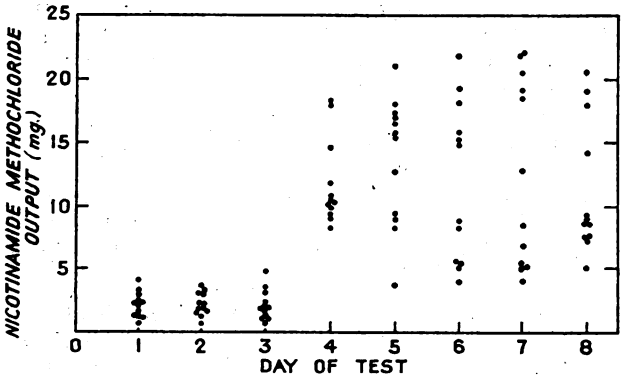

Fig. 2—Scatter diagram of nicotinamide methochloride output and saturation tests in sprue.

(4) Whether nicotinamide was given orally or parenterally to patients convalescent from sprue and to controls, the level of excretion was similar. This indicated that poor intestinal absorption of the vitamin was not a factor in cases without intestinal "hurry."

(5) Patients with amœbiasis, either with active disease or cyst passers, showed less excretion than the controls, and a slightly higher excretion than the sprue cases. Only two of these cases had diarrhœa, and both received their nicotinamide parenterally.

Comments.—The subnormal excretion in patients convalescent from sprue, who had no symptoms and had had their fill of nicotinic acid during treatment, was surprising. Not less surprising was a similar deficient excretion in cases of amœbiasis, mostly inactive from the point of view of intestinal "hurry."

It is impossible to draw any conclusions from these few results, and a larger series is required to confirm them. If, however, deficient nicotinamide-methochloride excretion in these cases can be shown to be due to subnormal intestinal biosynthesis and not to other factors (Perlzweig et al. 1943, Ellinger and Coulson 1944), our observations may be significant. We suggest tentatively that, behind this deficient nicotinamide-methochloride excretion in sprue and amœbiasis there may lie deficiencies of other

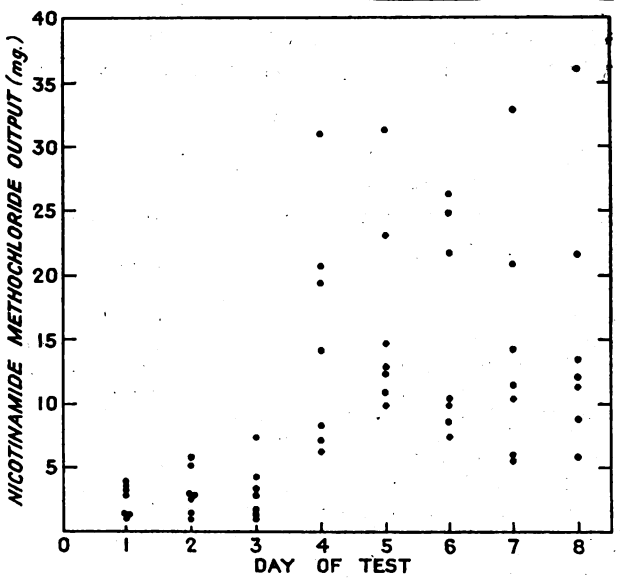

Fig. 3—Scatter diagram of nicotinamide methochloride output and saturation tests in amœbiasis.

members of the vitamin-B complex, known or unknown, whose relation to sprue may be of direct importance.

We have been obliged to leave this investigation in an incomplete state, and neither of us is likely for some time to be in a position to continue it. We feel, therefore, that these rather unexpected results should be recorded in the hope that they may be confirmed or otherwise, and possibly be of use to others continuing research in this field.

We agree with Leishman (1945) that the success of further research into this subject will depend on coördinated endeavour, an adequacy of clinical material, and laboratory facilities capable of coping with complicated and tedious analyses and assays.

We should like to thank Squadron-Leaders A. F. N. Neven, K. N. Lloyd, and J. D. Whiteside for sending us suitable cases, and Roche Products Limited for supplies of nicotinamide.

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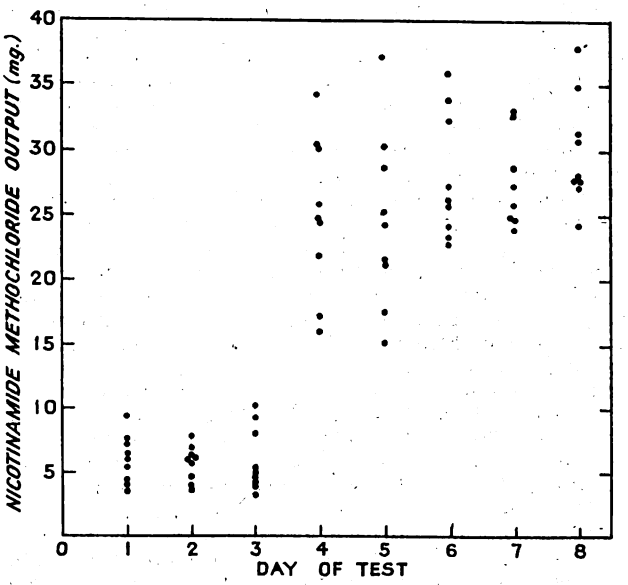

Fig. 4—Scatter diagram of nicotinamide methochloride output and saturation tests in controls.

RELATIONS OF STEROID HORMONES AND ANHYDRO-HYDROXY-PROGESTERONE TO FIBROMATOSIS

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UTERINE and other abdominal fibroids induced by œstrogens in the guineapig (Iglesias 1938, Lipschutz and Iglesias 1938, Lipschutz and Vargas 1939, Lipschutz et al. 1940) can be prevented by different steroids absorbed simultaneously with the œstrogen (Lipschutz et al. 1939, Lipschutz and Vargas, 1941a and b, Lipschutz et al. 1941, Lipschutz and Zañartu 1942, Iglesias et al. 1944), and fibroids already induced regress when an antifibromatogenic steroid is given (Lipschutz and Maas 1944, Lipschutz and Schwarz 1944).

A systematic search for antifibromatogenic steroids has shown that all the steroids capable of preventing œstrogen-induced fibroids—progesterone, desoxycorticosterone, dehydrocorticosterone, testosterone, and dihydrotestosterone—were 3-keto-steroids (Lipschutz 1944). Of these progesterone was the most active. Five other 3-keto-steroids were not antifibromatogenic in the quantities used: pregnanedione, allopregnanedione, Δ^{16}-dehydroprogesterone (Lipschutz et al. 1944), androstanedione, and cholestenone (Iglesias and Lipschutz 1944). On the other hand, no steroid with a hydroxyl group in position 3 was antifibromatogenic: androsterone, Δ^{5}-androstenediol, androstanediol (Iglesias unpublished), Δ^{5}-acetoxypregnenolone (Lipschutz et al. 1943), Δ^{5}-pregnenolone-3-acetate (Iglesias and Lipschutz, unpublished).

Our work on the antifibromatogenic activity of different steroids in relation to their chemical structure is of interest with reference also to the hormone treatment of other tumours, including cancer. Steroids have been shown to prevent many forms of œstrogen-induced atypical growth: the hyperplasia of the prostatic stroma and the metaplasia of the utriculus in macacus (Zuckerman 1936, Zuckerman and Parkes 1936, de Jongh et al. 1938), and the fibromyo-epithelioma of the prostatic region in the guineapig (Lipschutz et al. 1945). But steroids are active also against different *spontaneous* tumours in laboratory animals: the mammary adenocarcinoma of the mouse (Lacassagne 1937, Lacassagne and Raynaud 1939, Nathanson and Andervont 1939, Jones 1941, Loeser 1941, Heiman 1944, 1945), the mammary adenofibroma of the rat (Heiman 1943), a transplantable thoracic tumour in the mouse (Heilman and Kendall 1944), the leukæmia of the mouse (Murphy 1944, Gardner et al. 1944).

Steroids have been applied also in human pathology. Though success seems to be inconstant with testosterone treatment of mammary carcinoma, there may be sometimes good results (Fels 1944). Œstrogens also have been applied in similar cases (*Lancet* 1944). Fundamental progress has been achieved in the hormone treatment of prostatic cancer thanks to the work of Huggins (1943); see also Dodds (1944).

Hormones have been used also for the treatment of uterine fibroids in women (Loeser 1938, and many others). The work of Greenblatt (1943, 1944) with subcutaneously implanted testosterone-propionate pellets deserves special mention. Favourable results have been obtained also by workers associated with this department, (Vargas et al. 1945). Objections can be made against the use of testosterone because of its virilising action (Hamblen 1942), though this is only transitory (Palmer and De Ronde 1943), and because of its being active only on injection or on subcutaneous implantation of tablets and not when given by mouth.

PROGESTERONE AND ANHYDRO-HYDROXY-PROGESTERONE

Progesterone has in the guineapig a stronger antifibromatogenic action than has testosterone (Lipschutz 1942a and 1942b, 1944). But, like testosterone, progesterone is considerably less active when given by mouth than on injection; the progestational activity of progesterone given by mouth is, according to Miescher and Gasche (1943), only 1/160th of the activity of injected progesterone. Though, as shown by our previous work, progestational activity is not an absolute criterion of antifibromatogenic activity, the fact remains that progesterone which exerts the strongest progestational action also exerts the most antifibromatogenic one.

For the above-mentioned reasons an experimental study of the antifibromatogenic action of anhydro-hydroxy-progesterone (A.H.P.), or ethinyl-testosterone, has been undertaken in this laboratory. This synthetic compound is due to Ruzicka et al. (1938) and to German workers. Its biological properties have been studied by different authorities and have been described in an exhaustive study by Emmens and Parkes (1939). The androgenic activity of injected A.H.P. (in propylene glycol) was in the capon comb-growth test, according to Emmens and Parkes, only about 1/600th of the activity of injected testosterone, whereas the progestational activity of A.H.P. was in the rabbit test 1/10th of that of the injected progesterone. According to Miescher and Gasche (1943) A.H.P. (in sesame oil) has 1/5th of the activity of progesterone. But A.H.P. is equally active by mouth and by injection in producing progestational proliferation.

PREVENTION OF ŒSTROGEN-INDUCED UTERINE AND ABDOMINAL FIBROIDS IN THE GUINEAPIG BY ANHYDRO-HYDROXY-PROGESTERONE

Small tablets of α-œstradiol were implanted subcutaneously into forty-five castrated female guineapigs; 1–8 tablets of A.H.P. 5 mm. in diameter were also implanted, to obtain absorption of variable quantities of A.H.P. The quantity of α-œstradiol and of A.H.P. absorbed was calculated from the loss of weight of the dried tablet divided by the number of days. This gives only an approximate figure, as absorption per day diminishes with time (Folley 1943, Shimkin et al. 1944, Bishop and Folley 1944), and substances from outside the tablet are entering into it (Folley 1942, 1943). Absorption per day was about 0·4 μg. per sq. mm. of the tablet; this is about fifteen times less than with progesterone. Necropsies were done three months after

TABLE I—ANTIFIBROMATOGENIC ACTION OF ANHYDRO-HYDROXY-PROGESTERONE (A.H.P.) IN GUINEAPIGS

Group	α-œstradiol per day (μg)	Antifibromatogenic steroid per day (μg)	Average F.T.E. (units)*	No. of animals	Animals reaching 5·5 units†	Regional marks 2 and 3 per animal‡	F.T.E. range (units)
I	16–57	0	5·7	23	12	1·9	1–10
IIa	24–55	A.H.P. 14–25	7·1	7	5	2·6	1–11
IIb	14–64	32–85	5·3	9	5	2·0	2–8
IIc	21–84	100–191	2·5	23	3	0·5	0·5–7
IId	55–95	210–347	2·1	6	0	0·3	1–4
III	21–63	Progest. 13–24	1·4	14	0	0	1–2·5

Progest. = progesterone.

* Fibroids of four regions (uterine-subserous and parametric; of the mesosalpinx; of the mesentery and the abdominal wall; of the spleen) are classified separately and marked 0·5–1–2–3, according to size. The fibrous tumoral effect (F.T.E.) is the sum of the regional marks.

† The average of the α-œstradiol group I.

‡ See Lipschutz and Maas (1944).

implantation of the tablets. The fibromatogenic effect was classified according to the rules already published (see especially Lipschutz and Maas 1944). The results were compared with those obtained in twenty-three animals with α-œstradiol alone and with fourteen animals into which tablets of α-œstradiol and of progesterone were implanted simultaneously (group I in table II of Lipschutz et al. 1944).

Table I (see also figure) shows that a quantity of A.H.P. (groups IIa and IIb) up to four times greater than the antifibromatogenic threshold of progesterone (group III) could not prevent œstrogen-induced fibroids. With 32–85 μg. the fibrous tumoral effect (F.T.E.) and the coefficient indicating a strong fibrous reaction (penultimate column) were as pronounced as in the absence of A.H.P. (group I). In both groups IIa and IIb no less than 50% of the animals reached the average F.T.E. of the α-œstradiol group—i.e., there was no preventive action.

Things changed considerably with quantities of 100–200 μg. of A.H.P. a day (group IIc). Though there were still three out of twenty-three animals which reached the average of the α-œstradiol group, the diminished fibrous reaction—F.T.E.=2·5 instead of 5·3—indicates clearly that A.H.P. is antifibromatogenic. With 100–200 μg. of A.H.P. a day, or with about 5–10 times the antifibromatogenic threshold of progesterone, the

TABLE II—EFFECT OF A.H.P. ON UTERINE FIBROIDS IN GUINEAPIGS

Group	No. of animals	No. of animals with uterine bleeding	No. of animals with uterine fibroids	Average fibrous uterine reaction*	Average weight of uterus (g.)	Range of weight of uterus (g.)
I	23	5	18	1·25	4·9	2·7–12·0
		A.H.P.				
IIa	7	0	3	0·50	4·2	2·2– 7·0
IIb	9	0	3	0·23	4·0	2·5– 6·7
IIc	23	0	3	0·15	4·0	2·2–10·0
IId	6	0	0	0	3·0	2·0– 5·7
		Progest.				
III	14	0	1	0·1	3·0	1·7– 5·1

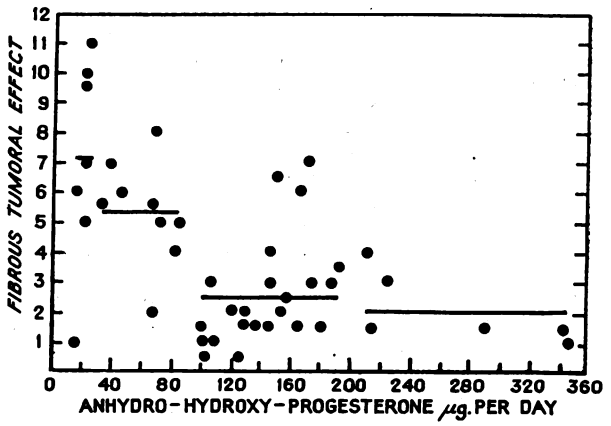
* Sum of the uterine marks of the whole group divided by number of animals in the group.

" transitional zone " (Lipschutz et al. 1944) is surpassed —i.e., the antifibromatogenic action is fully evident.

A further degree of preventive antifibromatogenic action was attained in group IId with quantities of A.H.P. 10–15 times the progesterone threshold (table I).

These experiments show that A.H.P. shares with progesterone the power of preventing œstrogen-induced abdominal fibroids. But the antifibromatogenic activity of A.H.P. is less than it should be if there were full concomitance between progestational and antifibromatogenic action. With 130–240 μg. of A.H.P. a day—i.e., with ten times the antifibromatogenic threshold of progesterone—there were fibroids in many of the animals. The antifibromatogenic action of A.H.P. was even less than with testosterone (Lipschutz 1944) and especially less than would have been expected because of the side-chain of two carbons at C_{17} (Lipschutz 1944).

There is still another feature of antifibromatogenic action which deserves special mention: the preventive antifibromatogenic action refers in the first place to the subserous *uterine* fibroids and to the parametric ones. In groups IIa and IIb (table II), in which the quantities of A.H.P. were still insufficient to inhibit the abdominal fibrous reaction, there was already a very pronounced diminution of subserous uterine fibroids. In groups IIc and IId uterine fibroids were absent or almost absent. The frequency of animals with a uterine fibrous reaction



Fibrous tumoral effect induced by α-œstradiol in 45 castrated female guineapigs. Various quantities of A.H.P. a day were absorbed simultaneously. Horizontal lines indicate averages of groups IIa, IIb, IIc, and IId of table I.

was with 100–191 μg. of A.H.P. a day scarcely more pronounced than in group III with small quantities of progesterone. Table II gives a comprehensive picture of the remarkable fact that the preventive action is preferably and primarily against the uterine tumours and only secondarily against the abdominal fibroids in general. This statement is of special interest so far as practical application of our results is concerned.

The differential behaviour of uterine and extra-uterine fibroids has been found with all antifibromatogenic steroids used in our work; it can be simply explained by the higher fibromatogenic threshold for uterine fibroids compared with that for extra-uterine ones. In these quantitative circumstances uterine fibroids certainly must be the first to be *prevented*. In experiments with the progesterone treatment of previously induced fibroids the differential *regression* of uterine and extra-uterine fibroids was indeed less pronounced (Lipschutz and Maas 1944).

OTHER ANTI-ŒSTROGENIC ACTIONS OF ANHYDRO-HYDROXY-PROGESTERONE

The antifibromatogenic action coincides with other anti-œstrogenic ones. The last two columns of table II show that the increase of uterine weight due to the œstrogen is in group IId partly counteracted by A.H.P. The thickening of the myometrium was less. Though polypous growth was still present it was much less than with œstradiol alone. It was the same with reference to the vascularisation of the submucosa. Consequently there was no œstrogen-induced uterine bleeding when A.H.P. was absorbed simultaneously. As shown in table II, 5 out of 23 animals with œstradiol alone bled from the uterus; there should have been uterine bleeding in about 10 out of 45 animals in group II. But bleeding was absent even in those experiments where A.H.P. was absorbed in quantities which were smaller than those necessary to prevent abdominal fibroids.

There was no masculinising action on the clitoris, which in the guineapig is very sensitive to androgens (Lipschutz 1919, 1924, Ruz 1939). The masculinising action was absent even in group IId with 210–347 μg. of A.H.P. a day, whereas with similar quantities of testosterone propionate the transformation of the clitoris into a hypospadic penis-like organ begins to be seen in 4–7 days (Ruz 1939). With A.H.P. nothing similar happened even in so long a period as three months. Our results corroborate fully the statement of Emmens and Parkes (1939) about the very small androgenic potency of A.H.P.

PROSPECTS OF CLINICAL TRIALS WITH ANHYDRO-HYDROXY-PROGESTERONE

Clinical trials with A.H.P. in cases of uterine fibroids can be recommended on the basis of our experiments.

The facts that A.H.P., unlike progesterone, is active by mouth and that there is not the slightest danger of virilisation as with testosterone give greater hopes for the successful treatment of fibroids with A.H.P. than with the two natural steroids mentioned. It is true that findings concerning the action of steroids in laboratory animals cannot be directly applied to women. According to some authorities œstrogens may play a part in the genesis of uterine fibroids in women (Hamblen 1945). But, on the other hand, we must emphasise that up till now we have been unable to induce fibroids with œstrogens in the new-world monkey (Iglesias and Lipschutz 1946), even when these animals were kept for almost three *years* in the same experimental fibromatogenic conditions under which fibroids were induced in guinea-pigs in three *months*.

Since androgens have been revealed to be so active against uterine bleeding and against fibroids, one may tentatively suggest combining in clinical trials maximal quantities of A.H.P. by mouth with the injection of small quantities of testosterone propionate or with the subcutaneous implantation of tablets sufficiently small to allow for an absorption of only non-virilising quantities of the androgen.

SUMMARY

The antifibromatogenic action of steroids and their antitumoral action in general is discussed.

Anhydro-hydroxy-progesterone (A.H.P.), a synthetic steroid active by mouth, was tested for its power to prevent œstrogen-induced fibroids in the guineapig.

A.H.P., whose progestational activity is about a tenth of that of progesterone, has been shown to be also antifibromatogenic. But the quantities of A.H.P. necessary to prevent abdominal fibroids are about fifteen times greater than the antifibromatogenic dose of progesterone, though the antifibromatogenic effect is evident with smaller quantities of A.H.P.

Uterine fibroids are more readily prevented than other abdominal fibroids.

Œstrogen-induced uterine bleeding was counteracted with quantities of A.H.P. much smaller than those necessary for obtaining an antifibromatogenic effect.

The prospects of clinical trials with A.H.P. are discussed.

ADDENDUM

On the strength of our laboratory results with different steroids and especially with progesterone in the treatment of experimental fibroids, A. L. Goodman (*J. clin. Endocrin.* 1946, **6**, 402) has tried the therapeutic possibilities of progesterone against uterine fibromyoma in women. In seven cases 10 mg. of progesterone was injected 3–6 times weekly. A decrease in the size of the tumour or of the uterus is reported in all cases; the decrease is notable as early as 1–3 weeks after beginning the treatment. In less than 2 months the decrease was to $^1/_4$–$^3/_4$ of the original size. In one case the tumour mass "appeared to be completely gone."

This investigation has been aided by grants from the Jane Coffin Childs Memorial Fund for Medical Research, the Rockefeller Foundation, and the Ella Sachs Plotz Foundation for the Advancement of Scientific Investigation. Acknowledgment is made by A. Lipschutz for the Charles L. Mayer Award, 1944, of The National Science Fund of the National Academy of Sciences of the U.S. Our thanks are due to Dr. E. Oppenheimer, of Ciba Pharmaceutical Products, Summit N.J., for a generous gift of steroids.

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REMEDIAL CORRECTION OF VALGUS FOOT STRAIN BY FOOT PRONATION EXERCISE

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THE normal foot has been aptly compared to a tripod balanced evenly beneath the leg, with the os calcis in line with the astragalus and tibia. The maintenance of this balance depends on the ability of the foot to bring the head of the first metatarsal to the ground by adequate foot pronation. Should this pronation be deficient, the first metatarsal can only be brought down by a tilting of the whole foot outwards at the subastragaloid joint. This at once produces the characteristic appearance of "flat-foot," with valgus deviation of the foot as a whole and of the os calcis in particular. In such a position of imbalance it is not surprising that symptoms of foot and leg strain appear with rapid fatigue of muscles working at a mechanical disadvantage.

Restoration of normal foot balance with adequate foot pronation should therefore be the aim of treatment; and, though corrective osteotomy of the first metatarsal may be necessary in certain cases of congenital abnormality, it was felt by us that remedial treatment specifically directed to foot pronation could bring about the desired result. With this object in view, one of us (B. S. H.) has designed the foot corrector apparatus illustrated which ensures maintenance of the correct position of the os calcis during pronation exercises in a manner which is not possible with orthodox routine foot exercises.

The apparatus (fig. 1) consists of a T-shaped wooden

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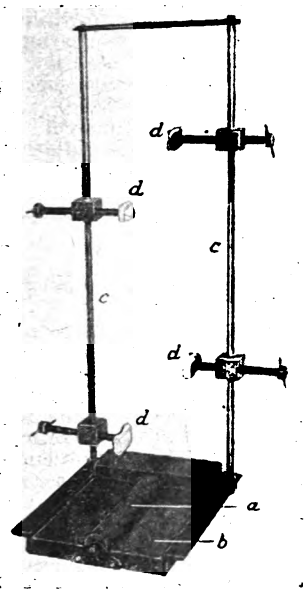

Fig. 1—The Harrens foot corrector: (a) T-piece with roller; (b) wooden base; (c) vertical rods; (d) metal plates.

foot-piece with the stem in the form of a roller (*a*) mounted upon a wooden base (*b*), from the sides of which arise two vertical adjustable metal rods (*c*). A top cross-bar unites the rods, each of which carries two sliding padded metal plates (*d*) for application to the heel and leg. Fig. 2 shows a patient seated with the leg vertical and the outer border of the foot resting on the T-piece. Four padded plates are in position, one on each side of the heel, one on the inner aspect of the leg, and one on the outer side of the thigh immediately above the knee. Movement can take place now only in the forefoot, which is actively pronated by the patient until the head of the first metatarsal can be brought down over the roller to touch the wooden base, as shown in fig. 3, which illustrates the degree of pronation present in the normal foot.

The use of two plates is not essential to maintain the position of the os calcis, which can in most cases be effectively controlled by a single plate on the outer side of the heel, provided the leg plate is applied well down the inner side of the leg about 2–4 in. above the ankle.

The apparatus has now been in constant use for eighteen months and has been found capable of correcting pronation deficiency of up to 30° in about three weeks. The pronation exercise is combined with other recognised foot exercises and physiotherapy, and is supplemented in most instances by wedging of the inner side of the heels of the boots or shoes.

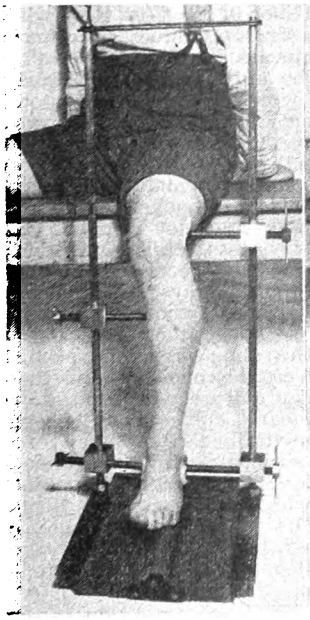

Fig. 2—Plates holding foot and leg in correct position, outer border of foot resting on roller.

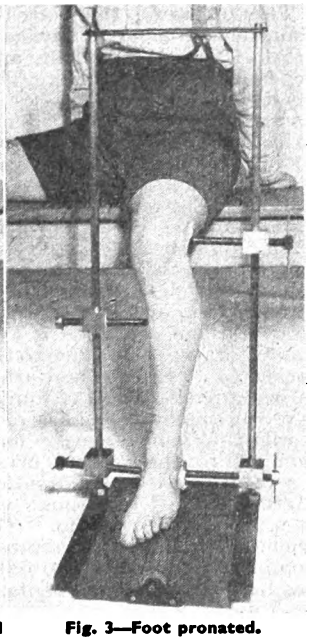

Fig. 3—Foot pronated.

The types of case for which the foot corrector has proved of value are: (1) simple valgus strains and early flat-foot in children and adults; (2) foot re-education after immobilisation in plaster; and (3) fractured os calcis.

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 the plaster as much as is practicable. The os calcis group of cases have proved more satisfactory than was expected and have in most cases been prevented from developing the all too common painful strain below the external malleolus.

We are indebted to the London County Council for the illustrations and for the supply of the foot corrector, which has been manufactured for us by Messrs. Masters & Sons, 240, New Kent Road, London, S.E.1, from whom it is obtainable.

Preliminary Communication

"PELLAGRAGENIC" ACTIVITY OF INDOLE-3-ACETIC ACID IN THE RAT

Krehl and co-workers [1] have shown that rats fed on a low-protein, low-tryptophane diet, containing 40% of maize, stop growing. Normal growth was restored by the addition of nicotinic acid or tryptophane to this diet. Woolley [2] found that 3-acetyl-pyridine produced in mice and rats a depression of growth which could be counteracted by either nicotinic acid or tryptophane. In search for a similar antivitamin in maize he has recently obtained a potent extract which was "pellagragenic" to mice in amounts of 1 mg. per 100 g. of diet.

We have been investigating the reasons why maize produces such a deficiency in rats, having particular regard to possible defects in the metabolism of tryptophane. Now, maize is known to be a rich source of indole-3-acetic acid (heteroauxin). Yellow maize meal contains, according to Haagen-Smit et al.,[3] 20 mg. per kg., or, according to Berger and Avery,[4] 100 mg. of indole-3-acetic acid per kg.; it is present largely in the form of a precursor which can be converted into indole-3-acetic acid by mild alkaline or enzymic digestion. For a diet containing 40% of maize meal the above figures correspond with 0·8 mg. and 4·0 mg. of indole-3-acetic acid per 100 g. of diet respectively.

In our experiments young rats of 60 g. weight all gained weight steadily on a purified diet containing 10·5% casein as the sole source of protein, and administration of nicotinic acid or tryptophane did not increase the growth-rate significantly. However, of 32 rats fed on a similar diet supplemented with 1·5 mg. of indole-3-acetic acid per 100 g. of diet, 19 rats showed a severe depression of growth. Of these 19 rats, 9 were dosed either with 1 mg. of nicotinic acid or with 20 mg. of tryptophane per day: this treatment in all cases effected a cure, while the remaining 10 rats which were left undosed as controls did not recover (see table).

The effect of indole-3-acetic acid was similar to that produced by the addition of whole maize meal (40%) to the diet. Of 33 rats fed on the maize-meal diet, 29 showed a severe depression of growth which could always be cured either by nicotinic acid or tryptophane. On a high-protein diet (20% casein) neither maize meal nor indole-3-acetic acid was effective in stopping growth.

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4. Berger, J., Avery, G. S. jun. *Ibid*, 1944, **31**, 199.

EFFECTS OF TREATMENT *

Diet	No. of rats	Average weekly gain in weight before treatment (g.)	Treatment	Average weekly gain in weight after treatment (g.)
10·5 % casein	4	15	—	—
	4	—	Nicotinic acid, preventive	18
	4	—	Tryptophane, preventive	15
10·5 % casein + indole-3-acetic acid	10	5	—	—
	7	3	Nicotinic acid, curative	11
	2	0	Tryptophane, curative	19
7 % casein + 40 % maize	22	4	—	—
	4	2	Nicotinic acid, curative	25
	3	2	Tryptophane, curative	13

* Basal diet: 3 % cotton-seed oil, 5 % salt mixture, 0·15 % cystine, casein as shown above, and sucrose ad 100. In diets containing yellow maize meal, the oil, salts, and cystine content were reduced by 40 %. The protein content of all the diets was about 10·5 %. Vitamin supplements as described by Black et al.,[5] omitting nicotinic acid.

Further experiments are in progress to determine whether the "pellagragenic" effect of maize can be attributed entirely to its high "auxin" content, relative to its low tryptophane and nicotinic-acid content.

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Reviews of Books

Actions of Radiations on Living Cells

D. E. LEA, M.A., PH.D., Prophit student of the Royal College of Surgeons, formerly fellow of Trinity College, Cambridge. London: Cambridge University Press. Pp. 402. 21*s*.

THE greater part of this good book is occupied by an account of the effects of radiations (mostly X and gamma) on viruses and on the genes and chromosomes of higher cells; this happens to be the field where Dr. Lea's own experimental and theoretical work has taken him and for which he is widely known. Exactly how cellular death is brought about by X and gamma rays is not yet known, but he discusses the question in detail, especially the so-called target theory, defined as follows:

> "When the biological effect observed is due to the production of ionization in some particular molecules, as in the induction of gene mutations, or is due to the passage of an ionizing particle through some particular structure, as in the induction of chromosome breakage, it is possible to calculate the size of the molecule or structure involved from a knowledge of the proportion of the organisms irradiated which are affected by a given dose or radiation. It is further possible to predict the variation of ionic efficiency of different radiations in producing effects of this sort. The interpretation of biological effects of radiation along these lines has become known as the *target theory*."

It is perhaps not unfair to say of this theory that while it does help towards explaining the way in which differing ionic efficiencies are linked with different radiations, it leaves many phenomena quite unexplained.

Many readers will welcome the full account of genetic effects and the chromosome structural changes set up by radiation. There is much discussion at present among radiologists as to whether the mutations set up in drosophila have any practical bearing on man. Is there any considerable chance that radiologists in the course of their work (which, however carefully carried out, does involve some degree of exposure) suffer mutational changes? Unfortunately nearly all of the mutations seen in drosophila appear to be regressive. With radiation work extending on all sides it is inevitable that this subject will be widely discussed in all its bearings. Cosmic radiation, it seems, is insufficient in intensity to account for the spontaneous mutations known to occur without apparent cause; we must look elsewhere.

Throughout the book the outlook is quantitative. It will appeal to a growing body of people who see radiation not only as benign but sometimes as deadly. Though Dr. Lea does not mention it, his text makes it clear that protective methods will have to be elaborated to cope with the growing use of this agent.

5. Black, S., Overman, R. S., Elvehjem, C. A., Link, K. P. *J. biol. Chem.* 1942, **145**, 137.

L'anémie infectieuse

G. HEMMELER, privat-dozent, University of Lausanne. Basle: Schwabe. Pp. 76. Sw. fr. 5.

THIS monograph is an attempt to amplify the scanty sections in most textbooks on the subject of anæmia in infectious disease. Details are given of anæmia occurring in typhoid fever, bacterial endocarditis, rheumatoid arthritis, and other conditions. Complete records are given of 25 selected patients; besides full blood-counts, sternal marrow punctures were carried out, the reticulocyte changes followed, and estimations made of the serum iron. Dr. Hemmeler notes that the severity of the anæmia is directly proportional to the severity of the fever, the acceleration of the blood-sedimentation rate, and the leucocytosis. The anæmia is normochromic and reticulocytes are low. The bone-marrow is less cellular than normal and the erythroblasts are mainly basophilic, few oxyphilic. The serum iron is normal or low. When the infection dies down there is a spontaneous remission of the anæmia, independent of treatment, accompanied by a small reticulocytosis and increased cellularity of the bone-marrow with accelerated erythroblast maturation. Dr. Hemmeler thinks that the anæmia arises from the failure of a depressed erythropoietic marrow to make up the loss of red cells due to the increased rate of hæmolysis that accompanies fevers. He finds no evidence that it is due to iron deficiency, and attributes it to toxic depression of erythropoiesis. He makes the useful point that iron and liver are useless for treating these patients; blood-transfusion should be undertaken whenever the hæmoglobin falls below 60 %.

A good deal of valuable information is presented in this pamphlet; but, as in other Swiss writings at present, there is little evidence of contact with Anglo-American literature since 1939, and no reference to the work on the disturbance of hæmoglobin formation in infectious diseases.

The Outlook of Science

Modern Materialism. (2nd ed.) R. L. WORRALL, M.B. Sydney. London: Staples Press. Pp. 191. 12*s*. 6*d*.

THOUGH useful, this book is not in the front rank with Maudsley's *Organic to Human* and Bosanquet's *Meditatio Medici* (neither of which appears in the bibliography appended to this work). The author's vision is fairly clear, but he wears glasses which are misty in spots. As a champion of dialectic materialism he looks forward to a time when, under a world government based on genuine democracy (undefined), science will satisfy the essential wants of all; and having demolished Bishop Berkeley, Bertrand Russell, Sir Oliver Lodge, Eddington, J. S. Haldane, Sir James Jeans, Lancelot Hogben, and A. N. Whitehead, he takes his stand on Lenin, Marx, Engels, and Freud. Besides science, he discusses philosophy, religion, and art. Religion, he says, is founded on idealism, the opposite of materialism; therefore religion is an illusion. Religion is a social product and "exists today because of its value to the ruling classes of capitalist society. . . . Science and art can be considered together, in being fertile forms of human culture. Religion, however, an inevitable phase of early culture, has become sterile, and is now equally inevitably a reactionary force inimical to the welfare of society." He advocates a "revolutionary transformation" of society (and points to the U.S.S.R.), without which the successful future of science is impossible. The present subservience of science to politics is illustrated, he believes, by the atom bomb. Few will want to follow him all the way but he has his stimulating moments.

Messrs. H. K. Lewis, Gower Street, London, W.C.1, are the English agents for the Year Book of Neurology, Psychiatry and Endocrinology which was reviewed in our issue of Sept. 21.

THE LANCET

LONDON: SATURDAY, OCT. 5, 1946

Over to the Lords

TAKEN by and large, Mr. BEVAN's handling of the National Health Service Bill in the House of Commons was masterly, and many of those who a few months ago were strongly antagonistic now understand the strength of the Government case. There are grounds therefore for his hope that, though the armies are still arrayed on the battlefield, they are becoming increasingly listless; and the president of one of the Royal Colleges did well last week to direct attention to the peace conferences which must soon follow. Nevertheless a further chance remains for amending the text of the Bill, during the debate which opens in the House of Lords next Tuesday, and it would be a pity if this discussion were to be a mere formality. Much in the scheme remains highly debatable, and the Government should welcome any attempt to make a good Bill better—to correct weaknesses that might eventually prove its undoing. Uneasiness over several of its provisions is still felt by those most anxious for its success.

Despite all the Minister's explanations, we are still uncertain whether the degree of autonomy granted to hospital management committees is going to be sufficient, in the long run, to induce able men and women to serve them devotedly. The misgivings felt on this score were cogently set out in our columns a few weeks ago [1] by a correspondent who rightly pointed out that on the management committee "more than on any other body or person—the Minister included—will depend whether a hospital functions in an efficient and humane manner." Decentralisation of powers, as Mr. BEVAN recognises, is the main safeguard against a uniformly second-rate service, and he has accepted the plea made in our first comment on the Bill [2] that hospital management committees should at least have their own pocket-money and be able to accept gifts. He has in fact promised that the regulations will ensure that adequate powers are delegated by the regional boards to the committees. But if that is his intention, is it necessary that the Bill should specifically lay down that the regional boards shall be the bodies to appoint officers, to maintain premises, and "to acquire on behalf of the Minister and to maintain equipment, furniture and other movable property required for the purposes of any such hospital"? Are the boards really going to appoint subordinate personnel, to paint the building, and to mend broken tables and chairs? In general Mr. BEVAN has sought to leave himself and his successors a free hand, so that where experience reveals a mistake it will be possible to modify the Bill by regulation, without new legislation. Can he be sure that the statutory assignment of these powers to regional boards—which, especially if there are only 16–20 large regions,[3] are capable of becoming pieces of bureaucratic machinery [4]—will not need modification? Some hold that in practice it will seriously limit the devolution of responsibility which all desire. If the policy is to delegate to local management committees whatever powers may be found necessary for their functional health, would it not be wise at this stage to omit these particularising subsections? To some extent the scheme is admittedly experimental, and it might be best to say quite simply that the regional boards and the hospital management committees shall exercise such powers as are respectively delegated to them by the Minister. Though nebulous, this would at any rate not be misleading.

Another possible source of future trouble is the wide power of direction given to the Minister in connexion with hospital and specialist services. As we have already remarked,[5] this power is not restricted to the administrative as distinct from the professional sphere. When Mr. BEVAN was challenged on the point in the standing committee he gave an assurance that he would not be so foolish as to meddle in professional matters; and this assurance, since repeated, undoubtedly represents his attitude correctly. Yet the profession, with its experience of directions of a semitechnical character that have issued from the Emergency Medical Service, cannot be so easily satisfied. There will be—there ought to be—medical officers in the Ministry of Health anxious to secure widespread adoption of modern techniques. Will their ideas emanate from Whitehall with all the authority of directions made in the name of the Minister, binding even on the regional boards? That is the question, and Mr. BEVAN did not really answer it. We hope therefore it is not too late to incorporate in the Bill a formula making it clear how far the Minister's power of direction legitimately extends. This should not be beyond the wit of legal draftsmen, for the distinction between administrative and professional matters is neither new nor hopelessly subtle: it is commonly respected in the hospital world today. The fact surely is that the simple wording of the Bill as it stands is too simple to meet the complexity of the undertaking. For simplicity's sake the distinction between the administrative and professional responsibility in respect of the hospital and specialist services has been allowed to slip into the background. It would be a pity indeed if it were to become blurred, for the ultimate consequences could be disastrous to professional freedom.

A related question, calling for legal debate, is whether practitioners whose conduct the Minister finds harmful to the National Health Service should have a right to appeal from his decision to a court of law. The procedure as now laid down is that any complaint is made to the local executive council and is examined in the first place by a purely medical body, the council's medical subcommittee. A decision on the complaint is then reached by the council, half of whose members are doctors, dentists, and pharmacists. If the defendant practitioner is dissatisfied with the council's verdict he can appeal to a tribunal of three persons, of whom the chairman is appointed by the Lord Chancellor. If again unsuccessful he can appeal to the Minister himself, who is the person finally responsible for the well-being of the service. But only if one of these authorities appears to have

1. *Lancet*, July 20, p. 103.
2. *Ibid*, 1946, i, 421.
3. *Times*, July 12, p. 5.
4. *Lancet*, July 27, p. 137.
5. *Ibid*, 1946, i, 783.

exceeded its legal powers, or to have acted improperly, can he seek help from an outside court. Provided the morale of the profession and the service is high, these arrangements should work well in practice; and Mr. BEVAN has substance for his contention that the High Court is not the right kind of body to say whether a doctor has been reasonably efficient. Nevertheless under the new régime expulsion from the public service will be an extremely serious penalty, and it seems contrary to the principles of justice that sentence should be passed by the Minister who may be indirectly responsible for the accusation. It was to overcome this objection, of course, that the tribunal was inserted between the local executive council and the Minister; but two of the three members of this tribunal are to be chosen by the Minister himself. The arrangements are in fact of the "quasi-judicial" nature which Sir HENRY SLESSER [6] and other eminent lawyers view with alarm, and there is far more in question than administrative convenience.

All these are matters that the Lords are well fitted to elucidate. It is their function to take a long view, and we trust that discussion will not be frozen by too ready acquiescence, on either side of the House, in the Bill as it stands.

Perforated Peptic Ulcer

"THIS is one of the most serious and overwhelming catastrophes that can befall a human being. Unless surgical measures are adopted early, the disease hastens to a fatal ending in almost every instance." In the decades since MOYNIHAN spoke these words, early operation for the perforated peptic ulcer has seemed to be as right and natural as the surgeon's gloves. So it comes as a shock to find HERMON TAYLOR, in the article we published last week, declaring that conservatism has a place—he would even give it pride of place—in the treatment of perforation. He puts forward a convincing series of 28 cases treated by conservative methods with 4 deaths; 3 from conditions unrelated to the treatment, and only 1 in which, as he admits, operation might have made a difference. TAYLOR has turned away from immediate laparotomy, first, because he often found at operation that the perforation was already partially sealed and nature was clearly capable of completing the process. The peritoneal cavity, it appeared, could cope with a considerable quantity of infective fluid, provided that continued gross flooding from the perforation site was controlled by aspirating the stomach. Secondly, he had found that the mortality with operation was high, largely because of chest complications. Thirdly, many of these patients, because of bronchitis, severe hypertension, or myocardial failure, came in the "poor risk" class, where even a minor surgical procedure was hazardous.

These results must be studied in conjunction with those of operation. TAYLOR'S cases were mostly early perforations, the delay before admission to hospital exceeding six hours in only 3—a fact that speaks well for the diagnostic alertness of the general practitioners in the district. Is operation really hazardous in such early cases? GILMOUR and SAINT [1] record 51 cases operated on within twelve hours of perforation with 1 death; SOUTHAM [2] 34 cases of duodenal perforation operated on within twenty-four hours with no deaths; MAINGOT [3] gives the mortality as 2–6%. Unfortunately it is the practice to group together all perforations, and the overall mortality figures for surgical treatment thus seem high. Even so, HOUSTON,[4] in a recent analysis, gives the Newcastle figures for 1943 as 184 cases with 8·2% mortality; for 1944 as 190 cases with a 6·3% mortality. Surgery has not a great deal to be ashamed of with such figures.

These comparisons in no way detract from the value of the information to be drawn from TAYLOR'S experience. It emphasises the need for emptying the stomach as soon as possible after the perforation has been diagnosed; the small Ryle tube is not enough, and it is a useful tip to give an amethocaine lozenge to facilitate the passage of a large tube. Morphine should be given as soon as possible and the patient "made comfortable." TAYLOR neither advocates nor condemns the Fowler position, and one may assume that the half-sitting position is the most comfortable one; it is noteworthy that none of his cases developed a subphrenic abscess. His results have shown that where the diagnosis is in doubt, or where the patient's poor general condition or the lack of a surgeon prohibits operation, we have a method of treating the early case with a reasonable chance of success. TAYLOR agrees that when there has been a recent large meal with a likelihood of extensive spilling into the peritoneal cavity, and when the patient comes "too late," surgery is indicated. It must not be forgotten that the perforation is usually an emergency, coming under the care of the house-surgeon or R.S.O., whereas conservative treatment obviously requires an experienced clinical eye; it might therefore be hazardous to advocate this treatment as the routine, even for the early case. Most surgeons, too, will find operation less nerve-racking than a policy of wait and see. One surgeon with a considerable experience of conservative treatment has remarked: "I agree conservative treatment works, but I have given it up. I have had too much anxiety with the early convalescence of these cases." The conservative method suggests itself as particularly suitable for the aged. TANNER,[5] in a series of 16 perforations in people over sixty, had 10 deaths after operation—apparently a formidable mortality. Of 8 cases operated on under twelve hours, however, 6 made a complete recovery, and the 2 deaths were due to bronchopneumonia and cerebral thrombosis; in TANNER'S view failure to send the patient to the surgeon early was mainly responsible for the high mortality, and in TAYLOR'S 6 cases in men over sixty the only death was in a patient who had perforated twenty-four hours before admission.

The operation for perforation is usually simplicity itself. A midline incision seems to be most popular, though a right rectus muscle incision is used by some surgeons because there is an 8 to 1 chance of the perforation being duodenal. In view of the chest complications which commonly follow the perforated ulcer, and the difficulty of attaining adequate relaxation of the abdominal wall, various methods of

6. *Times*, August 9, p. 5.

1. Gilmour, J., Saint, J. A. *Brit. J. Surg.* 1932, **20**, 78.
2. Southam, A. H. *Brit. med. J.* 1922, i, 556.
3. Maingot, R. H. Abdominal Operations, London, 1940.
4. Houston, W. *Brit. med. J.* 1946, ii, 221.
5. Tanner, N. C. *Ibid*, 1943, i, 563.

anæsthesia have been tried. HAMILTON BAILEY [6] advocates a local anæsthetic plus 'Pentothal sodium,' and his advice is followed by many resident surgical officers; this method has the advantage that a long anæsthesia is not maintained for what is really a short operation. Recently curare has proved useful in these cases. As MIMPRISS and ETHERIDGE [7] remark, the incidence of chest complications is largely determined by the state of the peritoneal cavity after operation. We know that the peritoneal cavity is usually sterile for about twelve hours after a perforation. The time of the previous meal, the presence of chunks of food, beer, and particularly the barium of an opaque meal—all these are factors influencing the prognosis which must be carefully weighed before deciding against operative treatment. Not enough has yet been heard of the use of penicillin in peritonitis to enable its value to be judged. If we are inclined to give credit to the sulphonamides for the very satisfactory Newcastle figures we must not forget that GILMOUR and SAINT's series was published in the days before sulphonamide therapy. TAYLOR's patients had neither sulphonamides nor penicillin. We know that the streptococcus is the usual infecting organism, and penicillin systemically administered does penetrate into the peritoneal cavity. This is a large cavity, so large doses of penicillin may be required. CRILE [8] has recently pointed out that in generalised peritonitis of appendicular origin, where there is a mixed infection, extremely large doses of penicillin are necessary; he has advocated 100,000 units every two hours for four to six days. Generalised peritonitis following perforation is an almost certainly fatal complication, and there is need for more work on this subject. TAYLOR has pointed to one way of preventing this disaster—turn the tap off, put the stomach-tube down, and give the peritoneum a reasonable chance of exercising its natural function of limiting infection.

Pilonidal Sinus

DURING the war pilonidal sinus proved, for so small and undignified a lesion, a remarkable waster of man-power. Thus, according to HOLMAN,[1] it cost the United States Navy 359,209 "sick days" in the two years 1942 and 1943. A peripatetic correspondent recalls that so striking was the tendency for riding in hard-seated vehicles to exacerbate the pilonidal sinus that it came to be familiarly called the "jeep disease." At first sight the treatment of a small discharging sinus or an apparent boil posterior to the anus seems a simple problem; but it is one which, from delayed healing or recurrence, has baffled the ingenuity of many surgeons.

The pilonidal sinus, or postanal dermoid, has hitherto been accepted as an infected embryological remnant. Two main theories of origin have been held—one that the sinus arises from imperfect separation of the hind end of the neural tube from the ectoderm, and the other that it is a sequestration dermoid formed during fusion of the ectoderm growing in towards the midline. There is proof that both these mechanisms do sometimes give rise to dermoids in this region, but Mr. PATEY and Professor SCARFF, elsewhere in this issue, challenge the view that all, or even most, pilonidal sinuses are of embryological origin. They have been struck by the number of excised specimens in which no epithelial lining can be detected, and by the rarity of sebaceous glands and even of hair follicles. They have found little difference in the histology of a primary and a recurrent sinus, and they think that most examples are acquired infective lesions, probably originating from puncture of the skin by a hair. This belief was strengthened by their encountering a pilonidal sinus in the hand of a barber and finding that puncture of the skin by hairs is by no means an uncommon cause of minor sepsis of the hand in barbers. The idea of a hair causing a puncture wound must be novel to many, but it seems to offer a reasonable explanation of pilonidal sinuses. Any puncture in an area so heavily infected, so humid, and so constantly subjected to friction and movement as the natal cleft, would tend not to heal.

Conflicting theories of ætiology seldom have an immediate practical impact on patients. What is distressing about pilonidal sinus is the extreme divergence of views on the best method of treatment, because it indicates that no method is really satisfactory. Every kind of operation has been tried, from mere evacuation of pus to wide ablation of the sinus and its surroundings. Most surgeons excise en bloc and suture the resulting wound, but some excise and leave healing to occur by granulation—a process tedious to both patient and doctor. Even among those who excise and suture, there is no unanimity on technique, as we may see from two recent papers from America, both reporting series of at least 100 cases. LARSEN [2] believes in wide excision of skin, no undercutting of skin edges, and approximation of fat and skin only, with as many layers of cotton sutures as can conveniently be inserted. LARKIN,[3] on the other hand, advises sparing excision of the skin and wide undermining of the flaps, and he approximates the wound edges with a single layer of wire sutures which pierce skin, fat, and sacrococcygeal fascia. LARKIN secures hæmostasis by catgut ligatures, LARSEN uses cotton, while HOLMAN stops bleeding by pressure, because he holds that the small tags of dead tissue caused by clamping and tying vessels are prejudicial to healing.

It seems as if results must depend, as in so many surgical procedures, on the man rather than the method. One can however state in general terms the present trends in the treatment of pilonidal sinus. First, radical operation should be deferred if the sinus is in a state of acute inflammation. When the latter has subsided the whole sinus must be excised so that the body starts its healing processes with an aseptic wound; and to achieve this it is not necessary to sacrifice much skin. The wound edges should usually be sutured, because healing by granulation takes a long time and often leaves a scar whose skin is ill adapted to sustain the chafe and pressure inherent in its position. Every effort must be made to prevent secondary infection: hæmostasis should be carefully secured with as few and as fine ligatures as possible, the dead space must be obliterated (for which purpose each surgeon must select

6. Bailey, H. Emergency Surgery, Bristol, 1943.
7. Mimpriss, T. W., Etheridge, F. G. *Brit. med. J.* 1944, ii, 466.
8. Crile, G. *Surg. Gynec. Obstet.* 1946, **83**, 150.

1. Holman, E. *Surg. Gynec. Obstet.* 1946, **83**, 94.
2. Larsen, B. B. *Ann. Surg.* 1946, **123**, 1090.
3. Larkin, L. C. *Surg. Gynec. Obstet.* 1946, **82**, 694.

for himself from a bewildering number of suture and dressing techniques the method he thinks will best avoid "tenting" of the skin), and the surface of the wound must be kept dry. Though penicillin can usefully be employed, local implantation of the sulphonamides, particularly the less soluble ones like sulphathiazole, is liable to increase exudation and thus do more harm than good. Finally, PATEY and SCARFF, following the implications of their hypothesis, suggest that preoperative epilation of the area by X rays is likely to prove an essential part of the treatment.

Annotations

WORLD MEDICAL ASSOCIATION

IF the World Medical Association, whose formation in London last week is reported elsewhere in this issue, is to fulfil the aims that are set before it, it will need world support. Its first purpose must therefore be to attract into full membership those countries which were not represented at the meeting or which, like the United States of America, were represented only by observers. Its second purpose may well be to become a live body, sharing actively in world health organisation. Last week the sentiment seemed to be against the association's concerning itself with scientific medicine, because, according to one delegate, each country has its own academies competent for this work. On the other hand, the resolution setting out the association's functions allowed for the exchange of information between the different countries. It might be best if this clause were liberally interpreted; for, as we have lately suggested (Sept. 7, p. 352), the complexity of modern medicine calls for the closest technical understanding between all countries. The association, if it shouldered the task of promoting the exchange of scientific information, and particularly information on research, might benefit not only world medicine but the professions in the constituent countries.

CARDIOVASCULAR CHANGES IN ANÆMIA

DESPITE the fundamental relation of anæmia to the cardiovascular system, published work has been mainly concerned with particular aspects of the question, or with rare or severe disorders. In 1939 Ellis and Faulkner [1] reviewed the effects of anæmia on the hearts of 47 patients, but these were of all ages, and, as the investigators themselves pointed out, degenerative cardiovascular changes in the elderly undoubtedly vitiated the results. In this country Alastair Hunter [2] has now made a similar study of 34 patients, excluding all those in whom factors other than anæmia were likely to influence the cardiovascular findings.

Dyspnœa, palpitation, and cardiac pain were noted in that order of frequency, all three symptoms being related to exercise and relieved by rest. Dyspnœa was never orthopnœic or paroxysmal. Anginal pain occurred in 8 patients, but only 2 had radiation to the arm or back, while 4 others had tightness of the chest. Hunter is sure that anæmia alone can cause cardiac pain, and he suggests that "in any woman under forty, without hypertension, and complaining of cardiac pain, the cause may be an unrecognised anæmia." Hypertensives were excluded; the average initial blood-pressure was 135 mm. Hg systolic, and 70 mm. Hg diastolic. Treatment was followed by a rise in both the systolic and, more especially, the diastolic pressures; in 3 patients the rise was considerable, amounting in 2 ultimately to hypertension. In 8 patients a third heart sound, classified as abnormal under Evans's recent scheme,[3] was heard. Systolic murmurs were present in 30 of the 34 patients; 9 had apical murmurs only, 20 had pulmonary, or pulmonary and aortic, and 1 had a pulmonary only. Of these, 2 had additional murmurs, early diastolic and presystolic respectively, which disappeared with treatment. Only 4 had no murmurs. No correlation could be demonstrated between murmurs and cardiac enlargement. Murmurs, although disappearing after treatment, did not do so with anything like the rapidity of the enlargement. Heart-size, which was assessed radiologically, was definitely increased in 12, and equivocally so in 6; size regressed with treatment in 11, improvement being maximal in the early weeks. There was no direct relation between enlargement and the severity of the anæmia, although the duration of the latter seemed a possible factor. Of 25 patients who had an electrocardiogram, 5 showed minor changes, 2 of these being gross; 2 of the 5 reverted to normal after treatment.

These are interesting findings, for the signs and symptoms described here have often in the past led to an erroneous diagnosis of heart-failure. The dyspnœa, palpitation, œdema, cardiac pain, and murmurs may all result directly from different qualitative changes in the blood. Cardiac enlargement, Hunter considers, is caused by a dynamic disorder of the circulation, although, with excessive physical demands or pre-existing cryptic cardiac disease, true failure may supervene. Sharpey-Schafer [4] has suggested that in severe chronic anæmia the raised venous pressure, which is a traditional sign of failure, may in reality represent the final phase in an undefined process of circulatory adjustment, directed towards maintaining the high cardiac output necessary for the adequate functioning of the defective blood. Hunter concludes that "enlargement of the heart in anæmia, accompanied as it sometimes is by a raised venous pressure, addition of the third heart sound, and inversion of the T-wave in the right pectoral electrocardiogram, is an expression of right heart preponderance which may progress to frank heart-failure with hepatic engorgement and œdema." Here is a fascinating field for investigation. The cause of the raised venous pressure requires elucidation, and the accurate methods of assessing venous pressure and cardiac output by cardiac catheterisation, which led to Sharpey-Schafer's observations, are likely to be used sooner or later in the investigation of uncomplicated anæmias in younger patients.

PALPABLE PEDAL PULSATIONS

THE study of the normal, which has been rapidly advanced by the mass medical examinations of the late war, has provided useful data that will be of value in the early recognition of disease. The latest addition to our knowledge is the finding that of 1014 healthy American soldiers, whose average age was 20 years and of whom over 90% were under 22, there were over 13% in whom the pulsation of the dorsalis pedis or posterior tibial artery was impalpable.[1] The dorsalis pedis pulsation was absent on the right in 11·4% and on the left in 13·6%. The posterior tibial pulsation was absent on the right in 2·9% and on the left in 2·7%. In only 5 men was pulsation absent in both arteries on the same side, but in 7·5% the dorsalis pedis pulsation was absent in both feet, while in 1·7% the posterior tibial pulsation was absent in both feet.

A curious incidental observation was that the posterior tibial pulsation was more commonly absent in the Negro, while the dorsalis pedis pulsation was more often absent in the white soldier. It was confirmed that when pulsa-

1. Ellis, L. B., Faulkner, J. M. *New Engl. J. Med.* 1939, **220**, 943.
2. Hunter, A. *Quart. J. Med.* 1946, **15**, 107.
3. Evans, W. *Brit. Heart J.* 1943, **5**, 205.
4. Sharpey-Schafer, E. P. *Clin. Sci.* 1944, **5**, 125.
1. Silverman, J. J. *Amer. Heart J.* 1946, **32**, 82.

tion was absent in one artery, the other artery in the same foot had an enhanced pulsation. This observation was first recorded in 1898, by Erb [2]; but pulsation was absent in only 3 of his 381 patients. Morrison [3] found that 19% of the 1000 people he investigated had absent pulsations; but most of his subjects were women, and there was a wide variation of ages. If 13 of every 1000 healthy young men have impalpable dorsalis pedis or posterior tibial pulsations, there is clearly need for caution in drawing conclusions from the absence of such pulsations in patients with suspected peripheral vascular disease.

INTENSIVE COURSE IN PSYCHOTHERAPY

AN interesting experiment on the teaching of psychotherapy to general practitioners is reported by Mr. Geddes Smith for the Commonwealth Fund.[1] A fortnight's course for 25 doctors was held at the University of Minnesota last April in an attempt, sponsored jointly by the university and the fund, to decide whether doctors can "be taught to practise in their own offices the kind of medicine psychoneurotic patients need." The course was conducted by psychiatrists with teaching experience, including four professors and two associate professors of psychiatry, as well as two consulting psychiatrists, two social workers, and an associate professor of medicine. A group of seven neuropsychiatrists helped with the clinical teaching, and the university provided the patients. Morning lectures followed by discussions laid the theoretical groundwork of the kind of medical care the students were to learn; afternoon seminars for the whole group were designed to give instruction in method; the students undertook supervised clinical work, and discussed it at small section meetings consisting of an instructor and five students; and films and special seminars were to be arranged as requested. In practice, the lectures and section meetings proved the best teaching agents, the large group seminars being less successful. The section meetings, with their informal give and take, allowed the students to hammer out the significance of clinical work case by case. The lectures covered such subjects as general orientation, patient-physician relationship, normal personality development, the meaning of a psychoneurosis and its diagnosis, anxiety, general principles of psychotherapy, common psychopathology, combat fatigue, and the care of veterans.

The students took the course hungrily, and "were so full of the subject that they spent hours at night talking with each other and with members of the teaching staff," and they much preferred this to evening seminars or films. Many of the cases seen were of long standing—patients who had had various kinds of medical and surgical treatment elsewhere, and who are all too common in the general practitioner's surgery: "it was an excellent sample of the persistently unwell." The purpose of the interview was thoroughly impressed on the students, this being not so much to get the facts as to find out the patient's attitude to the facts and to help him to tell his own story. They were asked to listen to the patient, to let him know he had undivided attention, and to talk with him for an hour instead of the customary fifteen minutes. The transference and counter-transference were explained; students soon grasped that a positive transference at the first interview gives the patient freedom and confidence, and is a good start for treatment. The instructor usually came in just before the end of the hour and brought out factors the student had missed, or made clear the significance of what the patient had already told him. At the end of the first day one student, speaking of the anorexia of a twelve-year-old said: "Well, then, you talk her into eating." The instructor answered: "You don't talk her into it; you let her talk herself out of the reasons for not doing it."

But in psychotherapy, while principles may be easy to grasp, management of cases can only be learnt by years of training and experience; in the second week the students had to be given some understanding of the possibilities and limitations of psychotherapy—to be shown, in fact, when to go forward with a case and when to leave it alone or seek help elsewhere. Moreover, they had to learn that they themselves were influenced by patients in ways of which they were not fully conscious; and that there were many cases in which they must be satisfied to help the patient to adjust himself to irreversible handicaps, without attempting to cure him. "The patient is a person needing help; the function of the doctor is not to play God, but to give help at any and all points where after thoughtful study he sees the way to do so. . . ."

The result, judged by written comments, was a new orientation of the students to their relationship with patients. Nearly all felt that they had gained help in their daily work. From the instructors' point of view it was clear that the present generation of general practitioners are not too old to learn the psychotherapy they have never been taught: the students at this course were both eager and quick to learn.

THE M.D.U.

IN an annual report of pre-war dimensions the Medical Defence Union gives an account of careful work on behalf not only of its members but of the public. In his presidential address at the annual meeting on Sept. 24, Mr. St. J. D. Buxton, F.R.C.S., reminded members that a joint coördinating committee, made up of representatives of the M.D.U., the London and Counties Medical Protection Society, and the Medical and Dental Defence Union of Scotland has been set up during the year to develop a common policy in matters of mutual interest. On the request of the M.D.U., the British Standards Institution set up a committee (on which the union was represented) to report on methods of preventing avoidable accidents associated with the use of gaseous anæsthetics. This committee have now reported, submitting a "Code of Practice" which should in time do away with all errors due to wrongly coupled leads, and misidentification of cylinders. Copies of this report will soon be available to any member who asks for it.

In answer to many inquiries from demobilised doctors about reinstatement, the union point out that the Act of 1944 provides that an employer must take a doctor back into his pre-war post if he applies for it within four weeks of demobilisation, and "if re-engagement is reasonable and practicable." This second requirement allows of shuffling, and the deliberate evasion of responsibility; moreover, if the post was honorary or only carried a token payment it does not come within the scope of the Act. Some governing bodies of voluntary hospitals have refused to reinstate returning specialists and consultants, on the grounds that they have now given the appointments to others. This attitude, though contrary to the spirit of the Act, unfortunately cannot be attacked on legal grounds. Doctors who held posts in municipal hospitals before the war have not encountered the same difficulty, partly because their appointments were paid and partly because the Act applies to municipal staff as a whole, as local authorities fully appreciate.

During the year the union has successfully prosecuted some unqualified practitioners who have used the titles of "physician," "surgeon," or "doctor" (usually preceded by some descriptive adjective), to which they have no claim. Members who know of unregistered

2. Erb, W. *Dtsch. Z. Nervenheilk.* 1898, **13**, 1.
3. Morrison, H. *New Engl. J. Med.* 1933, **208**, 438.

1. Psychotherapy in General Medicine: Report of an Experimental Postgraduate Course. The Commonwealth Fund. New York, 1946.

practitioners contravening the Act in this way are asked to inform the union.

Some of the cases dealt with during the year included questions of fees, certification, and alleged negligence. The report again impresses on doctors the importance of care in the coupling of anæsthetic cylinders, and the dangers of explosions in the theatre; and on surgeons the need for capable swab-counting, the importance of X-ray examination of bony injuries, and the duty which lies on them to establish the diagnosis to their own satisfaction: it is not wise to accept a colleague's opinion and to operate without confirming his findings. One member had found a commercial firm using a quotation from an article of his, published in the medical press, to support their advertisement for a certain form of electrical treatment. Permission to use his name had not been asked. The union protested to the advertisers who withdrew all the remaining pamphlets containing the advertisement and undertook to issue no more of the kind. Other examples of the union's work could be given, for the annual report makes instructive reading; but as Mr. Buxton pointed out, the existence of the M.D.U., telegraphic address "Damocles," should suffice to remind us that the path of the practitioner may be far from easy.

THE MAKINGS OF A MEDICAL SCHOOL

IN the hope that his findings might guide them in establishing a university medical school, the governors of the University of British Columbia asked Dr. C. E. Dolman, their professor of bacteriology and preventive medicine, to make a survey of medical education in Canada and the United States.[1]

Professor Dolman visited the 11 medical schools of Canada, and 22 leading medical schools in the U.S.A., talking with heads of departments, staff members, students, university presidents, deans, representatives of the Rockefeller Foundation, hospital directors, and any others who came his way. His list of requirements for a first-class medical school begins with a stable and flourishing parent university, a large body of good applicants from whom students can be selected, enough money, and a picked staff, of whom the heads of departments and some others are to be full-time. Teaching affiliations with local hospitals, he considers, should be made on terms satisfactory to the university; but there must also be a university hospital staffed entirely by the faculty of medicine. The school should be placed in the campus so that the students share the life and interests of their fellows working in other faculties; and the medical faculty must share its resources with the university, offering special courses to non-medical graduates, training students for medical ancillary services, and being fully responsible for a well-developed university health service.

He found, he says, plenty of evidence that a second-class university cannot hope to have better than a second-class medical school. Though fees for the medical course are nearly twice as high as for other courses given in the same university, they seldom meet more than a third, or in some schools a sixth, of the cost, and no university should contemplate founding this expensive form of school unless it has proper resources. Too big a teaching load on staff puts an end to the serious and sustained research which must be among the first duties of a medical school. A good staff, once appointed, must have proper apparatus for research, and such equipment quickly goes out of date: "hence no medical school ever seems to find its budget adequate." In the United States he found that the annual cost per student ranged from $600 to $3893; and he had no doubt that the student in the expensive schools got better teaching. Tutorials and seminars are better vehicles for teaching than didactic lectures, but are possible only when the ratio of instructors to students is high; and the atmosphere is more favourable to learning in a school where research is an honoured activity, not an intermittent and clandestine indulgence.

The best annual entry, Professor Dolman thinks, is round about 50 students a year. The Goodenough report, it will be remembered, suggested an entry of 100, which he would consider too high on the ground that if a class is much over 55 or 60 it has to be split into sections, and a disproportionate number of additional teachers must be provided. Good staff are as scarce in America as here. He notes that in the U.S.A. at least four chairs, and numerous assistant professorships, of anatomy are vacant, and that good pharmacologists are even harder to find than anatomists. Medically qualified men who go in for full-time teaching do it at a financial sacrifice, but even so he believes that "without plenty of money one cannot hope to get good men." He is also clear that it is not enough to appoint a single full-time man in a clinical department and leave him dependent for help on part-time workers and volunteers: the result of that is to push the head of the department into "the rôle of chore-boy."

In discussing the medical curriculum, Professor Dolman insists that preventive medicine must be better taught, but not to the point of displacing the doctor's traditional concern with the care of the sick. He notes the increasing popularity of joint conferences in which the anatomist, bacteriologist, biochemist, and pharmacologist take equal part with the physician and surgeon. In some of the best schools the department of psychiatry arranges lectures, demonstrations, and seminars, on normal psychology and on the psychological bases of abnormal behaviour, for students in their first and second years. The various departments must be closely interrelated, not only in the intellectual but in the physical sense; it is hard to coöperate fully over a gap of, say, six miles. He believes that every link possible should be forged between the medical school and the general practitioner, as well as with State health departments. Perhaps his most telling observation is that "the form and fame of a medical school is very largely determined by the character and ability of its first Dean."

1. Report to the board of governors of the University of British Columbia, May, 1946.

MEDICAL RESEARCH COUNCIL

THE Committee of Privy Council for Medical Research have appointed Group-Captain C. A. B. Wilcock, M.P., Dr. C. A. Lovatt Evans, F.R.S. (professor of physiology in the University of London), and Dr. R. A. Peters, F.R.S. (professor of biochemistry in the University of Oxford), to be members of the Medical Research Council.

RETIREMENT OF MR. F. W. MARTIN

WE who produce this journal have lost a valued colleague by the retirement on Sept. 26 of Mr. Martin, our head printer. He and his father, W. G. Martin, between them held this office for 56 years, and his father's association with THE LANCET began over 70 years ago. On July 4, 1893, Frederick William Martin was bound apprentice for seven years to Thomas Henry Wakley, F.R.C.S., and Thomas Wakley, jun., L.R.C.P., then proprietors of THE LANCET, to learn "the Art of Letter-Press Printing, which they use"; and until 1921 he worked at 423, Strand, where the typesetting was done above the editorial office. When 25 years ago the printing was transferred to Messrs. Hazell, Watson, and Viney, in Long Acre, Mr. Martin joined their staff but continued his close association with the editorial and managerial departments of the journal. Among us he had by far the longest experience of THE LANCET, and he did much to preserve its standards and transmit its tradition. The apprentice became himself a teacher and counsellor, and remains a friend.

Special Articles

CHILDREN IN DAY NURSERIES

WITH SPECIAL REFERENCE TO THE CHILD UNDER TWO YEARS OLD

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DURING the war there was a mushroom growth of nursery accommodation for children under five years of age. The Ministry of Labour and National Service pressed local authorities to establish nurseries as a means of encouraging mothers of young children to do full-time industrial work. Whether it was really wise to give mothers of young children this encouragement may be doubted (Menzies 1944).

By January, 1945, up to 1500 nurseries had been established with a maximum of 50 children per nursery. Since then about 200 have been closed. The latest estimates of the Ministry of Labour (as quoted in the *Times* of June 20, 1946) show that in the first ten months of peace nearly a million women left industry to return to their homes, and the number actually engaged in civil employment in April, 1946, was 5,420,000. The proportion of women therefore whose children were in nurseries during the war represented rather over 1% of the total number of women in industry, and as a result of closing 200 nurseries a maximum of 10,000 women may have left industry—again 1% of the total who ceased work. This disposes of the argument that the establishment of nurseries has had any appreciable effect on the labour situation.

The statement recently made in a propaganda leaflet, that the ability of women to remain in or re-enter industry "will depend largely on the speedy setting up of more nurseries and nursery schools," oversteps the bounds of justifiable emphasis which one expects to find in propaganda. A more reasonable argument is that nurseries have a contribution to make towards maternal and child welfare; but here again we should look at the facts in correct perspective against the background of general maternity and child-welfare services. The proportion of children under five years of age who were in nurseries during the war was only 2–3%; so the health of young children in general will not so far have been appreciably influenced by nursery provision.

The few nurseries in existence before the war were established for social reasons—to care for children whose mothers had to earn their living, or for those whose home circumstances were unsatisfactory. Curiously enough, there does not seem to be any published record of the progress of these children.

It is perhaps less surprising that the progress of children in war-time nurseries has not been recorded *; for the establishment and supervision of nurseries fell on depleted public-health staffs who had often Civil Defence duties besides their usual work. It seems important, however, that the progress of these children should be watched carefully, particularly if in the future there is to be any extension of nursery provision to make things easier for the tired mother.

Most mothers probably find their young children a trial at times, and those who have to care for one or more young children and run a house unaided have a tiring time; but how many of them will be prepared to secure their own relief unless they can be assured that their children will do equally well away from them? This factor operated even during the war, when there was a good deal of propaganda to induce mothers to go to work. In Leyton—which was not an area with much employment of married women before the war, and has a good standard of maternal care—when we set up two nurseries, for 50 children each, we had 48 withdrawals within one week, and another 36 within four weeks of admission. The majority who left within this time were considered by their mothers to be "fretting." Have we enough knowledge of the development of young children to tell these mothers they were wrong?

Since I have had an opportunity of examining the records of those children admitted before they were two years old who remained in the nurseries over three months, I think it is possible that those mothers who withdrew their children made a wise decision.

The rapid turnover of children in the nurseries is very striking; and, if experience in other nurseries has been similar, this may have been one reason which deterred medical officers from recording the progress of children. It also suggests that the nursery population is selected: the children of whom we have records are those who have stayed the course. In theory one would have expected that with certain exceptions—e.g., children withdrawn because of the mother's pregnancy—a child admitted to a war-time nursery would have remained there until he went to school. Yet in three and a half years in Leyton 368 children (occupying 100 nursery places) have been admitted and left, and of these only 60 (16%) have stayed until they went to school; 54 left within a week of admission, another 47 within a month, and 222 within six months. The obvious retort of the enthusiast will be that the fault is in the individual nurseries, and this may be suggested when my figures of progress of children under two years are read. But I shall be content if the critics record their own experience for comparison. From the remarks of the numerous visitors (official and otherwise) whom nurseries attract, the nurseries in Leyton seem to have been as good as the average, and a good deal better than many. The last inspector we had observed that as soon as she entered the door she could tell that the atmosphere of the nursery was good.

PROGRESS OF CHILDREN UNDER TWO YEARS OLD

Gain in weight is the most obvious tangible evidence of progress in the young child.

I have so far only tabulated the progress of children who were admitted to a nursery before they reached the age of two. This appears to be the most important group to study in the first place, because these children are not yet old enough to benefit from association with other children, and there are certain obvious risks—namely, fretting through separation from the mother, and infections.

GAINS IN WEIGHT

Age on admission (months)	Nursery	In 3 months		3–6 months		0–12 months	
		No. of children	Av. gain (lb.)	No. of children	Av. gain (lb.)	No. of children	Av. gain (lb.)
12–18	A	26	1·00	20	1·17	9	5·30
	B	32	1·40	24	1·34	16	5·12
18–24	A	15	1·49	10	1·08	3	4·29
	B	27	0·96	20	1·38	11	5·00

Of those admitted under two years old 76 left within three months, and it is therefore impossible to make any record of them.

In children under a year old the gain in weight is very definitely related to the month of life. The numbers in the nurseries at this age were not large enough to subdivide them; but, of 32 children who were admitted in their first year and stayed more than three months, 8 gained 0–8 oz. in weight in the first three months in the nursery, and another 7 gained 8–16 oz. An average

* Since this paper was written a report on the health of children in war-time day nurseries has been published in the *British Medical Journal*, August 17, p. 217.

gain of a child at this age, putting it at a low estimate, is 1 lb. a month.

The accompanying table shows the gain in weight in the first three months, in the second three months, and in the first twelve months of two groups in each nursery—those admitted when they were between twelve and eighteen months old, and those admitted when they were between eighteen months and two years old. Besides the average gain in weight in each group over the period stated, I have indicated the number of children in each group on which the gain in weight is calculated. It is obvious that the number who remained in the nurseries for a year or longer are a selected group, and the number in each age-group is too small to justify any definite conclusions. The average gain in weight of children between one and two years old may be considered to be 5–7 lb.; hence these gains appear to be at the lower limit of normality.

To take the average gain conceals the progress of individual children; but, of 58 children admitted at ages between twelve and eighteen months, 3 lost weight in the first three months, 9 gained 0–8 oz., and a further 9 gained less than 1 lb. Thus over a third made unsatisfactory progress in the first three months. In the second three months 2 children lost weight, 5 gained 0–8 oz., and 4 gained less than 1 lb. The total number of children here was 44; so a quarter made unsatisfactory progress in the second three months.

Of 42 children admitted aged between eighteen months and two years, 7 lost weight, 3 gained 0–8 oz., and 5 gained less than 1 lb. in their first three months in the nursery—i.e., in a third the gain was unsatisfactory. In the second three months out of 30 children 2 lost weight, 6 gained 0–8 oz., and 3 gained less than 1 lb.

As children in nurseries are in a favoured position as regards rations, compared with children whose mothers are looking after them at home, I regard the progress of these groups of children admitted under the age of two years as disappointing. It is reasonable to suppose that illnesses explained the poor gains to some extent, but this cannot be the whole explanation, because some children had as many as four infections and progressed satisfactorily, whereas others had no illness and yet did badly. Nor does it seem possible to foretell which child will do reasonably well and which will do badly. The fact that a child has had poor maternal care does not necessarily lead to its doing well when admitted to a nursery. Thus in a child aged between eighteen months and two years, with the note "care poor, verminous, went to residential nursery," there was a loss of weight of 15 oz. in the first three months in the nursery, and a gain of 15 oz. in the second three months. In that time the only illness was German measles. Another child, who was a removal into the district and whose mother appeared to have a low standard of care, gained 11 oz. in the first three months and lost 3 oz. in the second three months, again without having anything more serious than German measles. Of all our admissions we had only 1 child with chronic malnutrition from lack of food, and this child did well, gaining 3 lb. 12 oz. in the first three months, and 3 lb. 3 oz. in the second three months. Children whose general nutrition on admission was poor from no obvious cause did nothing spectacular.

In February, 1943, a warning was issued from the Ministry of Health to medical officers that nutrition in nurseries, particularly of children between one and two years of age, was in some areas less good than it should be. This was considered disturbing in view of the fact that nursery children got extra rations. It was evidently assumed that this poor nutrition in nursery children was due to some lack in nursery dietaries, for medical officers were advised to review the dietaries of the children, and extra iron was made available.

From the time the nurseries opened in Leyton in August, 1942, I had gone over the menus very carefully with the matrons. We had insisted on every child having cod-liver oil and fruit juice daily, and I had ordered a preparation of iron for those children who seemed to need it. I am not therefore prepared to agree that failure to gain weight adequately in the cases I have listed is due to anything so simple as lack of proper food. It seems more likely that it is due to emotional disturbance, and if this is so it is much more serious.

It is not unusual for a young child to take anything from a week to a month to settle. This period of adjustment to unknown people and surroundings may be characterised by continuous or intermittent crying, refusal to eat, refusal to sleep, or refusal to sit on a chamber without screaming. It is an unhappy time for all concerned.

Susan Isaacs (1932) mentions that emotional causes may affect weight gains in young children. Freud and Burlingham (1943), who made a detailed study of children in residential nurseries, found that in children from one to two years old the motor control was better in nurseries than in homes where freedom to move was restricted, but that the nursery child "is at a disadvantage wherever the emotional tie to the mother or to the family is the mainspring of development. Comparisons between children under these contrasting conditions serve to show that certain achievements such as speech and habit training are closely related to the child's emotions, even though this may not be apparent at first glance."

It is recognised now that too early and too strict habit-training in babies may lead to a relapse later on. Bowley (1942) says that bowel control should not be expected before the age of twenty-one months, and bladder control before that of twenty-four months. In our child-welfare clinics we advise the mothers on these lines and warn them of the dangers of overinsistence on cleanliness, but in nurseries it is inevitable that strenuous attempts at habit training should be made with the under-twos. "Potting time" is recognised in the nurseries as a time for squalls. The dangers of gastro-enteritis in young children have been brought back to us in recent years with the rise in the death-rate from gastro-enteritis in children under two years old, and this more obvious risk is bound to determine procedure in nurseries.

The social development of the child is tied up with his emotional development. So if this failure to gain weight adequately is evidence of an emotional hold up, the effect may be far-reaching.

INFECTIONS

At one nursery 54 children out of a total of 72 (admitted under the age of two years) who remained longer than three months in the nursery developed one or more infections. At the second nursery the proportion was 35 out of 60. The commonest infections were of the catarrhal type—measles, whooping-cough, German measles, bronchitis, and pneumonia, but scarlet fever, mumps, dysentery, jaundice, and chickenpox all occurred. Some children had as many as four infections, and of 60 children (including the admissions under the age of twelve months) who remained twelve months or more in the nurseries, only 7 escaped infection. I counted acute bronchitis only if it led to several weeks' absence from the nursery.

A preliminary study of infections in war-time day nurseries was made in Oxford from the Institute of Social Medicine (Allen-Williams 1945), and from the records analysed it appeared that children attending day nurseries were more liable to contract infections than were children living at home, and the infections occurred at an earlier age in the day-nursery population. The investigator discussed the likelihood of the infection-

rates being underestimated in both sets of records, and assumed that the nursery records would be more complete as the children were under daily skilled supervision. That might be a safe assumption so far as the Oxford records were concerned, but anyone who remembers the conditions in London war-time nurseries will agree that the matrons there had every excuse for not recording on the children's cards all their absences through illness. There was usually a shortage of staff, and, particularly from June, 1944, the children were in and out of air-raid shelters all day long. Careful recording was the last thing one could expect under such conditions.

EXPRESSIONS OF OPINION

Kershaw (1946) criticised the Oxford survey as being at the same time too scientific and not scientific enough, and in his criticism he betrayed a bias in favour of nursery provision, but he did not provide any facts to back his opinions. In his own words "We have tended to rely too much on general impressions often coloured by preconceived ideas."

Other expressions of opinion have been made recently.

"The scope of the evidence is admittedly limited, but so far as it goes it does not indicate a beneficial effect of nursery life for the younger children—rather the reverse. There was a general increase of respiratory infection, to a significant extent in some instances, but no constant or significant improvement in physical development as indicated by weight or the doctor's impression of general physique" (Medical Women's Federation 1946, in a report based on the records of 4587 children in 22 local-government areas).

"The advantages of a day nursery or nursery school are much greater (than a home help) for the child. A child needs training and discipline from the very beginning of its life, and this training can only be suitably given when there are facilities for mixing with other children. . . . The children are taught regular habits, are given well-balanced meals adequate in quantity and quality, and have proper periods of rest and sleep as well as of activity" (Paul 1946).

"The danger of infection was there but was just a thing to be overcome. Good nutrition was one safeguard. The social benefit of mixing of children was great and he doubted if the family was always the best place for their bringing up" (Roberts 1946).

"Day and residential nurseries have contributed a good deal to the improved knowledge and actual nutritional standard of children" (*Nutrition and Child Welfare* 1946).

I shall look forward to reading the investigations which would justify such opinions. I am not in a position to make any such definite statement, but as the result of studying the progress of children under two years old, admitted over a period of three and a half years to two war-time day nurseries in London, have come to certain conclusions.

CONCLUSIONS

Of children under two years old a substantial proportion do not make satisfactory progress on admission to a day nursery, as judged by their weight gains in three-monthly periods. This is in spite of the fact that over the period under review children in nurseries had available what amounted to almost double rations compared with children whose mothers cared for them at home, and that a very careful attempt was made to satisfy the dietary requirements of young children in the nurseries I have been supervising.

It is recognised by psychologists that emotional disturbance interferes with weight gains in young children; and, as it is obvious from their behaviour that these children do suffer an emotional upset on admission to a nursery, this may explain their failure to gain weight adequately. It is not necessarily possible to tell from their subsequent behaviour whether they are making satisfactory gains in weight.

Most of the children admitted under two years old who stayed in the nurseries developed one or more infections sooner or later. The extent of the infection-rate is less obvious owing to the practice of accepting on the register about 20% more children than there are places available in the nursery, but a recent epidemic of measles in one nursery reduced the attendance to 14.

In considering what proportion of children in these ages do or do not make satisfactory progress, and do or do not develop infections, account must be taken of the number who leave either because their mothers consider they are fretting or because they contracted an infection from the nursery. There is a tendency to forget about them. The mother does not attend mass meetings to describe the effect of the nursery on her child. She simply removes the child.

We require guidance from those best qualified to judge what is the earliest age at which a normal child may be removed from his mother, home, and familiar surroundings, and for how many hours a day, without the likelihood of experiencing emotional upset. As a corollary to this, at what age does the young child begin to benefit from mixing with other children?

The opinions expressed here are personal and are not intended to represent those of the borough of Leyton.

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INTERNATIONAL MEDICAL CONFERENCE IN LONDON

A CONFERENCE at which 21 European countries and 10 countries outside Europe were represented was held at the British Medical Association House in London on Sept. 25–27. The meeting was under the joint auspices of the Association Professionelle Internationale des Médecins and the British Medical Association, whose president, Sir Hugh Lett, was in the chair. Most of the national medical associations were represented by two delegates, and some of them by observers also; the American Medical Association was represented only by observers. Delegates from both the Palestine Arab and the Palestine Jewish Medical Associations were present.

Sir HUGH LETT, in welcoming the delegates, mentioned the interest of the B.M.A. in international coöperation, as testified by its recent allocation of money for sending medical lecturers to the Continent, and also by the forthcoming establishment of an abstracting service to cover all medical literature.

OBJECTS AND FUNCTIONS

On the motion of Dr. ALFRED COX (B.M.A.), seconded by Dr. P. MORAN (Irish Free State Medical Union), and supported by the Polish, Spanish, and Swedish delegates, it was unanimously agreed that an international organisation of medical associations should be set up. A long discussion on the objects of such a body centred largely on whether these should be limited to matters of medical practice and social medicine or extended to scientific coöperation. The Polish delegates wanted scientific medicine included, but this was resisted by the French, Belgian, Greek, and Dutch delegates, who pointed out that every country had its academies, and that the immediate need was for an organisation to defend the rights of the ordinary practitioner, especially in view of legislation passed or pending in many countries. Dr. T. C. ROUTLEY (Canada) suggested that the new

body might serve as the medical counterpart to the World Health Organisation recently established in New York. Without the help of the medical profession in the different countries, he said, the W.H.O. would be like an electric grid without power; no national governments could do anything with this new instrument unless the doctors in every country made it alive. What he desired was a world medical organisation to signify the unity of the world's doctors, knowing no geographical boundaries and concerned only to help mankind to attain the highest possible level of health.

A whole morning was spent in considering various formulas to express the objects of the world association. Ultimately the following was agreed to:

> "To promote closer ties among the national medical organisations and among the doctors of the world by personal contact and all other means available in order to assist all peoples of the world to attain the highest possible level of health; to study the professional problems which confront the profession; to organise an exchange of information on matters of interest to the profession; and to establish relations with, and to present the views of the medical profession to, the World Health Organisation and the United Nations Educational, Scientific, and Cultural Organisation."

The last phrase was arrived at after the rejection of a number of alternatives. Dr. P. CIBRIE (France) declared that in his country there was some suspicion of the W.H.O. and of UNESCO. Should these bodies assume bureaucratic functions, any agreement to coöperate with them would prove embarrassing. Dr. F. DECOURT, secretary of the A.P.I.M., spoke to the same effect. One of the reasons for the establishment of a world medical organisation, he said, was to defend medical practitioners' liberty, now menaced in several countries; to proclaim in advance that they were prepared to coöperate with these new official organisations would be unwise.

Dr. G. B. CHISHOLM, as an observer representing the World Health Organisation, said that under the W.H.O.'s constitution there would be no interference with the practice of medicine in any country. He quite understood the concern at possible regimentation of the profession; the interim commission which was now engaged in framing the constitution of the organisation was well aware of that concern. There would be no attempt to control the practice of medicine. On the contrary, the new organisation desired the advice of bodies which could speak for the medical profession; and it was ready to do all it could towards improving the health of the people.

NAME AND CONSTITUTION

Several delegates wished the name of the old body, the A.P.I.M., to be retained, but an amendment to this effect was defeated by 22 votes to 14. The suggestion that the name should be "World Federation of Medical Associations" was opposed by some countries, owing to the implications of the word "federation." Ultimately, on the proposal of Dr. I. C. MICHAELSON (Palestine Jewish Medical Association), seconded by Dr. J. A. PRIDHAM (B.M.A.), the title "World Medical Association" was agreed to.

It was also agreed that the members of the World Medical Association should be national medical associations. It was pointed out that in some countries more than one medical body could claim that rôle. Dr. CIBRIE, who said that in France there was only one representative body, the Confédération des Syndicats Médicaux Français, suggested that the criterion for admission might be that the membership must include half or more of the country's practising doctors.

It was agreed that the medical associations represented by delegates or observers at the conference should be eligible for membership, together with any other national or territorial medical association which was representative of the medical profession in its country or territory.

The subscription was fixed at half the rate for the A.P.I.M., the reduction being made in view of the straitened circumstances of several countries. Accordingly, the subscription will be 10 Swiss centimes per member of each national group, up to a total of 10,000 members; and 5 centimes per member above the first 10,000, with a maximum of 1500 Swiss francs.

It was also agreed, subject to consideration by the provisional committee which was to be set up, that each member-association should have two seats on the governing body or conference, and that voting should be by countries. This implies one country one vote, with exceptions, such as Palestine, where there are two medical associations representing different races.

A claim was made on behalf of the British Medical Students Association, which was represented by observers, that the medical faculty group of the International Union of Students should be admitted a member. This was opposed by the French and Belgian delegates, but the conference agreed to recommend to the committee that the two representatives should be admitted, but without voting power.

COMMITTEE AND SECRETARIAT

It was agreed to set up a provisional committee of nine, and to entrust to it the task of putting into French and English—the two official languages of the new body—a draft constitution and bylaws embodying the recommendations made by the conference. This will be submitted to the next conference, the first meeting of the World Medical Association, which, it was recommended, should be held in Paris, on a date to be decided by the committee.

The following were elected, by ballot, members of the committee:

Dr. F. Decourt (France), Dr. P. Glorieux (Belgium), Dr. Dag Knutson (Sweden), Dr. O. Leuch (Switzerland), Dr. J. A. Pridham (Great Britain), Dr. T. C. Routley (Canada), Prof. I. Shawki Bey (Egypt), Dr. L. Tornel (Spain), and Dr. A. Zahor (Czechoslovakia).

It was further agreed that there should be a dual secretariat, one secretary to be in London and the other in Paris. Dr. Charles Hill (secretary of the B.M.A.) and Dr. Cibrie were appointed to act in these capacities until the next conference.

Regarding the future programme, Dr. MICHAELSON suggested that the committee should obtain information as to the number of refugee doctors who are still not absorbed, and determine a general absorption rate sufficient to give employment to all refugees. The new association might act as a clearing-house for the resettlement of refugee doctors.

At the close of the conference, Sir HUGH LETT, replying to a vote of thanks, said that it had been a great privilege to preside. If only international coöperation could be secured between the medical men of different countries a big step would have been taken towards permanent peace. He wished to acknowledge the public spirit shown by Dr. Decourt and others in sustaining the old A.P.I.M. through difficult years and consenting to the new organisation taking the place of the old.

GOVERNMENT LUNCHEON

The delegates and observers were entertained by the Government to luncheon at the Dorchester Hotel, Mr. Aneurin Bevan, the Minister of Health, presiding. Mr. BEVAN expressed his appreciation of the initiative and imagination of the British Medical Association in summoning the conference. "There is no more important contribution that citizens can make towards universal appeasement than to meet each other as fellow craftsmen

and as members of the same profession." When politicians got together, friction of various kinds was likely to arise, but doctors in their assemblies "are not primarily concerned about who is going to do a thing, but that the thing is going to be done." It did not matter to the doctor whether the patient were black or white, brown or yellow, Communist or Fascist. "There is in medicine a catholic interest and dedication to the welfare of mankind, a concern for the individual, quite independently of his social group, his inheritance, origin, or destination. It is therefore of supreme importance that the organisation which has been born today should have a successful inauguration and be continually sustained by the enthusiasm of its founders and those who come after them." Dr. J. A. PRIDHAM and Dr. P. GLORIEUX replied.

The council of the British Medical Association also gave a dinner at which the presidents of the three Royal Colleges were present. On the last afternoon of their stay the delegates, at the invitation of Sir Alfred Webb-Johnson, paid a visit to Middlesex Hospital.

ROYAL COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS

MR. BEVAN'S LETTER ON MATERNITY SERVICES

AT a dinner held in London on Sept. 27 Lord WOOLTON, proposing The College, spoke of the distinction between being governed by public opinion—by the trust we have in one another—and being governed by edict and legislation. However high its own standards, the Government had perhaps something to learn in this connexion from the Royal Colleges, whose lack of specific powers made them all the more powerful. As a friend of Blair-Bell, founder of the college—"a great dynamic force constantly searching out new things"—Lord Woolton was glad to see that the dream had come true.

Recalling how, many years ago, he and his wife started one of the first maternity clinics, and the first antenatal clinic, in the North of England, Lord Woolton said that when he became Minister of Food he regarded it as an opportunity to do something to raise the standard of maternal and infant life, and in this he had been fortunate in having the help of Lord Horder and Sir Jack Drummond. By directing cod-liver oil, orange juice, and other supplements to pregnant and nursing mothers "I think we did something." No Minister could go ahead of the general sense of the public without being called an idealist, but as soon as he declared his policy of putting children first, Lord Woolton had ceased to get abusive letters about rationing: "the public thought I was right." There could be no wiser expenditure of public money than on preserving child life.

Mr. EARDLEY HOLLAND, responding as president, said that the college had grown rapidly in its 17 years and was hoping soon to receive a royal charter. Two-fifths of its existence had been in the difficult years of war, in which its members, unlike physicians and surgeons, had usually had to turn to different tasks. But the membership, which before the war was 580, was now 775. No less than a quarter of the fellows and a third of the members lived and worked in the Dominions, and the college was very proud of its Dominion fellows, many of whose departments were second to none in this country, and wanted them to have more part in its work. It was to hold an examination in Australia next year, and Sir William Fletcher Shaw, his predecessor as president, was even now on his way to Australia to make arrangements. Being still young, the college had still to work its way to fame by the quality of its work, and among the many subjects being discussed by its committees were population problems, human fertility, analgesia in childbirth, neonatal mortality, maternity hospitals, and the social and economic aspects of the maternity service. For the Royal Commission on Population it had undertaken a questionary of considerable difficulty, and in 1944 it had issued a memorandum on a National Maternity Service which already seemed to have influenced the planning of a service and the Government's Bill.

During the last few years, Mr. Holland continued, there had been a great change of outlook on obstetric practice. The "new obstetrics" must be practised on a broad national basis and was concerned with the social and economic factors. Obstetrics had, moreover, become a form of "precision practice" very different from the old. With blood-grouping, tests for rhesus factor, and radiological examination becoming matters of routine, and with new techniques against infection and shock, obstetrics had been completely transformed in the last ten years. As the techniques became more precise the standards of accomplishment must be raised among all who did midwifery—whether midwives, general practitioners, or specialists. This year the council had decided to double the period of training required of candidates for membership. While the college believed that the general practitioner should play a most important part in the maternity service, it maintained that only practitioners with postgraduate training or special experience should be considered capable of going to the aid of the midwife in difficulties.

The National Health Service Bill would become law in a very short time, after which "we shall have to get round a sort of peace conference table, but with more hope in our hearts than in Paris." In April, 1948, he felt sure, "we shall, like loyal citizens, carry out the will of the people and do our best to make the finest maternity service in the world." In time it should be possible to secure throughout the country an even distribution of those techniques now waiting to be used. The college's memorandum had laid emphasis on coördination between the various bodies which under the Bill would be responsible for the maternity service. The Minister had said that perfect coördination could be assured by administrative action, and in answer to a request for fuller information had sent him a letter which said:

> We have always envisaged that in staffing their antenatal clinics local authorities must enlist the coöperation of the regional board, and that this will be done by appointing one of the hospital obstetricians as officer in charge of each of the local antenatal clinics. This would enable the obstetrician to determine whether the mother will ultimately require admission to hospital (and to take the necessary steps accordingly) or whether she can be left to the care of the midwife, with the facilities of the hospital or the services of an obstetrician or experienced general practitioner always available in the background. This arrangement would ensure also that the social services of the local authority in the shape of the health visitors would be at the disposal of the obstetrician in the clinic, and similar service will of course be at his disposal by arrangement with the local authority in the hospital. But above all we must remember that the general practitioner is one of the chief coördinators of the service. He is the manager who produces for the benefit of his patient all the facilities which the National Health Service can offer. He will have contacts with all the working parties of the machine—the hospital, the clinic, the health centre, and the services of the local authority—and will personally know the men and women who staff them.
>
> We have still a good deal to do in planning out the precise details of the organisation, but these are the main lines along which it will be developed.

Royal colleges, said the president in conclusion, set the standards of specialist practice and therefore of all practice. "The college spirit in medicine is precious, is unique, and is peculiarly British, and its flame must never die down"; but the colleges must continue to make progress: their power and prestige now depended not on privileges but on cultural and even spiritual qualities. "Many of us believe that instead of working in complete isolation, like independent sovereign States, the colleges will come to work more and more closely together," and it was essential that they should achieve unity and harmony. It was essential too—though the day might be far distant—that they should come together geographically. His own college would in any case soon be forced to move house because in more ways than one it had grown out of the premises given it by its founder.

Mr. A. A. GEMMELL proposed The Guests, whom he included in the definition of the college as "a fraternity with a common purpose." Among those he mentioned was

Mr. Victor Bonney, admitted to the fellowship earlier in the day. Without going so far as to apply the parable of the lost sheep, Mr. Gemmell admitted that "there is more joy in our ranks because he has joined us than there would be over any other man."

Sir HUGH LETT, president of the British Medical Association, in reply, said that today no-one would be bold enough to put the question "is your college really necessary?" Before the college was founded the situation of surgery, medicine, and obstetrics recalled the old-fashioned bicycle in which there were two big wheels and a little one which ran behind without anybody noticing. In the last few years obstetrics and gynæcology had advanced so rapidly that it was essential to have a body like the college not only to lead developments but to speak with authority. Medicine was not only a great profession; it was the ideal profession: no other calling offered such opportunities for development and pursuit of the finest ideals. The ideals often met with disappointment in practice, but it had been well said that the joy of an ideal lies in its pursuit.

After touching on the risk of dividing medicine into specialties, which might lead the doctor to overlook the whole of the patient, Sir Hugh spoke of the danger that people in certain departments of medicine should regard themselves as the profession. It was of the greatest importance at this time that the profession should feel itself united and express its voice in such a way as to impress those in authority. Unity must be secured between the colleges themselves and between the colleges and other professional organisations. The work of the colleges was a special academic work, for which they were particularly fitted, but other things could be done only by such a body as the British Medical Association. One could not always be sure that the "will of the people" would bring about the good of the patient. Medicine should speak with one voice on what it believed to be in the best interests of the people as well as of the profession.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

THE University of Edinburgh is planning a considerable extension of its premises. For many years now the accommodation in the university buildings has been wholly inadequate, and in the period after the war of 1914–18 new departments were built on the south side of the city some distance away from the old university buildings and from the medical school. As a result the university was scattered rather widely over the city with a consequent loss of corporate sense and much inconvenience to all concerned. The present plan has been prepared for the university by Dr. Holden in consultation with Sir Patrick Abercrombie and Mr. Plumstead, the town planning officer for Edinburgh. Principal Sir John Fraser publicly described the plans some weeks ago and emphasised the urgency of beginning to put them into effect. The Edinburgh town council has now expressed its general approval, at least in principle, of the first stage of the development, and Sir John Falconer, the lord provost, has given the scheme for the formation of a university precinct his blessing.

It is intended that almost the whole area between the present old university buildings in the South Bridge at one end, and George Square and the Meadows at the other, should become a university area without interfering with the principal traffic routes which pass through this part of the city. The plan foresees the construction of teaching buildings on all sides of George Square with university hostel accommodation in Buccleuch Place and its neighbourhood. It is intended to develop the medical school by extending its buildings from the present New Quadrangle in Teviot Place backwards to include the north side of George Square. This will mean a great increase in accommodation for the various departments of the medical school. It is understood that the new building programme will not involve the abandonment of the buildings at West Mains Road, which are mainly occupied by departments of the faculty of science, but the arts and other faculties still accommodated in the old university buildings in South Bridge have been in a hopelessly cramped situation, and the provision of additional and better premises for these faculties is an urgent matter.

Public Health

Prospects in Industrial Medicine

A CONFERENCE held at Leeds last summer [1] reviewed the difficulty of giving medical care to people working in small factories—some 53% of the whole industrial population. Accidents and disease are commoner in these small factories, as Dr. C. G. Kirkland pointed out. He suggested that a mobile corps might be formed for factories, to take the doctor to the job. Dr. J. Vaughan Jones thought the care of people in these smaller factories could not be left to voluntary effort. In one or two places—at Bedford, and at Cray in Essex—small firms have grouped themselves together to provide medical care for workers, but such schemes he believes are not likely to become widespread: the interests of small firms are too diverse. He upheld the view of the Leeds joint council that industrial medicine should be a statutory service, regionally planned. The statutory principle was supported by nearly all the speakers. Many doctors felt that because they were paid by the firm they were at a disadvantage with workers, who suspected them of being "gaffer's" men, more interested in production than in the health of the producers.

Discussing the organisation of a statutory service, Dr. G. F. Keatinge said it would not do to put the responsibility of medical supervision on the existing examining surgeons, because they can only give a limited amount of time to the work; besides, their approach is personal instead of being environmental and occupational. He thought that a corps of specialists in industrial medicine should be formed, to be called occupational health officers. They would be the next link in the chain after the school medical officer, supervising conditions for the worker from his entry to industry to the end of his working life.

Many speakers noted that while the industrial medical officer can recommend alterations in working conditions, he has at present no authority to demand them. As a State servant he would be able to insist that workshops were maintained at the statutory level; though, as Dr. N. J. Cochran remarked, this might limit him, too: an intelligent doctor employed by the firm could suggest improvements beyond the statutory level.

It was generally agreed that industrial health research falls short in scope, speed, and operation.

The General Register Office

The branches of the office which were evacuated to Blackpool at the beginning of the war have now returned to Somerset House, London. The Registrar-General and a small staff remained at Somerset House throughout the war, but the general work of the office has been carried out at Blackpool. The records of births, deaths, and marriages were arranged and indexed there and then sent to Somerset House to be kept in the vaults. The whole of the office is now housed in London, except a part of the statistical branch and the whole of the Central National Registration Office which remain at Southport.

Infectious Disease in England and Wales

WEEK ENDED SEPT. 21

Notifications.—Smallpox, 0; scarlet fever, 853; whooping-cough, 1610; diphtheria, 240; paratyphoid, 17; typhoid, 13; measles (excluding rubella), 1208; pneumonia (primary or influenzal), 312; cerebrospinal fever, 36; poliomyelitis, 28; polio-encephalitis, 3; encephalitis lethargica, 1; dysentery, 66; puerperal pyrexia, 106; ophthalmia neonatorum, 69. No case of cholera, plague, or typhus was notified during the week.

Deaths.—In 126 great towns there were no deaths from scarlet fever, 1 (1) from an enteric fever, 1 (0) from measles, 6 (0) from whooping-cough, 3 (2) from diphtheria, 38 (3) from diarrhœa and enteritis under two years, and 5 (1) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 266 (corresponding to a rate of 30 per thousand total births), including 41 in London.

1. Industrial Medicine. Report of Conference held in Leeds on June 20, 1946, by the Leeds Joint Council on Industrial Medicine, the Burton-on-Trent Advisory Council on Industrial Medicine, and the Derby Advisory Council on Industrial Health.

In England Now

A Running Commentary by Peripatetic Correspondents

THE "squatters" have only recently burst on astonished newspaper readers. But the game is not new, as several hospitals can testify. One hospital urgently needed a large house and actively tried to obtain it. But the process of purchase and derequisitioning takes an amazingly long time and the house stood empty for months. So the homeless understandably assumed that since the war-time residents had long since gone, no-one was coming in; so in they went. How to get them out is another matter, but if the "usual channels" in Whitehall had not been so long, twisting, and clogged the trouble would never have arisen.

Another hospital, warned of its friend's dilemma and being itself endowed with the experience of many centuries, bought a house, and, since on the day it was derequisitioned the keys were not forthcoming, it applied padlocks to the outside of all the doors just to make sure. Thereafter it could set applications for licences in motion in a fairly secure frame of mind, and in the hope that its bombed-out nurses might some day find a resting place. But alas, that was too easy. The applications having gone the rounds for some two months and no answer having arrived, the premises had to remain unoccupied, and a new requisition order was issued by a different authority. And so the battle for derequisitioning started all over again. Meanwhile the nurses are thinking of doing a bit of squatting on their own account.

* * *

It was balm to me, as one of that ignorant class who learn most of their nutritional theory and practice from the daily press, to read in my evening paper the suave statement that "the reduction in the extraction-rate, nevertheless, will mean that bread will have a greater nutritional value, as the 5 per cent. reduction is equivalent to that amount less bran going into the bread." And, having read it, I was immediately in an awful state of mental conflict. Did not this contradict the assurances, so smoothly proffered, that previous increases were all for the good of our health and "nutrition"? Had I not read not so long ago an opinion of one of the Highest, that the (then) darker loaf was to contain more and more of five specified things and of a sixth class "some of them possibly not yet discovered"?

Well, I took the trouble to look it up, and I *had* read it all. I now suspect that these dizzy changes in our extraction-rate are but one voice in an elaborate counterpoint, grandly interpreted by the Public Relations Officer virtuoso on an instrument composed of "our medical and scientific advisers." I was pained to find how often I had meekly made a virtue of a necessity, gobbled up temporary surpluses, and skated round less temporary shortages. Of course I do not know whether the statement which set me inquiring was, or was not, part of an official hand-out. Perhaps it came from the Opposition. I hope it did; otherwise I could only say to the official spokesmen "Bah! Eat your words—they're so nutritious."

* * *

This complex modern life has given rise to an ever-increasing number of occupational diseases, and the participants in such a characteristically civilised activity as a world war have added their quota of martyrs to the inventive genius of mankind. For example, that vehicle of death, the jeep, has so often traumatised the posteriors of its hardy occupants and caused inflammation to arise in previously unsuspected pilonidal sinuses that the American Army Medical Corps has dubbed this complaint jeep disease.

But places and circumstances as well as machines have their own particular hazards. I well remember a winter spent in a much-bombed Italian market town, where there was, for some reason, a great dearth of manhole covers. This, combined with the black-out and a certain partiality for indulgence in the local "vino" on the part of our troops, made me familiar with a syndrome characteristic of the place. The essential features were a laceration of one supra-orbital region, occurring late at night in a somewhat alcoholic member of the Armed Forces. There was sometimes a concomitant abrasion of the shin, but this was usually trivial. Cases of this syndrome were seen at the rate of one a night on an average, and I was more annoyed than surprised when I was summoned from bed one winter night to yet another case. He appeared quite typical at first, except that the degree of alcoholisation was rather more profound than usual, and some difficulty was experienced in getting him to the theatre under his own steam. I was in the middle of my surgical procedure, conducted under local anæsthesia, when the patient announced with a great wail of distress that he had gone blind. I was taken aback by this and cursed myself for allowing my somnolence to make me omit even a cursory examination of the central nervous system; there had recently been a few cases of blindness among American troops in the neighbourhood who had drunk wine fortified by the natives of the place with methyl alcohol. Telling the patient not to worry I hastily completed my operation and proceeded to a more detailed examination. On inspection of the eyes it appeared to my relief that the cause of his ocular symptoms had been merely an alcoholic inability to open the eyes voluntarily. "Thank God, doctor," said the patient, with a cry of relief at his deliverance, "I can see quite all right now. You know, doctor," he added, "you're the most beautiful sight I've seen for ages." Even my wife hardly ever says that to me. But then she hardly ever touches alcohol.

* * *

In medieval times the view that disease in general, and plague and pestilence in particular, was a punishment for sin, was deep-rooted in the minds of men; and the gradual elimination of this vigorous superstition has been achieved slowly with the advance of medical knowledge and better understanding of the nature of disease. Through the accidental circumstances of their usual method of transmission, the venereal diseases, and these alone, still incur the judgment and condemnation of the stern moralist. Perhaps it is to the religious convictions of our forefathers, therefore, that part of the abnormal response to fear of these conditions must be attributed. The effects are variable and depend largely on mental balance and stability, but the apparently normal are not without their idiosyncrasies.

In better times, at this season of the year, it has been customary for our clinic to be invaded by workmen who render us acutely uncomfortable for a time, but leave us neat and shining with a coat of glossy paint. Sometimes they have expressed fears of contagion, but the rough and ready reassurance of our permanent staff has sufficed to calm these fears. This year we had to be content with a washdown of the walls and distemper on the ceilings. This year, too, the consternation of the workmen was exceptionally violent, and our technique of reassurance, spiced with ripe comment, failed to satisfy. The workmen were off their food, and the foreman's wife sternly forbade him the solace of the connubial bed until the danger was past. It was a bitter pill to us that we could not reassure them, and that our own year-long heroic defiance of the danger went for naught. Yet it had its advantages. It is long since men were seen to work so hard. The spirit and devotion of Dunkirk and D-day were born again, and wonders were wrought with almost incredible rapidity. It is hard to believe that sympathy with the foreman's predicament was the compelling factor, and the result must be attributed to a desire to restrict the period of danger. We are prepared, at a fee of course, to give advice to working parties on the proper application of the spirochætal spur and the gonococcal goad.

* * *

How quickly does fame depart! A recent examination of candidates for a postgraduate diploma in child health produced the favourite chronic arthritis child who is always a good topic for cross-examination—of the candidate. The usual gambit led up to the name of Still. The usual question as to who Still was produced the unexpected answer that he was an American. Lend-lease is all very well but this is going too far. It conjured up visions of George Frederic having an academic discussion with Andrew (somewhere in the shades) on the use of chiropraxis in the treatment of chronic arthritis in childhood. However, medical history is not a compulsory subject, so this candidate fared better than the one who remarked "If the W.R. excludes G.C., it's O.K." —surely the maximum of error combined with the maximum of irritation.

Letters to the Editor

MILITARY SERVICE FOR MEDICAL STUDENTS

SIR,—Your leader of Sept. 21 discusses alternative ways in which medical students may meet their obligation of military service. As you point out, the more useful and more convenient—namely, to serve after qualifying—will be impracticable for the next two years or so. May I then suggest another possibility which I believe would meet the present situation as well as future requirements?

Why not split up the whole term of military service for medical students into two independent periods? The prospective doctor could serve the first half of his term conveniently between school and university, thereby filling at least part of the interval that will elapse before he finds his place at a medical school. During this time he would have a general ordinary military training with the rank and file, though of course not a complete technical training in any of the specialised weapons and highly mechanised military craft which he does not require. Later, after qualification, he would complete his term of military service as a junior Service medical officer. This scheme proved its merits in Imperial Germany before, and with appropriate modifications during, the first world war.

Such a system would not only provide all the advantages and opportunities of the second alternative outlined in your leader but would also have some additional effects beneficial both to the doctor and to the fighting men under his care. (1) The medical student need not sacrifice too much of his precious time to purely military training but still has all the benefit a healthy young man can derive from military life. (2) During his shortened military training he acquires an intimate first-hand knowledge of the sort of job the soldier (or sailor or airman) has got to do. (3) If, as he should, he serves with the rank and file instead of with a selected group he gets to know something of the mentality of the ordinary man. This will stand him in good stead in civilian as well as military practice. (4) Last, but not least, he sees some of the methods and tricks used by comrades to evade duty. This knowledge will help him considerably as a doctor in assessing his patients' complaints.

Wolsingham, Co. Durham. E. G. W. HOFFSTAEDT.

A SYNDROME SIMULATING ACUTE ABDOMINAL DISEASE

SIR,—The letters following our paper of August 24 have suggested two possible explanations of the group of cases that we described—infective hepatitis and Bornholm disease.

Dr. Oram suggests that subicteric forms of infective hepatitis could have caused the syndrome. We agree that acute abdominal symptoms, rarely simulating surgical emergencies, may usher in the early stages. But at the time our wards contained many cases of obvious infective hepatitis, not one of which showed the syndrome described. It seems unlikely that subicteric cases would show more severe symptoms.

The question of Bornholm disease requires more careful consideration, and we admit that it might well have been included in the differential diagnosis. Neither of us has had experience of this disorder, which from the multiplicity of the symptoms described would appear to include a variety of pathological conditions. We are grateful to Dr. Evans for drawing our attention to Dr. Scadding's excellent article,[1] but our cases differ considerably from his, the symptoms being mostly abdominal while his were mainly thoracic. Pleural rub was absent in all our patients. We rejected an epidemic origin of our cases (perhaps wrongly) because they were unrelated, and because no minor varieties of the same syndrome were seen on the medical side of the hospital, as might have been expected in an epidemic. We are aware that a small percentage of cases of Bornholm disease may simulate abdominal emergencies, but nearly 100% of our cases presented with acute abdominal symptoms. The hypothesis that abortive staphylococcal retroperitoneal infection could be the cause of the syndrome was suggested to us because one of our cases developed a perinephric abscess. Dr. Evans objects to this hypothesis and says that one of his cases had a tuberculous apical abscess "but this does not make the rest tubercular." However, we stressed the perinephric abscess because it was possibly a significant lesion. It was capable of providing an explanation which we put forward quite humbly. At least it may stimulate inquiry, and should it be correct it will have rescued a series of cases from the dumping ground of varied conditions called Bornholm disease. Incidentally we wonder if Dr. Evans has noticed a letter from Dr. Cayley[2] on "The apparently acute abdomen in pulmonary tuberculosis."

B. W. GOLDSTONE,
Reading. H. S. LE MARQUAND.

1. Scadding, J. G. *Lancet*, 1946, i, 763.

MYTH AND MUMPSIMUS

SIR,—I regret that Dr. Forbes in his mention of lumber that should be thrown on the rubbish-heap did not include our antiquated Imperial system of weights and measures. I can recall the expectation fifty years ago that in the next *British Pharmacopœia* the metric system would be in sole use. What is the explanation of the retention of the older system? Is it a wise caution, or is it just pure thrawnness? It is not a mere question of nomenclature. A scientific system like the metric would tend to create a scientific outlook in its users.

Knock, Belfast. R. M. FRASER.

TUBERCULOUS ENDOMETRITIS AND STERILITY

SIR,—Your annotation of Sept. 7 says:

(1) "The association between sterility and tuberculous endometritis has been recognised only in the last few years. . . ."

(2) "His [Halbrecht's] conclusion that occult, subclinical tuberculous endometritis is one of the cardinal causes of sterility in general and of tubal occlusion in particular may have come as something of a shock to English workers. . . ."

(3) "It will be interesting to see whether, with further experience, similar reports appear in this country."

These statements require correction, not only in the interests of scientific accuracy but also because of the implication that the knowledge, to say nothing of original research, was new to "English workers." Only a few of the main facts can be dealt with here, but we should like to present a more accurate picture of the present-day knowledge of the relationship between tuberculous endometritis and sterility. A detailed account is, in fact, at present in the press, forming a portion of a paper being read by one of us (Sharman) at the Congress of the South African Medical Association this month. A study is made of 94 cases of tuberculous endometritis in a consecutive series of 1712 cases of primary sterility (5·5%)—this is the largest series ever recorded.

In 1943 one of us (Sutherland [1]), in a paper on Unsuspected Tuberculosis of the Endometrium, discussed at length the clinical aspects and pathology of the condition: the literature was fully reviewed. It was pointed out that the high incidence of sterility in endometrial tuberculosis was striking and that this causal factor had been stressed by Steinsick (1922),[2] Daniel (1925),[3] Halban and Seitz (1926),[4] and Vogt (1928).[5] The incidence was given as 7·2% in 212 patients (Steinsick), 7·0% in 71 patients (Schockaert and Ferin[6]), and 5·1% in 390 patients (Sharman). No relevant reference was found prior to 1922, not even in the excellent and exhaustive monograph by Norris in 1921.[7] In 1943 one of us (Sharman [8]) reported to the Royal Society of

2. Cayley, F. E. de W. *Brit. med. J.* Sept. 14, p. 403.

1. Sutherland, A. M. *J. Obstet. Gynæc.* 1943, **50**, 161.
2. Steinsick. Diss. Tübingen, 1922, quoted by Vogt (ref. 5).
3. Daniel, C. *Gynéc. et Obstét.* 1925, **11**, 161.
4. Halban, J., Seitz., L. Biologie und Pathologie des Weibes, 1926, vol. v, p. 367.
5. Vogt, E. *Z. Tuberk.* 1928, **51**, 114.
6. Schockaert, J. A., Ferin, J. *Bull. Soc. roy. belge Gynéc. Obstét.* 1939, **15**, 407.
7. Norris, C. C. Gynecological and Obstetrical Tuberculosis, New York, 1921.
8. Sharman, A. *Proc. R. Soc. Med.* 1943, **37**, 67; *J. Obstet. Gynæc.* 1944, **51**, 85.

Medicine a series of 840 cases of primary sterility, of which 42 (5%) showed endometrial tuberculosis.

One of us (Sutherland [1]) has pointed out that it is fairly easy to understand why this high incidence of endometrial tuberculosis in cases of sterility has not been more generally recognised.

(*a*) Routine histological examination of the endometrium was often omitted in the past, but in recent years has been carried out more generally in order to obtain evidence of ovulation.

(*b*) The isolated and infrequent lesions of one type of endometrial tuberculosis are easily overlooked as they are small and scanty. With increasing experience one's visual acuity for the lesions is correspondingly increased, but in many cases they are found only after diligent search.

(*c*) Even when the lesions are seen, their tuberculous nature is often not obvious to the observer with an inadequate background of general pathology.

(*d*) It is possible that the increasing incidence of tuberculosis in general may also apply to tuberculosis of the endometrium.

The prognosis in the subclinical type is good from the point of view of the patient's general health: systemic extension is uncommon. But the fertility prognosis is well-nigh hopeless, not one of our 64 cases, followed up for more than a year, having become pregnant. This is not entirely due to tubal occlusion caused by tubal tuberculosis, since, although every case of endometrial infection has an associated tubal one, complete occlusion has been found only in 62% of cases of endometrial tuberculosis.

A large amount of work on this interesting subject may be synopsised as follows: (1) careful study of endometrium in cases of primary sterility will show unsuspected endometrial tuberculosis in a minimum of 5·5% of cases; and (2) tubal occlusion, in the absence of palpable adnexal swellings, is due to tubal tuberculosis in a large proportion of cases.

Royal Samaritan Hospital for Women, Glasgow. ALBERT SHARMAN. ARTHUR M. SUTHERLAND.

NEW WORDS ABOUT OLD AGE

SIR,—Dr. Vertue is perfectly correct when he states that there is no word *geria* in Greek. But there is a word *geras*, the common word for old age, the stem being *ger(a)*, the root being *g(e)r*, from which comes also *graus*, an old woman. The *-ia-* in the middle of the word belongs, of course, to the second part of it, not to *ger*— as indeed Dr. Vertue recognises in forming "gerontiatrics." Why the newly named science should be exclusively applied to men is not clear; after all, old women preponderate. *Geron* never means "an old person," always "old man," "elder," "senator"; so it would be as logical to use *graus* for the word and talk of "griatrics." However, for the sake of euphony and neatness, "geriatrics" is preferable; it is justified by derivation, and is indeed the only word properly to be applied (the sole alternative being the harsh "geroiatrics").

Edinburgh. GORDON IRVINE.

PENICILLIN IN WOUND EXUDATES

SIR,—The results of the brilliant piece of research by Lady Florey and her colleagues (Sept. 21, p. 405) will no doubt stimulate other workers to produce the ideal medium for prolonged local application to wounds. That this has exercised the minds of military surgeons for some time can be gleaned by the perusal of the 21 Army Group publication, *Penicillin Therapy and Control*. One extract on pp. 114–115 reads:

"Deep Wounds with or without bone involvement.—Plugs should not be used, as during a battle when hurried evacuations occur the plug may not be removed for several days. Then granulations grow into the meshes and removal is difficult, and this is still more likely to happen in open fractures if the jagged bone ends become entangled. It is suggested plugs of penicillin wax might be used by those who feel they are indicated. These would cancel themselves out in transit and supply a prolonged local application of penicillin."

B.L.A. SURGEON.

ARSENICAL CHICKENPOX

SIR,—I can add another case to those described by Dr. Parkes Weber (Sept. 14) in which a patient who suffered from herpes zoster while having arsenical treatment apparently infected a child with varicella.

In 1932 a patient in hospital suffering from tabes dorsalis had two or three injections of neoarsphenamine and then developed herpes zoster of the ophthalmic division of the right trigeminal nerve. About a fortnight later another patient in the same ward developed a zoster eruption involving two or three dorsal segments, and a boy, aged ten years, developed a mild attack of chickenpox. The boy, who had an internal hydrocephalus, died a few days later, and at necropsy was found to have a congenital septum of the aqueduct of Sylvius. It may be contended that the arsenical treatment and the attack of herpes zoster in the first patient were not related, but it is by the accumulation of such happenings that it may be possible to establish a more precise relationship between arsenical treatment, herpes zoster, and varicella.

Harrogate. T. G. REAH.

DESOXYCORTONE AND ARTHRITIS

SIR,—Dr. Harrison has drawn my attention to Dr. Jennings's letter in your issue of Sept. 7. Despite Dr. Harrison's generous acknowledgment of my help (August 10, p. 215), my advice before the publication of his paper of June 1 (p. 815) was limited to explaining how to apply the chi-squared test to the facts as presented in table I of that article. The figures given in that table do not alone provide sufficient evidence to establish the hypothesis that adrenalectomy and thyroidectomy increase the rat's prospects of developing arthritis. I advised Dr. Harrison in this sense in September, 1945.

Dr. Harrison next consulted me in August, 1946. He sought advice in replying to Dr. Jennings's letter in the *Lancet* of July 20, in which Dr. Jennings suggested that there were fallacies in the statistical technique which Dr. Harrison had applied to the facts as presented in his table I. With my help, Dr. Harrison replied to these suggestions in his letter of August 10.

Dr. Jennings's remarks of Sept. 7 are therefore inappropriate. In this case, the "expert behind the scenes" neither "bullied" nor "threatened with specialised profundities," but gave advice on the interpretation of the facts as given in table I. He did not "really collaborate" because he was not invited to do so: he first heard of Dr. Harrison's paper in the *Lancet* after it had been published.

Dr. Jennings may argue that Dr. Harrison should have asked a statistical expert to go through both his paper and that of Professor Selye line by line with him, before he appeared in print: but he surely would not wish the expert to "bully" Dr. Harrison into doing this. I agree with Dr. Jennings that scientists would profit by asking fuller collaboration from statistical experts in the experimental as well as the statistical aspects of their work. Such collaboration is being developed at Oxford, and the understanding, now gradually growing, between scientists and statisticians will no doubt be advanced by Dr. Jennings's Pickwickian and (if I may return his compliment) Jabberwockian correspondence.

Dr. Jennings asserts that Dr. Harrison was claiming "statistical proof of his rightness." Actually, Dr. Harrison merely claimed that the facts as stated in his table I were not sufficient in themselves to establish Selye's hypothesis: he did not claim that they proved Selye's hypothesis wrong. Dr. Jennings points out that Professor Selye quoted evidence additional to that given in table I, and that, when this evidence is taken into account as well, he can disprove Dr. Harrison's hypothesis and establish that of Professor Selye. In particular, Dr. Jennings refers to information about rats which died during the experiment. This may be a point of substance, but as Dr. Jennings has not provided the details of his statistical proof it is not possible to pass judgment on its validity.

In a controversy of this kind, the statistician's aim should be to assist in a correct interpretation of the evidence. If Dr. Jennings and Dr. Harrison would produce a precise formulation of the evidence, stating in particular which of the dead rats had developed

arthritis, and if Dr. Jennings then set out his proof from that evidence that Dr. Harrison's hypothesis about rats was wrong and Professor Selye's hypothesis was correct, then the statistical experts should be able to pass impartial judgment supporting (or discrediting) his proof.

I heartily endorse Dr. Jennings's plea that medicine should keep in touch with statistics and vice versa: although since the statistician should also cover biology, astronomy, agriculture, psychology, economics, and the other social sciences, he must confine himself to their statistical aspects.

Institute of Statistics, University of Oxford. D. G. CHAMPERNOWNE.

TUBERCULOUS ABSCESS FOLLOWING INTRAMUSCULAR PENICILLIN

SIR,—In their article of Sept. 14 (p. 379) Mr. Ebrill and Dr. Elek say they were unable to find the source of the infection, though it was probably exogenous. In most penicillin drip set-ups there is a weak point that I have often tried to get rectified, but I have always met with the objection that the drip will stop flowing if my advice is followed. The weak point is the air-intake, which should be guarded with a cotton-wool filter to exclude organisms; without the filter a pint of solution is gradually replaced by a pint of bacteria-laden air from the ward. I do not suggest that a filter was omitted on this occasion; what often happens is that someone removes the cotton-wool from the filter for "practical" reasons.

Tubercle bacilli are not uncommon in the dust of hospital wards. It is not surprising that abscesses form at the site of injection; the surprising thing—a testimonial to the vis medicatrix naturæ—is that there are so few of them.

Epping, Essex. FRANK MARSH.

DEATH AFTER CURARE

SIR,—In your annotation of Sept. 21 you report that the pathologist considered that the death of a patient after an operation was due to toxæmia and had been accelerated by respiratory failure due to curare. The effect of curare wears off rapidly and I do not believe that it causes respiratory depression 43 minutes after administration. The patient was 70 years of age and the anæsthetic used was 'Pentothal.' It is my experience that a high proportion of elderly patients tolerate intravenous barbiturates extremely badly and that delayed recovery after intravenous anæsthesia is common among patients of any age. I know of two elderly men who never recovered consciousness after being given this anæsthetic for the performance of emergency suprapubic cystotomy. We have all seen the young healthy adult who took a very long time to wake up.

Pentothal is a drug which should be used with the greatest caution, and it is unfortunate that so many practitioners have been encouraged to administer an intravenous anæsthetic when some inhalation technique could be used. In this country we are too ready to publish our successes and too reluctant to report our fatalities. If one studies the American journals one can obtain a more accurate appreciation of the dangers of "modern anæsthesia," which I do not find to be as safe or satisfactory as ether. As Flagg rightly says, "Far too many anæsthetists have tried too often to avoid the use of ether anæsthesia, and the skill with which it might be used is not so much in evidence today as it might be." If our medical students and newly qualified practitioners were taught to understand the value and wide range of usefulness of ether we should read of far fewer deaths under anæsthesia being inquired into by the coroners' courts.

All that is modern and new is not progressive, and we might well ponder on the fact that when ether and chloroform were used almost exclusively in England the number of deaths associated with anæsthesia reported to the coroner in one year was 347, whereas in 1941 it was 835. This in spite of the fact that far greater surgical risks were accepted in those days, and that restorative measures were not very satisfactory. We also no longer see the neglected abdominal emergency, once a common cause of operating-room deaths.

I cannot help feeling that in the case you mention the cause of death was the pentothal rather than the curare. Curare may be a highly dangerous drug—we do not yet know—but do not let us blame it for the offences of another drug.

New Barnet, Herts. JOHN ELAM.

SIR,—Your annotation of Sept. 21 on the death of a patient following an operation during which curare had been administered was marred for me by the fact that it did not contain the information, which cannot be too widely spread, that in physostigmine (eserine) or 'Prostigmin' we have an antidote for curare. 'Coramine' or 'Veritol' are of no value for counteracting this substance. No anæsthetist should administer curare unless he has readily available an injection of eserine (1 mg.) or prostigmin (2·5 mg.).

JAS. D. P. GRAHAM.

Dept. of Materia Medica, Glasgow University.

AMŒBOMA AND CARCINOMA

SIR,—Mr. M. J. Smyth's article of Sept. 14 is of particular value in drawing attention to a subject which is not familiar to those who have been denied the opportunities of tropical practice. From time to time examples of amœboma of the rectum will occur in this country, and only careful differential diagnosis will prevent surgical disasters.

Amœboma of the rectum is one of the rarer forms of intestinal amœbiasis, and even in tropical countries no one surgeon is likely to see many examples. It may present as an ulcer or as a papilliferous overgrowth, and in either form may appear indistinguishable from carcinoma. The diagnosis, however, will rarely present much difficulty to those who follow Mr. Smyth's advice—that any tumour of the colon or rectum discovered in a patient who has served in the East should be regarded as amœboma rather than carcinoma until thorough pathological examination has proved otherwise. This should apply to all patients who have at any time been exposed to amœbic dysentery, whether they give a history of dysentery or not, and even if they have been discharged as cured of this disease, so noted for its tendency to relapse.

Repeated examination of the stools and of scrapings from the surface of an amœboma may fail to disclose the *Entamœba histolytica*. On the other hand, as Mr. Smyth reminds us, the presence of the *E. histolytica* does not exclude carcinoma. Fortunately in emetine we have a valuable aid to diagnosis. Whether *E. histolytica* has been found or not, before resorting to operation a course of this drug should be given, its effect being checked by repeated sigmoidoscopy. As a general rule the amœboma very rapidly responds, but only a complete resolution can be accepted as proof that the lesion is amœbic. If this is not obtained biopsy must be done.

During four years' military service in endemic areas, I saw six examples of amœboma of the rectum which simulated carcinoma. Five of these resolved completely on medical treatment alone. The sixth patient was admitted as an advanced case of carcinoma of the rectum, and the clinical condition was consistent with this diagnosis. When repeated examination of the stools and of the discharge from the surface of the tumour proved negative, colostomy was proposed; but a proctoscopic examination made on the operation table produced a specimen containing many typical *E. histolytica* and operation was therefore postponed. Emetine was given but the patient died within a few days. Post-mortem examination revealed how futile a colostomy would have proved, for the whole length of the colon was involved in a diffuse amœbic ulceration. These cases are reported in *Surgery, Gynecology and Obstetrics* (1945, 81, 387) and the *Liverpool Medico-chirurgical Journal* (in the press).

It would be unfortunate if Mr. Smyth's statement "I have no doubt that in amœboma of the rectum colostomy is helpful rather than otherwise" were to encourage the frequent performance of this operation. Whereas in the vast majority of cases of rectal amœboma medical measures result in a rapid and complete disappearance of the lesion, colostomy exposes the patient

to the risk of spreading amœbic infection of the wound and to serious hepatic complications. In rectal amœbiasis infection of the cæcum and proximal colon must be assumed even in the absence of clinical signs, and intestinal obstruction of a type which requires a colostomy so urgently that emetine cannot first be given a trial must be very uncommon. Colostomy may of course be needed in the rare event of failure to respond to amœbicides, or when dealing with complications such as intractable fistula.

Liverpool. PHILIP HAWE.

SIGN OF SUBMERGED GOITRE

SIR,—There is a useful sign given by a submerged or intrathoracic goitre which I have employed and taught for many years. It consists in getting the patient to elevate both arms until they touch the sides of the head; after a moment or so, congestion of the face, some cyanosis, and lastly distress become apparent—presumably from narrowing of the thoracic inlet and obstruction of the venous return. I have not seen it in superior mediastinal block.

Doubtless the sign has been described before and even bears a name, but I am unaware of it.

Liverpool. H. S. PEMBERTON.

HOSPITAL PHOTOGRAPHIC DEPARTMENT

SIR,—To your issue of August 31 Dr. Hansell and Dr. Stanford contribute most interesting articles on medical photography. Both see the necessity of adequate apparatus and premises, but their ideas on personnel (especially Dr. Stanford's) seem extremely wasteful. Why should a request for a photograph be so vague as to need a qualified medical man to interpret it? Surely those who request are the ones to be taught to know what they want and to appreciate its uses.

How often are photographs praised merely for their detail without regard to whether they show off the condition; or requests made at absurdly short notice for theatre work, showing only too clearly the general ignorance of the hospital of how to get the best out of its photographic department.

The time has come when medical photography should be a subject in our medical schools, clinical photography being on an equality with radiology. Then we will not need to waste doctors by putting them in photographic departments as elaborate buffers to the ignorance of their brothers on the staff. A photographer with really wide experience is essential, and once he or she has a certain amount of medical knowledge, the doctor who has "joined his hobby to his profession" becomes an extravagant and unwanted figurehead.

No photographer, if he is wisely chosen, needs a nurse's training to treat his patients with kindness and consideration.

SYLVIA TREADGOLD
Photographer-in-charge.

Photographic Dept., Guy's Hospital, London, S.E.1.

CHRISTIAN SCIENCE

SIR,—The Chadwick lecture published in your issue of Sept. 21 (p. 427) contains a reference to Christian Science which I should like to correct.

Christian Scientists do not regard disease or other ills as merely imaginary. Christian Science teaches that sickness and disease, and other ills, are phases of the belief in an existence apart from God. It further teaches that these evils can be overcome, not by ignoring them, but by correcting them intelligently by means of a right understanding of God and man and their relationship to one another.

This question is fully developed in the Christian Science textbook, *Science and Health with Key to the Scriptures*, by Mary Baker Eddy, the Discoverer and Founder of Christian Science, and on p. 460 the attitude of Christian Science to "the ills of the flesh" is briefly stated as follows: "Sickness is neither imaginary nor unreal,—that is, to the frightened, false sense of the patient. Sickness is more than fancy; it is solid conviction. It is therefore to be dealt with through right apprehension of the truth of being."

COLIN R. EDDISON.

Christian Science Committee on Publication,
Donington House, Norfolk Street, London, W.C.2.

Obituary

THOMAS WATTS EDEN

M.D. EDIN., F.R.C.P., F.R.C.O.G.

Dr. Watts Eden, who died at Torbay on Sept. 22, was consulting obstetric physician to Charing Cross Hospital, and consulting surgeon to Queen Charlotte's Hospital and the Chelsea Hospital for Women. A former editor of the *Journal of Obstetrics and Gynæcology of the British Empire*, he continued his association with the journal as chairman of the editorial committee and the board of directors.

Born in 1863, the son of Alfred Thomas Eden, of Evesham, he was educated privately and at the University of Edinburgh, where he graduated M.B. in 1888. Of his student days Sir Ewen Maclean writes: "I first met Watts Eden in connexion with the Drummond movement, which was inspired by the simple religious addresses given by Prof. Henry Drummond to his students in Glasgow. In this as in many other directions when effective speaking was required Eden's superb diction and delivery were in great demand. Though he was a year in front of me in the Edinburgh curriculum we contrived to room together, and I could not but envy as well as admire the apparent ease with which he assimilated notes and relevant parts of textbooks, gained medals galore, graduated with first-class honours, and was awarded the much-coveted Ettles scholarship. But despite his brilliant achievements and ability there was no aloofness about him, and in Edinburgh as later in London he made many warm friends."

[Press Portrait Bureau

After postgraduate years spent in Berlin, Leipzig, and Birmingham, Watts Eden came to London and joined the staff of the Chelsea Women's Hospital, where his colleagues included Fairbairn, Comyns Berkeley, and Victor Bonney. "I became acquainted with him," writes Mr. Bonney, "in 1898 when I went to Chelsea Hospital for Women as resident surgical officer. He had been attached to that institution, in a minor capacity, for a short time before the debacle which led to its reorganisation in 1894, and when the new staff was formed he was appointed assistant physician, a title subsequently changed to surgeon. He had already made a name for himself by a paper on the structure of the placenta which attracted much attention, and I remember him as a sparely made young man, somewhat sallow of complexion, with a kindly smile and a deliberate, though incisive, manner of speech.

"He formed one of that small band of surgeons, now alas all departed but one, who, by their devoted and earnest work, raised the reputation of the hospital from the zero to which it had fallen to the highest level of professional estimation, and with them he played a great part in putting abdominopelvic surgery on a sure foundation.

"His own reputation steadily grew. He became a member of the staff of Queen Charlotte's Hospital, and by the time that I went there as a resident officer he and William Gow stood head and shoulders above the rest of their colleagues."

In 1898 he was appointed to the staff of Charing Cross Hospital, where his gifts of clear thinking, writing, and expression quickly won him recognition as a great teacher. To this period belong his manuals of midwifery and obstetrics which have run into many editions, and later in collaboration with Dr. Lockyer he published *Gynæcology for Students and Practitioners*. Outside his own hospital he found time to examine for the universities of Oxford, Cambridge, Edinburgh, and Leeds, to serve on the council of the Royal College of Physicians of London, and to sit on the governing body of the British Postgraduate Medical School. During the first world war he held the rank of major in the R.A.M.C., and our

portrait shows him at this period. In 1930 he was elected president of the Royal Society of Medicine and his American colleagues made him an honorary member of the American Gynecological Society. He interpreted the responsibilities of his specialty widely, and in his Lloyd Roberts lecture at St. Mary's Hospital, Manchester, in 1925, and in an address to the Oxford Medical Society in 1931, he put the case for the unborn child, urging his colleagues to beware of regarding the infant as the by-product of the confinement.

A member of the joint council of midwifery appointed by the National Birthday Trust, he was chairman of the committee which in 1935 presented a scheme for an organised national midwifery service designed to raise the status of the midwife, and even after his retirement he continued to take an active interest in the Midwives Guild of St. Breca. "It was my good fortune," writes Dr. Cuthbert Lockyer, "to be Dr. Eden's junior colleague at Charing Cross for many years, and during that time I learned to esteem and respect him. Although never robust, his industry was remarkable and even in retirement at Thurlestone he gave unselfishly of his strength in the promotion of the welfare of the Royal College of Obstetricians and Gynæcologists, of which he had been an active and influential founder. With his many interests he would spend whole weeks in London attending as many as 15–20 committee meetings before returning spent to his country home. Our coöperation in clinical work was uniformly harmonious, our collaboration in writing was a labour of love, and our friendship has been up to the last close and intimate."

In Mr. Bonney's words, "A long life filled with honourable work has come to an end, and viewing it as a whole certain great qualities of the man stand out clearly: a steady level-headedness, a wide humanity, an unassailable integrity, and a great dignity. These are the things which, beyond all else, procured him the respect and affection of those who worked with him, and the specialty, which he made it his life's work to serve, grieves at his passing, for he kept its flag flying very high."

In 1900 Dr. Eden married Miss May Bain, of Cockermouth, who survives him.

FRANK McCALLUM

M.B. MELB., D.P.H., D.T.M. & H.

THE death is announced of Dr. Frank McCallum, who just over a year ago was appointed director-general of health for the Commonwealth of Australia. Son of the late Rev. Alexander McCallum, D.D., of Melbourne, he was educated at Wesley College and Melbourne University. At the outbreak of war in 1914 he joined the A.A.M.C. at once, only interrupting his service to graduate M.B. in 1917. After holding a house-appointment at Cardiff Royal Infirmary, he returned to Australia in 1920 to take his D.P.H. at Melbourne and to join the Commonwealth quarantine service. During 1922 and 1923, with a Rockefeller travelling fellowship, he visited the United States and returned to this country to take his D.T.M. & H. In 1927 he was appointed director of the division of epidemiology of the Commonwealth department of health, and two years later became chief medical officer at Australia House in London. During this period he represented Australia on the permanent committee of the Office International d'Hygiène publique. In 1934 he became chief quarantine officer of the North Eastern division and in the same year senior medical officer of the administrative staff at the health department at Canberra. Dr. McCallum was 56 years of age.

N. M. G. writes: "McCallum was chiefly known in this country for his interest in international health work. While chief medical officer in London from 1929 to 1934, and afterwards, he often represented Australia at international public-health meetings and I well remember how greatly the tedium of a return from Paris to London was relieved by his quiet and likeable companionship. His little book—now scarce—on *International Hygiene*, published in 1935 by the department of health of the Commonwealth and based on lectures he gave at Melbourne University, was acknowledged to be the most useful publication in that field. His friends in this country will deplore his untimely death so soon after he had taken over the leading public-health post of his country."

Notes and News

TRAFFIC IN NARCOTIC DRUGS

THE secretariat of the League of Nations at Geneva has lately issued a summary of the annual reports for 1941 from the countries party to the several opium and narcotic drugs conventions (1912–36), with apology for unavoidable delay. The summary surveys the position of the narcotic drugs traffic in the 67 contracting countries. China was said to be complacent at the completion of the "six-year suppression plan," and opium-smoking by overseas Chinese was to be taken in hand, while illicit cultivation and trade in many provinces in Japanese occupation was deplored. In the United Kingdom addiction to narcotic drugs, chiefly morphine, was reported to be decreasing. The number of addicts in 1941 was 503 (252 men and 251 women) of whom 89 were doctors. In India opium was being illicitly imported from border countries and Afghanistan, and illicitly exported to Burma and Ceylon from Bengal. In Canada there was still some addiction to codeine, and hypodermic injection of smoking opium was being practised by occidentals and orientals on the Pacific coast—addicts have been known to resort to the ointment of galls and opium to obtain its morphine content. In Egypt the Central Narcotics Bureau reported the continued smuggling of hashish and opium through Syria and Palestine, while the southern Sudan was growing illicit hashish and sending it north on river steamers.

As regards "raw opium" the area under poppy cultivation in India in 1941 was 1950 hectares, the whole of the produce being sold to the government opium factory at Ghazipur; the consumption of "excise opium" for "medical, quasi-medical, and non-medical purposes" in 1941 was 136,822 kg. Five firms are licensed in the United Kingdom to manufacture narcotic drugs, and a like number in the United States. From Colombia comes an urgent appeal, supported by the Apostolic Nuncio, for "reducing the cultivation of the coca plant to the level of world medical requirements" since its habitual abuse is said to cause widespread ravages by tuberculosis.

FOOD BULLETINS

King Edward's Hospital Fund for London circulates bulletins periodically to hospitals in which tested recipes are given to a wider public, current food problems are discussed, and inquiries to do with food or catering are answered. The first bulletin, which appeared in May, contained notes on dried milk, and recipes for puddings without fat. The August bulletin discussed allowances for expectant and nursing mothers, and gave some recipes for breakfast dishes. A third bulletin, nearly ready, will deal with the feeding of children. The fund's address is 10, Old Jewry, E.C.2.

MIDWIVES' PROGRESS

RETURNS made to the Central Midwives Board [1] by local supervising authorities show that the number of midwives who notified their intention to practise during 1945 was 16,680—some 300 more than in 1944. Of this number only 3 had been in practice before 1902, when the Midwives Act was passed, and only 10% had been enrolled before 1920. Some 7800 midwives have been trained and enrolled under the most recent rules of the Central Midwives Board, which have operated since May, 1939. More than half of these women were practising in 1945, and 90% of these were State-registered nurses. Probably about 62% of practising midwives are in the peak period of their working lives—between the ages of 27 and 47.

A great many women who do not intend to practise as midwives take the board's examinations. There are 72,248 names on the register, and of some 14,000 midwives enrolled in the six years 1936–41, only 24% notified their intention to practise in 1945. This custom of training an excess of midwives is not wholly extravagant, for the experience is doubtless useful to nurses who take up public-health work; indeed, employing authorities are apt to look for this qualification. But it has the effect of reducing the numbers of cases available for medical students, and it does not offer the prospective public-health nurse a course ideally suited to her needs. It would be useful to consider whether a more appropriate certificate course might not be offered to nurses who do not

1. Report on the work of the Central Midwives Board for the year ended March 31, 1946.

intend to practise as midwives, with less emphasis on delivery and more on the care of infants after the first month. The board, with the approval of the Ministry of Health, have amended their rules to enable sick children's nurses to be admitted to a shortened period of training, not described in the report; and such a course might serve the purpose of other nurses who do not intend to practise midwifery.

In view of the present shortage of practising midwives the board have decided that the time has not yet come to restore the rules, suspended in 1939, requiring midwives to attend post-certificate refresher courses; but they welcome the voluntary schemes for providing such courses which many local authorities are supporting.

ASPHYXIA AND ANOXIA

WRITING in *Science* (1946, **104**, 112), Prof. E. J. Van Liere protests against the misuse of the terms asphyxia and anoxia. He contends that during anoxia there is a diminished supply of oxygen to the tissues, but there is no accumulation of CO_2 in the alveolar air, or presumably in the tissues, because the associated hyperpnœa washes the CO_2 out of the lungs. In asphyxia, on the other hand, diminished oxygenation of the tissues is accompanied by an increase of CO_2 tension in the blood and tissues. He quotes Yandell Henderson's criticism that the term asphyxiated is well established but there is no equivalent term for a condition of anoxia: "Then let us create one," says Van Liere: "the equivalent would be 'anoxiated'." This term would certainly describe accurately the state of a man who has ascended to such a height that the oxygen tension is too low to sustain life.

VITAL STATISTICS FOR JUNE QUARTER

THE Registrar-General's return for the June quarter (H.M. Stationery Office, 6*d*.) confirms that the birth-rate was 19·2 per 1000 total population, the highest rate recorded in any quarter since June, 1925. The total number of births was 203,797 and the proportion of boys to girls 1069 to 1000. Births exceeded deaths by 89,727, compared with an excess of 64,252 for June quarter, 1945. Infant mortality, provisionally corrected, was 41 per 1000 related live births—9 per 1000 below the average of the previous ten June quarters. The number of illegitimate births was 14,789, this being 2625 fewer than in June last year. Deaths numbered 114,070, representing a death-rate of 10·7 per 1000 compared with 10·4 for June quarter, 1945, and an average of 11·6 for the previous five June quarters. Marriages totalled 100,814, an increase of 6620 over the average for the June quarters 1941–45.

ART EXHIBITION FOR THE HOSPITALS

King Edward's Hospital Fund for London has organised a loan exhibition of pictures from the collection of Sir Harold Wernher, K.C.V.O., at the Wildenstein Gallery, New Bond Street, W.1. The exhibition was opened by the Duchess of Kent on Oct. 2, and will remain open until Nov. 9. The charge for admission is 2*s*. 6*d*., and all proceeds will be given to King Edward's Fund.

University of Sheffield

At recent examinations the following were successful:

M.D.—H. B. Stoner.

Final M.B., Ch.B. examination.—Michael Redfern (with first-class honours); Derrick Dexter (with second-class honours).

Postgraduate Course at Leeds

A two-weeks' general refresher course for class 2 demobilised medical officers and insurance practitioners is to be held by the University of Leeds, commencing on Monday, Nov. 25. Inquiries should be directed to the Senior Administrative Officer, School of Medicine, Leeds, 2.

Royal College of Physicians of London

Dr. D. Evan Bedford will deliver the Bradshaw lecture at the college, Pall Mall East, S.W.1, on Thursday, Nov. 7, at 5 P.M. He will speak on Hypertensive Heart Disease.

Society of Medical Officers of Health

Sir Allen Daley, medical officer of health and school medical officer, London County Council, will be installed as president of this society for the session 1946–47, and will give his presidential address at a meeting to be held at Tavistock House, Tavistock Square, London, W.C.1, at 5.30 P.M. on Thursday, Oct. 17.

British Institute of Philosophy

A course of five lectures on Contemporary World Outlooks will be delivered at 5.15 P.M. on Fridays from Oct. 11 to Nov. 8, at University Hall, 14, Gordon Square, W.C.1.

Central Council for Health Education

The council has lately formed a field work committee, and a materials committee. The chairmen are Dr. A. B. Williamson, M.O.H. for Portsmouth, and Dr. H. Maurice Williams, M.O.H. for Southampton.

Medical Photographic Exhibition

An informal display of medical photographic apparatus and records is to be held in the department of medical photography, Westminster Hospital School of Medicine, from Oct. 8 to 11, between the hours of 10 A.M. and 4 P.M.

West London Medico-Chirurgical Society

A dinner will be held on Friday, Oct. 18, at 7 P.M., at the South Kensington Hotel, 41, Queen's Gate Terrace, S.W.7. Dr. G. S. Hovenden will deliver the presidential address on Fifty Years of General Practice.

Medical Defence Union

At the annual meeting held in London on Sept. 24, Mr. St. J. Buxton was elected president, Dr. Henry Robinson treasurer, and Dr. G. Roche Lynch chairman of the council committee. Dr. Janet Aitken, Mr. Buxton, and Dr. Peter Macdonald were re-elected members of council. The union now has more than 30,000 members, all of whom are registered medical practitioners. The annual report is reviewed on another page.

Local Responsibility for Hospitals

In an address at the annual meeting of the Nelson Hospital, reported in the *Times* of Sept. 28, Sir Alfred Webb-Johnson, P.R.C.S., suggested that in the National Health Service the freedom given to the teaching hospitals should be extended not only to the hospital management committees but also to individual hospitals. Local interest and support would thus be retained, and opportunities for donors, and for funds such as King Edward's Hospital Fund and the Nuffield Trust, would be greatly extended. He hoped that Parliament would allow the largest measure of local responsibility for the planning and conduct of hospitals.

British Orthopædic Association

The association's annual meeting is to be held in London on Friday and Saturday, Oct. 18 and 19; the meeting will be held on the first day at the Royal Society of Medicine, 1, Wimpole Street, W.1, and on the second day at St. Thomas's Hospital, S.E.1. The programme on Oct. 18 begins at 9.30 A.M. with a discussion on Fractures of the Os Calcis, to be opened by Mr. N. W. Roberts and Mr. W. Gissane; this will be followed by Mr. George Perkins's presidential address on Rest versus Activity in the Treatment of a Fracture, and by short papers. There will be a dinner at Grosvenor House Hotel, Park Lane, W.1, at 7 P.M. The annual general meeting will take place at 9.30 A.M. on Oct. 19, and will be followed by a demonstration of cases.

Centenary in Anæsthesia

The section of anæsthetics of the Royal Society of Medicine is to celebrate next month the centenary of the first public administration of an anæsthetic. A reception by Sir Gordon Gordon-Taylor, the society's immediate past-president, will be held on Friday, Nov. 1, at 7.30 P.M. This will be followed by a buffet supper, after which Dr. E. S. Rowbotham, president of the section, will speak on A Hundred Years of Anæsthesia.

The Association of Anæsthetists of Great Britain and Ireland is marking the centenary of the first administration of ether in Great Britain with events on Oct. 30 and 31 and Dec. 21. At 8.30 P.M. on Wednesday, Oct. 30, the Princess Royal will unveil at the Royal College of Surgeons a plaque commemorating four pioneers in anæsthesia; the ceremony will be followed by a reception. On the morning of Thursday, Oct. 31, there will be operating sessions at various London hospitals; the annual general meeting will be held at the Royal College of Surgeons at 2 P.M., and at 7 P.M. there will be a dinner in the Great Hall of Lincoln's Inn. An exhibition of anæsthetic apparatus will be open at the Royal College of Surgeons from Oct. 29 to Nov. 1. On Saturday, Dec. 21, there will be a dinner-dance at the Dorchester Hotel.

Heberden Society

The annual general meeting of this society is to be held on Oct. 25 and 26, at 11, Chandos Street, London, W.1. At 4.45 P.M. on Friday, the 25th, there will be a discussion on Future Trends of Research in Rheumatoid Arthritis, when Dr. G. M. Findlay will speak on Arthritis in Rats and Mice due to Pleuropneumonia-like Organisms, and Dr. D. H. Collins on Erysipelothrix Polyarthritis of Swine. The annual dinner will take place at 7.45 P.M., in the Euston Hotel. On Saturday, the 26th, at 11 A.M., Prof. J. A. Höjer, chief medical officer of the Royal Swedish ministry of health, will read a paper on the Organisation and Work of a Rheumatic Service in Sweden. Further particulars may be had from the general secretary, Miss Bereton, 91, Priory Road, West Hampstead, N.W.6.

Louis Gross Lecture

Dr. Roy R. Grinker, director of the Institute for Psychosomatic and Psychiatric Research and Training of the Michael Reese Hospital, Chicago, will deliver the ninth Louis Gross lecture at the Jewish General Hospital, Montreal, on Wednesday, Oct. 23, at 8.30 P.M. He will speak on Psychiatric Objectives of our Time.

Return to Practice

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

Mr. D. J. MACRAE, F.R.C.S., M.R.C.O.G., 10, Harley Street, London, W.1.

Dr. R. J. TWORT, 11, Park Terrace, Nottingham (Tel. 66486).

WEAPON AGAINST MIDGES.—In reply to our peripatetic correspondent of Sept. 21, who wondered whether D.M.P. has yet got through to the civilian, Dr. A. R. Neligan writes that it has, in the form of 'Mylol' (Boots), and is proving invaluable against this autumn's clouds of midges.

Messrs. Allen & Hanbury inform us that they now have limited stocks of 'Rutin' available. The use of this drug in the treatment of increased capillary fragility was discussed in our columns on July 6, p. 16.

Births, Marriages, and Deaths

BIRTHS

BORLAND.—On Sept. 23, at Sunbury-on-Thames, the wife of Dr. A. K. Borland—a son.

CATHIE.—On Sept. 24, at Guildford, the wife of Dr. I. A. B. Cathie—a daughter.

CROSS.—On Sept. 21, in London, the wife of Dr. W. George Cross, of Elstree—a son.

FLOWERDEW.—On Sept. 26, the wife of Dr. F. Digby Mackworth Flowerdew—a son.

GOWAR.—On Sept. 24, in London, the wife of Mr. F. Sambrook Gowar, F.R.C.S.—a daughter.

HINDS.—On Sept. 27, in London, the wife of Dr. S. W. Hinds—a son.

JAMISON.—On Sept. 23, in London, the wife of Dr. Howard M. Jamison—a daughter.

KING.—On Sept. 20, at Clifton, Bristol, the wife of Dr. Charles A. King—a son.

LEIGH.—On Sept. 26, in London, the wife of Dr. A. D. Leigh—a son.

MACKENZIE.—On Sept. 21, in Edinburgh, the wife of Mr. Ian MacKenzie, F.R.C.S.E.—a daughter.

OXLEY.—On Sept. 25, in London, the wife of Lieut.-Colonel W. Malcolm Oxley, R.A.M.C.—a son.

SARSON.—On Sept. 24, at Kettering, the wife of Flight-Lieutenant J. M. G. Sarson, M.B.—a daughter.

SYMONS.—On Sept. 20, at Southborough, the wife of Dr. H. McN. Symons—a son.

THORNTON.—On Sept. 21, at Stratford, the wife of Dr. Kenneth Thornton—a son.

MARRIAGES

GORDON—PEEL.—On Sept. 25, at Guildford, Frederick William Gordon, M.D., to Muriel Peel.

HUNT—CLAPHAM.—On Sept. 10, at Henfield, Geoffrey Notley Hunt, M.R.C.S., to Deborah K. R. Clapham.

SLOPER—CHAPPEL.—On Sept. 21, at Bedford, John Chaplin Sloper, M.R.C.P., to Irene Mary Susan Chappel, M.B.

DEATHS

ADAM.—On August 8, William Caldow Adam, L.R.C.P.E., flying-officer R.A.F.V.R., aged 26.

BASKETT.—On Sept. 25, Bertram George Mortimer Baskett, M.B. Oxfd, of London, S.E.26, aged 84.

JENKINS.—On Sept. 25, at Almondsbury, Glos., Robert Donaldson Jenkins, M.B. Brist., surgeon-commander R.N.V.R.

MACLEOD.—On Sept. 21, Neil Macleod, M.D. Edin., of Horsforth and Leeds, aged 52.

MOORE.—In September, presumed lost when sailing, Joseph Hodgson Moore, M.B. Lond., of Swinton, Manchester, aged 44.

MURIEL.—On Sept. 26, at Norwich, Cecil Jeffery Muriel, M.R.C.S., aged 87.

PHELPS.—On Sept. 29, at Great Malvern, John Henry Dixon Phelps, M.B. Oxfd, aged 74.

UTTING.—On Sept. 22, in Surrey, Erceinwin Anstey Utting, late assistant medical officer of health, St. Pancras.

Medical Diary

OCT. 6 TO 12

Sunday, 6th

INTERNATIONAL SOCIETY OF MEDICAL HYDROLOGY

9.30 A.M. (Buxton.) Dr. Victor Ott: Present Swiss Concepts of Rheumatism and Physical Medicine.

10.15 A.M. Dr. Abraham Cohen: Use of Physostigmine in Rheumatoid Arthritis.

11.15 A.M. Dr. Loring T. Swaim: American Concepts on Arthritis

Monday, 7th

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

3.45 P.M. Dr. K. J. Franklin: Fœtal Circulation and Cardiovascular System.

5 P.M. Prof. J. Z. Young: Nerve Injury and Nerve Regeneration.

Tuesday, 8th

ROYAL COLLEGE OF SURGEONS

3.45 P.M. Dr. K. J. Franklin: (1) Deglutition in Man and Other Animals; and (2) Pulmonary Mechanisms for Dealing with Inhaled and Insufflated Dusts.

5 P.M. Prof. W. R. Spurrell: Control of Secretion of Saliva, Gastric Juice, and Pancreatic Juice.

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

5.30 P.M. *Experimental Medicine and Therapeutics.* Prof. H. P. Himsworth: Protein Metabolism in Relation to Disease. (Presidential address.)

5.30 P.M. *Psychiatry.* Prof. Aubrey Lewis: Education of Psychiatrists. (Presidential address.)

CHELSEA CLINICAL SOCIETY

6.30 P.M. (South Kensington Hotel.) Dinner Meeting. Dr. Ronald Jarman: Modern Anæsthesia.

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

5 P.M. Dr. A. C. Roxburgh: Cutaneous Syphilis.

CHADWICK PUBLIC LECTURES

2.30 P.M. (26, Portland Place, W.1.) Sir Arthur MacNalty: Sir Thomas More as Public Health Reformer.

Wednesday, 9th

ROYAL COLLEGE OF SURGEONS

3.45 P.M. Dr. K. J. Franklin: (1) Eustachian Valve, Tuberculum Intervenosum, and Superior Caval Blood Flow; and (2) Vascular Short-circuiting within the Kidney.

5 P.M. Dr. C. J. C. Britton: Blood Grouping.

ROYAL SOCIETY OF MEDICINE

4.30 P.M. *Physical Medicine.* Dr. F. S. Cooksey: Planning and Organisation of Physical Medicine Departments. (Presidential address.)

NATIONAL HOSPITAL, Queen Square, W.C.1

4 P.M. Dr. Ludo van Bogaert (Antwerp): Progressive Atrophies of the Globus Pallidus.

UNIVERSITY OF GLASGOW

8 P.M. (Department of Ophthalmology). Dr. Michaelson: Proptosis and Exophthalmos.

Thursday, 10th

ROYAL COLLEGE OF SURGEONS

3.45 P.M. Prof. A. J. E. Cave: Thoracic Operculum.

5 P.M. Dr. C. J. C. Britton: Blood Grouping.

ROYAL SOCIETY OF MEDICINE

5 P.M. (*Ophthalmology.*) Mr. A. H. Levy: Æsthetics of Vision. (Presidential address.) Mr. John Foster: Ophthalmic Tour in France and Switzerland. Cases will be shown at 4.30 P.M.

LONDON SCHOOL OF DERMATOLOGY

5 P.M. Dr. H. MacCormac: Industrial Dermatitis.

Friday, 11th

ROYAL COLLEGE OF SURGEONS

3.45 P.M. Prof. G. R. de Beer: Segmentation of the Vertebrate Head.

5 P.M. Dr. Bernard Johnson: General Anæsthetics.

ROYAL SOCIETY OF MEDICINE

5 P.M. *Clinical.* Cases will be shown at 4 P.M.

ROYAL MEDICAL SOCIETY, 7, Melbourne Place, Edinburgh

8 P.M. Sir Henry Wade: Life of an Edinburgh Medical Student 300 Years Ago. (Inaugural address.)

Appointments

BATES, J. L., M.B. Lond., M.R.C.P., D.C.H.: temp. asst. physician, Kent County Hospital.

BOWES, R. K., M.S. Lond., F.R.C.S.: obstetric physician, St. Thomas's Hospital, London.

CLAY, JOHN, jun., M.B. Durh.: examining factory surgeon, Baldock, Hertford.

GILLIES, HUNTER, M.D. Glasg., D.P.M.: deputy medical superintendent, Crichton Royal, Dumfries.

HOLDEN, C. E., M.R.C.S.: examining factory surgeon, Surbiton, Surrey.

O'DONNELL, J. H., M.B. Leeds, D.L.O., F.R.C.S.: asst. surgeon, E.N.T. dept., Leicester Royal Infirmary.

PERKINS, GEORGE, M.C., M.CH. Oxfd, F.R.C.S.: orthopædic surgeon, St. Thomas's Hospital, London.

SWANN, W. G., M.D. Belf., D.P.H., D.OBST.R.C.O.G.: deputy medical superintendent officer of health and deputy port M.O., Belfast.

St. George's Hospital, London:

CHARLES, A. H., M.B. Camb., F.R.C.S., M.R.C.O.G.: asst. obstetric and gynæcological surgeon.

CRAWFORD, THEODORE, M.D. Glasg., F.R.F.P.S.: director of pathological services.

DOGGART, J. H., M.D. Camb., F.R.C.S.: ophthalmic surgeon.

MALLINSON, Sir PAUL, B.M. Oxfd, M.R.C.P.: asst. psychiatrist.

MARNHAM, RALPH, M. CHIR. Camb., F.R.C.S.: surgeon i/c proctological dept.

MILLER, EMANUEL, M.R.C.P., D.P.M.: psychiatrist to children's dept.

SHIELDS, D. C., B.M. Oxfd: director of physiotherapy dept.

YOUNG, ROBERT, B. CHIR. Camb., F.R.C.S.: asst. orthopædic surgeon.

SYMPATHETIC CONTROL OF BLOOD-VESSELS OF HUMAN SKELETAL MUSCLE*

HENRY BARCROFT
M.D. Camb.
PROFESSOR OF PHYSIOLOGY, QUEEN'S UNIVERSITY OF BELFAST

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M.B., B.Sc. Lond.
PROFESSOR OF PHYSIOLOGY, ROYAL VETERINARY COLLEGE, LONDON

Vasoconstrictor Tone

THE question whether or not the sympathetic nervous system supplies the blood-vessels in muscle and maintains vasoconstrictor tone during muscular inactivity is of fundamental importance in peripheral vascular disease. Animal investigations on the whole seem to point in that direction. Sympathetic nerve-endings have been identified histologically in the walls of blood-vessels in cat muscle (Hinsey 1928). Increase in blood-flow through muscle in the dog and cat has been observed after section of the sympathetic nerve-supply (Anrep et al. 1934, Baetjer 1930). Nevertheless general opinion, as shown by reviews by Abramson (1944), White and Smithwick (1941), and Wilkins (1942), is against the presence of sympathetic tone in the vessels in human muscle. Recent work in Belfast, however, has convinced us that such tone exists, and we submit here a summary of the evidence in favour of our view.

METHODS

The blood-vessels investigated were those in the muscles of the forearm. Details of the plethysmographic technique have already been published (Barcroft et al. 1943). We wish to emphasise here only the following points:

(1) It is important to maintain the temperature of the forearm as near as possible to its normal physiological level. Lack of this precaution is one of the reasons why the presence of tone in the blood-vessels in human muscle has not been noted by previous observers. During the experiments the limb is kept in a constant-temperature water-bath. Most workers use a water temperature near skin temperature. Grant (1938) used 30° C, most others 32° C. We have measured the temperature and blood-flow in normally clad forearms and find they are maintained at their normal levels when the limb is immersed in water at 34° C (Barcroft and Edholm 1946). Lower water temperatures depress muscle temperature and blood-flow. For example, at 30° C the rate of flow is only about a third of the normal.

(2) We have confirmed Grant and Pearson's (1938) dictum that blood-flow as measured with the forearm plethysmograph is mainly muscle blood-flow. The table shows the approximate distribution of the blood-flow to the different tissues of the forearm in the clothed arm.

EXPERIMENTAL

The proof of the existence of sympathetic tone in the blood-vessels in muscle is summarised below from the paper by Barcroft et al. (1943). Fig. 1 (*a*) shows that the blood-flow in the right forearm is about equal to that in the left. Fig. 1 (*b*) shows that the blood-flow in the left forearm is greatly increased by blocking the median, radial, and ulnar nerves just above the elbow, a technique developed by Dr. W. M. Bonnar. There are the following possible explanations for this vasodilatation:

(1) Release of the sympathetic tone in the vessels of the forearm skin.
(2) Diminution in the resistance opposed to the blood-stream owing to paralysis of tonic contraction of the skeletal muscles.
(3) Release of sympathetic tone in the blood-vessels in the muscles.

Gilding (1932) reviews the published work showing that the sympathetic fibres to skin travel with the cutaneous nerves, whereas those to muscle accompany the motor nerves. The first explanation can therefore be discarded, since the forearm skin is supplied by the antebrachial cutaneous nerves, which are not blocked. The second suggestion can be discarded, because paralysis of the muscles by nerve-block in sympathectomised subjects does not increase forearm blood-flow. Therefore the last suggestion must be correct. The increased blood-flow in the blocked forearm must be due to release of sympathetic tone in the blood-vessels of the muscles. This experiment has been done more than 25 times with consistent results. In the average forearm, blood-flow on the blocked side is about doubled. This means that the muscle blood-flow is increased about $2^1/_2$ times. If the vasomotor centre were to release the vasoconstrictor tone throughout the skeletal muscles of the body, the blood-flow throughout the muscles would increase by more than a litre a minute.

Some experiments were done under even more strictly controlled conditions. Fig. 2 shows a forearm with adrenaline introduced into the skin by electrophoresis to arrest the cutaneous circulation. By this technique the skin becomes blanched, with occasional small cyanotic patches. The penetration of the adrenaline into the deeper layers was shown by goose-flesh and by paralysis of the sweat-glands. In such forearms the blood-flow was slightly reduced because of the decrease in the amount of blood flowing through the skin. Even so, as fig. 1 (*c*) shows, deep nerve-block increased the blood-flow far above that on the normal side. Obviously the hyperæmia could not have been in the blanched skin and must have been in the underlying muscle. The bone could be safely left out of consideration since its blood-flow is negligible compared with that of muscle (Edholm et al. 1945).

Woollard and Phillips (1932), Friedlander et al. (1938), and Grant and Holling (1938) blocked the sympathetic fibres to muscle and noted that temperature in or over the muscle did not rise. Since blocking the cutaneous nerve-supply to the fingers often causes a very large rise in finger skin temperature, these workers considered that the sympathetic vasomotor tone in muscle must be negligible. However, muscle is less vascular than finger-tip skin; so release of tone would cause far less increase in blood-flow per unit volume of tissue. Moreover in exposed forearms the muscle would be cooling, and release of tone would merely delay the rate of cooling. Further, if the limb had been exposed for some time before the block, muscle blood-flow would be subnormal, and the effect of the block would be reduced. Inferences concerning muscle blood-flow made on the basis of temperature measurements cannot be so reliable as direct plethysmographic determinations.

Warren et al. (1942) measured the forearm blood-flow with the plethysmograph and found that it was increased after paravertebral block. Their suggestion that the increase was entirely in the skin is not borne out by the deep nerve-block and adrenaline electrophoresis experiments described above.

PARTITION OF BLOOD-FLOW THROUGH VARIOUS TISSUES OF FOREARM

—	Muscle	Skin	Bone	Tendon, fascia, &c.
Blood-flow c.cm. per 100 c.cm. of forearm per minute (total flow = 3·1 c.cm.)	2·1	0·8	0·2	
Tissue c.cm. per 100 c.cm. forearm	64·0	8·6	14·0	13·4
Blood-flow c.cm. per 100 c.cm. of tissue per minute	3·25	9·7	1·0	0·5

* Based on Arris and Gale lectures delivered at the Royal College of Surgeons of England by Professor Barcroft on Dec. 19 and by Professor Edholm on Dec. 20, 1945.

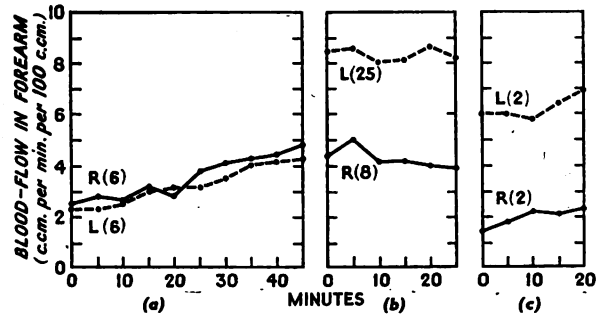

Fig. 1—Blood-flow in forearms: (a) right and left arms normal, showing flow equal in both arms; (b) deep nerve-block of left radial, median, and ulnar nerves (right arm intact); (c) same nerves blocked and cutaneous circulation abolished by adrenaline electrophoresis in left arm (right arm intact). The numerals in parentheses denote the number of experiments from which the averages were obtained on which the curves are based.

To sum up, there is good evidence that the release of sympathetic tone in the blood-vessels in muscle would more than double the rate of blood-flow.

PHYSIOLOGICAL RELEASE OF VASOCONSTRICTOR TONE IN MUSCLE VESSELS BY BODY HEATING

Grant and Holling (1938) found that the blood-flow to the forearm could be increased by heating the legs, but that this required very considerable heat, and the rate of increase varied. They considered that the increase in blood-flow was due to cutaneous vasodilatation. Wilkins and Eichna (1941) also obtained an increased blood-flow in the forearms on body heating, and suggested that some of the increased flow was due to vasodilatation in muscle vessels. We have now carried out this procedure on a large number of subjects with the forearm in water at 34° C, and usually found a considerable increase in the forearm blood-flow when the legs were heated. The effect is absent in sympathectomised subjects. We have also used the skin-blanching technique to analyse the effect, and have shown that the dilatation definitely takes place in the muscle blood-vessels. Fig. 3 shows dilatation in the blanched forearm following immersion of the feet in hot water. Since the increases in forearm blood-flow after deep nerve-block and after feet heating were similar, we concluded that the hyperæmia in the forearm was mainly due to release of vasoconstrictor tone in the blood-vessels of resting muscle.

COMMENT

Grant and Pearson (1938) and Wilkins and Eichna (1941) have shown, and we have confirmed, that forearm blood-flow is practically normal some weeks after sympathectomy. The tone of the blood-vessels in muscle which is released after operation gradually returns. Hence, on theoretical grounds, it does not necessarily follow that sympathectomy could achieve any permanent improvement in peripheral vascular conditions such as intermittent claudication.

Vasodilator Tone

It is now proposed to present some evidence concerning the presence of vasodilator fibres in the blood-vessels of human skeletal muscles.

Vasodilator fibres have been demonstrated by Bülbring and Burn (1937) in muscle vessels in certain animals, notably the hare. Grant and Pearson (1938) and Holling (1939) have shown that adrenaline in small quantities produces vasodilatation in human skeletal muscles. We have confirmed this (Allen et al. 1946) but have found that the dilatation is only fleeting, and, with continued infusion of adrenaline, dilatation is followed by constriction. Nevertheless the fact that a sympathomimetic substance can produce a vasodilatation suggests that adrenergic vasodilator nerves exist.

Grant and Holling (1938) have also presented evidence of vasodilators in cutaneous blood-vessels, but their conclusions have been criticised by Warren et al. (1942).

The first experiments we carried out—namely, comparison of the effects of nerve-block and of heating the legs on forearm blood-flow—were inconclusive. As described above, these two procedures produced nearly similar effects; so it was considered that the increase in blood-flow produced by leg heating was due to release of vasoconstrictor tone alone, not to any active vasodilatation mediated by vasodilator nerves.

More convincing evidence was obtained unexpectedly during an investigation of the effects of hæmorrhage on the peripheral circulation in man, to determine the extent and degree of peripheral vasoconstriction after venesection. In one of the earliest experiments the subject fainted, and, to our great surprise, the forearm blood-flow very much increased during the faint, in spite of the sudden drop in blood-pressure. This unexpected finding made us change the original scheme, and instead an investigation of fainting was initiated (Barcroft et al. 1944, Barcroft and Edholm 1945). It was in the course of this work that evidence was obtained of the existence of vasodilator nerves to muscle blood-vessels.

The large number of blood-donors submitting to venesection has provided opportunities for skilled observation of fainting; so the literature on the subject is now considerable. The incidence of fainting in blood-donors varies, but with a venesection of some 400 c.cm. the average fainting-rate is about 5% (Poles and Boycott 1942, Brown and McCormack 1942). The incidence is affected by fatigue, hunger, and thirst. Posture is important; fainting can and does take place with the subject prone, but is much more easily provoked in the sitting or upright position. Room temperature is also a factor. In the Middle East, with a temperature of 100° F or more, the incidence of fainting in blood-donors might be as high as 20% (Buttle 1945). Emotional factors certainly play a part. It has been a common experience in blood-donor centres to observe epidemic fainting when many donors are together in view of each other; one donor faints, others follow suit. It has also

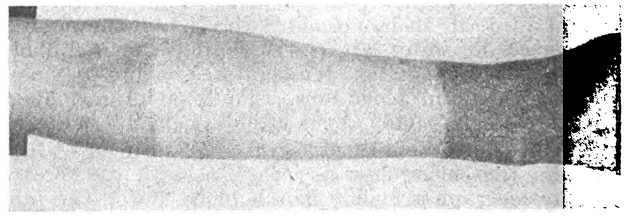

Fig. 2—Forearm, after introduction of adrenaline by electrophoresis into the skin to arrest the cutaneous circulation, showing blanching and occasional small cyanotic patches.

been observed that those subjects who faint as a result of a small venesection often give a history of previous fainting. So it has been considered that fainting is an abnormal reaction implying an unstable vasomotor system. Nevertheless it is generally agreed that it is extremely difficult to predict who will faint as a result of a given hæmorrhage; there is no test which will reveal the potential fainter. However, Wallace and Sharpey-Schafer (1941) have shown that the incidence of fainting increases steadily with increase in the volume of blood withdrawn.

Hæmorrhage is not the only stimulus which will provoke fainting; emotional shocks, such as the sight of blood, hypodermic or intravenous injection, the upright posture, and anoxia, can all be effective. It is a subject which merits investigation.

Lewis (1932), in a classical paper on the subject, emphasised the salient features of a faint: sudden drop in blood-pressure, slowing of the heart, pallor, sweating,

commonly nausea, and often loss of consciousness. He showed that the cardiac slowing was not an essential feature of the circulatory collapse, since atropine administered during the faint accelerated the heart without hastening recovery. Lewis epitomised his work by describing fainting as the vasovagal syndrome, meaning that there were two components of the faint, the vagal effects of cardiac slowing, nausea, &c., and a vascular effect. More recently, Barcroft et al. (1944) confirmed that fainting was not a cardiac event. They measured cardiac output with the cardiac catheter and showed that there was no fall in cardiac output during fainting. Fainting is not a cardiac syncope; it represents a peripheral failure—i.e., the fall in blood-pressure is due to peripheral vasodilatation.

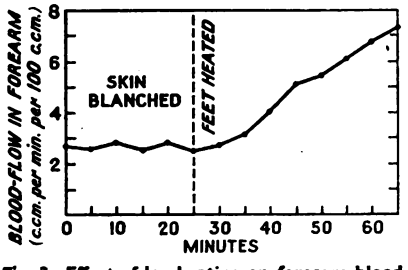

Fig. 3—Effect of leg heating on forearm blood-flow after abolition of cutaneous circulation. Curve based on average of 5 experiments.

In our investigation we used hæmorrhage to produce fainting. We wished to have a high incidence of faints so, as Wallace and Sharpey-Schafer (1941) had shown that the greater the volume of bleeding the higher the incidence of faints, we used large venesections. This was done by combining a venesection from the arm with a simulated venesection by inflating pressure cuffs on the thighs to diastolic pressure. Ebert and Stead (1940) have shown that such a procedure dams back up to 700 c.cm. of blood in the lower limbs. It is not unduly uncomfortable, and by releasing the pressure on the thighs the trapped blood is rapidly returned to the general circulation. The average volume of the venesection from the arm was about 500 c.cm., and this, together with pressure on the thighs, produced a faint in nearly every subject. Since our subjects were young healthy adults, this showed that fainting was not an abnormal reaction but one which could be produced by a suitable stimulus in all persons, though the strength of the required stimulus varied from subject to subject. The forearm blood-flow was recorded and the original finding confirmed; the forearm blood-flow increased in every case during the faint.

The next step was to investigate the mechanism of this vasodilatation: was it nervous or humoral? There is evidence that adrenaline secretion is increased during hæmorrhage, and adrenaline has been shown to produce a considerable vasodilatation in the forearm. So there seemed to be a distinct possibility that adrenaline secretion was responsible for this dilatation. To test this hypothesis, fainting was induced in sympathectomised subjects. These patients were rigorously tested to establish that the sympathectomy was still complete. Resting forearm blood-flow was within normal limits, as in all cases the sympathectomy had been performed some time previously. (Grant and others have shown that the forearm blood-flow is only temporarily increased after sympathectomy, the vessels soon recovering their tone.)

In these subjects forearm blood-flow did not increase during fainting; on the contrary, the blood-flow diminished as the blood-pressure fell, and recovered when the pressure rose again. This finding provided definite evidence that the dilatation in normal subjects was not due to the secretion of adrenaline or any other humoral agent, for such effects would still have been present after sympathectomy. On the other hand, since the dilatation was abolished when the vasomotor nerves were absent, it was evident that the dilatation was mediated by the vasomotor nerves.

The next problem was to establish the site of the vasodilatation. A striking feature of the vasovagal syndrome is the intense pallor of the skin, and it seemed very unlikely that the considerable increase in blood-flow could be taking place in the skin vessels. This was investigated by comparing the blood-flow in the hand and forearm. The hand consists largely of skin and bone with only 15% muscle. If the vasovagal dilatation takes place in muscle vessels only, the rate of flow through the hand should diminish during fainting. And that was what we found. Weiss et al. (1937) have previously shown that, during the circulatory collapse induced by amyl nitrite, a collapse which closely resembles the vasovagal reaction, the blood-flow through the hand is unrecordable. However, Rushmer (1944) reported that, in the collapse induced by needling the brachial artery, plethysmograph records of the finger-tip indicated a vasodilatation. Nevertheless in the hand as a whole there is no doubt that the blood-flow decreases during fainting. So it was concluded that, during fainting induced by hæmorrhage, there was a sudden vasodilatation in muscle blood-vessels due to nervous impulses.

This conclusion led to the next question: was the dilatation solely due to the removal of vasoconstrictor tone, or did active vasodilatation occur? Experiments were carried out in subjects in whom a nerve-block was performed in one arm. This procedure, as described above, removes vasoconstrictor tone and therefore increases the rate of forearm blood-flow. When fainting was induced in these subjects, the blood-flow decreased as the blood-pressure fell, behaving similarly to the sympathectomised forearm. But in these subjects the level of blood-flow during the faint was much less than that in the normal arm during the faint. Considering the conditions in the two arms, one with the nerve-block and the other intact, in the first vasoconstrictor tone had already been removed by the nerve-block. If the vasodilatation during the faint was solely due to the removal of vasoconstrictor tone, then the conditions in the two arms during the faint should be the same: in the one arm vasoconstrictor tone removed by nerve-block before the faint, in the other removed by fainting. But the flow in the normal arm at this stage was much greater than in the blocked arm; so this increase could not be solely due to the removal of vasoconstrictor tone, otherwise the level of blood-flow during the faint should be the same in the two arms. During fainting, in brief, there is an increase in forearm blood-flow greater than can be explained solely by the removal of vasoconstrictor tone. It has been shown that no humoral agent is involved and that the skin vessels play no part. The only reasonable conclusion is that part at any rate of this vasodilatation is mediated by vasodilator nerves.

Summary

The technique of demonstrating sympathetic vasoconstrictor tone in blood-vessels in human skeletal muscles is described.

Blood-flow in muscles is more than doubled by the release of sympathetic tone.

Heating the body relaxes the vasoconstrictor tone in blood-vessels supplying muscles.

Vasoconstrictor tone gradually returns to the blood-vessels of sympathectomised subjects.

Vasodilatation takes place in the muscles of the forearm after fainting, except in sympathectomised subjects. Therefore this vasodilatation is due to nervous control.

It is shown that vasodilatation in the forearm muscles is not due merely to removal of vasoconstrictor tone but that it is, at any rate in part, mediated by vasodilator nerves.

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PSYCHONEUROSES
TREATED WITH ELECTRICAL CONVULSIONS
THE INTENSIVE METHOD

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THOUGH there has been some agreement concerning the benefit obtained from electro-convulsive therapy in certain psychoses, recent publications show divergent opinions about its use in the psychoneuroses. Those who believe in its efficacy have so far produced little evidence in support of their statements. Good (1940), Cheney et al. (1941), Zeifert (1941), Furst and Stouffer (1941), Low et al. (1938), and Shapiro and Freeman (1939) report good results in small series of cases, and Feldman et al. (1945) have reported a considerable improvement in 2 cases of acute hysteria. Kerman (1945) mentions only 1 case of psychoneurosis out of 300 various psychotic patients treated by this method, and this patient was only partially improved. Pacella and Barrera (1943) report rather poor results, Smith et al. (1943) state that it is of doubtful value, and Walshe (1945) goes so far as to say that convulsion therapy has no place in the treatment of the psychoneuroses.

This report deals with 100 psychoneurotic patients treated in St. James Hospital, Portsmouth, during the past five years. The intensive method described was originated by Dr. Thomas Beaton, physician-superintendent of this hospital.

METHOD

The apparatus used is a special model manufactured by the Solus Electrical Co. Ltd. All unnecessary recording instruments—e.g., for determination of head resistance—have been eliminated. The maximum voltage is 200, and the time mechanism is calibrated in tenths of a second, increasing by $^1/_5$ sec. intervals to a maximum of 1 sec. It has been found, in treating many patients, that a high voltage can be used with certain advantages and no untoward results. The average dose used has been 180 volts at 0·4 sec. This produces a convulsion in nearly every case and has the further advantage that it eliminates the usual preceding cry. This is very helpful when many patients are being treated in a ward with only movable screens between the beds. No restraint is used, and the only precaution taken, apart from the usual gauze gag, is the use of a dorsal pillow to keep the patient in a position of slight opisthotonos.

The machine, which has a silently acting switch, is moved slowly down the ward on a trolley, and the ward sister manipulates the electrodes while the doctor operates the apparatus. The electrodes are mounted on a flexible metal band of horseshoe shape similar to that used in headphones. This is held momentarily in position on the patient's forehead by means of insulated handles on the outer side of the electrodes. By this method it is possible to treat 20 patients in eight minutes.

We have recently introduced a wireless-set to provide light music during treatment. This is perhaps a minor point, but it helps patients awaiting treatment to pass the time and prevents apprehension while the patient in the next bed is receiving treatment. It also ensures that patients regaining consciousness return to a more cheerful environment.

The number and spacing of treatments vary from case to case. Cook (1944), in a review of convulsion therapy, quotes the average as three a week, and Stockings (1944) refers to the frequency used in some of his own cases—one a day—as drastic. We have employed an intensive method in many cases, particularly in those of long standing. This sometimes involves as many as four treatments a day, the dosage being modified as the patient responds to treatment. The confusion, amnesia, and complete disorientation produced by such treatment call for very careful nursing. In some cases it is necessary to reduce the patient to the infantile level, in which he is completely helpless and doubly incontinent.

The course of treatment is then adjusted so that the patient is allowed gradually to emerge from the confusional state. During this time simple psychotherapy, in the form of explanation and reassurance, is given, and the helpful attitude of the nurses is of the greatest importance. Occupational therapy is used as an adjuvant, and the patient is encouraged to take part in social activities. We are fortunate in that this hospital is situated in the city itself, so that, by a system of gradually extending parole, the patient can slowly resume a normal form of life.

After discharge from hospital the patient usually returns to work immediately and reports at the out-patient department for several months, if necessary. All cases in this series have been followed for a period ranging from eight months to five years.

THEORY OF ACTION

The most satisfactory explanation of the action of electro-convulsion therapy so far advanced is quoted by Brain and Strauss (1945). This postulates the presence of faulty electrical patterns in the brain which are altered by the treatment, the resulting amnesia allowing time for the brain to become accustomed to simplified patterns. If this is so, it is a definite indication for the use of the intensive method, which appears to obliterate entirely the faulty patterns, and thus allows the patient to be rehabilitated along correct lines.

RESULTS

The criteria used in assessing the condition of patients on discharge were as follows:

Patients noted as "*recovered*" were discharged symptom-free and apparently quite stable; no patient discharged in this category has relapsed.

All patients noted as "*relieved*" were much improved, and most of them were symptom-free, but they were placed in this category if there was any doubt about their stability. Only 6 of the 46 patients in this category have shown any signs of relapse, and 3 of these had received insufficient treatment, having left hospital before the course was completed.

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The 2 women noted as "*not improved*" responded to treatment at the outset but left hospital before the course was completed. The male patient included in this category was approaching senility and was precluded from receiving intensive treatment because of his physical condition.

The numbers discharged in these categories are as follows:

	MALE	FEMALE
Recovered	25	27
Relieved	19	26
Not improved	1	2

Thus 51% were classified as "recovered," 46% as "relieved," and 3% as "not improved."

The differential classification is as follows:

—	MALE			FEMALE		
	Recovered	Relieved	Not improved	Recovered	Relieved	Not improved
Anxiety states ..	10	10	1	8	8	1
Hysteria	9	4	..	14	13	1
Obsessional states	4	..	..	5	2	..
Mixed states ..	2	5	..	..	3	..

ILLUSTRATIVE CASE-RECORDS

CASE 1.—A male married chartered accountant, aged 36, was admitted on April 30, 1945, with four months' history of inability to work owing to a "constant series of figures passing through my mind." He also complained of a severe pain in the throat, preventing him from swallowing properly, and he expressed the fixed idea that this was due to cancer.

Mental State.—An immature type of man, rather childish in manner, very hypochondriacal, anxious, worried, and very apprehensive. He could not speak without first striking his left thigh.

Family History.—Father, aged 56, had died of cancer of the stomach. Mother had died of cerebral hæmorrhage six months ago. She was said to have been a domineering type of woman, on whom the patient had been very dependent, even after his marriage. Her sudden death seems to have been the precipitating factor in the patient's illness. No siblings.

Personal History.—Patient had not had any serious illness. He was said to have worried over details. His school career had been brilliant, and he now held a very responsible position.

Diagnosis.—Obsessive-compulsive neurosis.

Treatment.—April 30, 1945: 3 convulsions induced at 10 A.M., 11 A.M., and 3 P.M.

May 1: 2 convulsions induced at 10 A.M. and 4 P.M.; patient was confused and rather restless, but made no complaints about his throat, and spoke naturally and without his thigh-striking ritual. May 2: 2 convulsions induced at 10 A.M. and 3 P.M. May 3: a convulsion induced at 10 A.M.; patient was confused, amnesic, and completely disoriented. May 5: a convulsion induced at 10 A.M. May 10: he was no longer confused, but there was complete amnesia for events which happened during the week before admission. May 12: a convulsion induced at 10 A.M. May 30: he was well and symptom-free, except for a patchy amnesia, which was slowly clearing.

June 8: improvement had been maintained; patient was discharged "recovered."

July 12: reported in outpatient department (OP); he had remained well and now had a full recollection of events leading up to his admission; he said that he still had slight difficulty in remembering the names of acquaintances.

Sept. 4: reported in OP; he had remained very well and said that he had now no memory difficulties.

Dec. 6: reported in OP; he was completely symptom-free and had no complaints whatsoever.

April 2, 1946: contacted by telephone, he said he had remained perfectly well.

CASE 2.—A male married draughtsman, aged 41, was admitted on March 29, 1945, with fifteen years' history of recurrent attacks of vomiting.

Personal History.—He was said to have been liable to worry unnecessarily since childhood. The attacks of vomiting had been becoming progressively worse; and whereas they had formerly lasted only a few days, with remissions of several months, the present attack had lasted three months, even a glass of water causing him to vomit. In the past ten years he had attended sixteen different doctors, had been admitted to general hospitals four times, for periods varying from two to five months, and in one of these hospitals a laparotomy had been performed. No organic lesion had been found at any time during his illness.

Family History.—Mother, aged 64, said to be nervous and unstable. Father, aged 61, fit and well. Siblings, eight brothers and two sisters, all said to be nervous.

Mental State.—Very hypochondriacal, anxious, worried, and easily upset by trifling incidents, manifesting this by acute attacks of anxiety. He realised that these acute attacks were responsible for his gastric upset.

Diagnosis.—Chronic anxiety state.

Treatment.—March 30, 1945: 3 convulsions induced at 10 A.M., 12 noon, and 2 P.M. At 4 P.M. patient was only slightly confused. March 31: 4 convulsions induced at 10 A.M., 12 noon, 2 P.M., and 4 P.M.; at 6 P.M. patient was confused, amnesic, and disoriented in time.

April 1: 3 convulsions induced at 10 A.M., 2 P.M., and 5 P.M.; patient was now very confused and completely disoriented, tended to be restless, and required careful supervision. April 2: a convulsion induced at 10 A.M. April 6: a convulsion induced at 10 A.M.; patient was now only slightly confused, was bright and cheerful, had no complaints, and enjoyed full hospital diet. April 8 and 10: a convulsion induced at 10 A.M. each day. April 16: he was now bright and cheerful, coöperative, and symptom-free; he said he enjoyed his food for the first time in fourteen years and could eat anything; his interests were varied, and he was doing some fairly heavy manual labour in the villa garden. April 26: he remained well and, though he was occasionally upset, the resulting anxiety reaction was much less severe than formerly. April 28 and 30: a convulsion induced at 10 A.M. each day.

May 17: he remained well and symptom-free. May 20: discharged "recovered."

June 21: attended OP; had remained well, had started work, and reported no difficulties.

Sept. 6: attended OP; was very well and said he could eat anything and had gained 2 st. in weight during the past three months.

Dec. 20: attended OP; he had remained well.

Feb. 21, 1946: attended OP; he said he felt perfectly fit and had no complaints; he had gained self-confidence and was apparently stable.

April 11: reported at OP; had remained perfectly well.

CASE 3.—An unemployed single man, aged 51, was admitted on Sept. 1, 1945, with twenty years' history of epigastric pain and ten years' history of inability to swallow solids.

Personal History.—No illness or accident until the age of 22, when he was badly wounded while serving in an infantry regiment during the war 1914–18. He had been in hospital eighteen months and had subsequently had many operations for the removal of shrapnel. He had been employed as a stage hand from 1921 to 1926, but since then had done no work, lived on his disability pension, and had been a chronic invalid. He had been admitted to five general hospitals for investigation, and laparotomy had been performed twice. No organic lesion had ever been found. For the past ten years he had been existing on a diet composed solely of three pints of milk a day, with an occasional raw egg.

Family History.—Parents had died of natural causes, and little information was available about them. He had one brother and four sisters alive and well. These relations lived in widely separated parts of the country and had on many occasions received telegrams summoning them to patient's bedside. On each occasion the message has been dictated by patient, who said he was dying.

Mental State.—Egocentric, petulant, and plausible, and delighted in giving a long circumstantial account of his illness, going into unnecessary details. He showed no trace of depression, though he complained bitterly of his treatment in other hospitals and said that no doctor had ever properly understood his case.

Diagnosis.—Hysteria.

Treatment.—Sept. 2, 1945: 3 convulsions induced at 10 A.M., 12 noon, and 4 P.M. Sept. 3: 2 convulsions induced at 10 A.M. and 2 P.M. Sept. 4: 2 convulsions induced at 12 noon and 3 P.M.; he was very confused, completely disoriented, and restless, and his habits had become faulty. Sept. 5, 6, and 8: a convulsion induced at 10 A.M. each day. Sept. 10: he was less confused but tended to be very elated. Sept. 12: a

convulsion induced at 10 A.M. Sept. 16: he was bright, cheerful, and contented, and had no complaints.

Oct. 3: he was quite settled, worked well in the villa garden, and had, for the past fortnight, enjoyed full hospital diet; he ate his food with great relish; there was no trace of either confusion or amnesia.

Oct. 9: he was discharged "recovered." Oct. 23: reported in OP; he had remained well and had no complaints.

Nov. 20: reported in OP; he had remained well and was apparently stable.

March 28, 1946: reported in OP; he had remained very well and said he could eat anything and hoped to find employment in the near future.

CASE 4.—A married male bus conductor, aged 48, was admitted on Nov. 2, 1945, with three years' history of severe pain in the back, preventing work.

Personal History.—Had been healthy and had a good work record until 1941, when he had received severe burns of the lower limbs in a motor accident. He had spent nine months in a general hospital and been unable to resume employment until November, 1942.

Three years ago, while employed as a bus conductor, he had accidentally fallen down the stairs of his omnibus. He had complained of pain in the back, but had been able to continue work. He had consulted his doctor, who had treated him for a month; but, as the pain had still persisted, he had been referred to the OP of a general hospital. There it had been thought that he had a tuberculous lesion of the spine, and he had spent the next two months in a sanatorium. He had then been referred to an orthopædic surgeon, who had recommended massage and radiant heat, as no bony injury had been found on radiography. As there had been apparently no alteration in either the nature or the severity of the pain, he had been fitted with a plaster-of-paris spinal jacket. Two months later he had been admitted to an E.M.S. hospital, where for three months he had been investigated and treated. He had again been fitted with a spinal jacket and discharged from hospital.

For three years he had been receiving £3 a week compensation.

Family History.—He was one of a family of fourteen. One brother had died of pulmonary tuberculosis.

Mental State.—Though he said he was very worried and depressed because of his inability to work, there was no trace of this at the interview, when he was quite cheerful. He walked in a most peculiar manner, with the aid of two walking-sticks. He gave a reasonable account of himself and said he was most anxious to resume his employment.

Diagnosis.—Hysteria.

Treatment.—Nov. 3, 1945: 4 convulsions induced at 10 A.M., 12 noon, 4 P.M., and 6 P.M. Nov. 4: 3 convulsions induced at 10 A.M., 2 P.M., and 4 P.M.; patient was very confused, constantly asked why he was in hospital, and said there was nothing wrong with him. He walked in a fairly natural manner. Nov. 5 and 6: a convulsion induced at 10 A.M. each day. Nov. 8: he was much less confused, but did not remember why he was admitted. Nov. 9, 12, and 14: a convulsion induced at 10 A.M. each day. Nov. 15: he was now rather elated, but had no complaints and was walking normally.

Dec. 20: He remained very well and was much more settled; he now fully appreciated the reason for his admission. Dec. 25: he was bright, cheerful, and symptom-free, and was assisting the gardener; he had been demonstrating his physical capabilities to his fellow-patients by man-handling a heavy garden roller single-handed.

Jan. 2, 1946: discharged "recovered."

Feb. 14: reported in OP; he had remained well and had resumed work.

April 9: reported in OP; he said he felt very well, was completely symptom-free, and was finding no difficulties in connexion with his employment.

CASE 5.—A married housewife (ex-school teacher), aged 43, was admitted on Jan. 16, 1944, with fifteen years' history of a constant feeling of faintness; inability to walk more than a few steps without collapsing; inability to write or knit, owing to weakness of hands; and inability to sleep.

Personal History.—She had been fairly well until the birth of her son, fifteen years ago. Since then she had adopted the rôle of a permanent invalid, had been very jealous and possessive, and constantly demanded the complete attention of her husband and son. She said she had no friends.

Family History.—Mother had died of cancer at 65. She was said to have been a dominating type of woman, who never allowed the patient to do anything for herself. Father had died of cancer at 62. No siblings.

Mental State.—She was very miserable, self-pitying, and petulant, and could talk of nothing but her various symptoms. She constantly demanded attention and, if this was not forthcoming immediately, wept copiously and called out for her husband and "baby." Her conversation was carried on in an exhausted whisper, but she could raise her voice considerably when she wanted anything.

Diagnosis.—Hysteria.

Treatment.—Jan. 17, 1944: 2 convulsions induced at 10 A.M. and 12 noon. Jan. 18: 2 convulsions induced at 12 noon and 4 P.M. Jan. 19: 2 convulsions induced at 10 A.M. and 3 P.M.; she was still miserable and emotional but was sleeping well without sedatives. Jan. 20: 2 convulsions induced at 10 A.M. and 4 P.M.; she was becoming more confused but was now very hostile. Jan. 21: 2 convulsions induced at 10 A.M. and 12 noon; she was very confused, disoriented, and very restless. Jan. 22 and 23: a convulsion induced at 10 A.M. each day. Jan. 27: a convulsion induced at 10 A.M.; she was now bright and cheerful and had no complaints, though she was still confused.

Feb. 2 and 6: a convulsion induced at 10 A.M. each day. Feb. 15: she was very much improved, bright, cheerful, and coöperative, attended the occupational therapy department daily, and mixed well with other patients; she now said her husband had always spoiled her, and that it would "do her good" to have another child.

March 23: improvement maintained; she was cheerful and energetic; she attended all functions and was especially keen to be present at the dances. March 30: discharged "recovered."

April 18: reported in OP; she had remained well and was doing all her own housework for the first time in seventeen years.

June 7, 1945: reported in OP; she had remained very well, and her husband said she was a "changed woman."

March 22, 1946: social worker visited patient in her home and reported that she was perfectly well; bright and sociable, and had made many friends in the neighbourhood.

CASE 6.—A single female cashier, aged 25, was admitted on Jan. 3, 1945, with two years' history of breathlessness, palpitation of heart, frontal headache, and a constant feeling of tension.

Personal History.—She had been perfectly fit until three years ago, when she had had an attack of rheumatic fever. She had been told that her heart might be affected, and since then she had been very easily upset.

Family History.—Mother had died of cancer at 53. Father, aged 63, had "heart trouble." She had two brothers. A sister had died of "heart trouble."

Mental State.—She was very anxious, worried, apprehensive, dissatisfied with life, and very hypochondriacal. Her father had remarried two years ago, and she expressed great resentment at this, becoming rather excited and emotional when discussing it. She was very miserable and said she did not like being an invalid.

Diagnosis.—Anxiety state.

Treatment.—Jan. 24, 1945: she had been treated on general lines; but, though slightly brighter, she was still very unstable and complained of her cardiac condition. There was no physical lesion to explain her breathlessness and tachycardia, which were undoubtedly anxiety manifestations.

Feb. 3: 2 convulsions induced at 10 A.M. and 5 P.M. Feb. 4 and 5: 2 convulsions induced at 10 A.M. and 2 P.M. each day. Feb. 6–10: a convulsion induced at 10 A.M. each day. Feb. 14: a convulsion induced at 10 A.M.; she was confused and rather restless, but was now elated and made no complaints. Feb. 16: a convulsion induced at 10 A.M. Feb. 28: she was still slightly confused and amnesic but more settled and was sleeping well.

March 10: she was bright, cheerful, coöperative, and symptom-free, attended the occupational therapy department daily, enjoyed walking, and took part in all social activities.

March 28: discharged "recovered."

April 19: reported in OP; she had remained well and was anxious to start work.

July 5: reported in OP; she said she was very well and had been working as a cashier for the past two months and had no difficulty in carrying out her duties.

Nov. 22: visited by social worker, who said that she had remained well and could take part in all normal social activities.

March 21, 1946: reported in OP; she had remained very well.

Case 7 is included to illustrate the necessity of giving a thorough course of treatment to every patient. In this case treatment was suspended owing to an unfortunate accident, and the patient left hospital against advice. She remained well for three months but subsequently relapsed. She was recently readmitted and is now receiving a complete course of treatment.

CASE 7.—A single woman, aged 52, of no occupation, was admitted on Oct. 7, 1945, with two years' history of overwhelming fear that she would do some "terrible thing" if she did not wear a particular pair of gloves.

Personal History.—She had always been very healthy and had led an active life in the country. About two years ago she had had an inconclusive love affair (her only one), and this had left her with a strong feeling of guilt. Since then there had been a gradual development of obsessional ideas and ritual, which now dominated her completely.

Family History.—Father, a country gentleman of high intellectual attainments, had died of cerebral hæmorrhage 10 years ago. Mother an overanxious type, on whom the patient depended completely and who treated the patient as a child. Mother and daughter had been living alone for the past three years and were inseparable. No siblings.

Mental State.—She was very restless, apprehensive in the extreme, and agitated, and continually asked that her hands should be tied together in case she should harm anyone. She said she was terrified lest she should be left alone for even a minute.

Diagnosis.—Obsessional state.

Treatment.—Oct. 7, 1945: 3 convulsions induced at 11 A.M., 12 noon, and 5 P.M. Oct. 8: 2 convulsions induced at 10 A.M. and 4 P.M.; patient was very restless and confused, and constantly asked where she was. Oct. 9: patient accidentally fell out of bed and sustained an injury to the left side of the face; radiography revealed no bony injury; but, as she complained of severe pain on opening the mouth, electrical treatment was suspended for the time being. Oct. 12: she was still slightly confused but bright and cheerful, having forgotten her obsessional ideas.

Nov. 7: she remained fairly well and said she remembered her previous obsessions but now laughed at them; she refused to remain in hospital for further treatment as she was worried about her mother. Nov. 12: discharged at her own request, contrary to medical advice, "relieved"; she was cheerful, had no complaints, and no memory difficulties, and was relatively stable, but it is unlikely that she will remain so in view of the curtailed course of treatment.

Feb. 6, 1946: patient telephoned to report that she remained well.

March 2: patient telephoned to report that she had been very worried about her mother's health during the past fortnight; she had lost a good deal of sleep and was again afraid that she might injure someone. March 10: readmitted to hospital; her mental condition was similar to that on her first admission.

DISCUSSION

These results seem to indicate that electro-convulsive therapy, particularly the intensive method, is of the greatest value in the treatment of selected cases of psychoneuroses. Though this is a physical method of treatment, 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.

In the present series the main factor militating against successful treatment has been an inherent constitutional defect, which may range from slight immaturity to definite high-grade mental deficiency. As might be expected, approaching senility is another factor of unfavourable prognostic import.

The anxiety states, on the whole, respond well, especially those of long duration. Cases of conversion hysteria do very well and, more important still, do not tend to relapse, if thorough treatment has been carried out. Striking results are obtained in obsessional states, which do not respond to other methods of treatment, except prefrontal leucotomy. It is admitted that, except in four cases, the follow-up has not been long enough to permit of dogmatic statements regarding the benefits of electro-convulsive therapy over the latter procedure, but the advantages are, nevertheless, apparent. There is practically no danger attached to the use of electro-convulsive therapy, and in our opinion no patient should be subjected to prefrontal leucotomy before a complete intensive course of electrically induced convulsions has failed to produce the desired effect.

In the light of experience it has been the custom of this hospital, during the past year, to use electro-convulsive therapy on inpatients only. It was found that outpatients returning to their home environment after each treatment did not respond satisfactorily. In using the intensive method it is essential to have the patient in hospital, and in view of the gross confusion, restlessness, and, especially in hysterics, the occasional outbursts of impulsive behaviour, this treatment should only be carried out in a mental hospital, where there are adequate facilities for dealing with disordered behaviour. The mental hospital has the added advantage that it usually possesses extensive grounds, and this is of great importance to the convalescent patient.

The use of electro-convulsive therapy greatly shortens the duration of psychoneurotic illness; and, especially in chronic cases, it seems to be of much more value to admit the patient to hospital for a month or six weeks rather than to compel attendance at an outpatient department for many months or even years. Many psychoneurotics are notoriously lacking in patience with regard to their treatment and become very bored with hospital life. The use of electro-convulsive therapy prevents this completely and tides the patient over the initial period of readjustment to hospital routine. It is just this adaptation that the psychoneurotic often finds impossible because of his general maladjustment to environment. It is not, however, suggested that this treatment should be used merely as a short cut—on the contrary, great care should be exercised in the selection of cases. In this hospital only a relatively small proportion of psychoneurotics have been treated by this method. In most of these cases the symptoms were of long duration and the more recent cases had proved resistant to psychotherapeutic measures.

None of these cases has exhibited the prolonged memory defects noted by Brody (1944), and in this connexion it seems that his statement about the contra-indications to the use of this form of therapy is, to say the least, dogmatic. This series included several school teachers, a chartered accountant, the department manager of a large business, a bus conductor, and a cashier. It would have been grossly unfair to debar these patients from treatment on the grounds of occupation alone. A patient (not included in this series), who was treated by intensive electro-convulsive therapy, is employed in a Government department as a linguist and reports that she has no memory difficulties but continues to express herself freely in five languages.

SUMMARY

The results of electro-convulsive therapy in 100 cases of psychoneuroses are summarised.

An intensive method was used in many cases, up to four convulsions being induced daily. This procedure is especially suitable for chronic cases.

All cases responded well, but the most striking results were noted in those of long duration.

Electro-convulsive therapy should not be used indiscriminately; the greatest care should be taken in selecting cases.

The course of treatment for each patient should be based on the original clinical findings and modified according to the response produced.

I wish to thank Dr. Thomas Beaton, physician-superintendent of this hospital, for helpful criticism and for permission to use the case material; and Dr. Elizabeth Barker, senior assistant physician of the hospital, for help in connexion with the female case-records.

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EFFECT OF TEMPERATURE ON SEDIMENTATION-RATE

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THE effect of temperature on the erythrocyte-sedimentation rate has been noted by workers using all the different techniques that are known. Westergren (1921) suggested a correction for it, especially if cases were to be followed up, but he stated that the difference in temperature in the average laboratory was not great. Nichols (1942) states that any technique is valueless if the results are not comparable on repetition, and he notes the importance of a constant temperature if the results are to be reproducible. It was through trying to obtain reproducible results that the following work was performed; there is a regional chest centre based on this hospital, and some cases have to be tested many times.

The standard E.M.S. issue is the Westergren apparatus. With the stand supplied, if one of the six tubes was fixed vertically with its lower end in the centre of the rubber pad at the base, it was found that, if the other five tubes were also to be vertical, their lower ends were scattered round the periphery of their respective pads, and none of them would occupy the same relative position; this wasted a great deal of time when the tubes were set up. Also, it became obvious that the Westergren technique would not allow for the changes in corpuscular volume, such as resulted if a patient had had much blood-loss or a transfusion before operation.

ANALYSIS OF 736 CASES USED IN TESTING SEDIMENTATION-RATE

Chest investigation	No. of cases	Medical wards	No. of cases	Surgical wards	No. of cases
Carcinoma of œsophagus	6	Psycho-neurosis	75	Carcinomata	23
				Osteomyelitis	7
Carcinoma of bronchus	27	Peptic ulceration	24	Postoperative sepsis	21
Mediastinal Hodgkin's disease	7	Diarrhœa	15		
		Infective hepatitis	4		
Cardiovascular lesions	12	Malaria	29		
Lung abscess	17	Urinary infections	13		
Empyema	50				
Bronchiectasis	55	Blood diseases	29		
Bronchitis	72	Rheumatism and chorea	62		
Pulmonary tuberculosis	142	Arthritis and spondylitis	40		
Pick's disease	6				
Total ..	394		291		51

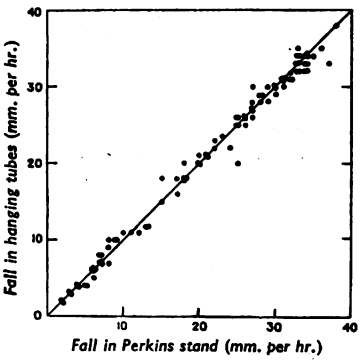

Fig. 1—Comparison of readings at 20° C in the Perkins stand and in hanging tubes, showing very little difference.

A change was therefore made to the Wintrobe technique, using the Perkins stand and the correction graph of Hynes and Whitby (1938). The results were still not reproducible, and the variant factor was temperature. The laboratory is a single-storied building placed on an exposed hillside, and the temperature could vary 7° C in a day, and more than 15° C between winter and summer. Mere statement that the test was performed in a certain season gives no indication of the average temperature: four inches of snow appeared in a recent May.

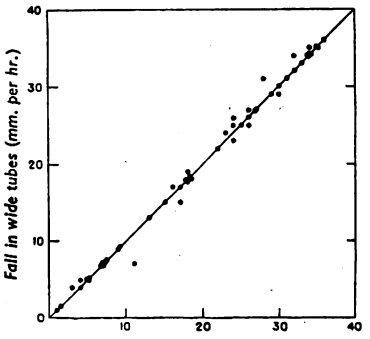

Fig. 2—Comparison of readings at 20° C in tubes 3·5 mm. in diameter (Rourke and Ernstene 1930) and in tubes 2·5–2·8 mm. in diameter (Wintrobe), showing very little difference.

TECHNIQUE

To perform the following experiments an apparatus had to be devised that would allow the sedimentation tubes to be kept at controlled temperatures. A holder was designed to slip over the top of the tube and allow it to hang as its own plumb-line (Rogers 1946). The tubes were suspended in water contained in a glass 7-lb. sweet-jar by passing them through a perforated cardboard lid; one set of tubes was kept at a standard temperature of 20° C and the other at the test temperature. (A tube stops swinging within a few seconds when suspended in water.)

The temperature was maintained to within 1° C; thus, if there was to be a mean temperature of 10° C, the water was placed at 9·5° C; when it was warmed to 10·5° C, the lid was lifted off the jar, and the tubes were transferred to another sweet-jar with water at 9·5° C. This would necessitate about two changes of water when there was 10° C difference between the external room and the test temperature.

The material used consisted of blood from routine examinations, mostly from chest cases. The bloods were all drawn by me, using no. 20 hypodermic needles, oil-sterilised syringes, and no tourniquet; 2 c.cm. of blood was placed in a tube containing the correct amount of Heller and Paul's mixture or heparin. Up to six different bloods were put up for the test, $^1/_2$–2 hours after collection; the bloods were thoroughly mixed, and a set of tubes was filled at $^1/_2$-min. intervals and placed at 20° C; the same bloods were remixed and then placed into duplicate tubes at the test temperature.

There was, therefore, in each point plotted a strict comparison between the same blood, in the same anti-

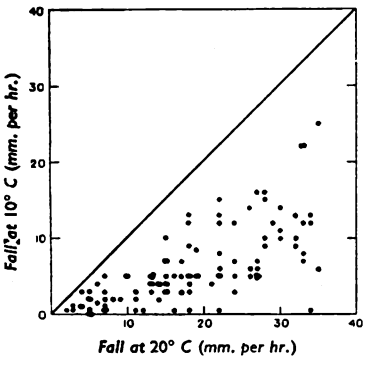

Fig. 3—Comparison of readings at 20° C and 10° C.

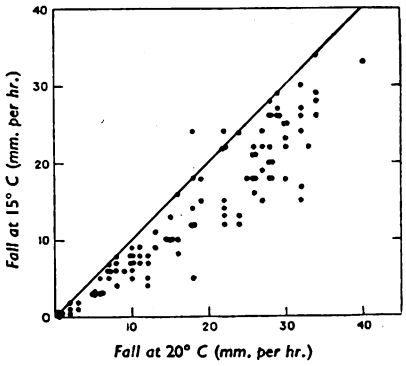

Fig. 4—Comparison of readings at 20° C and 15° C.

coagulant put up in a similar tube but at a different temperature. The fall was recorded an hour after each blood was put up; comparisons were made between the corrected rates, after the bloods had been centrifuged and corrected by Hyne and Whitby's graph.

Weingarten (1945), using Westergren's technique, has shown that the accelerating effect of high temperature is not constant; that, when liver damage is well marked, a sedimentation-rate test performed at 3·5° C will give a higher reading than will a duplicate test at 38° C. An analysis of the cases used in this investigation is given in the accompanying table. None of the cases would be likely to fit into Weingarten's group III; they would all seem to be in his group I, which is probably the same for most cases in any English hospital.

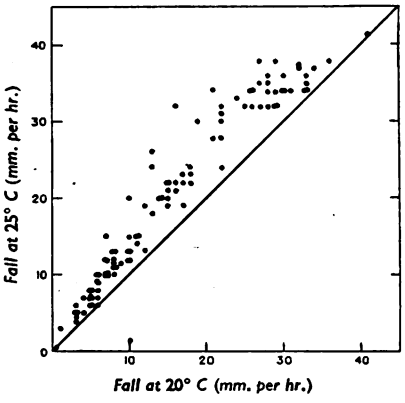

Fig. 5—Comparison of readings at 20° C and 25° C.

RESULTS

Figs. 1–7 show the patterns obtained; they record the results of just over 100 experiments at each temperature. No graphs have been drawn, as it is not desirable that corrections should be attempted; but it would be more useful if a standard temperature was always used. Figs. 3–7 show the effect of varying the temperatures at which the tests are done. The differences are most marked in the middle range; for example, a "slight" could become a "moderate" increase in rate, if the temperature were 5° C higher (20°–25° C). The 10° C chart shows that this temperature provides results that are too scattered, at all increases in rate, to be trustworthy.

TIME TAKEN FOR BLOOD TO REACH TEMPERATURE OF SURROUNDING WATER

A micro-ammeter was connected to a thermocouple kept in an ice-water mixture at 0° C; another thermocouple, in series, was first placed in water at 22° C, then at 32° C, and readings were taken on the ammeter for the purpose of calibration. A Wintrobe tube, with a thermocouple placed down the centre, was filled with blood and suspended in water at 32° C; it was then transferred to water at 22° C, and the time that the ammeter took to equilibrate to the 22° C reading was noted. The experiment was repeated with the tube transferred back to the water at 32° C. The thin type (Baird and Tatlock) Wintrobe tube took an average of 52½ sec. and the thicker (Hawksley) glass Wintrobe tube took 67½ sec. to attain an equilibrium. (It was realised that the type of curve was really asymptotic, but the results are sufficiently accurate for this type of work.) Each result is the average of four experiments.

CONCLUSION

It seems that the experiment of Wintrobe and Landsberg (1935), from which they concluded that there was no significant effect of temperature betwen 22° C and 27° C, gave a wrong impression, and that a rise from 22° C to 27° C has very appreciable effects. In their paper giving a correction graph for varying corpuscular volumes Hynes and Whitby (1938) do not mention the temperature, but Whitby and Britton tell me that this work was carried out in winter, without temperature being recorded or controlled. From the above results it appears that their average temperature was probably about 18° C; this is at variance with Whitby and Britton (1944) who suggest performing the tests at temperatures between 22° C and 27° C; this range is both too high and too wide.

The ranges of temperature experienced in this laboratory are probably very similar to those in sanatoria, and it is desirable that the temperature at which the tests are carried out may be controlled in the future. Often a test is set up in the ward, which is well ventilated; hence in winter the temperature will be very near 10° C, a temperature at which results are untrustworthy. This will explain the results quoted by Edwards and Cuttrill (1942) who urge the use of a standard temperature.

SUMMARY

A method has been devised of keeping sedimentation tubes at a controlled temperature by suspending them in a container of water. The use of only one constant temperature is desirable.

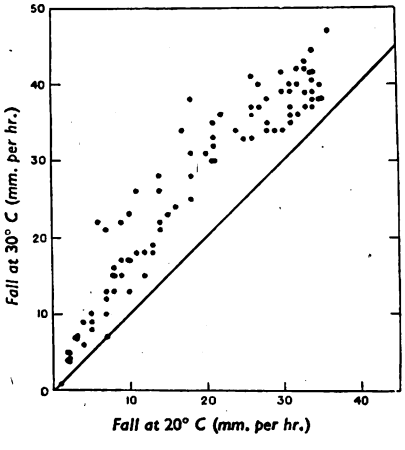

Fig. 6—Comparison of readings at 20° C and 30° C.

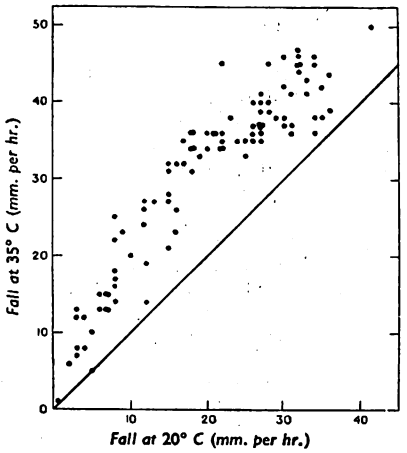

Fig. 7—Comparison of readings at 20° C and 35° C.

In the cases investigated (in England) variation in temperature affected the sedimentation-rate, increased rates being recorded with rises in temperature. Temperatures below 15° C should never be used.

I wish to thank Mr. E. W. Switzer, of Shotley Bridge, who produced the original holders; Messrs. Willen Bros. Ltd., for making the holders; Sir Lionel Whitby and Dr. C. J. C. Britton for help and advice; my colleagues in this hospital for their coöperation; and Mr. L. B. Holt, who supplied the apparatus and advised in the experiments using the micro-ammeter.

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TREATMENT OF YAWS WITH PENICILLIN

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THE original observations of Mahoney et al. (1943) on the curative action of penicillin in syphilis have now received ample confirmation. Comparatively few investigations, however, have been made on the action of penicillin in yaws.

In a preliminary communication from West Africa, Findlay et al. (1944) recorded results obtained with penicillin in 24 cases of primary and secondary yaws. Whitehill and Austrian (1944) reported the successful treatment of 17 cases in Fiji, da Cunha et al. (1944a and b) 12 cases in Brazil, and Logfren (1944) 1 case in a European. These observations showed that *Spirochæta pertenue* is highly susceptible to penicillin; the period of observation, however, was in all cases short.

In the present communication, in addition to the 24 cases originally described (Findlay et al. 1944), of which 20 were followed for considerable periods, 104 further cases are discussed. The patients were all African children or mothers belonging to various tribes.

TECHNIQUE OF ADMINISTRATION

Both sodium and calcium salts were used intramuscularly. With 20,000 units dissolved in saline and injected every three hours for twelve to twenty-four hours, the primary and secondary lesions rapidly disappeared. Continued observation showed, however, that after two to three months some cases relapsed, as had been noted in syphilitics by Mahoney et al. (1944). A total dosage of 1,000,000–1,500,000 units thus seemed indicated, but a course of three-hourly injections for six or seven days was impossible with African children.

On the appearance of the paper by Romansky and Rittman (1944), suggesting the suspension of penicillin in ground-nut (pea-nut) oil with beeswax, this technique was adopted: 5 c.cm. of sterilised 2% beeswax in ground-nut oil is added to the solid penicillin in the phial, and the mixture is shaken with glass beads for an hour. Despite great care the resulting suspension, at any rate in the tropics, was lumpy. It had to be injected through a wide-bore needle, and the injection caused extreme pain. A second method was therefore tried. The dried penicillin was first dissolved in 1 c.cm. of sterile physiological saline; then 4 c.cm. of sterile beeswax in ground-nut oil was added. On shaking immediately before administration a fine emulsion was produced. One daily injection of 100,000 units was given intramuscularly. This was well tolerated and caused little pain.

CONCENTRATION OF PENICILLIN IN BLOOD AND URINE

Tests on the concentration of penicillin in blood and urine, when penicillin was given by the above two methods, were made both by the slide-cell technique and by the capillary-tube method described by Fleming (1944).

The administration of 100,000 units every twelve hours in beeswax and oil suspension gave a persistent blood concentration of 0·1–0·15 unit, and urine concentrations of 60 units per c.cm. throughout the twenty-four hours. When the same dose was given in an emulsion of saline with oil and beeswax, the blood and urine concentrations were of the same order and only more sustained by two or three hours than those obtained when penicillin was given in saline alone (cf. Fleming et al. 1944).

TIME OF DISAPPEARANCE OF SPIROCHÆTES

In 6 cases of secondary yaws in children, serum from lesions was examined for spirochætes by dark-field illumination. Results are shown in table I. Spirochætes were no longer visible in the lesions nine to twenty-four hours after the start of treatment. Logfren (1944), in his case of yaws in an adult European, found that the spirochætes had disappeared eighteen hours after treatment; Whitehill and Austrian (1944) found them absent after sixteen hours in 16 cases, and forty hours in 1 case.

RESULTS OF TREATMENT

There appeared to be little difference between the clinical results obtained with sodium penicillin and with calcium penicillin; nor, despite the low blood and urine concentrations obtained with the saline and ground-nut oil suspension, did the results appear inferior to those obtained with penicillin in saline alone or in oil suspensions.

The only serious reaction was an abscess in the buttock of one small boy; the pus contained penicillin but yielded a pure growth of *Ps. pyocyanea*. No Herxheimer reactions were observed, though in syphilitics treated with penicillin Mahoney et al. (1944) and Moore et al. (1944) encountered them in 86% and 59% respectively. It must be remembered, however, that African children so constantly have attacks of malaria that they make little of a temperature which would at once send a European to bed.

TABLE I—DISAPPEARANCE OF SPIROCHÆTES

Case	Time of disappearance after treatment (hr.)	Dose of penicillin* (units) up to time of disappearance	Total penicillin* (units) used to complete treatment
18	9	75,000	100,000
19	9	50,000	50,000
21	9	75,000	120,000
58	24	200,000	1,200,000
75	9	100,000	1,300,000
110	24	200,000	1,200,000

* In saline

Primary Cases.—We treated 15 cases of primary yaws; dosage varied from 100,000 to 1,500,000 units. There were 2 failures, though 1 of these cases showed slight improvement in four months. The average time for a clinical cure—that is, the disappearance of the mother yaw—was nine days. Within twenty-four hours there was drying up of the yaw and flattening of the verrucous base, or, in cases where a scab had already formed, pronounced desiccation; within forty-eight hours commencing epithelisation was apparent or desquamation of the scab; in three to six days healing

of the lesion was well advanced; by about the ninth day the site of the lesion was denoted by a grey-brown or pink scar, or, in the case of a thick keratinised surface like the sole of the foot, by complete restitution of normal tissue.

Of these 15 cases, 6 were followed up: 4 showed sustained cures, 1 at four months, 1 at five months, and 2 at seven months; 1 case had relapsed at three months but again responded to further treatment and had no relapse five months later; and 1 case, which had appeared to be an immediate clinical failure, was found to be cured when seen eight months later.

In 5 cases the Kahn reaction was reversed; in 2 after one or two weeks, in 1 within four months, and in 2 within seven months of treatment. The first 2 cases had only two or three weeks' history of yaws; the dosage of penicillin was 100,000 units. The other 3 cases were of six weeks' to three months' standing; and, though the Kahn reaction was not reversed three months after treatment, it later became reversed. In 1 case, which had four days' history of yaws and a negative Kahn, there was an immediate clinical cure, which was sustained

TABLE II—FOLLOW-UP RESULTS IN SECONDARY YAWS

Period of observation (months)	No. surveyed	No. of sustained cures	No. of relapses during this period
1½–3	63	61	2
4 – 6	45	44	1
7 –12	21	21	..

after a month's follow-up, the Kahn reaction being still negative.

A typical primary case treated with penicillin was as follows.

CASE 1.—A girl, aged 2 years, had two weeks' history of a large primary yaw on the left heel, consisting of an ulcer 1 cm. in diameter, with a fungoid granulomatous base. Kahn and Ide tests both negative. Penicillin sodium, 100,000 units, in beeswax and oil, injected into buttock.

Within twenty-four hours there was drying up of the ulcer and flattening of the verrucous base; at forty-eight hours epithelisation was apparent; and at seventy-two hours healing of the ulcer was well in progress. At six days the lesion was healed, leaving pink scar tissue. A month later cure was found to be sustained. No relapse. Kahn and Ide both negative. No further follow-up.

Secondary Cases.—We treated 96 secondary cases; 81 completed the course, and 78 of these showed immediate clinical cure. The result in 15 cases was uncertain, because immediately after the course of treatment the patients ceased to attend and left the district.

The average time for clinical cure was eight and a half days. The papules desquamated, and the typical yaw scabs dried up and lost their yellow colour within twenty-four hours. Between two and ten days the scabs underwent further desiccation and flaked off, leaving white, pink, or greyish-brown scar tissue at the site of the original lesion.

Table II gives the results of a clinical follow-up over a period up to a year of cases which were originally "immediate clinical cures": 63 cases were followed up to three months, 45 up to six months, and 21 up to twelve months.

On relapse, yaws lesions in new situations were commonly encountered, but also there was often a breaking down at an old site to form a shallow ulcer, which sometimes had a very mixed flora, including on occasions spirochætes and fusiform bacilli; such lesions may therefore have been ordinary tropical ulcers.

Table III gives the results of a serological follow-up over a period up to one year. This survey shows 7 cases with reversal of Kahn out of 40 cases examined, up to a year from the date of treatment.

TABLE III—SEROLOGICAL FOLLOW-UP RESULTS IN SECONDARY YAWS

Period of observation (months)	No. of cases examined	No. of cases with reversal of Kahn	No. of cases with positive Kahn
1½–3	40	1	39
4 – 6	31*	4	27
7 – 9	19	2	17
10 –12	8	..	8

*Includes one case that had a reversed Kahn reaction at 4 months but a serological relapse at 5 months, though still maintaining clinical cure.

A typical secondary case was as follows.

CASE 2.—A boy, aged 2½ years, had eight months' history of a primary lesion on the inner border of the right thigh and six months' history of multiple secondary lesions. The main sites were chin and neck, abdomen, pubis, perineum, and occiput. Nasal discharge and seborrhœa present. Ide test positive. Spirochætes demonstrated in the yaws in large numbers. Sodium penicillin 100,000 units was given over twelve hours intramuscularly.

Spirochætes disappeared from the yaws within nine hours. Within twenty-four hours the primary lesions had dried up and presented a pink glazed appearance; snuffles ceased. Within forty-eight hours all yaws showed thinning and shrinking of their crusts, and darkening and complete disappearance of the typical yellow colour, the whole giving an appearance of desiccation. Some lesions had already shown separation at the periphery. By six days all yaws had disappeared, leaving either a pale fairly sound skin at the site of the lesion or a grey-brown leathery surface. By ten days there was no evidence of active yaws, and the only stigmata left were the areas of scarring denoting the site of the original lesions. Ide test positive after twenty-one days. Eleven months after the start of treatment the cure had been sustained and there had been no relapse, the Ide test still being positive.

Tertiary Cases.—We treated 17 cases with bone lesions due to yaws: 11 gave immediate clinical remission of symptoms, and almost complete disappearance of osseous signs within sixteen and a half days; 4 showed improvement; and 2 did not respond to treatment at all.

We followed up 6 cases: 2 patients observed at four months, 1 at eight and a half months, and 2 at ten months were in good health. In 1 case there were clinical relapses at six weeks, and at four, seven, and eleven months, but nevertheless the Kahn reaction was negative at the last date.

There were also 2 cases of goundou, which is commonly regarded as a tertiary manifestation of yaws. Neither

TABLE IV—RESULTS OF TREATMENT WITH ARSENICALS ALONE OR PRECEDED BY ONE INJECTION OF PENICILLIN

Acetylarsol alone			Penicillin and acetylarsol			Neoarsphenamine alone			Penicillin and neoarsphenamine		
Cured	Improved	No change	Cured	Improved	No change	Cured	Improved	No change	Cured	Improved	No change
Secondary											
1	..	4	5	1	..	5	3	1	4	..	..
Tertiary											
3	4	8	9	3	2	11	3	3	12	..	4

of them was cured, but 1 had relief from pain and considerable decrease of swelling.

Of 2 cases of foot yaws treated, 1 was clinically cured, and 1 showed considerable improvement immediately after treatment, and on examination seven months later was completely healed without any further treatment.

A typical tertiary case was as follows.

CASE 3.—A boy, aged 10 years, had had primary yaws two and a half years ago, and had a week's history of pain and

swelling above the left wrist. Kahn and Ide tests positive. He had had tropical ulcers for many years.

April 14, 1945: radiography showed a yaws periostitis at lower end of right radius, with slight medullary rarefaction. Sodium penicillin in beeswax and oil in daily dosage of 100,000 units was given intramuscularly for fifteen days. The arm was splinted. Within two days the pain subsided.

April 24: clinically much improved, with very little swelling; radiographic appearances showed no extension of lesion, and an area of increased translucency, with cortical erosion and periostitis, in the shaft of the radius 1 in. above the epiphyseal line.

May 5: pain and swelling had disappeared; clinical cure; radiography showed some regeneration of cancellous bone, and less translucency.

June 12: radiography showed a slightly decalcified oval area about 1 in. long in the lower radial shaft, with an associated thin layer of smoothly ossifying periostitis.

August 1: cure clinically sustained; Kahn and Ide tests, both positive; radiography showed slight sclerosis and restoration of normal structure in the formerly translucent areas, and periosteum ossified and almost united to cortex.

Thus there was clinical cure after about a week, but radiologically the lesion progressed at one to two weeks, and then steadily retrogressed until, three and a half months afterwards, there was little evidence of former disease.

COMPARISON OF PENICILLIN AND ARSENICALS

To compare penicillin and arsenicals in the treatment of yaws, each of the following treatments was given in a few cases: (1) acetylarsol 1·25 g. daily for fourteen days; (2) one injection of penicillin 100,000 units in oil followed by acetylarsol 1·25 g. daily for fourteen days; (3) three weekly injections of neoarsphenamine 0·6 g.; (4) one injection of penicillin 100,000 units in oil followed by three weekly injections of neoarsphenamine 0·6 g. The results are given in table IV.

The period of observation has been a month; no reversal of Kahn has taken place. Though the series is obviously too small to allow any definite conclusion, a single injection of penicillin followed by acetylarsol seems to be preferable to acetylarsol alone, but with neoarsphenamine the synergic action of penicillin is not in evidence. Of the 62 tertiary cases treated, 11 had yaws ulcers. The result of treatment of the cases with ulcers was as follows:

Treatment	*Cured*	*Improved*	*No change*
Acetylarsol	1	2	1
Penicillin and acetylarsol	2	1	..
Neoarsphenamine	3	..	..
Penicillin and neoarsphenamine ..	1	..	..

DISCUSSION

In most cases the penicillin dosage consisted of 100,000 units in oil injected intramuscularly once or twice daily, the object being to obtain a continued low concentration of penicillin in the blood, as distinct from the initial peak followed by rapid elimination of penicillin, which is produced by an intramuscular injection of the drug dissolved in saline (Fleming et al. 1944).

McDermott et al. (1945) suggest that, in the treatment of syphilis by repeated doses of penicillin, a minimal effective level need not be maintained absolutely continuously. Intermittent treatment, aimed at obtaining a minimal effective concentration in the blood at intervals corresponding to the growth phases of the spirochæte, would be as efficient. This may well apply to yaws.

Disappearance of the organisms from the yaws lesion does not appear to be influenced by the amount, above a minimal concentration, of the single or the total dosage of penicillin, a fact also noted in syphilis by Moore et al. (1944).

Our results showed that in 12 of 14 cases with primary lesions, and in 78 of 81 cases with secondary lesions, healing took place in an average period of nine and eight and a half days respectively. Out of 17 cases with bony lesions (tertiary), 11 showed complete disappearance of signs and symptoms, and 4 were improved at an early date. Of 2 cases of goundou, 1 showed a slight response and 1 no response at all. The results with penicillin compare favourably with those of other forms of treatment, an important feature being the absence of toxic reactions.

In both syphilis and yaws it is well recognised that, though it is possible to clear up the lesions of the primary and secondary stages with comparative ease, protracted observation is essential if the final results of treatment are to be evaluated. This applies as much, if not more, to yaws. Many African soldiers, for instance, are seen with active tertiary yaws of recent onset who say that years ago they had a series of injections of a yellow fluid into the vein of the arm. It is therefore fully realised that the period of observation of our own cases—and this applies also to all other investigations so far reported on penicillin in yaws—is far too short to allow of final judgment being passed.

In the present series, out of 5 primary cases originally cured and observed during a period of four to seven months, 1 relapsed; out of 45 secondary cases originally cured 3 relapsed during a period of one to twelve months; and during a similar period 1 tertiary case relapsed out of 6.

In yaws there appears to be considerable uncertainty as to how far serological reactions are a significant guide to ultimate cure. In the present series treated with penicillin, the following results were obtained in sustained cures of primary, secondary, and tertiary yaws:

Period of observation (months)	*No. of cases*	*Kahn positive*	*Kahn negative*
1½– 3 ..	43 ..	42 ..	1
4 – 6 ..	38 ..	33 ..	5
7 – 9 ..	38 ..	25 ..	13
10 –12 ..	12 ..	11 ..	1

The number of serological reversals was thus small, and it seems that a serologically positive reaction does not necessarily mean lack of therapeutic response. If this is so, serological controls should at the most act as a guide to treatment rather than as a test of permanent cure.

During a short period of observation Whitehill and Austrian (1944) were unable to determine any effect of penicillin treatment on the serum Kahn reaction in yaws, even though the dosage they used was about 1,000,000 units. On the other hand, da Cunha et al. (1944a and b), though they used only 9600–54,000 units, claim to have obtained complete reversal of the Wassermann reaction in 8 out of 11 cases, and in a further case the Wassermann reaction was negative at the beginning of treatment and remained negative. No explanation is forthcoming for the different results in the serological reactions obtained in West Africa and Fiji on the one hand, and in Brazil on the other.

A striking result of penicillin treatment has been the change in the granulomatous bone lesions of tertiary yaws. According to Goldmann and Smith (1943), without treatment the osseous lesions of yaws invariably become worse, either with thinning of the cortex and subsequent deformity, or with bone thickening, so that the medulla is encroached on and the line of demarcation between medulla and cortex is lost. This picture may remain unchanged for years or may slowly progress to give the appearance of "marble bone."

As shown radiologically, there is after treatment a very rapid rarefaction of bone, a process which suggests a deterioration, were it not that the clinical signs indicate improvement. This initial rarefaction, which is similar to that observed in penicillin-treated cases of coccal infection of bone, is followed by a rapid formation of normal new bone. Stokes et al. (1944) found that bony lesions in syphilis treated with penicillin healed in from one to six and a half weeks, but they make no mention of radiological control of the healing process. Helfet (1944), in yaws treated with either neoarsphena-

mine or bismuth and 'Sulphostab,' found relief from pain in the bones in one or two weeks, with some early healing of the osseous lesions in six weeks. Our experience of the osseous lesions of tertiary yaws treated with 'Sobita' or with neoarsphenamine indicates a much slower period of healing than with penicillin.

At this stage it would be foolish to compare the permanent results of penicillin treatment of yaws with those obtained with such drugs as neoarsphenamine, acetylarsol, and sobita, but penicillin clearly has some advantages over bismuth and the arsenicals. The rapidity with which the lesions begin to heal is remarkable and has an excellent psychological effect on African patients. The single daily intramuscular injection allows the therapeutic course to be completed in a much shorter time than with either sobita or the arsenicals, an advantage both to those who are giving numerous injections and to the patients, whose attendance is more likely to be regular. Penicillin is far less liable to cause toxic reactions than either arsenical or bismuth preparations. As mentioned previously, Findlay et al. (1944) in one instance found that the lesions of both yaws and of bismuth stomatitis, associated with spirochætes and fusiform bacilli, were rapidly removed by penicillin.

Preliminary observations suggest that acetylarsol and penicillin in combination may act synergically on the spirochætes of yaws, and that penicillin for the acute stage, followed by protracted arsenical therapy, is possibly the ideal treatment if complete and lasting cure is to be attained. Whether, in an area where the possibility of reinfection is by no means remote, it is desirable to effect a radical cure is a problem which requires much fuller investigation.

In the two small villages from which the bulk of our patients were derived there has not appeared any case of primary or secondary yaws in the last five months, suggesting that, if all early cases could be promptly treated and rendered non-infectious, the incidence of yaws in particular areas might be greatly reduced.

SUMMARY

In 128 cases of yaws (15 primary, 96 secondary, and 17 tertiary) treated with penicillin the method of choice was a daily injection of 100,000 Oxford units in groundnut oil and beeswax, up to a total dosage of at least 1,000,000 units.

Spirochætes disappeared from the lesions in 9–24 hours after doses of 50,000–200,000 units.

There was remarkably rapid healing of the acute lesion in primary and secondary yaws, the average times being 9 and $8^1/_2$ days respectively.

With bony lesions of tertiary yaws considerable success was achieved both clinically and radiologically in a few weeks.

No correspondence could be found in the follow-up investigations between sustained clinical cure and reversal of Kahn reaction.

In 20 cases penicillin was given with either acetylarsol or neoarsphenamine. The results suggest that penicillin in the acute stage, followed by a more prolonged arsenical treatment, is the ideal therapy for ultimate and permanent cure, but further controlled observations are required.

Our thanks are due to Brigadier H. B. F. Dixon, D.D.M.S., West Africa Command, and the Director of Medical Services (Colonial Medical Service), Gold Coast, for permission to publish these observations; and to Dr. O. Ampofo and Mr. A. Kpeglo. Private Amoah, W.A.A.M.C., gave us much assistance.

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THE USES OF PLASTICS IN SURGERY

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IN the last few years plastic chemistry has developed a number of new materials and has shown that many biochemical substances possess plastic properties which can usefully be applied in surgery. Most of the fundamental and pioneering applied work has been done in Great Britain and in North America.

Since instruction in plastics is not included in the medical curriculum, a summary of their salient characteristics is a necessary preliminary to a survey of their place in surgical practice.

Plastics are chemical substances of high molecular weight. They are deformable (mouldable) under suitable conditions and retain their acquired shape thereafter in a normal environment. They are versatile in that the end-product of the plastic process can be given different physical properties. For instance, some plastic might be made into a moulded ivory-hard object, a flexible rubbery mass, a thin adhesive film, a yarn that might be woven into fabric, or a highly porous spongy or foam-like structure. Provided they fulfil the requisite criteria of surgery they can be used in place of existing materials, and in some cases they make new surgical procedures possible.

Plastics can be grouped according to their physical and chemical behaviour and divided into absorbable and non-absorbable materials according to their interaction with living tissue (Blaine 1945a). The accompanying table gives the facts of interest to the surgeon.

SPECIAL APPLICATIONS

In *bone surgery* plastic materials have been used for filling gaps in the cranial vault and facial bones. Acrylics have been found most useful for this. After animal experiments had proved the harmlessness of polymethyl methacrylate in trephine holes of the cranium of the cat (Blaine 1946a) and rabbit (Beck et al. 1945), Small and Graham (1945) reported 30 cases in which acrylic obturators had been used in filling cranial defects. Shelden et al. (1944) used entire acrylic "cranial vaults" in investigations on shock in monkeys. A good description of the current "dental" technique of use of acrylics is found in both these papers.

Attention has to be drawn to the late behaviour of acrylic plates in bone gaps. Sometimes the plate, quiescent for six months or more, has become loose and worked its way to the surface (Blaine 1945b). This was more likely to happen where transplanted skin was used to provide skin cover; experimentally it happened regularly where the bulk of the implant caused tension in surrounding tissue and possibly interfered with vascularisation. I have seen two cases where acrylic plates were used in covering defects after operations on the frontal sinus; in one case the plate was firm for three years before it became loose; it could be moved about under

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the skin but it caused otherwise no discomfort. There was no tendency in this case for the plate to "work itself out."

Acrylics are currently used with the "dental impression" technique. Many excellent descriptions, with as many individual modifications, are available, and two have been referred to above. The use of this method demands the assistance of trained dental mechanics and necessitates a two-stage operation: in the first stage the impression of the gap contour is taken; in the second the finished prosthesis is fitted. The use of this technique is an obvious drawback and provides, in comparison with tantalum, the advantages of radiolucency and cheapness only; many brain surgeons consider it more complicated than the fashioning of a bone graft to the gap.

Two methods have been described and demonstrated (Blaine 1945a) which permit the use of acrylics in one stage. The one makes use of ultraviolet-ray acceleration of polymerisation (setting) of "activated" acrylic dough, formed in situ; the other method makes use of the "thermoplastic" properties of preformed unplasticised methyl methacrylate sheet. This sheet when heated to 130° C becomes readily mouldable and soft to handle. Pressed to a model it takes the exact shape of the "master" and retains this acquired shape on rapid cooling. Either of these methods enables methyl methacrylate to be used in a short time, say 15–20 min. A detailed description of the methods is given elsewhere (Blaine 1946a). Another simplified in-situ process has since been developed and will be described shortly.

Harmon (1943) described the use of acrylic "joint-caps" in the operative treatment of arthritis of the hip and in the reconstruction of the small joints of the hand and foot. Very little has been heard of this application since the first paper on the subject, and it is therefore difficult to evaluate its usefulness in comparison with the metals.

It may be remarked that indifferent and frankly bad results following the use of acrylics in these and other fields might well be due to the purely practical exploitation of acrylics, inevitable in war-time, without due attention to fundamental physiological research; it must be realised that reaction to acrylics varies with the amounts and nature of plasticisers and other added substances which are found in most commercial preparations. Cutler (1946) expressed himself particularly forcibly on this subject, drawing attention to the "mere trickle" of really scientific dental contributions in this specialised subject, as against the spate of technical articles and notes.

In *dental and faciomaxillary work* acrylics are now well established. Many appliances formerly made of precious metal are now made of these plastics, as a routine. Clarkson et al. (1946) summarise the work of the faciomaxillary units in the Central Mediterranean Force; about 90 acrylic Gunning splints were fixed in 45 cases of fracture of the edentulous jaw.

Acrylic splints are enthusiastically recommended (McGowan 1945, Scales and Herschell 1945, Cholmeley 1945) for splinting forearms and wrists, and at the National Orthopædic Hospital at Stanmore a method has been devised for adapting acrylic sheet for use as a spinal jacket.

At present acrylic splints hardly fulfil all the criteria one ought to apply to new materials replacing old and trusted ones (see Blaine 1945b). However attractive and elegant a plastic splint or appliance looks, its direct moulding to the human frame requires greater heat than the operator's hands and the patient's skin will tolerate; its "indirect" application by the dental method is too complicated; the fact that it does not absorb moisture is hardly as advantageous as has been claimed (McGowan 1945). The plastic splint allows sweat to accumulate; pruritus develops, and the odour of the skin fully counteracts the elegant appearance, lightness, radiolucency, and "washable" nature of the splint. However, in cases where the splint can be removed daily—e.g., in radial-nerve palsy—acrylic splints are useful.

I have used acrylic dough (of the commercial type) for splinting a forearm in a patient who volunteered for this treatment. The method consisted of the application of the "kneaded" and "flat-rolled" dough to the limb; the dough could be cut with a pair of scissors. The splinted limb was exposed to the rays of the tropical sun to accelerate the setting of the plastic. Though the result was mechanically excellent, the dough caused acute dermatitis and had to be removed on the second day. Whether specially treated dough would be more satisfactory remains to be seen. Excess monomer was probably responsible for the dermatitis.

Before any plastic is recommended to replace plaster-of-paris in orthopædic splinting, it is well to bear in mind that it would have to possess the following properties: cheapness; foolproof handling; quick setting without complicated machinery; and porosity. Were these added to the existing properties of plastics—radiolucency, lightness, elegance, and the fact that they allow the patient to wash and bathe—the plastic splint or spinal appliance would come to stay.

OPHTHALMOLOGICAL USES

Contact lenses and artificial eyes made from acrylic plastics do not break easily, but they are easily scratched, and their cost is relatively high (Stewart 1946).

Flexible rubber-like plastics of the polyvinyl group are increasingly used as drainage-tubes (Mann 1945) and take the place of rubber on many an anæsthetic airway (Thornton 1944). The tolerance of tissues to polyvinyls varies, however, and it must be remembered that this material is always plasticised and that countless varieties exist. Before these materials are recommended for use, the tolerance of tissues to the different makes will have to be established.

Polyvinyls are also used as soft-tissue prostheses (masks) in plastic surgery. Reports from the U.S.A. (Lougee 1943) and from Australia (Woerner et al. 1945) are encouraging. The polyvinyls are, however, photosensitive and cannot therefore be worn indefinitely (Office of Scientific Research and Development 1943).

In *suture materials* plastic chemistry produced 'Nylon,' the popularity of which makes further comment unnecessary. The reaction of the tissues to it is excellent (Aries 1941); its only drawback is that the material slips, and knots have to be double and tied with great care.

ABSORPTION

The finding that certain plastics were absorbable was perhaps the most important step in the development of plastics for surgical uses. Research was long directed towards the development of absorbable materials for surgery. Used as thin homogeneous films such materials are required to "isolate" healing tissues, thus preventing the formation of adhesions. Amnioplastin, used for some time, was found unsatisfactory by Rogers (1943). Used as carriers of biochemical hæmostatics, such as thrombin, they must facilitate control of capillary oozing. Woven into gauze-like fabric they can control hæmorrhages otherwise difficult to deal with. They can possibly also be used as vehicles for penicillin and thus ensure a more prolonged action. Painted or sprayed over surface wounds and burns they can combine the advantages of the open and closed methods of treatment. The ideal absorbable material must naturally be sterilisable by heat and compatible with added substances, and its handling must be simple.

The first practical development was made with oxidised cellulose (Frantz 1943, Frantz and Lattes 1945, Frantz et al. 1946). Suitably treated cellulose (oxycellulose) was woven into gauze and made into film and foam; it was found that it could carry thrombin. Experiments have shown that it was readily absorbable with a

CHARACTERISTICS AND SURGICAL USES OF PLASTICS

Material	Physical form in which used	Tissue reaction	Sterilisability	Uses
Acrylic (polymethyl methacrylate)	Processed and moulded plates, dough, and ultra-violet-sensitised dough	Mild fibrous reaction to all physical forms; no giant cells; some solvents—e.g., acetone—irritant	By heat and pressure; plasticised material undergoes some deformation	Cranial and faciomaxillary obturators, plates; external prostheses
Cellulose acetate	Flexible films	Massive fibrous tissue formed around implant (Graef and Page 1940)	By heat and pressure	Experimentally for producing "armour plating" round kidney and blood-vessels
Methyl cellulose	Solution	Not tested	By heat and pressure	Experimentally as plasma substitute
Polyamide ('Nylon')	Filament yarns, solid plates	Mild fibrous reaction; no giant cells	By heat and pressure	Suture materials; experimental bone plates and screws
Urea and phenolic resins	Resin, for coating and moulding cloth	The resins are highly irritant	Sterile	Experimentally as splints
Polyvinyl chloride	Flexible sheets, tubes, blocks	Variable reaction depending on added materials	By heat and pressure	Drainage-tubes, airways, facial prostheses
Polyvinyl alcohol	Solution	Not tested	By heat and pressure	Experimentally as plasma substitute
Casein	Solid rods, blocks, film-forming emulsions	Transient aseptic inflammation during absorption	Deforms on heat-treatment unless specially packed	Experimental bone plates and screws; films in treatment of burns
Fibrin and fibrinogen	Solid blocks, foam, film; with thrombin "in situ" formed clots	ditto	By formalin treatment only; not sterilisable by heat	Tissue-isolating films, cover of dural defects, hæmostasis
Gelatin	Porous elastic "sponge"	ditto	By heat and pressure	ditto
Oxycellulose ..	Woven fabric as gauze, cotton-wool; solution	ditto (less highly oxidised material creates fibrous reaction)	By formalin treatment only	ditto (also experimental plasma substitute)
Alginates ..	Woven fabric as gauze, cotton-wool, film, foam sponge; solution of sodium salt with $CaCl_2$ for "in situ" clotting and plasma clotting	Mild aseptic inflammation in course of absorption	By heat and pressure	ditto

comparatively minimal tissue-reaction. Clinical use was made of it in neurosurgery; it was satisfactory as a thrombin carrier and controlled capillary hæmorrhage in brain surgery. In general surgery it was used to control hæmorrhage from highly vascular organs. Drawbacks of this material are that it cannot be sterilised by heat and is incompatible with penicillin, reducing the potency of the drug. It destroys penicillin preparations.

PROTEIN PLASTICS

About the same time when the uses of oxycellulose were published it was found, almost simultaneously in the U.S.A. (Ingraham and Bailey 1944, Bailey and Ingraham 1944) and in Britain (Blaine 1945a), that proteins possessed suitable plastic properties.

Fibrin.—In course of plasma-protein fractionation experiments at Harvard Medical School and elsewhere fibrin was particularly experimented with in this connexion. Fibrin was made into film and foam and into a sprayable solution. Used in covering dural defects the film was found highly satisfactory (Ingraham and Bailey 1944, Bailey and Ingraham 1944). As a foam in combination with thrombin it proved of great help in arresting capillary hæmorrhage. Sprayed on burns and clotted with thrombin it was also useful.

Drawbacks to the ubiquitous use of fibrin (or fibrinogen) plastics are their non-sterilisability by heat and the relatively complicated and expensive method of their production. Used experimentally in the treatment of scleral wounds (Blaine et al. 1944) it was found too quickly absorbable, though it fulfilled the other criteria admirably. Workers in the U.S.A. reported persistence of fibrin film for about 80 days over the dura (Ingraham and Bailey 1944).

Casein.—In Britain the protein-plastic experiments were mainly directed towards the development of solid plastic appliances as plates and screws for the internal fixation of fractures (Blaine 1945a, 1946a). Though the initial physical properties of *casein* plastic—the protein predominantly used—were promising, such plastic softened in tissue too early to be of use.

Casein plastic films formed in situ were used by Curtis and Brewer (1944) for burns. Their results speak well of this method.

Gelatin.—Light and Prentice (1945) described the use of gelatin plastic sponge, 'Gelfoam,' as a thrombin carrier. The easy handling and availability of the material makes it a very promising foam in hæmostasis.

Alginates.—The latest development in absorbable plastics to be used as a tissue isolator, absorbable gauze, cotton-wool, and a "carrier" of added substances in the form of a foam, film, or gel is the adaptation of alginate products to surgery (Blaine 1946b). These are a derivative of seaweed; though not generally known and developed as a plastic, certain of its salts possess plastic properties.

Evidence has been presented that certain alginate products are absorbable in tissue, sterilisable by heat, and compatible with penicillin (Blaine et al. 1944, Blaine 1946b). Used (also in combination with plasma as an alginate-plasma film) as "puncture patches" over scleral defects, alginate film was found satisfactory both experimentally and clinically (Blaine 1946b). There is, however, no further report of its use in this connexion in this country. Alginate films clotted in situ with calcium chloride (the quick clotting of the sodium alginate solution under the action of calcium chloride is particularly noteworthy) were used by me in the treatment of wounds and burns in troopship hospitals in the Far East. Results were very encouraging, but lack of facilities and "exigencies of the Service" made it unpractical to follow up the cases methodically. The same holds good for penicillin "carriage" experiments.

Gough (1945), in the National School of Medicine in Wales, reported the usefulness of alginate gels in the sealing of bronchi in the surgical treatment of pulmonary tuberculosis.

PLASTIC SOLUTIONS

Experimental use of plastic solutions was made in the search for plasma substitutes in blood-transfusion. Sodium alginate (Solandt 1941), methyl cellulose, and polyvinyl alcohol (Roome et al. 1944) were reported on in this field of research. Polyvinyl alcohol alone showed sufficient promise. Roome et al. (1944) in Canada found that it was well tolerated by patients.

CONCLUSION

It will be seen that a considerable amount of work was carried out, mostly under the stimulus of war-time needs of surgery, in this newest field of experimental surgery. Further research might produce many a useful innovation. One factor must be borne in mind. The plastic industry is not ancillary (like the pharmaceutical industry) to the medical profession. Stimulus for further work in these fields must therefore come from the surgeon.

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Medical Societies

TUBERCULOSIS ASSOCIATION

AT a meeting in London on Sept. 20, with Dr. NORMAN TATTERSALL, the president, in the chair, a paper on

Tuberculosis of the Nervous System

was read by Dr. HONOR SMITH. She said that while there are powerful new weapons against purulent meningitis, the tuberculous form is still as great a therapeutic problem as when Whytt first described it in 1768, though hopes are now raised by streptomycin.

Apart from Pott's disease, there were two types of infection—meningitis and the much rarer large tuberculoma. The latter presented as an expanding lesion, with raised intracranial pressure and localising signs; the diagnosis was from tumour or abscess, and though tuberculosis elsewhere was a pointer, biopsy was sometimes necessary for diagnosis. Radiological evidence of calcification was not pathognomonic; it was, for example, seen with gliomata. Removal of a tuberculoma did not necessarily result in tuberculous meningitis; of 6 cases operated on at the Nuffield Department of Surgery, Oxford, 4 had recovered completely. A simple decompression might suffice, especially with cerebellar tuberculomata.

Tuberculous meningitis was said by Rich and McCordock to result from rupture of a tuberculous focus into the ventricles or subarachnoid space. Dr. Smith said she had found small tuberculomata with meningitis, but their piecemeal removal did not inevitably result in meningitis. Of 25 cases of tuberculous meningitis, rather more than half were over ten years of age. The insidious prodromal phase might be due to concomitant miliary tuberculosis rather than to meningeal involvement. The stages of nervous involvement were as follows:

1. *Meningeal Irritation.*—This might be absent or hard to detect in infants. There was evidence (O'Connell) that it was due to irritation of the posterior nerve-roots. The site of the exudate might substantially influence the effect of chemotherapeusis.

2. *Signs of Raised Intracranial Pressure.*—Headache was closely paralleled by vomiting. The further increase in pressure at a later stage was usually due to obstructive hydrocephalus.

3. *Mental Changes.*—There might be a change of temperament, succeeded later by delirium, and finally stupor or coma.

4. *Epilepsy.*—When this occurred it was usually at the end of the prodromal phase and was focal or jacksonian.

5. *Focal Signs.*—These might include ophthalmoplegia, extensor plantar responses (often unilateral), and hemiplegia or paraplegia. They might be caused by tuberculomata, or by vascular occlusion and infarcts. Chemotherapeusis, to be effective, must act before these vascular changes developed.

The average chloride content of the cerebrospinal fluid (C.S.F.) was 650 mg. per 100 c.cm., as compared with 663 mg. in a series of pneumococcal meningitis; but in half the tuberculous patients the content was less than 600 mg. The chloride level might be depleted by persistent vomiting (as also in pyogenic meningitis) or it might be raised owing to uræmia. The content was usually less than normal, but there was no diagnostic level. Differentiation from pyogenic meningitis might be aided by the discovery of tuberculosis elsewhere in the body and by a positive family history; and a history of a pyogenic focus might cause confusion. Unfortunately, tubercle bacilli could seldom be found in the C.S.F. Ventriculography might show a moderate symmetrical hydrocephalus, which was diagnostic. When the diagnosis was in doubt the condition might justifiably be treated as a pyogenic infection.

Dr. P. DANIELS remarked that the capacity of patients with severe pyogenic meningitis for almost complete recovery after suitable treatment encouraged hope for the successful treatment of tuberculosis of the central nervous system. If an effective drug were found it must be applied early; with complete blockage of C.S.F. circulation the condition became almost hopeless, and the changes with infarction were irreversible, though there might be some improvement with resolution of surrounding œdema.

Treatment of Lupus Vulgaris

Dr. G. B. DOWLING said that lupus, though uncommon, was extremely chronic; there was thus always a pool of affected patients, who constituted a serious social problem. In this country the larger general hospitals bore the brunt of treatment. In Denmark the Finsen Institute treated all cases, numbering, in the ten years between 1914 and 1923, 975, of which 735 were cured, chiefly by local Finsen therapy, carbon-arc baths, heliotherapy, and nutritional remedies; other methods, such as diathermy and cautery, pyrogallol and other caustics, and surgical excision, had also been used. He thought that treatment would be materially helped by intensive vitamin-D therapy, but that there was still need for skilful local treatment.

The first patient treated intensively with vitamin D had had local treatment for five years; he was ordered 150,000 I.U. daily without much confidence in success. The condition was almost cured after $2^1/_2$ months. There were, however, two relapses, the first within a few weeks with congestion and swelling of the area; moreover, two small lupus nodules embedded in scar tissue were untouched. Between 1943 and 1945 Dr. Dowling

and Dr. Prosser Thomas had treated 32 cases: 18 had been cured and 9 much improved. These patients had received very little local therapy, in contrast to similar groups treated by Charpy from 1941 onwards. With toxic symptoms—nausea, malaise, and sometimes vomiting—the usual dose of 3 high-potency 'Ostelin' tablets daily might have to be reduced. Hypercalcæmia occurred erratically and was not necessarily associated with toxic symptoms or improvement of the condition.

Calciferol in Tuberculous Conditions

Dr. D. E. MACRAE described a trial of calciferol in 20 long-standing cases of lupus vulgaris, in which the average duration of the disease exceeded nineteen years. Of these, 14 had so far been discharged as clear of disease. Results could be summarised as follows: (1) profuse soft granulations, easily removed by scraping, required additional local treatment; (2) raised firm plaques responded well; (3) more deep-seated lesions, level with the skin, responded well; (4) isolated nodules responded on the whole badly; (5) with lesions inside the mouth, nose, and larynx the results were mixed; and (6) with multiple areas of affection, the larger the areas the slower the response. During the first 2–3 weeks there was a reaction; patches became angrier and isolated nodules more scarlet, and spontaneous ulcers might develop. Calciferol, he suggested, acted by promoting reaction in the lupus tissue; this resulted in some general toxæmia, as shown by a stronger tuberculin reaction and increased blood-sedimentation rate; and it was succeeded by fibrosis which "literally squeezes the lupus to death." The effect did not seem to be influenced by either the method of administration or by altered calcium metabolism. The addition of local therapy hastened improvement.

He had also observed improvement with calciferol in 2 cases of adenitis, though in these again there was an initial reaction, with softening and pus-formation; and in 1 case of advanced wrist tuberculosis, 1 case of multiple dactylitis, and 1 case of tuberculous cystitis; though these had shown unexpectedly rapid improvement, no precise claims could yet be advanced for calciferol in these conditions.

He had twice seen calciferol treatment complicated by abdominal discomfort and constipation proceeding eventually to coma, peripheral neuritis, and optic atrophy; both patients had ultimately recovered. There had been no evidence of treatment causing renal damage; but calciferol should probably not be given to completely recumbent patients; and the possibility of the initial reaction causing a flare-up necessitated caution where there was active lung disease.

Dr. EMRYS JONES, of Cardiff, said that lupus, usually of long standing, had cleared with calciferol in 16 out of 18 patients. Adenitis also had been cured with this treatment; the periadenitis seemed to clear up first, so that the glands became more discrete.

Dr. M. C. WILKINSON referred to the effect on resistance of increase in the body sterols, and quoted a case of lupus which had cleared up when the patient became pregnant. So far he had not been impressed with the effect of calciferol on tuberculosis of bones and joints.

PRODUCTION OF STREPTOMYCIN.—At a recent press conference held at the London headquarters of Messrs. Boots, Sir Jack Drummond, F.R.S., described the process employed in the manufacture of streptomycin. In the surface-culture method spores of the *Actinomyces griseus* are sprayed on the surface of a medium containing sugar and meat extract or corn steep liquor filled into milk bottles from a conveyor belt (some 250,000 milk bottles are in use). Streptomycin is excreted in measurable quantities after the 7th day, and after 14 days the mould is discarded and the liquor made acid and pumped through charcoal filters which absorb the impurities. After further purification and freeze-drying a white powder emerges which is packed into sterile ampoules. The cost of producing sufficient streptomycin for the three-months course of treatment at present considered necessary for a case of tuberculosis works out, on the basis of American costs, at about £3000, employing the surface-culture process. Messrs. Boots are planning to replace surface culture in bottles by deep culture in huge tanks, and by this process the cost may be reduced to a quarter of the present figure.

Reviews of Books

Abnormal Behaviour

R. G. GORDON, M.D., D.SC., F.R.C.P., late medical director, Child Guidance Council. London Medical Publications. Pp. 75. 5*s*.

Dr. Gordon writes with the freshness and charm of an acknowledged master, but he spends too many of his 75 pages on going over old ground; consequently, when he comes to the problems of capital and corporal punishment he disposes of them with "it is impossible to go into all the arguments which might be advanced in this complicated problem." This is just the sort of topic, however, about which readers would be glad to see the arguments set out with Dr. Gordon's objectivity. Dealing with the question of punishment, Dr. Gordon sticks to the familiar three purposes—retribution, deterrence, reform—and does not attempt to break new ground. When he comes to the practical issues he writes with good sense and wisdom and makes a convincing case for the psychological attitude. His tolerance, his kindliness, and his obvious soundness must help to win understanding and sympathy for the mentally abnormal.

The Ship Captain's Medical Guide

(18th ed.) Ministry of War Transport, London. H.M. Stationery Office. Pp. 225. 3*s*. 6*d*.

NEARLY twenty years have elapsed since the last edition of this venerable publication, and pending a complete revision the compilers have made a determined effort to bring it up to date by rewriting 11 of the 24 chapters and introducing material from *First Aid in the Royal Navy 1943*. The ingenious Neil Robertson stretcher is described in detail, with a series of good photographs to demonstrate its use. The diagrams throughout the book are useful.

Much of the elegant 18th-century English of the original composition, and some of the remedies current at the time, have been retained. The burning of feathers under the nose of the fainting patient is highly commended, and the amount of castor oil and Epsom salts consumed by the patients should keep the ship's lavatory accommodation fully occupied. Any suggestion of heart weakness may be countered by the exhibition of brandy, whisky, or gin at two-hourly intervals, and in the case of the apparently drowned 4 tablespoonfuls are advised as an enema, a pleasure which we must regretfully deny our patients ashore. The style throughout is dogmatic and obviously intended to inspire confidence in the master and his patient. In the background one can almost hear the clanking of irons for any who raise their voices in dissent. We quote one paragraph without comment:

> "PLEURISY. . . . If the patient is robust a tablespoonful of Epsom Salts in just sufficient water to dissolve it should be given every morning. This produces copious liquid discharges and helps to get rid of the accumulation of fluid in the chest by draining it through the bowel."

There is a fine nautical description of appendicitis, commencing with a sudden pain in the south-west corner of the abdomen; but as suspected appendicitis is the biggest bogy facing the unqualified ship's doctor it would be better to rewrite this chapter and say that most cases start with central pain, backing later to south-west, localising, and with the onset of peritonitis veering south and east. McBurney's point is incorrectly described; few surgeons would agree with 4 oz. of milk or liquid nourishment being given every two hours; and the instruction to give a dose of castor oil as soon as the pain and tenderness disappear (when the appendix bursts, for instance) is dangerous.

Since much of the book is concerned with good hygiene, it is odd to find modern fungicides and D.D.T. completely omitted. Penicillin is not even mentioned, though most American ships carry a supply with a purser instructed in its use. All senior officers in our Merchant Navy are required to pass a course in first aid, and it would require little more instruction to enable them to clear up their cases of gonorrhœa with 200,000 units of penicillin or to use the same technique as a life-saver for cases of pneumonia or appendicitis in mid-Atlantic. Where common sense obtains the text is magnificent.

Among the usual anti-shock treatment we find the following splendid advice :

> "CHEER HIM UP. . . . Remember that a casualty is wondering what has happened, whether he is going to live or die and whether, if he lives, he is going to be scarred or mutilated for life. His thoughts are turning in a lonely little personal world of fear, no matter how brave a man he may be. All this mental worry serves to increase his shock and it can be lessened very much by a sympathetic shipmate. Talk to him, be natural . . . and while talking near injured men, never whisper."

We wish all the book was as good as this.

Forensic Medicine

(4th ed.) DOUGLAS KERR, M.D., F.R.C.P.E., D.P.H., lecturer in forensic medicine, School of Medicine, Royal Colleges of Edinburgh. London : A. & C. Black. Pp. 359. 18*s*.

Douglas Kerr's well-known textbook continues to enjoy the affection and regard of both the student and his teacher. It is so readable, so reasonable, so reliable, and so free from the recondite that ruins many standard textbooks as they achieve success. This fourth edition in some ten years has been augmented with benefit, and new illustrations have been added. References might be better chosen : in toxicology, especially, there is much useful new reading on industrial aspects. The new material—on blood and head injuries in particular—is as clear as the rest. How eminently reasonable it all is, and what sound witnesses we should all be if we digested its principles. The time has come, however, to reduce the references to the pharmacy laws to essentials, and to cut down the sections on artificial respiration and Binet-Simon tests, and the verbatim judgments such as that on Rex *v*. Savage. And the examiner would have an easier time if the "Schedule to an Order in Council dated April 13th 1937 (S.R. & O. 1937. No. 327)" (sic) were stated, and if no doubts were roused on the gestation at which the law recognises viability. But how little there is in this good book with which to differ. Kerr remains a shining example of clear teaching for the student, readable to a degree.

Food and Nutrition

The Physiological Bases of Human Nutrition. E. W. H. CRUICKSHANK, M.D. Aberd., D.SC. Lond., PH.D. Camb., M.R.C.P., regius professor of physiology in the University of Aberdeen. Edinburgh : E. & S. Livingstone. Pp. 326. 16*s*.

THE author of this addition to the numerous textbooks on nutrition has in mind medical practitioners, medical students, candidates for the diploma in public health, and sociologically minded laymen. But it is a book with a difference : though the basic science is all there—and well set out—there is much emphasis upon the sociological implications and applications of the science of nutrition. In fact the author introduces the subject with no less than four interesting and valuable chapters on the evolution of human dietaries, the problem of world malnutrition, and the problem of nutrition in Great Britain in 1939–45 and in the coming years. And then, having polished off the science of the subject in six chapters, with three more on foods, he reverts to dietary planning, the appraisal of the nutritional state of individuals and communities, and the Food and Agriculture Organisation. There are numerous digressions into the histories of foods and the science of nutrition for which the author will be both thanked and criticised.

Sciatiques et lombalgies

par hernie postérieure des disques intervertébraux. D. PETIT-DUTAILLIS, professeur de pathologie chirurgicale, Paris; S. DE SÈZE. Paris : Masson. Pp. 178. Fr. 235.

THIS book is a full and straightforward account of the anatomy, pathology, clinical features, and treatment of prolapse of the intervertebral disk, and most of what the authors have to say will meet with general agreement in this country. They emphasise the frequency with which sciatica may be complicated by paralysis below the knee ; and they use intrathecal iodised oil as a routine in diagnosis, where we have learnt to do without it. Their operative approach is a full laminectomy done under local anæsthesia, and the extradural removal of the prolapse is supplemented by division of the sensory root on both sides at the level of the lesion.

Pathology of the Central Nervous System

(2nd ed.) CYRIL B. COURVILLE, M.D., professor of nervous diseases, College of Medical Evangelist, Los Angeles. London : H. K. Lewis. Pp. 450. 36*s*.

THE second edition of this book has been somewhat expanded to include recent work on problems of the circulation, infection, and some neoplastic and degenerative diseases. Special attention is paid to the effects of trauma and bony diseases of the cranium and spine. Rather more space might have been given to the important subject of the virus infections, and more might with advantage have been said about the postexanthematous demyelinating diseases and their relationship to disseminated sclerosis. The presentation is clear and the micro- and macro-photographs and diagrams are well chosen and reproduced. The book is comprehensive and well written, and lays a sound foundation in neuropathology for the student of neurology or general medicine.

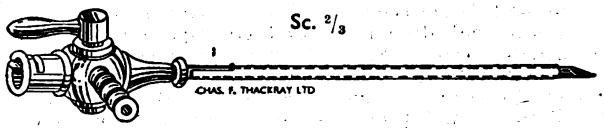
New Inventions

NEEDLE AND CANNULA FOR CHEST EXPLORATION

ONE of the dangers associated with the aspiration of the pleural space is spontaneous pneumothorax. It is not perhaps a very common one, but experience on a thoracic surgical unit, where aspiration is an everyday occurrence and forms a major part of treatment, shows that it is sufficiently common, in spite of the most careful technique, to justify efforts to reduce its incidence to a minimum.

The danger lies in the penetration of the lung with the large aspirating needle used, but this alone need not necessarily give rise to spontaneous pneumothorax. The latter is far more likely to develop as the result of unnecessary manipulations of the needle when the pleural space has been entered, and it should be the main rule in chest exploration to avoid these manipulations.

The special needle (incorporating a two-way attachment) described below and in the accompanying diagram



was devised with a view to minimising this danger, and has been used extensively in the thoracic surgical unit at Harefield with good results.

Essentially, the instrument consists of a cannula into which a large-bore needle is fitted closely enough to avoid leakage of air and yet allowing the needle to slide freely within the cannula. A guiding pin, firmly attached to the shaft of the needle, fits into a slot at the base of the cannula. The slot is arranged in the following way :

1. When the cannula is pushed right home, preparatory to aspiration, the needle point protrudes from its distal end.
2. When the pleural space has been entered, the needle point may be withdrawn into the cannula, and a small side extension of the slot allows the needle to become locked in this position.
3. If necessary—e.g., for cleaning—the needle can be removed from the cannula.

The advantages of this needle are as follows :

1. Once it is in the pleural space, the needle point can be withdrawn into the cannula, thus considerably reducing the likelihood of trauma to the lung.
2. The cannula protects the point of the needle when not in use, particularly when it is being boiled.
3. The incorporation of the two-way tap reduces the possibility of an air leak at the junction.

The only disadvantage appears to be the size of the needle, which is necessarily large, though not unduly so.

I wish to thank Mr. E. Blackburn, of Chas. F. Thackray Ltd., for his assistance and advice on the manufacture of the instrument.

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THE LANCET

LONDON: SATURDAY, OCT. 12, 1946

Nuremberg

HISTORY, contemporary or otherwise, may be conceived as a series of dramatic and important happenings, such as wars, separated by intervening periods which are undramatic and unimportant. This way of looking at human affairs is taught in schools because it is easy, and encouraged by newspapers because it is exciting; but it leads to bewilderment when the course of events does not take so simple a form. A different view of history, though it involves the acceptance of some painful ideas, will lead to less bewilderment. On this alternative view the movement of individuals and of groups, even nations, is determined not by their intrinsic character but by the field of forces of which they are a part; their individual volition, if it exists at all, is less significant, in the shaping of their destinies, than the total of forces which moves them. The Aristotelian notion that a stone falls because it is in its nature to go towards the earth gave place to GALILEO'S and NEWTON'S idea that the stone falls because it is influenced by the forces in the field: and in the same way, in human affairs, we must look to the total pattern before we can understand the movement of a part. On this basis one may look on wars and the intervening periods of peace as phases of human adjustment, both having ultimately the same purpose. This purpose is to achieve a situation of looser tension —to redistribute the forces of constructiveness and destructiveness so that eventually a condition of less danger to valued objects may be established. For the preservation of loved persons and loved ideals is central to any rational consideration of human affairs.

The Nuremberg trial of a score of ageing malefactors and the impeachment of a few disgraceful political organisations can be looked at from two quite different angles. The opinion which has been generally expressed is that it represents a stage in the gradual extension of the range of law; it is a demonstration that, even though the resentment of having been dragged into war is still strong, the principles of fair play are dominant in the victors; and even if it sets higher international standards than the victors always themselves observe it is at least a statement of the moral principles to which they aspire—a statement which may be justified by their future behaviour. True though all this may be, however, it is certainly not the whole truth. Perhaps more fundamentally, the Nuremberg trial may also be regarded as a theatre of operations where the victors came together and worked through their states of tension and mistrust. It too is part of the technique of post-war adjustment, and for this reason no less than the other has potential value. Nobody can now assess this value, though it is easy to suffer illusions about it. On the one hand it is reassuring that the governments can treat abominations in international affairs as they treat crimes in their domestic affairs; on the other hand, law-courts however fair, and sentences however just, do more to assuage the ruffled feelings of the community than to remove the cause of crime.

The victorious nations were a team forced together by a common external danger; they were far from being united, and it would be a foolish act of misbelief to imagine that they were. Profoundly conflicting views as to the way social life should be lived are held by the parties to the peacemaking; there is mutual suspicion, mistrust, and hostility—all the more disquieting when the nations are so explosively armed and when the techniques for reducing tension otherwise than by arms are so poorly integrated into the structure of international life. Nevertheless these techniques exist: there are today many theatres of adjustment where stresses of conflict can be worked out, and the various conferences of foreign ministers, UNO, UNESCO, and others serve as outlets of aggression and means of acquiring experience of distrusted people. A conference that ends in discord may seem a disaster but may rather be a valuable cathartic; whereas a trial which ends in unanimity may be a soporific. We cannot judge: indeed most of us can now do nothing except observe the course of events. But we shall do more for the cause of constructiveness and cohesion if we try to keep in mind the whole agony of the world than if we dream, or even hope overmuch, that the condemning of conspicuous criminals is a measure of the world's unity.

Our unity as allied nations was greatest when the common foe was pressing hardest. What common enemy threatens us now? None perhaps is greater than despair over the settling of our own internal difficulties, and the weakness of our methods of dealing with tensions within our groups and with our individual disquiet.

Twenty Years of Typhus Research

THOSE who were young a quarter of a century ago are apt to compare the present age unfavourably with the years which succeeded World War I. Whatever enchantments distance may lend to the political scene there is no doubt that medically we are now far better equipped with knowledge of how to deal with menaces to life and health than we were in the early twenties. This was clearly brought out by Prof. HERMANN MOOSER[1] in his address to the British-Swiss Medical Conference on progress in typhus research.

Twenty years ago almost all that was known of the rickettsial infections was that typhus was transmitted by lice, a fact discovered by NICOLLE, COMTE, and CONSEIL[2] in 1914, and that Rocky Mountain spotted fever and tsutsugamushi disease were distinct specific infections with their own epidemiological peculiarities. Names like tick typhus, Saõ Paulo typhus, summer typhus, pseudotyphus of Delhi, tropical typhus, scrub typhus, shop typhus, Manchurian typhus, and mild endemic typhus were indiscriminately applied to febrile diseases for which no specific classification was available. The first step in resolving this confusion was the differentiation of flea-borne or murine typhus from the epidemic

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2. Nicolle, C., Comte, C., Conseil, E. *C.R. Acad. Sci., Paris*, 1914, **159**, 661.

or louse-borne variety. MOOSER's account of how this was accomplished differs somewhat from that usually accepted. Doubts as to the louse being the sole insect vector of typhus were first raised in 1923 by JOSÉ TERRÉS [3] in Mexico, where the disease had been endemic and occasionally epidemic from shortly after the Spanish conquest. Since the local population was heavily infested with lice it was difficult to disprove the louse transmission theory in Mexico. A series of mild cases, however, was recorded by SINCLAIR and MAXCY,[4] from the American side of the Rio Grande valley, where the rarity of *Pediculus humanus* var. *corporis* made it unlikely that that insect could act as an effective vector. Previously HONE [5] in Australia had observed cases of typhus in Adelaide in 1922 and 1923 among persons handling wheat and other foodstuffs, while WHEATLAND,[6] another Australian, connected his cases of mild typhus with a migration of mice, associated with an epizootic. WHEATLAND went so far as to give the name "mouse fever" to the disease from which his patients suffered, though they all had positive Weil-Felix reactions. In 1924 FLETCHER and LESSLAR [7] had observed in the Federated Malay States cases of what they called tropical typhus where there was no evidence of man-to-man transmission but the possibility of contamination from rats was high. In 1925 MOOSER [8] obtained a strain of typhus in guineapigs inoculated with the blood of a patient from Mexico City; this and subsequent strains produced a scrotal reaction in male guineapigs similar to that observed by NEIL [9] in 1917 in guineapigs injected with the blood of typhus patients in Texas. In smears from the hæmorrhagic tunica vaginalis stained by Giemsa's method, MOOSER [10] for the first time saw cells with the cytoplasm heavily loaded with rickettsiæ, cells which since 1933 have been known as "Mooser cells." Later, in 1928, MAXCY [11] isolated strains from the south-eastern United States which also produced Mooser cells in the tunica vaginalis of male guineapigs. Shortly afterwards DYER and his colleagues [12] brought forward conclusive evidence that the rat flea was a carrier of what is now known as murine typhus, a disease endemic not only in America but in Europe, Asia, and Africa. Investigations on louse-borne epidemic strains soon showed that some of these also produced scrotal reactions in guineapigs, though the lesions were not so frequent or so advanced as with murine strains. MOOSER [13] was therefore led to regard the differences between murine and louse-borne typhus as quantitative rather than qualitative, and to suggest that the classical strain results from the adaptation of the murine strain to the louse-man-louse cycle of transmission. No conclusive evidence, however, has yet been advanced for the soundness of this hypothesis. We are still uncertain how typhus manages to persist for years in a population where no known cases exist. There are three possibilities: (1) the rat and the rat flea may maintain the infection which periodically becomes converted into the louse-borne form when a patient with murine typhus also harbours lice; (2) the fæces of lice deposited on clothes and furs may retain their activity for many months, a view specially favoured by Polish and German workers; or (3) persons who have had typhus may carry the rickettsiæ in the bone-marrow and may relapse after months or years. ZINSSER,[14] working on Brill's disease in Boston, convinced himself that all cases of that disease were late relapses of a typhus infection acquired many years previously in Eastern Europe, and MOOSER [1] has recently observed a case of classical louse-borne typhus in Zurich in a man who had suffered from typhus in Russia in 1918.

The other typhus-like fevers have now been classified. In the Mediterranean area fièvre boutonneuse has been shown to be related to Rocky Mountain spotted fever, as is the South African tick-borne fever and incidentally that discovered during the war in West Africa. Saõ Paulo typhus is now known to be identical with Rocky Mountain spotted fever. The scrub typhus of India, Malaya, and Java is identical with tsutsugamushi, while the so-called Manchurian typhus turns out to be of the murine type. Recent studies on the tick-borne typhus of North Queensland suggest that it may be related antigenically to the South African form. Great progress has also been made in the production of vaccines, which, if not entirely protective, are sufficient to lessen the severity of the infection. In *p*-aminobenzoic acid a chemotherapeutic remedy of considerable value has been discovered. Finally, there have been developed insecticides, such as D.D.T., whose lethal action on lice was demonstrated by MOOSER [15] as early as September, 1942. The researches of the last twenty years have thus clearly pointed the way to the control and eventual elimination of the rickettsial infections.

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4. Sinclair C. C., Maxcy, K. F. *Publ. Hlth Rep., Wash.* 1925, **40**, 241.
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7. Fletcher, W., Lesslar, J. E. *Bull. Inst. med. Res. F.M.S., Kuala Lumpur*, 1925, **2**, 1.
8. Mooser, H. *J. Amer. med. Ass.* 1928, **91**, 19.
9. Neil, M. H. *Publ. Hlth Rep., Wash.* 1917, **32**, 1105.
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11. Maxcy, K. F. *Publ. Hlth Rep., Wash.* 1929, **44**, 589.
12. Dyer, R. E., Rumreich, A., Badger, L. F. *Ibid*, 1931, **46**, 334, 1869, 2415, 2481.
13. Mooser, H. *Arch. Inst. Past. Tunis*, 1932, **21**, 17.
14. Zinsser, H. *Amer. J. Hyg.* 1934, **20**, 513.
15. Mooser, H. *Schweiz. med. Wschr.* 1944, **74**, 947.

Clues to the Anti-anæmic Liver Principle

IT is twenty years since MINOT and MURPHY introduced the liver treatment of pernicious anæmia; and for twenty years biochemists have been striving to find out just what it is in liver that has this anti-anæmic effect. The clinical worker who follows their work [1] will find himself in a world of filtrates, precipitates, extracts, eluates, and dialysates, and may well ask if such a protracted effort in which, from the lack of a satisfactory animal test, every step had to be checked on human beings has been worth while. The answer is that this research has brought progressively more effective materials for the treatment of pernicious and allied anæmias, and has taught us a great deal about the composition of anti-anæmic factors. It has reduced the amount of solid material needed to bring about remission in a patient with pernicious anæmia from several kilogrammes to about 20 mg., and for maintenance in normal health from 400 g. a day to less than 1 mg., and it has replaced the daily "sandwiches" of almost raw liver by an

1. See the review by SubbaRow, Y., Hastings, A. B., Elkin, M., in Vitamins and Hormones. Edited by R. S. Harris and K. V. Thimann. New York, 1945, vol. III, p. 237.

intramuscular injection of 1 c.cm. once a week or even once a month.

In 1927 COHN and his co-workers started by preparing a liver extract free from known vitamins; they eventually obtained a material containing 10·8% nitrogen which they thought was a nitrogenous base, but its low nitrogen content excluded purine or pyrimidine bases. WEST showed that phosphorus-free fractions were active, and obtained a material thought to be a peptide or diketo-piperazine, and on hydrolysis was able to identify β-hydroxy-glutamic acid among others. In 1935 DAKIN and WEST adopted a different technique for fractionating COHN's parenteral liver product, using Reinecke acid, and they obtained a material of which 'Anahæmin' is a type. Hydrolysis of this product yielded arginine, lysine, leucine, a trace of histidine, hydroxyproline, aspartic and glutamic acids, glycine, and 15% of aminohexose; pyrimidine and purine bases were absent. Later they obtained active preparations free from aminohexose, and finally concluded that the hæmopoietic substance in liver was, or was associated with, a peptide "possessing many, but by no means all, of the properties of an albumose." In 1942 WEST and MOORE, by electrophoretic methods, split up their most active fraction still further into an active "slow component" and a practically inactive "fast component." A group of Scandinavian workers tackled the problem by utilising adsorption on charcoal and elution with phenol, and two of them, LALAND and KLEM, eventually prepared active fractions 0·2–0·3 mg. of which corresponded to 100 g. of liver; but the technique seemed to spread the anti-anæmic principle among different fractions, rather than effect a separation. Ten years ago, in Manchester, WILKINSON purified still further the Reinecke acid precipitates and obtained a material of which 18–36 mg. would produce a complete remission of pernicious anæmia—the greatest concentration of active material so far obtained. In Switzerland, KARRER and his associates, using an initial acetone extraction, and adsorption on charcoal with phenol elution, prepared materials of similar activity to WILKINSON's. This material was free from flavine, pterine, and reducing carbohydrates; it contained a small amount of sulphur, and yielded amino-acids, including arginine and tyrosine, on hydrolysis. In 1937 SUBBAROW and his colleagues postulated that the active principle comprised more than one factor; they described a primary hæmopoietic factor and three accessory factors—l-tyrosine, a complex purine, and a peptide. The accessory factors were inactive by themselves but when combined with the primary factor they gave rise to a much better response than did the primary factor alone. The complex purine was later found to be an impure mixture containing mainly xanthine, but also a strongly fluorescent xanthopterin. Attempts to determine the nature of the primary factor failed, but its properties suggested a pyridine derivative.

Many other attempts to identify the liver principle have been made without, on the whole, adding anything significant to our knowledge. There is general agreement that it is some form of amino-acid combination resembling a peptide. Organic chemistry does not take us further than this point. It is the stage at which the analysis of the pituitary hormones and insulin have remained for so long. The appearance, during this period of deadlock, of folic acid, a synthetic hæmopoietic substance with the same anti-anæmic effect as liver principle, is a surprise; for folic acid is a pteridyl glutamic acid, and pterines—which are complex pyrimidines—have repeatedly been excluded from the analyses of the liver principle. The manner of folic acid's action has yet to be worked out, but it is likely that it acts, like hæmopoietin, as an enzyme catalysing the reaction by which liver principle is produced in vivo; for it is this enzyme, rather than the liver principle itself, that is deficient in human pernicious anæmia. The action of folic acid was demonstrated in the course of researches into the activity as growth factors of the vitamin-B complex in bacterial metabolism; and its discovery once again illustrates the occasional startling advances gained by indirect approach when the direct method is gravelled.

Annotations

THREE IN ONE?

IN announcing the establishment of a new Ministry of Defence[1] the Government say that the possible advantages of combining the medical (and certain other) services of the Navy, Army, and Air Force—perhaps under the direct administration of the Defence Minister—are now being studied. This is welcome news, for, as we lately indicated,[2] amalgamation would reduce the number of doctors needed by the Forces both in peace and in war. Examples of redundancy in the triple system both here and overseas are fresh in the minds of those who served in the late war; and the wastage impressed even more forcibly the hard-worked civilian doctor.

The medical service must be (1) reasonably economical in money and men, (2) efficient and readily available to all, (3) flexible enough to fit in with administrative and operational needs, and (4) capable of rapid expansion in war. The efficiency of a unified service would, as now, depend chiefly on the men operating it, but also on the administration and leadership. Plainly, the enlistment of able men is of the first importance. One consideration that has often deterred keen young doctors from finding a career in the Forces has been the comparative dearth of clinical experience—a disadvantage which, in a unified service, might be partly offset by the chance of working, in turn, with each of the three Fighting Forces, in which everyday medical practice differs, even in peace-time. No doubt, too, men could be attracted by a further increase in the establishment of senior clinicians; a perennial grouse against all three Services has been the scarcity of senior clinical appointments; and many have rejected a Service career knowing that when they reach a certain rank they will go no further unless they abandon clinical medicine for an administrative post. Nevertheless the importance of administration should not be decried—especially in a single medical organisation where precise inter-Service coördination would be a first essential. In war, not only must the medical service be rapidly expanded but in all probability it must also be temporarily broken up into constituent parts, some of which will come under the operational control of field commanders. These parts must be swiftly and smoothly formed, and, once separated, must be well administered; and this calls for the training and maintenance of a corps of administrators out of all proportion to peace-time needs. One of the difficulties that may be set against a single service is the restriction it would impose on the training of this reserve of administrators. Lay administrative officers were

1. Central Organisation for Defence. Cmd. 6923. H.M. Stationery Office. Pp. 12. 2d.
2. *Lancet*, Sept. 21, p. 421.

employed to some extent in the late war; the Army, for example, appointed non-medical stretcher-bearer officers, company officers, registrars, and deputy assistant directors of medical services who acquitted themselves with distinction. No doubt the still wider use of laymen will be considered when the reserve of administrators is in the making.

A unified service can be evolved and operated only by the closest understanding between representatives of the clinicians, the medical administrators, and the combatant arms of the Fighting Services; and the Ministry of Defence might well decide to set up a permanent council of this constitution. The difficulties should not be under-emphasised; but given good will in planning, and efficiency in execution, the scheme could benefit all three Services and enhance Britain's already notable reputation in Service medicine.

NICOTINIC ACID IN HYPOMENORRHŒA

EXPERIMENTAL results from Australia suggest that nicotinic acid may be usefully employed in amenorrhœa, hypomenorrhœa, and dysmenorrhœa. Hawker [1] found that the ovaries of guineapigs which had been given nicotinic acid in their feeds weighed 44·5 mg. on the average, whereas the average weight in the untreated animals was 36·5 mg. The application of nicotinic acid to functional disorders of menstruation first suggested itself when a patient who was under treatment with nicotinic acid for a chronic inflammatory lesion at the corners of her mouth started to menstruate, although she had never done so before; in addition, she lost 18 lb. in weight in four months, having previously been inclined to obesity. She was given 75 mg. of nicotinic acid a day for seven months and has menstruated regularly ever since. For the treatment of hypomenorrhœa Hawker suggests the coincident use of stilbœstrol 1 mg. three times a day for fourteen days from the commencement of the period and nicotinic acid 50 mg. three times a day throughout the whole cycle. His nine cases of hypomenorrhœa so treated all showed an increase in the duration and quantity of the flow. The material on which this paper is based is scanty, but it would be foolish to belittle any therapy which may help in these intractable conditions. Further experiments will be needed to discover the exact effect, if any, of nicotinic acid on the ovary; meanwhile, this relatively benign treatment is worth a trial in selected cases.

THE HOSPITAL OF THE FUTURE

EVEN the most modern hospitals nowadays become outdated in the course of twenty or thirty years. The moral seems to be that permanent buildings are not for hospitals: let them rather be transitory, functional, easily assembled, and quickly demolished. That is part of the solution to our present difficulties recommended by Prof. Harry Platt, whose address [2] last year to the Ulster Medical Society has now been reprinted. A rigid pattern of hospital, he holds, tends to determine function, which is fundamentally wrong. Rebuilding every thirty years is out of the question, and remodelling within the shell is a makeshift, not always economical.

The type of hospital in which function is best served, Professor Platt considers, is that in which a number of separate blocks or units, with self-contained ancillary services, each houses one of the major branches of medicine or surgery. These should be placed on an island site with a green belt encircling them, and with space for expansion. Such a multiple-block hospital need not be unsightly: he recalls a fine example of harmonious layout in the University Hospital at Lund, in Sweden, where the separate clinics are Georgian in style, though widely differing in age. In Manchester, his own university, the Royal Infirmary, built on the pavilion plan in 1908 is already becoming out of date in every way as a university teaching hospital, and the adjacent Eye Hospital, and St. Mary's Hospital for Women and Children are both structurally obsolete. There is, however, a large potential island site of some 100 acres, visible from the air, which is to be zoned, cleared of some dingy property, and dedicated to the purposes of a new hospital centre.

In Manchester the separate institutes are to include university preclinical departments of anatomy, physiology, and pharmacology; separate units of medicine, surgery, obstetrics, child health, orthopædics, neurology, ophthalmology, otolaryngology, radiology, dermatology, an institute for the chronic sick, and a health centre; a group of administrative, educational, and residential blocks—including the administrative headquarters of the hospital centre, the preliminary training school for nurses, students' hostels, residential flats for the staff, and a medical institute and library: Professor Platt even foreshadows a shopping centre. But the first stage will be what the university architect calls the "shack period." The first new block contemplated is a neurological institute of 120 beds with both public and private wards and its own outpatient clinic; it will also have its own X-ray department and pathological laboratories, in both of which research will be undertaken. The director, and probably his assistant, will have consulting-rooms in the institute. The principle of the multi-institute hospital could probably be applied, Professor Platt thinks, on a miniature scale in smaller cities.

Building itself is in a state of rapid change at present, and he suggests that it would be profitable to choose and subsidise a hospital architect, and give him five years to study and travel. Meanwhile hospitals could be making use of the shack period to concentrate on personnel.

THE BUSY NERVOUS SYSTEM

IT may be possible to predict what will happen when a known electrical force is released into a known circuit; but when conditions within the circuit are constantly varying, what then? Prof. J. Z. Young, in his inaugural lecture at University College, London, last February (now published [1]), described the ceaseless change which is the normal state of the nervous system, and attacked firmly the custom of representing it as a mere telegraph system along which messages are transmitted.

We now think of nerve-cells as elongated bags of fluid in which compounds are constantly being built up and broken down. And, thanks to studies on the giant nerve-fibres of the squid, we know that the fluid runs the length of the fibres, which therefore have the properties of cylinders of liquid. They are conductors, but not passive conductors like electric wires; for a nerve-fibre is made ready to conduct by "the production of a state of tension usually referred to as a charge across its membrane." The nerve-cell works hard to maintain the fibre in the right condition to respond to such a charge. The various sensory nerve-endings are similarly triggered, but not all in the same way—one will respond to touch, another to temperature, another to light, and each must be maintained in the right state to do its selective work.

The mechanistic theories on which most of us were brought up paid much attention to reflex action, leaving us with a picture of a conducting system which responded in a given way to a given stimulus, but which, in the absence of such stimuli, returned to a state of rest or inactivity. This picture, it seems, has had a wide influence on our attitudes and behaviour, not only in

1. Hawker, R. W. *Med. J. Aust.* 1946, i, 872.
2. *Ulster Medical Journal*, May, 1946.

1. Patterns of Substance and Activity in the Nervous System. London: H. K. Lewis. 1946. Pp. 19. 1s. 6d.

medicine and science but in life generally, for it implies determinism. For Professor Young, "this view of the organism as a marionette dancing under the pull of its sensory impulses is wrong. There are abundant quite simple facts which show clearly that the brain is not by any means a passive thing, receiving all its orders from outside. Its actions cannot all be adequately described as reflex, as reflections of outside influence."

Physiologists in general, he considers, have not yet responded fully to the facts revealed by the electro-encephalograph—that there are continuous rhythmical changes of potential between neighbouring parts of the brain. These are independent of external stimuli: rhythmical activity of the kind continues in the fore-brain of the frog even in a piece of brain removed from the body. When an image falls on the retina a pattern of nerve impulses is sent to the cortex of the occipital lobe; but the cells there are already active, "exciting each other or changing their thresholds in manners as yet unknown." This activity must certainly affect the reaction of the brain to the impulses reaching it. In this, he feels, we may begin to study the problems of recognition of form and the process of learning. "Remembering" may consist in "the maintenance of a particular pattern or mode of activity."

In this conception of the brain as a continually active agent he sees the opportunity for a much more fruitful collaboration between anatomy, physiology, neurology, and psychology than was possible on the basis of the reflex concept. To those who think of anatomy as a cut-and-dried subject, which early reached the end of its age of discovery, it will be revealing to learn that "whatever part of the body you study you soon find that very little is known about it, at least from current points of view." Professor Young wishes to see more than collaboration between anatomists and physiologists: he would have a fusion in which those expert in special techniques work side by side, remembering that they are dealing with "an organised substance in a state of organised and directed activity."

HEPARIN IN INFECTIVE ENDOCARDITIS

THE possibilities of heparin in the treatment of infective endocarditis have been overshadowed by recent spectacular successes with penicillin. Although final evaluation is not yet possible, it now seems certain that heparin, if used at all, will be used rarely in this disease. It was first employed in the treatment of endocarditis in 1939,[1] and it was soon found that its problematical advantages are usually outweighed by its proved dangers. When heparin was given in conjunction with sulphonamides, the recovery-rate—6·5%—was an improvement of only 2·5% over results with chemotherapy alone. When it is given with penicillin, hæmorrhagic complications are more common than with penicillin alone, although the recovery-rate (55%) remains high; no direct synergism between heparin and penicillin can be demonstrated.[2] Dawson and Hunter [3] have summarised current opinion in concluding that heparin is not essential to the treatment of infective endocarditis. They find only two indications for its use: to prevent retrograde intravascular clotting where a large embolus lodges in a vessel; and to inhibit thrombosis when penicillin is given intravenously. The latter indication is now rarely encountered since the intravenous route has been virtually abandoned in favour of intramuscular injection, which gives equally good results; moreover, the increased purity of present-day penicillin has undoubtedly lessened the risk of intravenous clotting. Other workers [4] advise resort to heparin only when the disease has not responded to one course of penicillin, and add: "in such a case we would hope that heparin might cause disintegration of the vegetations and pray that the fragments will not enter the cerebral vessels."

The value of penicillin in infective endocarditis has now been firmly established in this country.[5] The principal points which suggest that the drug is likely to fail are congestive failure, particularly when the aortic valve is infected; embolic incidents; and a long history. Where the condition has existed for more than a few months there is increased resistance to the penetration of penicillin according to the size of the vegetations and the fibrin and platelet barrier with which they are covered. Necropsies have not provided histological proof that anticoagulants influence the course of the disease under such circumstances [6]; nevertheless, the bad prognosis in these resistant cases may still tempt physicians to give heparin a further trial on the score that nothing can be lost by heroic measures.

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3. Dawson, M. H., Hunter, T. H. *Ann. intern. Med.* 1946, **24**, 170.
4. Levy, L., McKrill, N. *Arch. intern. Med.* 1946, **77**, 367.
5. Christie, R. V. *Lancet*, 1946, **i**, 369.
6. Priest, W. S., Hildebrand, E. *Proc. Inst. Med., Chicago*, 1946, **16**, 173.

SUPPLIES OF ARTIFICIAL RADIOACTIVE SUBSTANCES

THE Government is to establish a national centre for the processing and distribution of radium, radon, and artificial radioactive substances for scientific, medical, and industrial purposes. The centre will be operated by Thorium Ltd., acting as agents for the Ministry of Supply, and as a first step the Ministry will purchase its buildings and plant at Amersham, Bucks. The extraction of radon, which during the war was carried on at Barton-in-the-Clay under the auspices of the Medical Research Council, will be transferred to the new centre, and Johnson Matthey & Co., Ltd., are voluntarily handing over to it their business of filling radium into containers. The Amersham site will not be large enough to accommodate the centre permanently, so it will be removed to new premises when the shortage of building labour has eased and the volume and scale of its work can be assessed more clearly. The centre will be controlled by a council, which will include representatives of the Ministry of Supply, the managing agents, and users of its products.

In the United States the distribution of radioisotopes prepared at the Clinton Laboratories, Oak Ridge, Tennessee, began in August, the first recipient being the Barnard Free Skin and Cancer Hospital of St. Louis, which received a so-called unit of carbon 14 (C^{14}) weighing about one ten-thousandth of an ounce. The unit has a radioactivity equal to that of 1 millicurie, and, since future investigators with radioisotopes will often refer to the actual emission of the substances they are using, it may be recalled that 1 millicurie emits 37 million alpha particles per second. It is understood that activities will be referred to in terms of the curie or millicurie rather than to radium; the C^{14} unit cost the hospital about $400, which can be reckoned a permanent investment, seeing that the half-life of C^{14} is estimated to be between 10,000 and 25,000 years. It is to be used for studying the processes by which cancer is produced. The investigations planned [1] will tackle such diverse medical problems as the mechanism of cancer production, the utilisation of sugar in diabetes, the dysfunction of the thyroid gland, the growth and composition of tooth and bone, and the rôle of iron in anæmia. Outside the fields of medicine the various new isotopes will be applied to problems in agriculture and industry; the outstanding agricultural problem to be studied is the mechanism by which plants utilise the energy of sunlight. Most of the subjects for study are not essentially new, but the method

1. See *News Notes* (*Washington*), August 15, 1946.

of approach may be said to be so, for the investigators aim at following processes step by step, any faltering being signalled to the observer by the Geiger counters in circuit.

ANTICOAGULANTS IN CORONARY THROMBOSIS

EMBOLI and thromboses in various parts of the arterial system are recognised complications of coronary thrombosis, occurring in 14% of Blumer's 1000 cases,[1] and in 18 of the 100 cases reported by Nay and Barnes.[2] These complications have usually been attributed to narrowing of the arterial lumen and stasis in the blood-flow, but Peters and colleagues [3] have noted that in three-quarters of their patients with coronary thrombosis there was an increased prothrombin activity. This observation is in agreement with de Takats's [4] observation that patients with coronary thrombosis show an increased resistance to heparin.

In view of Solandt and Best's evidence [5] that myocardial infarction and thrombus formation in the coronary tree can be prevented by the administration of heparin, it was only natural that physicians should consider its clinical application. There are difficulties and even dangers in this use of heparin; but the introduction of dicoumarol by Link and his colleagues [6] gave fresh impetus to the study, and several reports have recently appeared in American journals.[3,7] Peters and his associates have used dicoumarol in a series of 50 patients with coronary thrombosis, among whom the incidence of clinical embolism was 2%, as against 16% in a control group. The mortality-rate in the dicoumarol group was 4%, compared with 20% in the untreated group. Although dicoumarol was given for at least six weeks and sometimes much longer, no serious toxic effects and no frank hæmorrhages were noted; but in three patients microscopic hæmaturia was found. It is emphasised that this treatment should be given only when there is a laboratory for the estimation of the prothrombin clotting-time. Definite contra-indications are hepatic disease and any blood dyscrasia. Special care must be exercised in the presence of hypertension, and the dicoumarol-like action of salicylates [8] and quinine [9] must be borne in mind. Dosage was determined entirely by the prothrombin clotting-time of diluted plasma (12·5%), for which the normal is 85–100 seconds. The usual dose is 300 mg., which can be repeated daily unless the prothrombin clotting-time of 12·5% plasma reaches 400 seconds, which is the upper limit of safety. Hæmorrhage, should it occur, can be controlled by the intravenous administration of menadione bisulphite 37·5 mg. The scheme is very similar to that of Wright,[7] who uses the prothrombin time of undiluted plasma as his guide: the normal figure here is 13–17 seconds, and dicoumarol was discontinued if the time exceeded 30 seconds. Wright's report is only a preliminary one; but, considering that most of his patients were selected for treatment because of repeated episodes of multiple thrombi or repeated embolic phenomena elsewhere in the arterial tree, his results are certainly encouraging. Of 43 patients selected because of complications known to be associated with a very high mortality-rate, only 11 (25%) died, compared with an anticipated risk of 60–70%; while of 33 patients having their first or second uncomplicated attack of coronary thrombosis, 4 (12%) died, compared with an anticipated mortality of 20–30%.

Two further aspects are worth considering. It has been confirmed by Peters and his co-workers that one risk in using digitalis for the heart-failure of coronary thrombosis is its tendency to increase the clotting-time of the blood.[10] Does dicoumarol neutralise this danger? Scherf and Schlachman [11] found that the prothrombin time and the plasma coagulation time are shortened after the intravenous administration of theophylline with ethylenediamine, and also of theophylline sodium acetate. A similar effect was obtained by the oral administration of the methylxanthines (theophylline with ethylene diamine, theobromine, and theobromine sodium acetate). This is not a new observation (some of the earlier German workers actually recommended theophylline with ethylenediamine as a coagulant, and Wright gave it as part of his "conventional treatment" to patients receiving dicoumarol); but it suggests that a careful review of our treatment of coronary thrombosis is called for. Until much fuller data are obtained dicoumarol should clearly be used only in selected cases treated in hospitals.

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SIXTH AND LAST

THE final issue of the sixth volume of the *Bulletin of War Medicine* contains two epilogues which mark the end of this publication. The first, by Sir Edward Mellanby, F.R.S., secretary of the Medical Research Council, recounts briefly the history of its inception; the second, by Dr. Charles Wilcocks, director of the Bureau of Hygiene and Tropical Diseases, acknowledges the services of all those whose work contributed to the value of the *Bulletin*. Together, these epilogues reflect a fruitful collaboration between the Medical Research Council and its publications officer, the bureau, and the large number of abstracters who devoted part of their meagre leisure to the task of providing medical information for those who otherwise might have missed it. Though the immediate purpose of the *Bulletin* has now been served, the medical historians of the war will find in it much of the material they may need for describing the developments of that period of—in some directions—phenomenal progress. The rapid growth of knowledge in relation to transfusion, penicillin, D.D.T., and mepacrine, for instance, is reflected in these abstracts.

The enormous importance of diseases (especially tropical diseases) in military campaigns has been reaffirmed during the war, when the success of operations turned on the maintenance of forces healthy enough to undertake them. That many of the problems involved were quickly solved was largely due to the stimulus given to research by the urgency of the situation. But the same or similar problems persist among the indigenous inhabitants of these tropical countries, and we must hope that research will be pursued as vigorously for peace as for war. There is still, therefore, the same need for information on tropical diseases and on public-health measures, and this will continue to be supplied by the bureau in its two publications, the *Tropical Diseases Bulletin* and the *Bulletin of Hygiene*, which were in existence long before the war, and which were the models on which the *Bulletin of War Medicine* was based.

A MEETING has been arranged at the London School of Hygiene, Keppel Street, London, W.C.1, for Thursday, Oct. 17, at 3.30 P.M., with the object of inaugurating a council for the care of spastic children. The chair will be taken by Mr. G. R. Girdlestone, F.R.C.S. The acting secretary is Mr. H. P. Weston, c/o Council for the Care of Cripples, 34, Eccleston Square, S.W.1.

WE regret to record that Lieut.-Colonel R. J. C. THOMPSON, who retired from the secretaryship of St. Thomas's Hospital medical school last month, died on Oct. 2. He was 66 years of age.

Special Articles

TUBERCULOSIS IN POLAND

MARC DANIELS
M.D. Paris, L.R.C.P.E., D.P.H.
MEDICAL OFFICER, HEALTH DIVISION, UNRRA

THIS report is based on information collected during six weeks' tour of the Polish tuberculosis services, covering the areas of eleven of the sixteen regional authorities, and including personal visits to twenty-three sanatoria and numerous hospitals and dispensaries, and discussions with doctors in these places, in provincial health offices, and at the ministry of health.

The situation, a tragic one, must be set against the background of war-time and post-war Poland. The six years' occupation of Poland was so grim that the people must be considered primarily as survivors of the occupation. Almost every Pole has lost relations or a home, has starved, or has lived in unimaginable conditions. Very many can roll up a sleeve and show concentration-camp numbers tattooed on their arm.

The Germans set about systematic extermination of intellectuals and professional people, with the object of reducing Poles to the level of slaves. Leading medical specialists were taken from the wards and shot in their offices or against a street wall. Their equipment and apparatus for research was stolen or deliberately destroyed, as were their documents representing many years of valuable work. Of the 12,900 doctors in 1939 only 6000 are left. In a rural area we gave a lift to a country doctor; he is sole doctor for an area with 14,000 people and has no car. Nurses also are very scarce; half of them were killed during the war.

The devastation of Warsaw, Poznan, and Wroclaw is indescribable. Warsaw was destroyed systematically, house by house, street by street. In the shambles that remain live half a million people. Among this population living in dark cellars and one-room flats which by a miracle retain four walls and a ceiling there are several thousand cases of tuberculosis. Overcrowding and shortage of food provide all the tubercle bacillus requires in order to flourish. In devastated rural areas families are living in dugouts and mud huts. Millions of acres are still lying fallow for lack of seed, equipment, or labour. Some areas have yet to be cleared of mines; peasants impatient to plough their land are sometimes blown to pieces.

To the rural areas are returning peasants and children of peasants who were taken off for slave labour in Germany. Many contracted tuberculosis there and, returning home, are spreading infection. Millions of the people are, or have recently been, on the move. They return from camps for displaced persons in Germany, from the armies, from Russia. Large communities are being transferred from the old eastern provinces to the newly acquired western provinces. People who sought refuge in the country during the war are trying to return to the city, even to Warsaw.

Against this background of devastation and potential chaos reconstruction is going on. Some of the work is described in this report. In assessing the services and work done to date, the background must not be forgotten. The work of public-health officers with no records, of professors of medicine with no clinics, of scientists with no laboratory or equipment in Poland needs to be seen to be believed.

MORTALITY

There has been an alarming increase of tuberculosis in Poland during the war years, and the disease is now widespread. Destruction of all pre-war records by the Germans renders detailed comparisons impossible. During the war only such services were allowed to function as would protect the Germans from danger of infection, and public-health services worked on a very reduced scale. Towards the end of the war, during the retreat, there was wilful destruction of public buildings and records. At present the services are being restored, but records are still very limited and fragmentary, since new workers are being trained to replace the many thousands killed and executed, and many new workers are still inexperienced and overworked. In view of these limitations, statistical information has been considered carefully, and only that considered valid after personal discussion with the health authorities is given here. The only figures of value come from large towns. Death certificates outside towns may be given by non-medical persons and are for statistical purposes valueless.

Warsaw.—The number of deaths from tuberculosis per 100,000, already high before the war, rose 200% in the war years, from 155 to 452 in 1941 and 500 in 1944. Before the war the rate was four times as high as in U.S.A. (white population); in 1944 it was fifteen times as high. The tuberculosis mortality in Warsaw and Lodz, compared with that in U.S.A., Copenhagen, and Stockholm, was as follows:

	1938	*1941*	*1944*
Warsaw	155	452	500
Lodz: All persons	176	316	371
Germans	..	139	155
Poles	..	378	461
U.S.A. (whites)	39	35	34
New York (all persons)	..	46	48
Copenhagen	51	44	40
Stockholm	92	75	70

In 1945 the registered tuberculosis deaths in Warsaw totalled 1189, which figure for a population of 400,000 gives a death-rate of 297. It must be remembered, however, that in that year, after the destruction of the city, the population numbered only a few thousands in January, and former inhabitants returned during and after liberation, to reach a total of nearly half a million only at the end of the year. If a mid-year population figure were available, the rate on this basis would be much higher than 297.

The recent census has shown that the proportion of young adults in Warsaw has fallen to an abnormally low level, owing to killing and deportation of all active members of the community; the population age-distribution curve shows a well-marked dip between the ages of 15 and 30. An adjustment of the death-rate to take into account the absence of this most susceptible age-group would have the effect of raising the rate considerably.

In Jews the death-rate before the war was relatively low, about 80. In 1941 it had risen to 440.

Lodz.—Here the mortality rose from 176 before the war to 401 in 1943, dropping later to 371 in 1944 and 288 in 1945. The war-time rates relate to the combined German and Polish population. For the Poles alone, the figure was 488 in 1943 and 461 in 1944, while in Germans the death-rate was only a third of that in the Poles (see fig. 1).

Poznan.—Mortality rose from 198 before the war to 360 at the end of the war.

Krakow.—In 1945 there were 615 deaths from tuberculosis in a population of 221,260, a death-rate of 278.

INCIDENCE

Mass Radiography Surveys.—This is the most valuable method of determining incidence of pulmonary tuberculosis in large communities. Several such surveys have been made in Poland since the end of the war. There are no similar results covering the pre-war period, but these recent figures are very striking.

(1) At Krakow University 9387 students have been examined by mass radiography in 1945–46, with the result that 392 (4·2%) are found to have tuberculous lesions considered active, and 623 (6·6%) tuberculous lesions requiring observation, making a total of 10·8% who require treatment or observation.

(2) In the Poznan surveys of 1945–46 7% of 4000 university students, 6·5% of 201 high-school students, 7·1% of 463 school-children, and 13·5% of 1361 factory employees have been found to have tuberculous lesions requiring treatment or observation.

(3) A Swedish Relief Service team is examining students in Warsaw. Provisional results, for 2000 students, indicate that over 15% have pulmonary tuberculosis requiring treatment or observation.

(4) During the occupation 1941–44, of 180,000 railway employees examined by the social-insurance organisation 7% were found to have pulmonary tuberculosis requiring treatment and 5% required observation.

Mass Radioscopy Surveys.—Of 4220 Lodz high-school and university students examined 5·8% have tuberculous lesions requiring treatment or observation; and of 1500 Lublin university students examined 2·1% have tuberculous lesions requiring treatment and 9·7% have tuberculous lesions requiring observation. These figures of the results of mass X-ray examinations are approximately ten times as high as corresponding figures in England (fig. 2) or the U.S.A. They confirm the impression given by the very high mortality in large towns of Poland.

Known Clinical Cases.—The figures given above indicate the prevalence of undiagnosed tuberculosis in the general population. They do not include the known cases, diagnosed by ordinary clinical methods. Tuberculosis is not notifiable in Poland; but some information is provided by the numbers of patients attending tuberculosis dispensaries. In Upper Silesia, in a population of 1,600,000, there are over 16,000 cases (1%) known to the tuberculosis clinics. In Poznan, a city of 283,000 inhabitants, there are 3293 (1·2%) cases known to the city dispensary. In the town of Zgierz 1·7% of the population are known to be tuberculous and requiring treatment. These figures are high compared with similar figures in U.S.A. and Great Britain. Moreover it must be emphasised that not all cases are reported to the tuberculosis clinics; the figure, therefore, falls far short of the total of diagnosed cases.

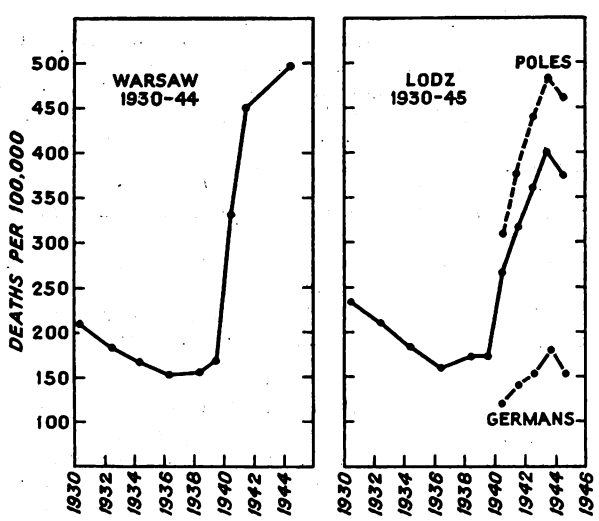


Fig. 1—Tuberculosis mortality in Warsaw and Lodz.

TUBERCULOSIS SERVICES

After 1918, legislation placed the onus for establishing and maintaining dispensaries, tuberculosis wards, and sanatoria on the smaller local authorities—districts or communes—empowering them to unite to form joint schemes. The province (vaivodeship) was to have an overall responsibility of directing the small local authority regarding when and where such services should be established. General control was exercised by the department of health of the ministry of labour and

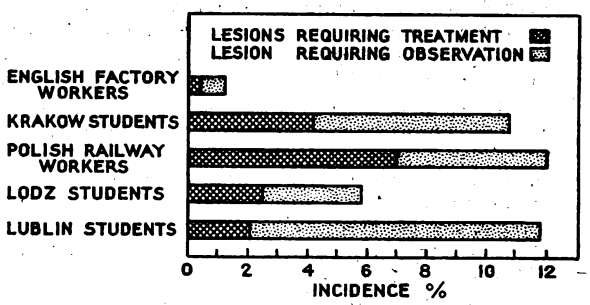


Fig. 2—Incidence of tuberculosis found by mass X-ray surveys.

social welfare. Educational and propaganda work was conducted largely by the National Anti-Tuberculosis Association.

The main work of the services was conducted from tuberculosis dispensaries, which numbered 532 in 1937. Of these, 436 were in health centres administered mainly by the local authority and providing diagnostic and treatment facilities for venereal diseases, trachoma, tuberculosis, and incorporating also maternity and child-welfare services. They were staffed by doctors who usually also carried on private practice and worked for social-insurance and other organisations. The social-insurance body also conducted a few tuberculosis dispensaries independently.

In 1938 there were 2680 beds for tuberculosis in 137 general hospitals and 5638 in 45 sanatoria. Only 7 of the sanatoria belonged to local authorities; the rest were owned by the social-insurance organisation, private bodies, Polish Red Cross, and professional and occupational associations. There was no central or regional control or planning of the institutions.

Payment for hospital and sanatorium treatment was the responsibility of district local authorities in all cases not covered by such organisations as social insurance. Local-authority funds being very limited, this meant in practice that institutional treatment could be provided to only a very small proportion of those unprotected by insurance or private income.

At the present time general control is exercised by the tuberculosis control section of the newly created ministry of health; the section is directed by Dr. Telatycki. Regional health control is exercised through the health departments of the fourteen provinces and of the cities of Warsaw and Lodz. The tuberculosis subcommittee of the National Health Council acts as an advisory body. The Anti-Tuberculosis Association is being reconstituted.

Dispensary Service.—The services, which suffered severe losses during the war, are being reorganised with more or less the same general structure, and the same unequal division of financial responsibilities. Dispensaries, many of which ceased to function during the war, and which in any case were allowed to serve only as diagnostic centres without being able to provide or arrange for treatment, are now being rapidly restored; 440 are operating at present, nearly all within health centres. There is a serious lack of equipment, X-ray units especially, and a great shortage of doctors and nurses, particularly of specialised personnel. The doctors at these centres,

nearly all of them doing this service in addition to busy private practice, are doing a heavy job of work. Relatively few of them have any particular training in tuberculosis. In the province of Kielce, for instance, for forty-five dispensaries there are forty-five doctors, only four of whom have special qualifications. The dispensary service, main prop of the tuberculosis organisation, is for the most part staffed by unspecialised personnel provided with a bare minimum of equipment, and struggling with an ever-increasing tide of tuberculous patients. The chief tuberculosis officer (also part-time) in the provincial health department has very little authority either over the dispensary service or over the sanatoria.

Case-finding Surveys.—Several case-finding schemes are under way; the results of some of these have been given. There are seven photofluorographic units, located as follows:

1 in Warsaw, in op.,	70 mm.,	Swedish Relief Service.
1 in Krakow, ,,	35 mm.	Belongs to social-insurance organisation.
1 in Poznan, ,,	35 mm.	
1 in Poznan, not in op.,	lens missing	
2 in Bydgoszcz, ,,	,,	Belongs to dispensary service.
1 in Katowice, ,,	awaiting film	

The main universities have an excellent diagnostic service for their students resumed on the same basis as before the war. There is also a very fine students' sanatorium, probably the first to have been founded in Europe (inaugurated in 1907).

Hospital and Sanatorium Services.—A complete picture of these services cannot be given at present, as the situation changes from day to day; only information collected quite recently is presented.

In general hospitals, out of a total of 86,000 beds, 4000 are set aside for the treatment of tuberculosis.

During the six years of war all the sanatoria except one were occupied by the Germans. Towards the end of the war, as the Germans retreated, they destroyed, looted, and burnt many of the buildings, stripping them of all equipment. This was the situation the Poles faced a year ago: a country which had been without sanatorium facilities for its tuberculosis population for six years, sanatoria destroyed, sanatoria with no beds, no equipment, and no staff. During the past year people have been occupied with the enormous task of restoring these sanatoria within the Polish tuberculosis services. Almost the whole time, for instance, of the director of the students' sanatorium in Zakopane is taken up by problems of rebuilding and by search for equipment, instruments, and drugs. This search, in a country plundered systematically during the war, is no easy task. Principal items lacking are thoracoscopes, replacement bulbs for thoracoscopes, surgical sets for thoracoplasty, X-ray film, developer, and fixer, X-ray tubes, needles, plaster, laboratory reagents, and narcotics.

In spite of lack of material the sanatoria are being restored very rapidly. Much equipment has been received from UNRRA. There is now more sanatorium accommodation than before the war, thanks to the acquisition of previously German institutions in Lower Silesia. There are 11,580 "potential" sanatorium beds. A description of the situation in Southern Poland, where most of the best sanatoria stand, will help to explain what this "potential" figure means at present.

In Lower and Upper Silesia and in Zakopane there are sixteen sanatoria with a possible total of 6078 beds: 1301 are not yet ready (equipment lacking, premises not completed); 1840 are still requisitioned by armed forces; and 2937 are available for tuberculous patients. Of the 2937 available beds 1905 are occupied by patients (of whom 237 are German) and 1032 are empty.

The 2937 beds are in excellent sanatoria, equipped for active treatment of tuberculosis and staffed by competent doctors. Yet 1032 stand empty. The main reason for this lies in the financial difficulties of the health authorities responsible. For some patients cost of hospital treatment may be covered by an insurance organisation, the Polish Red Cross, or the ministry of health, which assumes responsibility for treatment of repatriates. A few persons may bear the cost privately. But the majority have no protection of any kind, and for them the small local authorities are theoretically responsible for provision of treatment for tuberculosis. In fact, with the present high cost of maintenance in institutions, 100–200 zlotys a day, and with few local taxes collectable, most authorities can only afford to maintain very few patients in hospital or sanatoria. Most of their patients, when they do go, are sent only for a short time. From Lublin city dispensary for instance, where 1211 new cases were diagnosed in 1945, only 99 patients were sent to hospital (for an average interval of three weeks) and 9 to sanatoria. This dispensary has a waiting-list of 646 persons. Bydgoszcz provincial authority has a good sanatorium at Smukala, with 124 beds, yet of the 360 new tuberculous patients diagnosed in the first three months of this year none could be sent to sanatoria.

The ministry of health is able to pay for only 1000 patients for the whole country, and these include repatriates. For patients unprotected by insurance, private income, or otherwise, there is little hope of any treatment other than two weeks in the local hospital for induction of pneumothorax when this is thought advisable; they are then sent home again. These patients are the ones in the worst economic condition; it is not difficult to imagine the prognosis for such patients, and the risks for their families. Even for insured patients, the limit of stay in sanatoria is usually three months.

On the basis of an overall tuberculosis death-rate of 300 per 100,000, and setting the minimal standard of 100 beds against every 100 deaths, there should be at least 66,000 beds. There are only 11,580; and, though half of these are not ready or are still requisitioned, there are still many beds standing empty because no one can bear the cost.

The main cost is food. Sanatoria are obliged to buy most of their food in the open market. The cost of food varies from one province to another. In one, 100 zl. may cover a relatively adequate diet of about 3000 calories (with too high a proportion of carbohydrate); in Lower Silesia 150 zl. may provide only a diet well below the minimal requirements for a healthy person. For example, in Zeylandowo, patients receive a small portion of meat or fish twice a week, no cheese, and no butter. For three months they had no milk except in soup, now they have 0·25 litre a day. Nurses are constantly leaving because of the bad diet, since they have the same as patients but minus the milk. In one sanatorium, arriving at 1 P.M., we partook of the main meal; it consisted of a thin vegetable soup and a plate of rice.

In several institutions the diet is not more than 2000 calories. From Kamieniegura sanatorium we brought away a complete list of all foods consumed during March by the 400 persons in the sanatorium. An analysis on the basis of figures given by the M.R.C. Memorandum (no. 14, 1945) on "Nutritive value of war-time foods" shows that the average daily diet per person in this sanatorium amounted to 1995 calories, with 348 g. of carbohydrate, 37 g. of fat, and 67 g. of protein (of which 23 g. was animal protein).

Thus the problem of food not only affects the condition of patients in sanatoria but also is indirectly responsible for many beds standing empty. UNRRA is committed to a programme of provision of food to the whole Polish people through the central government and cannot undertake specific allocation and distribution; but any assistance that could be given in provision of food to the sanatoria would go a long way to the solution of their problems.

Staffing of Services.—Reference has already been made to the severe shortage of doctors and nurses. There is

an average of one doctor for 3600 people, and one nurse for 7000 people. We met a woman doctor running a health centre who works there all day, has no nurse to help her, and is so overworked that she has no time to keep any record of patients. In her district previously there were 72 doctors; now there are only 10. In the sanatoria there are for 100 patients usually 4 qualified nurses, this number including both day and night nurses. In one sanatorium for 275 patients there are 5 nurses. Many dispensary nurses have no time to do any health visiting.

The lack of specialised personnel is particularly great, as a relatively high proportion of these were killed. The chief thoracic surgeon for Warsaw was shot by the Germans. There are now in Poland only two surgeons specialising in chest surgery.

Courses are being arranged for doctors; they are planned as intensive courses lasting two or three months and will be given in the principal university centres. Grave difficulties are arising in this connexion. Owing partly to economic difficulties of doctors, and partly to the fact that a country doctor can find no locum to replace him even for a few weeks, there are very few candidates, though the ministry is offering maintenance and 8000 zl. a month to those attending the course.

In Poland, as throughout the rest of liberated Europe, a constant cry is the need for medical literature covering the war period. In addition, Poland suffered complete and wanton destruction of many medical libraries, public and private, so that she has lost also much valuable medical literature from before 1939.

CONCLUSIONS

The incidence of tuberculosis in Poland is now alarmingly high. Involving usually chronic disease over many years, and affecting mainly adolescents and young adults, it causes an immense wastage of human life. Of the toll on health taken by the war and the German occupation, it is by far the most serious disease, and will continue to be so for many years to come. The fact that it is not an acute epidemic disease renders less apparent the need for an intensive campaign; the need, however, is urgent.

Great progress has been made in re-establishment and re-equipment of the services. But these services started almost from zero after liberation a year ago; equipment is still in very short supply, and organisation is still defective. The situation is such that it must be regarded as nothing less than a national emergency. Recommendations have been made for an emergency supply programme and for urgent reorganisation along lines practicable under present conditions.

The task that lies before the ministry of health is no mean one; it is that of planning tuberculosis control in a country which has been systematically devastated, which has a very high incidence of tuberculosis, which lacks equipment, doctors, nurses, and trained administrators, and which must concentrate its economy mainly on reconstruction. In a five-year programme far more equipment will be required, particularly for the establishment of tuberculosis hospitals to raise the total to 30,000 beds. Radical reorganisation will be necessary if the service is to be well staffed and to come within a single national plan of attack on tuberculosis. A much greater proportion of the national budget will have to be devoted to the anti-tuberculosis campaign (before the war the proportion was exceptionally low).

Only after the initiation of such a programme, and after a raising of the living standard, which will of necessity be slow, can any important and continuous decline in this disease be expected in Poland. Further, though much will depend on the Polish people themselves, war-time devastation has been such that assistance from without will be needed for a long time and on a generous scale.

INTERNATIONAL SOCIETY OF MEDICAL HYDROLOGY

THE first post-war annual meeting of the society was held at Buxton from Oct. 4 to 6. The principal representatives from abroad were: Belgium, Dr. J. Michez (Brussels); Czechoslovakia, Prof. F. Lenoch (Prague); France, Dr. P. Petit (Royat); Holland, Dr. J. van Breemen; Switzerland, Dr. V. Ott (Zürich); U.S.A., Dr. Loring Swaim. The following officers were elected for 1946–47: president, Lord Horder; chairman of council, Dr. J. B. Burt; vice-chairman, Dr. G. D. Kersley; hon. treasurer, Dr. Frank Clayton; hon. secretaries, Prof. František Lenoch and Dr. Donald Wilson; 39 new members and 5 associate members were elected. Arrangements for renewing the publication of the society's journal were discussed.

In his presidential address, Lord Horder, one of the two surviving founder members of the society, emphasised the great part which would be played in the restoration of international relations by free associations of medical men of different countries for discussion of common problems.

Dr. J. van Breemen discussed the four causal factors in rheumatic disease—focal or other infection; constitutional anomalies; abnormalities of the peripheral circulation and in the defence mechanism of the skin; and social and environmental influences—in relation to medical hydrology.

Dr. V. Ott described research work done in Switzerland in testing the effects of thermal treatment on the autonomic nervous system.

Dr. Abraham Cohen, of the Philadelphia General Hospital, gave an account of the use made in his hospital of physostigmine in the relaxation of muscle spasm. He referred to the experience of other workers with 'Prostigmin' but maintained that physostigmine salicylate was equally efficacious, less expensive, and less toxic. The method adopted in the arthritis (inpatient) ward was to give all patients injections of isotonic saline daily for a week. If these and complete rest produced no improvement, hypodermic injections of atropine (0·06 mg.) were given daily for the next week. If again there was no improvement, he gave physostigmine and atropine mixed in the same syringe, beginning with 0·06 mg. of each. The quantities were adjusted according to whether side-effects on the autonomic nervous system were produced by either of the two drugs. If the physostigmine/atropine balance was correct, the treatment could be administered indefinitely, but the usual period was six weeks. The best results were obtained in rheumatoid arthritis when the spasm was very severe. The treatment was not to be regarded in any way as a cure but as an auxiliary method which might produce considerable amelioration of symptoms, particularly relief of pain. Among other conditions in which good results had been obtained were spasm due to war wounds and other traumata, Felty's syndrome, and paralysis resulting from nerve injuries.

Dr. Loring Swaim discussed American concepts of the treatment of chronic rheumatic diseases, stressing the importance of individual reactions to personal and social environment, and the responsibility of the physician to reorientate the patient.

Mr. R. B. Whittington (Manchester) discussed the correlation between the plasma viscosity of the blood and the erythrocyte-sedimentation rate; he produced evidence of the greater reliability of the former in reflecting the progress of various diseases.

TOWN MEETS COUNTRY

"ONLY when the soil of a country is in good heart and fruitful can the rest of that country's system be in good heart also." In this belief the founders of a new Association of Agriculture seek to engage the interest of the British public in a prosperous countryside, which they regard as necessary "economically, nutritionally, and socially." They hope to achieve this object partly by the education of the young, but partly also through the coöperation of medical authorities who can emphasise the need for a national food policy that will enable British agriculture to make its full contribution. "A

healthy farming industry is everybody's affair, and everybody should realise it."

The new association was launched last Monday night at a Mansion House dinner with the Lord Mayor of London in the chair. Mr. TOM WILLIAMS, Minister for Agriculture, said that only 7% of the population of this country now work directly on the land, and the man living in the heart of urban Britain naturally has more regard for the habits of the people among whom he was brought up than for the environment of his great-grandfather. Agriculture was now fully recognised as a national asset, but "town and country must eventually learn to understand each other's problems."

Lord DE LA WARR, president of the association, said that in the past the towns had demanded a rising standard of life at the expense of food-producers both at home and abroad. That scheme of things had broken down between the wars because of the glut which prevented food-producers from buying the products of the town, and it had now broken down again for precisely the opposite reason. He based the claims of British agriculture not so much on good will or gratitude for war services as on the continuing need for food-production at home: why should precious money be sent abroad to pay for food that can be grown in this country? "Periods of plenty exploited by the consumer, and periods of shortage exploited by the producer, are not going to lead us anywhere," said Lord De La Warr. It was the task of the new association to show that, wherever temporary advantage may lie, in the long run the interests of town and country are the same. It was not concerned with policy but with education, seeking to create the mental background against which policy may be considered. This country should face the future not as two nations but as one, with equality of rights and responsibilities.

Colonel WALTER ELLIOT, F.R.C.P., said that as a former Minister of Agriculture he shared the uneasiness of the countryside; and when Minister of Health he had been responsible for inviting over a million women and children into the country—thereby introducing the word "evacuee." He asked the City to consider the great and steady markets that can be built out of "the processing of mud"—a raw material of which, in this country, there is unlikely to be any shortage.

Mr. ANTHONY DE ROTHSCHILD spoke of the need for a balanced economy, and Mr. CHARLES DUKES, president of the Trades Union Congress, said that the Government must ensure that goods produced under sweated conditions shall not unfairly compete with the products of labour on our own soil. Mr. J. TURNER, president of the National Farmers' Union, thanked the medical profession for showing that agriculture should produce what is needed by the people rather than what it would like to produce. Agriculture, he said, was now straining at the leash to produce what the country really needs.

The address of the Association of Agriculture, which hopes to receive the widest possible support, is 32, Bedford Square, London, W.C.1.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED SEPT. 28

Notifications.—Smallpox, 0; scarlet fever, 1001; whooping-cough, 1451; diphtheria, 285; paratyphoid, 19; typhoid, 12; measles (excluding rubella), 1461; pneumonia (primary or influenzal), 373; cerebrospinal fever, 32; poliomyelitis, 30; polio-encephalitis, 0; encephalitis lethargica, 2; dysentery, 66; puerperal pyrexia, 164; ophthalmia neonatorum, 67. No case of cholera, plague, or typhus was notified during the week.

Deaths.—In 126 great towns there were 2 (0) deaths from enteric fevers, 1 (0) from measles, 1 (0) from scarlet fever, 8 (1) from whooping-cough, 7 (0) from diphtheria, 47 (3) from diarrhœa and enteritis under two years, and 5 (2) from influenza. The figures in parentheses are those for London itself.

Willesden and Swansea each reported 1 death from an enteric fever.

The number of stillbirths notified during the week was 275 (corresponding to a rate of 28 per thousand total births), including 29 in London.

Medicine and the Law

Insanity Moral or Legal

SINCE the Court of Criminal Appeal was created, an appeal thereto in all cases of conviction of murder has been almost automatic. The judges of that court indeed have sometimes found themselves saying that there is no explanation of a particular appeal except the fact that it is a case of murder. Neville Heath, sentenced to death at the Central Criminal Court on Sept. 26, has furnished an exception to the usual practice. He made no appeal to the Court of Criminal Appeal, but left his case to the medical board which the Home Secretary consults when the defence is insanity. Thus his fate will depend not on the narrow definition of insanity enshrined in the rules in McNaghten's case as long ago as 1843, but upon up-to-date medical opinion informed by all relevant evidence, whether or no the evidence was given at the trial.

Heath was convicted of the murder of Mrs. Margery Gardner at a London hotel on June 21. British justice requires that an accused person be tried for one offence only at one time, lest a jury be tempted to believe that, because he has been guilty of one crime, he is therefore probably guilty of another. Heath, as his counsel conceded, had also murdered Doreen Marshall at Bournemouth on July 4. The worse his conduct, the more material for a plea of insanity. For the defence Mr. J. D. Casswell, K.C., asked the jury to say that Heath was "as mad as a hatter, absolutely insane, a maniac." The conduct of the accused, who suffocated one of his victims, lashed her, and tied her up so that she was helpless, did not (urged counsel) show the premeditation of a sane person; no man in his senses could possibly have done what this man did; it was a case of sudden but latent insanity.

The expert testimony at the trial showed the usual conflict. Called by the defence, Dr. W. H. D. Hubert, psychotherapist at Wormwood Scrubs Prison before the late war, said that the injuries inflicted on the two women were extremely savage, the actions of a sadist. Heath, when visited in prison, appeared to show no remorse or appreciation of what other people would think of his behaviour; after committing these crimes, he behaved in quite a casual manner, considering his intelligence. In the witness's opinion, Heath was not an ordinary sexual pervert, but he suffered from "moral insanity" and at times was quite unaware that what he was doing was wrong; he was certifiable as morally insane. Under cross-examination Dr. Hubert described Heath as a moral defective in law, but, when referred to the statutory definition in the Mental Deficiency Act of 1927, he could point to no evidence of arrested or incomplete development of mind before the age of 18 years. In answer to the Judge, Dr. Hubert said Heath was suffering from a disease of the mind, a general abnormality; he suffered from a defect of reason inasmuch as he was unaware of other people's attitude towards these offences. Prosecuting counsel called Dr. Hugh Grierson and Dr. Hubert Young, senior medical officers at Brixton and Wormwood Scrubs prisons respectively. Neither considered Heath insane; he was a sadist, but sadism is an abnormal exaggeration of a normal instinct of the human race. Neither was prepared to agree that Heath did not know that what he was doing was wrong and punishable by law. For the defence it was suggested that these two witnesses were not consultants, had not practised in mental hospitals, and had experience only as prison doctors; they had found Heath repressed, uncommunicative, and uncoöperative because he knew that they were prospective witnesses for the Crown.

Mr. Justice Morris, in summing up to the jury, used the usual judicial definition of insanity. Everyone was

presumed to be sane and responsible for his actions until the contrary was proved. Insanity was not established merely by outrageous and unexpected behaviour. This had been described as an instance of "partial" or "moral" insanity or as mental defectiveness. These were not the real issues. The judge emphasised that the jury must consider whether they thought that Heath did or did not know that he was doing what was wrong. It seems to have been upon this issue that he was convicted. The prosecution suggested that in his conversation with Miss Symonds about the crime, in his letter to Superintendent Barratt as to the identity of the criminal, in his change of name (to "Group-Captain Rupert Brooke") when he went to Bournemouth, and in his attempts to conceal the body of Miss Marshall, Heath had been trying to cover his tracks. These matters were among those mentioned by the judge as possibly material to the issue which they were trying. After a retirement of an hour they brought in a verdict of guilty. Heath, when called upon, made no statement and indeed showed indifference and unconcern.

The lay public was probably less interested in the issue of criminal responsibility than in the details of the crime. Heath's past career was narrated by a police witness in answer to questions by Mr. Casswell.

Born in 1917, he had served in the Territorial Army in 1934, and in 1936 had joined the Royal Air Force. He was dismissed by court-martial sentence next year, after trial for absence without leave, for escaping while under arrest, and for unauthorised taking of a motor-car. A month later he was placed on probation for frauds at an hotel and for attempting to obtain a car by false pretences, eight other cases of fraud being taken into consideration. In July, 1938, he was sent to Borstal on charges of stealing jewellery and cheque frauds, ten other cases being taken into consideration. He was released at the outbreak of war, enlisted in the R.A.S.C., and went to the Middle East in 1940 with a commission. In 1941 he was court-martialled and cashiered for frauds as to pay; there were other charges. Sent back to England, he landed improperly at Durban and found his way to Johannesburg where he posed as Captain Selway, M.C., of the Argyll and Sutherland Highlanders. Changing his name to Armstrong, he joined the South African Air Force as a pupil pilot, reached the rank of captain, and in 1944 was seconded to the R.A.F. and took part in operational flying. He had been married in South Africa in 1942; his wife obtained a divorce nine months later but with no suggestion of cruelty or sadism. In December, 1945, he was convicted by general court-martial in South Africa on various charges, including three for wearing decorations without authority. He was then sentenced for the third time to dismissal from the R.A.F. Returning to London last February, he was fined in April at Wimbledon for unlawfully wearing uniform and decorations to which he was not entitled.

How the recital of this record may have affected a jury it is difficult to say. There was little in it to suggest disease of the mind, and there was nothing in the case to suggest delusion.

In his recently published recollections Mr. Justice Travers Humphreys seems to deprecate taking away the decision in respect of a death sentence from the judges and giving it to the Home Secretary. Be that as it may, there will be considerable relief in many minds that Heath's strange case has forthwith been made the subject of a medical inquiry instead of merely leading to the repetition of the McNaghten rules in the Court of Criminal Appeal.

A GROUP of patients with disseminated sclerosis have initiated in New York the Association for Advancement of Research on Multiple Sclerosis, of which the chairman is Dr. Tracy Jackson Putnam, New York. The aims are to coördinate research, gather statistics, act as a clearing-house for information, educate the public on the problem of the disease, and collect funds for research. A large medical advisory board has been appointed.

In England Now

A Running Commentary by Peripatetic Correspondents

THE latest experiments with yellow maize meal (*Lancet*, Oct. 5, p. 491) are a reminder that this coming winter marks the centenary of perhaps the largest experiment ever made with maize in human dietary. In 1846 the potato crop, the staple food of the Irish poor, completely failed, and both the Government and charitable organisations supplied vast quantities of "Indian corn" or maize for cooking at home and set up thousands of "kitchens," where the meal was cooked before distribution at a nominal price, both to avoid the stigma of charity and to maintain the morale of the men, who were put to all sorts of road-making and hill-shifting to earn money to buy the maize. For several years afterwards hundreds of derelict wheelbarrows lay about the roads and fields. Anthony Trollope, who has "come back" so remarkably in the past few years, was then a post-office surveyor, his job taking him over a large part of the Irish countryside. He has left vivid descriptions of the ravages caused, especially among young children, in his novel *Castle Richmond*. One wretched woman is made to say: "Is it the mail? An' shure an' haven't I had it the last month past? Nothin' else. Not a taste of a praty or a dhrop of milk for nigh a month. And now look at the childher. . . . They are dying by the roadside." And she shows a child, aged nearly two years, whose little legs seem to have withered away; its cheeks wan, yellow, and sunken; its head, back, and legs covered with sores. "Look at that," the mother says, almost with scorn, "that's what the mail has done —my black curses be upon it, and the day that it first came nigh the counthry."

* * *

The Royal Life Saving Society's handbook [1] makes it all look so easy. Even the drowned man in bathing-drawers wears a calm smile as the rescuer, sometimes disquietingly called the operator, pushes him in the face, shoves a knee in his chest, tows him ashore, leans on his ribs, rubs his arms, rolls him over, and generally does him good. The rules for saving life were not always so cut and dried; the drowned man is probably smiling at the thought of what he escaped by being born well after the society got down to its enlightened work. Dr. Rowland Jackson, who published in 1746 *A Physical Dissertation on Drowning* (Price One Shilling), had no such mine of information to draw on, and though on his very first page he exclaims against "that ignoble and unmanly Turn of Mind, commonly known by the Name of *Credulity*," he seems to have been led into accepting some pretty tall stories. There was the "Gardner of Froningholm," for example, who fell through the ice and "went perpendicularly to the Bottom, in which his feet stuck for sixteen Hours before he was found." This sturdy fellow (for he survived) said afterwards that he "perceived a Kind of Bladder before his Mouth which hindered the Ingress of the Water by that Passage, tho' it enter'd freely into his Ears, and produc'd a Dulness of Hearing for Some Time after." Then there was the woman who had the misfortune to be thrice drowned. The first time she was three whole days under water, "but the two other Times had more Speedy Relief afforded her." She died at 75. And so on, from the Painter of Falung, who was eight days in the water and had a good deal to say about it, to Laurence Jones, who continued seven weeks under water—though about him even Dr. Jackson seems to have felt a few qualms in his organ of faith.

From drowned men he passes to the drowned Polish swallows, who, on the word of Fortunus Licetus, towards the end of September "plunge themselves into Ditches and Rivers, where they remain conceal'd till about the Middle of May"; and clusters of these swallows taken out from below the ice only needed warming to come to life again. Moreover, if released "they forthwith fly back to the Water and plunge themselves into it."

But Dr. Jackson's readiness to believe all he heard sprang from a human and practical desire to see the

1. Illustrated Handbook of Instruction (21st ed.). Royal Life Saving Society, 14, Devonshire Street, Portland Place, London, W.1. 2s.

drowned resuscitated, and though nearly as credulous about remedies as he is about recoveries, yet he gives first place to sensible measures. His opening directions are to carry the patient into a house and warm him gradually before a gentle fire, wrapping him in warm cloths and rubbing him until circulation is restored. He does not believe in rolling patients on barrels because one of his authorities had known it to cause sudden death. He shares contemporary opinion on the value of bleeding but advises the utmost caution in the use of cordials in the early stages. If other measures prove ineffectual he advises tracheotomy, and neatly describes the method. If no tracheotomy tube is at hand the shank of a common pipe—presumably a churchwarden—is to be slipped into the tracheotomy opening, and the operator (as the R.L.S.S. handbook would call him) "blows into the Bole." He recommends another and much more extraordinary use for the common pipe, this time loaded and burning. The small end is to be introduced into the anus, the bowl covered with a piece of perforated paper, and the operator is then to blow tobacco smoke into the intestines as strongly as he possibly can. On one occasion, when this remedy was put to trial at the instigation of a soldier, "at the fifth Blast, a considerable rumbling in the Woman's Abdomen was heard, upon which she discharg'd some Water from her Mouth and in a Moment after return'd to Life." Dr. Jackson was so much impressed with reports of this method that he invented an instrument, illustrated in his frontispiece, "contriv'd on purpose for impelling the Smoke of Tobacco into the Intestines." It enables the blower to operate from a distance of some feet, but has no advantage for the patient unless, like the users of cigarette-holders, he prefers his smoke cool. One look at it is enough to prove that we should all be very grateful to the Royal Life Saving Society.

When my fellow peripatetic of Sept. 21 spoke of "swanning" he stirred up many memories of days in the Western Desert with the 8th Army, including one which throws light on the origin of the term. In the second desert campaign of November, 1941, a variety of codes were used for R.T. communication by the different branches of the Service. One of these, known as the "Bird" code, and originating, I believe, with the then D.D.M.S., 30 Corps, for use by medical units taking part in the campaign, referred to motor ambulances as "swans." One of the commoner sights in that campaign being ambulances crossing and recrossing the desert, "swanning" came to be applied to their activities. The term persisted, eventually becoming common 8th Army slang for any apparently aimless wanderings. From the 8th Army it diffused outwards to the rest of the Army, carried no doubt by old members of the 8th.

* * * *

How tantalising it is to travel in the train past fields full of mushrooms, knowing that all we shall get this season is a quarter of a pound of tasteless cultivated things costing several shillings. We are still very conservative in this country about eating fungi other than the common mushroom, mainly because of the fear of poisonous toadstools, though Mr. Ramsbottom says in the *Times* that the toadstool is becoming more fashionable. His excellent King Penguin book on poisonous fungi shows how uncommon dangerous forms are, for he has to fill up his slim volume with kinds which are liable to give slight indigestion. Personally I don't think that we miss a great deal by our conservatism. To my palate few compare in flavour with a freshly gathered field mushroom, and in England it is an awful job to pick enough of other sorts to produce a decent portion. Even in France I have been faced with a repellant dish resembling tenderised 'Sorbo' rubber in the guise of a great delicacy.

Parliament

THE BILL IN THE LORDS

ACCOMMODATION in the smaller but by no means cramped quarters now used by the House of Lords—whose proper benches are still occupied by the Commons—was taxed to capacity when last Tuesday afternoon the LORD CHANCELLOR rose from the Woolsack to open for the Government the Lords' debate on the second reading of the National Health Bill. There was nothing in Lord Jowitt's speech to suggest that during the parliamentary recess the Government has considered any revision of the Bill. Most of his survey and his arguments followed the now familiar lines of ministerial speeches in the lower House. The one new fact he disclosed was that the Government (adopting a suggestion of which Lord Moran had given notice) propose to set up a "Spens Committee" to consider and report upon the proper remuneration of consultants. He defended at length and with conviction the powers given to the Minister under the Bill—powers without which, he said, it would be impossible for the Minister, as commander-in-chief of the health forces, to provide the service the country has been promised.

It was to these same powers, vested in one individual, that the Earl of MUNSTER, opening for the Opposition, took strong exception. He welcomed the conception of a National Health Service but was very sure that a better and more democratic service could have been framed if greater use had been made of local authorities. He hinted that his party would be putting down amendments in the committee stage designed to liberalise the administration and preserve the autonomy of the voluntary hospitals.

The Marquess of READING saw in the Bill the logical development of the social services inaugurated by the Asquith "Government of all the Talents," but feared the possibility of over-centralisation of administration in a Ministry of Health already overburdened with housing responsibilities. He believed that, with adequate devolution of power and function to the regional boards and to the executive councils, a service may be built not unsatisfactory to the doctors. He suggested that when the time comes it may be only the very few—and they the very elderly—who will prefer to "reign in Hell rather than serve with Bevan."

The Archbishop of YORK saw in the Bill a great opportunity for ensuring that preventable illness does not go unprevented. He was followed by the first of the medical speakers, Lord MORAN, who dealt with the need for establishing conditions of practice, in all branches of the profession, that will ensure the continued recruitment of the right men and women in numbers sufficient to provide a complete and balanced service. At present (but this may be partly due to demobilisation) the would-be entrants to the medical schools are more than the schools can absorb. If medicine is to remain attractive, conscious effort is needed to make all branches of medical work satisfying. In particular, the provision of an extended consultant service should not be allowed to exclude the general practitioner from his proper access to, and share in, the work of the hospitals. Lord Moran referred to the present difficulty in which the Minister finds himself in his negotiation with the Insurance Acts Committee. He felt this was largely a procedural difficulty which with good will could still be overcome. He appealed to the Minister to try again to come to some agreement with the profession before prejudice over this present trouble mars the reception of the final scheme.

Lord TEVIOT, speaking from knowledge gained from his long chairmanship of the Teviot Committee, stressed the even greater need for attracting urgently and by all possible means many more students to dentistry. The country, he said, could well afford to have each year three times the number who now qualify.

Lord INMAN saw in the new service not the death of the voluntary hospitals but enlarged opportunity free from all-pervading worries about finance. Lord HORDER regretted the lack of real consultation with the medical profession in the preparation of the Bill, and was glad that the Minister at last realised that there can be no new service without the willing coöperation of the men and women who have to work it.

The first day's debate ended with a plea from Lord AMULREE for a better, a more scientific, and a more humane treatment of the problem of the chronic sick.

The debate continued on Wednesday, when Lord LISTOWEL replied for the Government to the first day's critics.

Letters to the Editor

PERFORATED PEPTIC ULCER TREATED WITHOUT OPERATION

SIR,—Some twelve months ago I had the opportunity of visiting Professor Winkelbaum's clinic in Graz. In his wards I noticed several patients with what he called perforated duodenal ulcer. They had not been operated upon. "Why?" I asked. The professor was obviously a little taken aback by so naïve a question. The substance of his reply was that if the cases were brought into hospital early for treatment the ulcer sealed itself off. It was necessary to operate only on cases, usually late, in which there was evidence of a lot of fluid in the peritoneal cavity; and these were usually gastric, not duodenal ulcers. The routine was to await recovery from perforation, and in 3–4 weeks perform a partial gastrectomy.

Whether the latter action is commendable is a subject for debate. But the efficacy of the conservative treatment of perforation in these cases left no room for doubt, and made me realise that there was a great need for revision of the usual and long-established teaching of immediate operation for all cases of perforation; for the mortality of such a procedure is considerable, and the postoperative morbidity great.

Mr. Hermon Taylor's article of Sept. 28 is both timely and encouraging. The results—admittedly this is a small series—compare favourably with any that could have been obtained by routine laparotomy. It will be noted that nearly all the ulcers in Mr. Taylor's series were duodenal. Conditions for spontaneous sealing of a perforated duodenal ulcer are more favourable than those for sealing of a perforation on the anterior wall of the stomach; and I feel that if one is to adopt conservative treatment it may be wise to restrict it to duodenal ulcers, if differential diagnosis permits the distinction to be made.

London, W.1. HAROLD C. EDWARDS.

SIR,—Although I have never had the courage to treat without operation cases of frank perforation of a peptic ulcer as practised by Mr. Hermon Taylor, I have frequently treated by generally conservative means those cases in which the diagnosis appeared somewhat indefinite and which appeared clinically to be cases of what we might call a local peritonitis in relation to an ulcer—such cases as are often referred to as "leaking ulcers." And in such cases the symptoms have subsided, though there has been noted from time to time a gas shadow under the diaphragm a few days later when a barium meal was about to be contemplated. This has led me to the conclusion that in many so-called perforated ulcers there has been a gas leak only, which can settle down with restriction of fluids by mouth for 24 hours and a dose of morphine without actually going to the trouble of gastric aspiration in this less severe type of case.

One other point I should like to mention, though it is not exactly relevant: it has been my experience that operation on late cases of perforation (i.e., those over 24 hours old) is almost inevitably fatal, but that a number of these cases may be saved by intravenous fluids coupled with a small suprapubic drain inserted under local anæsthesia. This form of drainage is recommended because I have always felt that a quantity of fluid plus gas inside the cœlom has kept the viscera of the upper abdomen apart and so prevented the falling together of those tissues, the apposition which might result in the perforation becoming sealed off.

Selly Oak Hospital, Birmingham. JAMES GORE.

SIR,—I read Mr. Taylor's paper with great interest. Thirty years ago I reported a case in which perforation of an ulcer of the lesser curvature was cured by non-operative treatment.[1] The ulcer, having perforated between the layers of the lesser omentum, was observed by radiography; the perforation disappeared, and later the ulcer greatly diminished after routine dietetic treatment. So far as I am aware this was the first case in which gastric perforation was deliberately treated medically without operation, as noted previously by me.[2]

The X-ray pictures of the ulcer before, during, and after the perforation have been published in my textbook.[3] Many years later Prof. M. Roch,[4] of Geneva, reported a case of "spontaneously healed gastric perforation."

Conservative treatment should be restricted to those perforations which are sealed off. Therefore the question arises of how these cases are to be recognised. The partial or total absence of muscular rigidity cannot be regarded as pathognomonic of a sealed perforation, since rupture of an ulcer sited on the posterior wall of the duodenum or of the stomach induces primarily rigidity in the musculature of the *posterior* abdominal wall. Only later, mostly after 2 or 3 days, with the appearance of meteorism, and intestinal obstruction, is it possible to make a certain diagnosis of diffuse peritonitis, indicating that the perforation was not sealed off. An operation at that stage, however, carries a great risk.

Hitherto it has not been known, or even supposed, that in most cases the perforation was sealed off. The value of Mr. Taylor's treatment will be enhanced if some early and reliable sign differentiating between open and sealed perforations can be found.

Letchworth. EUGENE ROSENTHAL.

1. Rosenthal, E. *Berl. klin. Wschr.* 1916, no. 34.
2. Rosenthal, E. *Lancet*, 1936, i, 1263.
3. Rosenthal, E. Diseases of the Digestive System, London, 1940, p. 72.
4. Roch, M. *Schweiz. med. Wschr.* 1942, **72**, 1307.

CHILDREN IN DAY NURSERIES

SIR,—Dr. Menzies, in her paper of Oct. 5, quotes me as having described the Oxford survey of the incidence of infections in day nurseries as being "at the same time too scientific and not scientific enough." This suggests a serious misunderstanding of my comments which were, actually, that the Oxford survey was too much of an academic exercise and was based on data whose scientific validity was open to serious doubt.

I use the term "academic exercise" to describe a type of investigation which draws inferences from observed facts but does not concern itself with the practical importance or application of those inferences, and it is with regret that I notice that other investigations into the welfare of nursery children seem to share this character.

The recent paper on the incidence of infections of the respiratory tract, published by a group of members of the Medical Women's Federation, though unimpeachable so far as data and analysis were concerned, is a case in point. Its findings were, in brief, that a child who leaves home to enter a nursery runs thereby a serious risk of catching colds or bronchitis. But it has been a matter of common knowledge for years that the child's first departure from the restricted circle of the home to enter a mixed group is likely to be followed by a series of colds and coughs. The two pertinent questions, "What is the long-term effect on the child's health of these colds?" and, "How much harm is done by shifting this phase of infection from the normal school entrance age of 4–5 years to the earlier age of $1^1/_2$–2 years," remain unanswered.

Dr. Menzies is concerned because in her nurseries the gain in weight of the entrants is "unsatisfactory." Her anxiety would be pardonable if the children were being fattened for the pot, but it is rash to suggest that at this particular stage in a young child's life it is possible to lay down arbitrary standards of satisfactory gain on purely physiological grounds. It is quite true that loss of weight may arise from emotional disturbance. It may also arise from a change of diet, from a change from a bad diet to a good one, or from the fact that the child, for the first time taking adequate exercise and discovering the open air, is merely getting rid of his "puppy fat." It is difficult, if not impossible, to assess whether either the emotional disturbance or the failure to gain weight is, in any given child, likely to cause long-term harm, and Dr. Menzies is not to be blamed for not having attempted it. Yet without such an assessment her investigation is barren.

Can we be realistic about this nursery business? A majority—often a large majority—of nursery children are the children of mothers who are compelled to work either by poverty or by the needs of industrial reconstruction. It is fallacious to compare nursery children

with children from normal homes; the true comparison is with children from necessitous homes and children who are cared for by "daily minders." I should be happy to see a state of things in which no woman with a child under the age of two years was compelled by social or economic circumstances to go out to work, and if Dr. Menzies finds me "biased in favour of nursery provision" it is a bias in favour of the nursery as against unsatisfactory alternatives. I plead guilty, also, to a bias against unpractical "research" and would suggest some questions with which future ambitious researchers might profitably occupy themselves.

1. What is the relationship of infection in nursery days to illness or physical defect in later childhood?

2. Does the school record of ex-nursery children suggest that their "social training" in the nursery has helped them toward social adjustment?

3. Does the comparison of infection-rates in different nurseries, and possibly in different towns, suggest that certain remediable factors are associated with high infection-rates?

But there is, as yet, no totalitarian suggestion that all children, from rich families and poor, shall be compulsorily drafted into nurseries at the age of six months, and therefore no need to discuss whether nurseries are or are not an evil in themselves. In point of fact, nurseries are our present therapy for an admitted social evil, and our concern should be to investigate their work constructively with the intention of improving them.

Accrington. JOHN D. KERSHAW.

ARSENICAL CHICKENPOX

SIR,—Dr. Parkes Weber (Sept. 14) may be interested in an account of arsenical polyneuritis in a family, one of whom developed both local (segmental) and generalised zoster 12 and 19 days respectively after ingestion of arsenic (*London Hosp. Gaz.* July, 1946, p. 144, and Clinical Supplement, September, 1946, p. xiv).

This case supports the theory of activation by arsenic of a latent virus infection, since the zoster rash appeared 12 days after a single dose of arsenic. This is the usual incubation period of the naturally occurring disease, so that if the cause were exogenous exposure must have taken place at the same time as the poisoning—which is improbable. The postulated selective action of arsenic on the pyruvate enzyme system of cells, interfering with their normal oxidation, may possibly explain the assumption of activity of a cell parasite such as a virus.

Loughton, Essex. A. L. CRADDOCK.

WOMEN IN MEDICINE

SIR,—In reply to Dr. Usborne's letter of Sept. 28, it should be stated that, apart from direction of the recently qualified, it was not found necessary to direct medical women, except perhaps in a few isolated cases, since those available by age for direction were either already employed or were not liable. It would seem, therefore, that those medical women who resumed work after definite intervals of retirement did so in spontaneous response to the urgency of the times and the increased opportunities for work, especially in part-time posts suitable for those with family ties.

ANNIS GILLIE
Bromley, Kent. Hon. Secretary, Medical Women's Federation.

USE OF REASSURANCE

SIR,—For some time I have been experimenting with a method of explanation and reassurance designed for long-standing and severe psychoneurosis.

It consists in a short elementary and ad-hoc quasi-correspondence course on the effect of emotion on bodily and mental functioning. On each visit the patient is given a lesson stencilled on a sheet of paper with a large blank space. He takes this home, studies it, and writes on the blank space examples, illustrating the point of the lesson from his own experience and what he knows is the common experience of others. On his next visit these examples are discussed and he is given the next sheet, which is dealt with in the same manner, and so on to the end of the course.

Thus the patient teaches himself, with only the minimum of guidance, to understand his illness, or rather, to arrange, in relation to his own symptoms, knowledge which he and everybody possesses about the effects and manifestations of emotion. The reassurance that the patient feels is all the stronger because the explanation has been arrived at by himself.

I hope to publish a full account of this method in the near future.

Graylingwell Hospital, Chichester. M. B. BRODY.

ROYAL MEDICAL BENEVOLENT FUND

SIR,—Christmas once again draws near and it is time to ask the hospitality of your columns to launch our annual Christmas appeal on behalf of the poor beneficiaries of this Fund.

The reasons for this appeal are now well known to all your readers and there is no reason to stress them again. I would rather emphasise the point that they are as cogent as ever. It is true that the old-age pension which is now in force, whilst making the financial position of old people more bearable—whereas previously it was quite intolerable—still means that the actual increase in annual income is only £41 12*s.*, which, bearing in mind the tremendous increase in the cost of living, still makes the position of the poor housewife very difficult indeed. Further, very many of our beneficiaries are under 70 years of age and so not able to draw this pension. Lastly, there is that very real sense of being "not forgotten" at the festive time of Christmas, and the knowledge that our Christmas gift will ensure the purchase of a few extra luxuries which just make all the difference.

I recall that my appeal last year for £2000 to enable the Fund to give £4 to every beneficiary—a record sum for which I scarcely dared to hope—actually reached the grand total of £2127, and I know every generous donor will feel amply repaid by the gratitude and pleasure these gifts have evoked. May I venture to plead for a similar sum this year? I feel sure that, although I well recognise that times are very difficult for everybody just now, the still greater difficulties and anxieties of our very poor brethren will not pass unheeded.

Please forward contributions marked "Christmas Gifts" to the secretary, Royal Medical Benevolent Fund, 1, Balliol House, Manor Fields, Putney, London, S.W.15, who will gratefully acknowledge.

ARNOLD LAWSON
London. President, R.M.B.F.

MEGALOBLASTIC ANÆMIA IN CHILDREN

SIR,—In your annotation of Sept. 28 you say that "ordinary crude [liver] extracts should be used and not the purified extracts specially designed for the treatment of pernicious anæmia, like 'Anahæmin.'" If it is implied that crude liver extracts administered *parenterally* provide a reliable method of treatment in cases of megaloblastic anæmia in children, I wish to dissociate myself from this view. From my own experience, and from my reading of the literature, it seems that oral liver therapy is by far the most effective and certain therapeutic measure hitherto available, not only in megaloblastic anæmia of childhood but in other types of megaloblastic anæmia proving refractory to refined parenteral liver extracts—with the possible exception of tropical nutritional anæmia, in which autolysed yeast may be preferred on the score of cheapness.

Your annotation quotes the case of a boy of 14 years, previously reported by me, in which "a purified liver extract was ineffective, but proteolysed liver by mouth and a crude liver extract parenterally produced a remission. . . ." In my original report, however, it was pointed out that the crude parenteral extract 'Plexan' was ineffective, the condition relapsing with this treatment but responding when it was replaced by proteolysed liver given by mouth.

I am aware that claims have been made, from time to time, for the superiority of 'Campolon' to more refined parenteral liver extracts in the treatment of certain types of megaloblastic anæmia. Opinion on this question, however, is by no means unanimous. Nevertheless, if it be accepted that genuine crude liver extracts prepared by the Gänsslen or some similar process may in certain cases be more effective than purified extracts, I feel that your advocacy of "ordinary crude extracts"

may be dangerous and misleading, since the various preparations on the market vary considerably in their constitution and mode of preparation. Some of them appear to differ from refined extracts mainly by their greater content of water.

Regarding the type of oral liver therapy effective in megaloblastic anæmias, including those of childhood, refractory to injections of refined extracts, my own experience has demonstrated the efficacy of proteolysed liver ('Hepamino') in daily doses of $1^1/_2$ oz., but a few recent trials suggest that oral liquid liver extract, now generally available once more, may prove equally efficacious.

Muirhead Department of Medicine, University of Glasgow. L. J. DAVIS.

EXTRANEOUS CAUSES OF UTERINE BLEEDING

SIR,—Nobody will quarrel with your advice to the gynæcologist, confronted with a case of menorrhagia, to bear in mind the various systemic conditions which may cause this symptom (Sept. 28, p. 460). But if you include idiopathic hypochromic anæmia among the extraneous causes of uterine bleeding, are you not putting the cart before the horse?

Bethnal Green Hospital, London, E.2. HERBERT LEVY.

THE NATIONAL LOAF

SIR,—The fact that an attempt has been made to keep secret the instruction to force us to swallow extra doses of calcium, as revealed by Sir Ernest Graham-Little's letter of August 17, is in keeping with other strange methods employed in this business.

Originally the scheme applied to white bread, which does not contain phytic acid, and not to brown; the idea underlying the proposal was to prevent osteoporosis among the adult population. The authority concerned was challenged to produce a dozen cases of calcium deficiency in adults (*Lancet*, 1941, ii, 25) but did not do so. The proposal to adulterate white bread had to be dropped. But evidently the authority in question felt that its amour-propre had suffered by the failure of the Food Minister to act on its suggestion. In such circumstances the phytic acid bogy was resurrected, and now it was maintained that only brown bread needed fortifying and not white. But the American "Council on Foods" in 1937 came to the conclusion that "there is no good evidence for the existence of a decalcifying factor in cereals" (quotation from *J. Physiol.* 1942, **101**, 304). Long after the recommendation to add calcium was made it was sought to justify this recommendation. The first paper by McCance and co-worker was received by the *Journal of Physiology* in October, 1941 (*J. Physiol.* 1942, **101**, 44). But in a paper received in April, 1942, by that journal these workers had to admit that their first paper was inconclusive, because "brown bread had a laxative action," and the negative calcium balance therefore might have been due to this factor. Still no justification! A new investigation therefore became necessary. No-one would hang a dog on the type of evidence offered in the second paper. Thus it was virtually admitted that at the time the recommendation was made to add calcium to bread there was no valid reason for the proposal. Otherwise there would not have been a call for the two papers. It should be borne in mind that the recommendation was made years before the appearance of these two papers. A more damning admission it is difficult to imagine. Years after the recommendation, and after an investigation, the workers had to admit that the evidence to justify the proposal was inconclusive. To force forty million human beings to consume extra doses of so potent a substance as calcium without valid reason is surely an amazing procedure! Furthermore, Mellanby himself admitted that much of the phytic acid is destroyed in the process of baking (*Nature, Lond.* 1944, **154**, 394); and people usually eat baked bread.

Again, when bread became whiter the Minister of Food stated in Parliament, in reply to a question by Sir Ernest Graham-Little: "The addition of calcium to the loaf was retained when the extraction-rate was reduced to 80% in order to ensure good intakes of calcium as a beneficial nutritional measure" (House of Commons, Feb. 20, 1946). When the bread was dark it was phytic acid that required calcium; when it became whiter it was calcium deficiency in dietary which needed calcium; and now it is again phytic acid.

If the authority who recommended the adulteration of our bread has a good case, why this twisting and turning and concealing? The subject is of grave importance, and, in the interest of public health, an independent open inquiry into the whole matter by a competent body is long overdue.

Liverpool. I. HARRIS.

CHILDREN WHO SPEND TOO LONG IN BED

SIR,—The view that some children who are on the go all day need longer sleep is, I think, a relic of the days before metabolism became an accurate science. If it is true, why is it that as the child gets older and his calorie expenditure goes up he needs less and less sleep? The view may arise from the confusion of length of sleep with intensity or depth of sleep and with ability to fall asleep easily. Activity certainly leads to easy sleeping. During the examination of parents I find repeatedly that these three factors are tied up in confusion. Far from meaning the same thing, length and intensity of sleep are vaguely in inverse proportion to one another.

Whatever may be practicable in the home, it is much more satisfactory to arrange the children's hours in bed according to age-weight grouping than according to "activity." Mothers require guidance in this matter particularly during the first three years of a child's life, for it is then that the effects of the long transition period from animal polyphasic sleep to human monophasic sleep are most intense and most badly handled.

Westcliff-on-Sea. JOHN A. MCCLUSKIE.

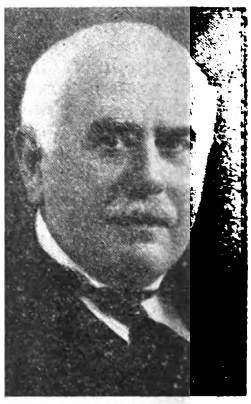
Obituary

WALTER LANGDON-BROWN

KT., M.D. CAMB., SC.D., LL.D., F.R.C.P.

IT is perhaps as a teacher in the profession that Sir Walter Langdon-Brown will be best remembered. When he died on Oct. 3 he was 76 years of age but was still capable of influencing and inspiring younger men, because maturity never impaired the enterprise of his mind. Holding high professional positions as physician at St. Bartholomew's and regius professor at Cambridge, he could yet be intellectually unconventional, and he showed courage as well as skill in advocating unfamiliar ideas.

His father was the Rev. John Brown, Congregational minister at Bedford, who wrote what has become the standard life of John Bunyan. Born at Bedford on August 13, 1870, he was named after his mother's uncle, J. Langdon Down, physician to the London Hospital. Thus heredity contrived to blend in him those diverse qualities that make for distinction in medicine and literary accomplishment. On leaving Bedford School he was too young to go to Cambridge, where he had won a scholarship at St. John's College, and he spent a useful year at Owens College, Manchester, working at biology under Milnes Marshall. At Cambridge he took a first in both parts of the natural sciences tripos and won a Hutchinson research scholarship at his own college. The thorough training in physiological principles and thought which he thus gained was the background of his medical career, and enabled him to consider his clinical problems with a scientific approach and to teach with an exceptional clarity.



Press Portrait Bureau

Entering Bart's with the senior science scholarship in 1895, he qualified in 1897, and in the same year became house-physician to Samuel Gee, one of the best clinical teachers of his time. In 1899 his bent towards physiology

led him to become junior demonstrator in physiology, and in two years he was senior demonstrator. At the same time he continued his clinical work and teaching in the posts of casualty physician and demonstrator of practical medicine. In 1906 he relinquished his appointment in the physiological department to become medical registrar and demonstrator of morbid anatomy; but it was not until 1913, at the age of 43, that he was elected to the senior staff as assistant physician. He became a full physician in 1924, and retired from Bart's in 1930, but continued for some time to work at the Metropolitan Hospital to which he had been appointed at the beginning of the century.

Langdon-Brown was widely read on many subjects, and his ward rounds were enlivened and illustrated by references to English literature. From early in his career he was especially interested in endocrinology and showed his originality of thought, and he was one of the first to draw attention to the similarity of the features produced by lesions of the anterior pituitary and of the adrenal cortex, some years before Cushing described the syndrome associated with pituitary basophilism. The importance which he placed on a knowledge of physiology in the practice of medicine is reflected in his Croonian lecture, delivered at the Royal College of Physicians in 1918, on the Rôle of the Sympathetic Nervous System in Disease, and in his best-known book, *Physiological Principles in Treatment*, first published in 1908, and now in its eighth edition. To him, more than to any other man in recent years, belongs the credit for teaching medicine as applied physiology, and he introduced successive generations of medical students and doctors to the new facts and ideas of which physiology was so prolific between the two wars. If he sometimes, perhaps, over-simplified the physiology, this was the result of those qualities which made him such an excellent expositor. His attention to things of the mind led him naturally to consider the minds of his patients, and the close linkage between the endocrine glands, the autonomic nervous system, and the emotional life brought him face to face with this aspect of the body-mind relationship. He was thus a pioneer of what is now called psychosomatic medicine, though he was not much interested in the more recondite schools of medical psychology and preferred the simpler approach of Adler.

From the first Langdon-Brown showed himself a fertile writer with an unusual range. He was joint editor of *The Practitioner's Encyclopædia of Medical Treatment*, published in 1915; and his own works included *The Sympathetic Nervous System in Disease* (1920), and *The Endocrines in General Medicine* (1927). All these had a practical application to the art of clinical medicine, of which he was a master. His wide learning, his breadth of vision, and his erudite style are seen at their best in *Thus we are Men* (1938), which examines human nature, and in *Some Chapters in Cambridge Medical History*, a small gem at which he laboured with increasing difficulty during the last year of his life. He had a sense of history which constantly illuminated the present with the past. Some of his lectures and occasional writings, such as *The Pursuit of Shadows*, deserve to survive as models of their kind, for he brought wit and elegance as well as culture to the discussion of clinical problems.

At Cambridge, because of age-limit rules, he occupied the regius chair for only three short years, from 1932 to 1935, but he faithfully maintained its great traditions. He loved Cambridge, with which he was intimately associated by many ties of relationship. "In his own profession," writes L. W., "there can have been no man better known or better loved by young and old alike. It was revealing to be his co-examiner and to note how many candidates he would put at their ease at the beginning of a viva by inquiring whether they were the sons of his medical or lay friends. His wisdom, his experience, and his counsel were always available to the undergraduate, the newly qualified, or the embryo professor, and many sought his advice, always kindly and patiently given however trivial the problem." "All Bart's men," A. W. S. writes, "will call to mind L.-B.'s arrival in the square for his ward round at ten minutes to two, with cigar, not yet fully smoked, that had to be discarded. On his rounds the opinion and argument of anyone, however lowly, were always carefully considered, and his kindly manner endeared him to his housemen and students. He would never hesitate to seek the opinion of a junior on a matter about which there was some doubt: humility is one of the marks of a great man, and this L.-B. had. Of him can be said what Sir Norman Moore has said of his old chief, Samuel Gee, 'He was a constant friend and a pleasant companion, a learned physician, and a most excellent teacher'."

At the Metropolitan Hospital, as well as Bart's, he was a tower of strength. A colleague there, P. H., speaks of "his constant endeavour to relate clinical observation to physiological knowledge and to bridge the gap between the laboratory and the ward," and recalls that he was one of the first in this country to apply the work of Pavlov on gastric secretion and the teachings of Lenharz to the treatment of patients suffering from gastric and duodenal ulcer. "He inspired his house-physicians with a scientific attitude while at the same time taking a broad view of the problems of the individual patient."

The same theme is again repeated by another and younger associate, R. G. "Langdon-Brown," he says, "was one of the first, perhaps the first, of modern physicians to attempt to apply to clinical medicine the teachings of modern physiology—the physiology, that is, of the present day rather than of his student days. He acted as a catalyst between the laboratory and the ward, and this line of thought inevitably led him to endocrinology as a major interest, endocrinology not as a specialty (for his was too Hippocratic a view for the admission of a specialty) but as a tool to the better understanding of medicine as an indivisible whole. For this reason he gave his support to the formation of a section of endocrinology of the Royal Society of Medicine, and, knowing his end was near, was happy to see it in being in time to become its first president. He was too ill to read his inaugural lecture, but not too ill to write it. His mind was unclouded to the end and only a few days before his death he was able to remember full details of a case not seen for years." In this last presidential address he described the development of endocrinology, adding "I ventured to call the pituitary gland 'the leader of the endocrine orchestra,' though it later transpired that the hypothalamus holds the still more important rank of conductor." This now celebrated simile is an indication of his aptitude for exposition.

His wisdom was broadly based in experience. As a young man he served in the South African War as senior physician at the Imperial Yeomanry Hospital at Pretoria, contributing later to the book on *Imperial Yeomanry Hospitals in South Africa*, and he kept up his military associations as a Territorial. As a young man, too, he lectured to working men's institutes on biology and physiology. Afterwards an examiner in many universities, he went to Egypt in 1936 on behalf of the General Medical Council to report on teaching and examinations as there conducted, and he presided over the Committee on Postgraduate Training in Psychological Medicine which reported in 1943. Through his multifarious activities he came to know an immense number of people, and he was a charming host with a great knowledge of good food and good wine, a vast fund of anecdote, and a gift for stimulating conversation. "One remembers him sitting in his combined consulting-room and study in Cavendish Square, surrounded by cats, or standing like a rock in a seethe of more mobile persons at some medical meeting. He said many good things, which he enjoyed as much as his hearers. He was a humanist in every sense of the word: 'in mind, as in body, he was *totus, teres, atque rotundus*'."

Langdon-Brown's distinction and industry brought him many honours. Elected a fellow of the Royal College of Physicians in 1908, he became senior censor and delivered the Harveian oration of the college in 1936. He was a fellow of Corpus Christi College, Cambridge, and received honorary doctorates in science from Oxford, and in law from the National University of Ireland, and from Dalhousie University, Canada. The Royal College of Physicians of Ireland elected him an honorary fellow in 1940, and he was also an honorary fellow of the Royal Society of Medicine, the Faculty of Radiologists, the Hunterian Society, and the Harveian Society, and

honorary freeman of the Society of Apothecaries of London. He served on the council of the Pharmaceutical Society, and was president of the Medical Society of Individual Psychology. The variety of his interests was evident in his presidency at various times of no less than four sections of the Royal Society of Medicine—urology, therapeutics, the history of medicine, and endocrinology—and he also presided over the section of medicine of the British Medical Association. He gave the Horsley lecture at University College Hospital in 1935, and the Linacre lecture at Cambridge in 1941. In 1935 he was knighted.

Sir Walter's first wife died in 1931. Lady Langdon-Brown, who survives him, is the daughter of Mr. H. B. Hurry. He had no children.

MEMORIAL TRIBUTE

A memorial service was held last Tuesday in the church of St. Bartholomew-the-Less. In the course of his address Mr. Geoffrey Keynes said: "Langdon-Brown was a big man both mentally and physically, handsome in face and stature, and endowed with an intellect which was robust rather than brilliant. He was the ideal teacher in a school such as this, where tradition combines so happily with progress, for his historical sense, his profound knowledge of medicine, and his breadth of grasp, were united with a forward-looking sense of what was most important to patient and to student. Thus he kept always abreast of contemporary knowledge while furnishing his mind with a treasure-house of experience from which he could draw with effective ease. . . . It is true to say that Langdon-Brown was the wise architect with the materials that came to hand rather than the experimenter and innovator. But that was the source of his strength as physician and teacher—his mind was always balanced between the learning of the past and the illumination of the present, without omitting an inquiring glance to the future.

"In spite of his great qualities, success came to him but slowly, and he was sometimes a little impatient at the fate that seemed to hold him down. But his zest in life, in everything that belonged to cultivation of the mind, and in clinical medicine never flagged. Wherever he worked he was a great humanising influence, and he always gave to the utmost, whether to his Hospital or his University."

HASSAN SUHRAWARDY

KT., D.SC., M.D. CALCUTTA, F.R.C.S., D.P.H.

Sir Hassan Suhrawardy died in Calcutta on Sept. 18, at the age of 62. A great champion of the Moslems in India, he did much to raise the standard of education among them, and thereby had a considerable influence on medical education throughout the country.

He was born in Dacca, a great Moslem stronghold and centre of the jute-growing industry in Bengal. He received his early education there, but later went to Calcutta and took his basic medical course at the Bengal Medical College, obtaining his M.B. and afterwards achieving that rather rare distinction—certainly for a Mohammedan—the Calcutta M.D. He made several visits to Europe to complete his medical education, and attended further courses in this country and in Ireland. His outlook was liberal, for he took both the F.R.C.S. and the D.P.H., the latter at Edinburgh. Nor were his scholarly interests limited to medicine, for he studied the history and culture of his faith and made many pilgrimages to the holy places of Islam.

His first important appointment was as health officer to the East India Railway, and eventually he became head of the medical service of that railway. In 1931 he was appointed to the chair of public health at Calcutta, and in the following year he became vice-chancellor of the university and dean of the medical faculty. He was appointed adviser of the Secretary of State for India in 1939, in succession to Sir Abdul Qadir, and in this capacity spent five war years in England. On his retirement in 1944 he returned to Calcutta and was appointed professor of Islamic history and culture in the university.

"I remember very clearly," writes L. E. N., "when I first met Hassan Suhrawardy, his expression of concern about the relatively poor position of Mohammedans in the medical institutions of Bengal. A senior medical officer to whom he complained pointed out that this was largely due to the very poor primary education that Mohammedans received in the province. Hassan Suhrawardy said, 'That is what I am complaining about,' to which the reply was, 'Well, why don't you do something about it?' And he did. This conversation took place 25 years ago, and during the rest of his life he spent a great part of his diverse energies in helping to raise the level of the standard of primary, college, and medical education of the Moslems in Bengal nearer that of the Hindus."

He received a knighthood in 1932, an honour which would undoubtedly have come his way very shortly, but which was precipitated by his saving the life of Sir Stanley Jackson, at that time governor of Bengal, when a girl student attempted to shoot him at a university ceremony. He relinquished his knighthood a few weeks ago when the Moslem League called upon its members to give up their British decorations. He had been appointed honorary surgeon to the Viceroy, an exceptional honour for a non-Service Indian, and he was the first Mohammedan vice-chancellor of Calcutta University. He had a full and valuable life, and his wide experience would have been a great help to his countrymen in holding up medical organisation in India under their new-found national independence.

Appointments

BULL, J. W. D., M.B. Camb., M.R.C.P., D.M.R.: asst. radiologist, National Hospital, Queen Square, London.
MCARDLE, M. J., M.B. Lond., M.R.C.P.: asst. physician, National Hospital, Queen Square, London.

London County Council:
FELDMAN, WILLIAM, M.D. Lond., M.R.C.P.: medical superintendent (group II), St. Giles Hospital.
LEEBODY, J. G., M.B. Edin., F.R.C.S.E.: medical superintendent (group III), Fulham Hospital.
MILLOY, J. MCN., M.B. Glasg., F.R.C.S.: medical superintendent (group III), St. Mary Abbots Hospital.
WATKIN, J. H., M.D. Lond., D.P.M.: medical superintendent, Leavesden Hospital.

Hospital for Sick Children, Great Ormond Street, London:
NORMAN, A. P., M.B. Camb.: resident medical registrar.
SHEEHAN, JOAN M., M.R.C.S.: asst. resident M.O. at Tadworth Court.
SLOWE, J. J., M.R.C.S.: resident anæsthetic registrar.

Births, Marriages, and Deaths

BIRTHS

BENSON.—On Sept. 29, in Bath, the wife of Dr. G. E. M. Benson—a son.
BOLTON.—On Oct. 4, in Belfast, the wife of Dr. Sloan Bolton—a son.
BRAMWELL.—On Oct. 2, in London, the wife of Dr. Byrom Bramwell—a daughter.
CUMMING.—On Oct. 1, in London, the wife of Dr. Alister Cumming—a son.
DALY.—On Oct. 2, in London, the wife of Dr. Anthony Daly—a daughter.
DAWSON.—On Sept. 20, the wife of Dr. R. L. G. Dawson—a son.
GORDON.—On Oct. 1, at Walton-on-Thames, the wife of Surgeon Lieut.-Commander K. G. O. Gordon, R.N.—a daughter.
HINDS.—On Sept. 27, in London, the wife of Dr. Stuart Hinds—a son.
HOBBS.—On Oct. 4, at East Molesey, the wife of Mr. Henry Hobbs, F.R.C.S.—a daughter.
KELLY.—On Sept. 30, in London, the wife of Mr. P. M. Kelly, F.R.C.S.—a son.
KEMP.—On Oct. 2, in London, the wife of Dr. J. W. L. Kemp—a daughter.
KIPLING.—On Oct. 4, in Liverpool, the wife of Dr. Miles Kipling—a daughter.
MOIR.—On Sept. 26, in Oxford, the wife of Prof. J. Chassar Moir, F.R.C.O.G.—a son.
PENNYBACKER.—On Sept. 29, in Oxford, the wife of Mr. Joe Pennybacker, F.R.C.S.—a son.
PLAYFAIR.—On Oct. 3, at Whitby, the wife of Dr. A. S. Playfair—a son.
PRIEST.—On Oct. 3, in London, the wife of Dr. W. M. Priest—a son.

MARRIAGES

CRAWSHAW—GOODDEN.—On Sept. 28, at North Cheriton, Everard George Aitken Crawshaw, major R.A.M.C., to Susan Woulfe Goodden.
POWELL—MULLER-ROWLAND.—On Sept. 28, at Woking, Richard Pearce Powell, L.D.S., to Joan Veronica Muller-Rowland, M.B.
WAGNER—WILSON.—On Sept. 30, in Bristol, Michael S. Wagner, M.B.E., to Elizabeth Nan Russell Wilson, M.B.

DEATHS

ELLIOTT.—On Oct. 2, at Tunbridge Wells, Andrew Royston Elliott, M.D. Lond., of Crowborough, aged 55.
LANGDON-BROWN.—On Oct. 3, at Cambridge, Sir Walter Langdon-Brown, M.D. Camb., F.R.C.P., aged 76.
THOMPSON.—On Oct. 2, in London, Richard James Campbell Thompson, C.M.G., D.S.O., M.D. Durh., M.R.C.P., lieut.-colonel R.A.M.C. retd.

Notes and News

ON THE RECORD

LAST March Westminster Hospital broke new ground by establishing a department of medical photography under the full-time charge of a doctor. This week the department has held an exhibition. Part of its work is to help in clinical investigation by enabling the staff to keep permanent visual records and to compare serial studies. But it also caters largely for the student; already one film (on inflammation) has been made, and others are planned. For tutorials, photographic displays—on gout, for example—are arranged; and considerable use is made of filmstrip, which is shown, among other purposes, as replacing the familiar lantern-slide. With a projector that can be fitted easily into a suitcase, pictures are reproduced on a screen up to any magnification that the light will allow. A lecturer can carry 300 pictures in 30 ft. of 35 mm. film, weighing no more than an ounce; and for those that choose to vary the order of their showing, the strip can be divided and the pieces mounted as for a lantern-slide, but without the lantern-slide's cost, weight, and fragility.

The exhibition shows clearly enough that photography has much to offer both student and doctor; it may, perhaps, prompt others to follow the Westminster Hospital's lead.

A NEW JOURNAL OF ANÆSTHESIA

THE Association of Anæsthetists is launching a new quarterly journal, *Anæsthesia*, of which the first number has appeared this month. Edited by Dr. C. Langton Hewer, assisted by Dr. R. Blair Gould, the journal will be primarily scientific, but it will also publish official news of the association. "It has become obvious," writes the editor, "that the rapid advance in all types of anæsthetic and analgesic technique requires fuller and quicker expression than can be provided in the overloaded columns of the general medical press." Sir Alfred Webb-Johnson, P.R.C.S., in a foreword, remarks on the fitness of this, the centenary of the first operation under general anæsthesia in this country, as the year for initiating the venture. Among other papers are an account of the association since its inception, by Dr. H. W. Featherstone, its first president, and a sketch of anæsthetic practice a hundred years ago by Dr. A. D. Marston, who is now president.

NARCOTICS CONTROL

THE Drug Supervisory Body and the Permanent Central Opium Board, which were established under the auspices of the League of Nations for the international control of narcotics, are meeting in London this week and next. The Economic and Social Council of the United Nations has lately agreed that the present members of these two bodies should be invited to continue for the time being in office. The British representative is Sir Malcolm Delevingne, who is chairman of the Drug Supervisory Body.

University of London

Mr. Frank Dickens, D.SC., F.R.S., has been appointed to the Philip Hill chair of experimental biochemistry tenable at the Middlesex Hospital medical school.

In 1923 Dr. Dickens was appointed first assistant in the Courtauld Institute of Biochemistry at the school. From 1933 until this year he worked at the Cancer Research Laboratory at the Royal Victoria Infirmary, Newcastle-on-Tyne, and he was research director for the North of England council of the British Empire Cancer Campaign. In March of this year he returned to the Courtauld Institute of Biochemistry.

Dr. Clifford Wilson has been appointed to the university chair of medicine tenable at the London Hospital medical college, as from Oct. 1.

Dr. Wilson, who is 40 years of age, qualified from the London Hospital in 1931 and took his D.M. Oxfd five years later. After demonstrating in physiology at the London he went with a Rockefeller research fellowship to work at Harvard medical school and Boston City Hospital under Dr. George Minot. He returned to this country in 1935 and was appointed assistant director of the medical unit of the London Hospital in 1938. From 1939 to 1942 he was E.M.S. physician in the London Hospital sector, and from 1942 to 1946 he was on military service, attached to no. 2 Medical Research Section, G.H.Q., Home Forces. Last year he became acting director of the medical unit, London Hospital. Dr. Wilson is the author of papers on renal lesions in hypertension, and was associated with Prof. Arthur Ellis in work on Bright's disease on which Professor Ellis's Croonian lectures were based.

Dr. J. L. D'Silva has been appointed, as from Oct. 1, to the university readership in physiology tenable at St. Bartholomew's Hospital medical college, where he has been lecturer in physiology since 1944.

Mr. J. F. Danielli, D.SC., has been appointed to the university readership in cell physiology tenable at the Royal Cancer Hospital, as from Oct. 1.

Royal College of Physicians

The Charles West lecture will be delivered on Tuesday, Nov. 19, at 5 P.M., by Prof. J. C. Spence, whose subject will be the Care of Children in Hospital.

Royal College of Surgeons of England

Three lectures are to be delivered at the college, Lincoln's Inn Fields, London, W.C.2, by Prof. Alexander Lipschutz (Chile), who will speak on the Tumorigenic Action of Steroids and its Implication for the Problem of Cancer (Oct. 28); the Antitumorigenic Action of Steroids (Oct. 29); and the Steroid Balance and the Antitumoral Autodefence (Nov. 1). The lectures, which will be given at 3.30 P.M. on each day, are open to medical practitioners and advanced students.

Royal College of Obstetricians and Gynæcologists

At a meeting of the council, held on Sept. 28, the following were admitted to the membership:

H. R. Arthur, S. J. Barr, B. E. Blair, Catherine I. Blyth, Joyce Burt, Harold Burton, G. B. W. Fisher (in absentia), R. L. Hartley, Derek Jefferiss, Iola L. T. Jones, L. W. Lauste, Margaret Orford, H. C. Perry, D. L. Poddar, Esther M. Pollock, J. E. Scott-Carmichael, E. W. L. Thompson, T. G. E. White.

At the end of the meeting Mr. William Gilliatt assumed the office of president, Sir William Fletcher Shaw and Mr. James Wyatt of vice-presidents, and Mr. A. A. Gemmell of treasurer.

Faculty of Radiologists

The following are the officers of the faculty for the present session: president, Dr. C. G. Teall (Birmingham); vice-presidents (radiodiagnosis), Dr. Peter Kerley (London), (radiotherapy), Dr. Robert McWhirter (Edinburgh); immediate past president, Dr. Ralston Paterson (Manchester); warden of the fellowship, Dr. S. Cochrane Shanks (London); treasurer, Mr. G. F. Stebbing (London); secretary, Dr. J. F. Bromley (Birmingham).

Research Defence Society

The annual general meeting will be held at 26, Portland Place, London, W.1, on Wednesday, Oct. 23, at 3.15 P.M. The Stephen Paget memorial lecture will be given by Prof. N. Hamilton Fairley, F.R.S., who will speak on War-time Research in Malaria and Other Tropical Diseases of Military Significance.

Tuberculosis Course at Newcastle

The Tuberculosis Educational Institute announces a refresher course, for medical practitioners and tuberculosis officers, at the Literary and Philosophical Library, Westgate Road, Newcastle-upon-Tyne, from Nov. 4 to 9. Programmes may be obtained from Dr. Harley Williams, Tavistock House North, Tavistock Square, London, W.C.1.

College of Pharmaceutical Society

Opening the college's 105th session in London on Oct. 2, Sir Percival Hartley, F.R.S., director of biological standards at the National Institute of Medical Research, recalled the valuable work undertaken by the health organisation of the League of Nations. The organisation had advanced the prospects of an international pharmacopœia—a project which had been under discussion for over half a century—and this year had published a report which could fairly be regarded as the nucleus of such a pharmacopœia. "My experience," he concluded, "has convinced me that international coöperation among men of science is not only easily secured but is a kind of natural impulse."

Hunterian Society

A dinner meeting will be held at Pimm's (3, Poultry, E.C.2) on Oct. 14, when Dr. J. B. Cook will deliver a presidential address on the Evolution of Municipal Medicine. On Nov. 18, at the Apothecaries' Hall, a discussion on the advertisement of proprietary medicines will be opened by Mr. Hugh Linstead, M.P. On Dec. 16, at a further dinner meeting, Dr. Geoffrey Evans will open a discussion on flatulence. The Hunterian lecture will be delivered at the Mansion House on Jan. 20, 1947, by Professor Debaiseux (Louvain), whose subject will be Hypotension in Intracranial Injuries. The annual dinner will be held at Grosvenor House on Feb. 13. On Feb. 24 Mr. Zachary Cope will deliver the Hunterian oration on Literature and Doctors, and on March 17 there will be a dinner meeting at which a discussion on Sprains and Strains is to be opened by Sir Reginald Watson-Jones.

Society of Apothecaries of London

Gillson Scholarship in Pathology.—This scholarship of £105 a year is open to candidates under 35 who are licentiates or freemen of the society or become so within 6 months. The regulations may be had from the registrar, Black Friars Lane, E.C.4.

Society for the Study of Addiction

On Tuesday, Oct. 15, at 4 P.M., at 11, Chandos Street, London, W.1, Dr. W. R. Bett will give an address entitled Poppies, Dawamesk, and the Green Goddess: an Exotic Study of Literary Genius.

Medical Society for the Study of Venereal Diseases

A general meeting will be held at 11, Chandos Street, London, W.1, at 2.30 P.M. on Saturday, Oct. 26, when Dr. F. R. Curtis will speak on Venereal Disease in Occupied Germany.

Food and Agriculture Organisation

Mr. S. M. Bruce, F.R.S., has been appointed chairman of the preparatory commission appointed at the F.A.O. conference in Copenhagen to examine methods for setting up a world food board (see *Lancet*, Sept. 28, p. 463). The first meeting of the commission will be held in Washington on Oct. 28. Mr. Bruce, who was prime minister of Australia from 1922 to 1929 and represented Australia in London from 1932 to 1946, took a leading part in the social and economic work of the League of Nations.

Centenary of Anæsthesia

Two further celebrations of the centenary of anæsthesia are announced to be held on Oct. 16, the anniversary of Morton's first operation at the Massachusetts General Hospital. At 2.30 P.M. there will be a special meeting of the history of medicine section of the Royal Society of Medicine at 1, Wimpole Street, London, W.1, when papers on the development of anæsthesia will be read by Prof. Charles Singer, Mrs. Barbara Duncum, Dr. Joseph Blomfield, and Dr. E. Ashworth Underwood.

After this meeting, at 4.45 P.M., Lord Moran will open an exhibition of anæsthetic apparatus and literature at the Wellcome Historical Medical Museum, 183, Euston Road, N.W.1. The exhibition will remain open until Dec. 31.

Middlesex Hospital Dinner

Presiding over the annual dinner held in London on Oct. 4, Dr. G. E. Beaumont spoke of losses from the honorary staff by retirement (Lakin, MacCormac, Cockayne, Gordon-Taylor, Webb-Johnson, Hastings, Greeves, Bankart) and by death (Voelcker, Berkeley, Bennett). He welcomed the appointment of F. Ray Bettley as dermatologist, O. P. Dinnick as anæsthetist, A. J. B. Goldsmith as assistant ophthalmic surgeon, R. S. Handley and C. J. B. Murray as assistant surgeons, P. H. Newman as assistant orthopædic surgeon, and Arthur Willcox as assistant physician. Mr. Plimsoll had been succeeded as secretary by Brig. Harvey Roberts. Meanwhile professors seemed to be sprouting on every bush, perhaps because of the wet summer; and the wisdom of the young suggested that original sin has been replaced by original knowledge. Dr. H. E. A. Boldero, as dean, spoke of changes in the medical school, including the retirement of Prof. S. Russ, the promotion of Dr. R. W. Scarff to be professor, and the return of Prof. F. Dickens, F.R.S., to the Courtauld Institute. By a happy innovation, Colonel J. J. Astor, succeeding Mr. Samuel Courtauld as chairman of the school board, would unite that post with chairmanship of the hospital. Dr. Boldero regretted the circumstances which obliged some of the young men who were to have entered the school this autumn to enter the Forces instead, and he hoped for a change of policy by which military service, if required, would follow completion of the medical course. During the war the school had admitted 80 students a year, and he hoped the number would rise to 100 as recommended by the Goodenough Committee; but this would be impossible until more preclinical accommodation was provided by rebuilding, and until the number of teaching beds could be increased. The board had bought a sizable piece of adjoining land which offered, said Dr. Boldero, "a very real additional opportunity for extension of clinical facilities under our own control." Dr. J. Marks, Broderip scholar, averred that the students had no complaints this year, and their athletic record was very satisfactory. Replying to his health, eloquently proposed by Sir Gordon Gordon-Taylor, the chairman said that his mention of the rowing club's difficulties had caused Sir Alfred Webb-Johnson to promise it a boat of its own.

Medical Diary

OCT. 13 TO 19

Monday, 14th

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
3.45 P.M. Prof. A. J. E. Cave: Anatomy of the Larynx.
5 P.M. Dr. F. W. Roberts: Local Anæsthetics.

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1
8 P.M. Sir Philip Manson-Bahr: Biological Basis of Tropical Medicine. (Presidential address.)

Tuesday, 15th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Dr. E. L. Patterson: Blood-supply of the Brain.
5 P.M. Prof. R. J. S. McDowall: Blood-pressure.

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle Street, W.C.2
5 P.M. Dr. I. Muende: Fungus Infections of the Skin.

EDINBURGH POSTGRADUATE BOARD FOR MEDICINE
5 P.M. (Royal Infirmary.) Prof. F. A. E. Crew, F.R.S.: Place of Genetics in Clinical Medicine.

Wednesday, 16th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Dr. E. L. Patterson: Cerebral Ventricular System.
5 P.M. Prof. W. D. Newcomb: General Pathology of Bone.

ROYAL SOCIETY OF MEDICINE
2.30 P.M. *History of Medicine.* Prof. Charles Singer: Anæsthesia in the Pre-anæsthetic Period (before 1846). Dr. Barbara Duncum: Development of Inhalation Anæsthesia in the Second Half of the 19th Century. Dr. Joseph Blomfield: Modern Development of Anæsthesia (1900–35). Dr. E. Ashworth Underwood: Contribution to the Early History of Anæsthesia in this Country.
5 P.M. *Comparative Medicine.* Prof. G. R. Cameron: Shift of Body Fluids.

UNIVERSITY OF GLASGOW
8 P.M. (Department of Ophthalmology.) Professor Loewenstein: Phakomatoses.

Thursday, 17th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Dr. E. L. Patterson: Cerebellum.
5 P.M. Prof. W. D. Newcomb: General Pathology of Bone.

ROYAL SOCIETY OF MEDICINE
5 P.M. *Dermatology.* Cases will be shown at 4 P.M.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, 26, Portland Place, W.1
8 P.M. Dr. C. J. Hackett: Clinical Course of Yaws in Uganda.

Friday, 18th

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East
3 P.M. Sir Maurice Cassidy: Coronary Disease. (Harveian oration.)

ROYAL COLLEGE OF SURGEONS
5 P.M. Prof. R. J. S. McDowall: Shock.

ROYAL SOCIETY OF MEDICINE
5.30 P.M. *Radiology.* Dr. Whately Davidson: Basis for Staffing a Radiological Department. (Presidential address.)
8 P.M. *Obstetrics and Gynæcology.* Mr. James Wyatt: Future Teaching of the Undergraduate. (Presidential address.)

BRITISH ORTHOPÆDIC ASSOCIATION
9.30 A.M. (1, Wimpole Street, W.1.) Annual Meeting. Mr. N. W. Roberts, Mr. W. Gissane: Fractures of the Os Calcis.
11.30 A.M. Mr. George Perkins: Rest versus Activity in the Treatment of a Fracture. (Presidential address.)
2 P.M. Short papers.

FACULTY OF RADIOLOGISTS
2.30 P.M. (Royal College of Surgeons.) Dr. Solve Welin (Stockholm), Dr. H. Graham Hodgson: X-ray Diagnosis of Cholesteatoma in the Temporal Bone.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY
7 P.M. (South Kensington Hotel.) Dr. G. S. Hovenden: Fifty Years of General Practice. (Presidential address.)

Saturday, 19th

BRITISH ORTHOPÆDIC ASSOCIATION
9.30 A.M. (St. Thomas's Hospital, S.E.1.) Annual meeting, continued.
10 A.M. Demonstration of cases.

ASSOCIATION OF INDUSTRIAL MEDICAL OFFICERS
10.30 A.M. (London School of Hygiene, Keppel Street, W.C.1.) Dr. Donald Hunter, Dr. R. S. F. Schilling: Industrial Medicine in the U.S.A.

Sir Lionel Whitby and Mr. A. E. Porritt have accepted the invitation of Harvard University to occupy the chairs of medicine and surgery there for a short period. Sir Lionel Whitby leaves for the United States next week.

In future the new quarterly, the *Journal of the History of Medicine and Allied Sciences*, will be issued in this country and the British Empire by William Heinemann Ltd., London. The subscription in Britain is 50*s.* per annum or 12*s.* 6*d.* per single copy.

A warning against the uncontrolled use of a new drug, 'Triodione,' for the treatment of epilepsy, has been issued by the American Medical Association, which states that two deaths have been reported in patients who were treating themselves.

CARCINOMA OF PROSTATE TREATED WITH ŒSTROGENS *

J. D. FERGUSSON
M.D. Camb., F.R.C.S.
SURGEON, CENTRAL MIDDLESEX COUNTY HOSPITAL

THE treatment of carcinoma of the prostate by castration or by the feminising influence of œstrogens has been introduced comparatively recently but already seems capable, in many instances, of giving greater relief than other methods.

In 1935 an investigation into the origin of enzymes found in urine led to the discovery that the normal human prostate is a prolific source of an acid phosphatase. Further observations by Gutman and Gutman (1938) showed that this enzyme is only elaborated in appreciable quantity by the mature gland. This significant finding was later confirmed by Gomori (1941), who demonstrated the phosphatase in adult prostatic epithelium by a special staining method. Subsequent research on pathological material has established that a high percentage of carcinomatous prostates also produces large amounts of the enzyme.

Huggins et al. (1941) considered that these findings meant that the majority of carcinomatous prostates contain epithelial cells of a highly differentiated type, capable of elaborating acid phosphatase. Acting on this assumption, and with the knowledge that normal adult prostatic epithelium could be made to atrophy by removing the male genital glands, Huggins advocated castration in the treatment of prostatic carcinoma. The synthesis of œstrogenic substances by Dodds (1938) afforded an alternative and perhaps more humane method of treatment; for, by their antagonistic action to androgen, these substances appear to induce a response similar to that obtained by castration.

ÆTIOLOGY OF PROSTATIC CARCINOMA

Little is known about ætiological factors in prostatic carcinoma, but, so far as I can ascertain, it has never been noted in a eunuch. The prophylactic implications are hardly likely to meet with universal approval, but it is of interest to compare this observation with the effect of castration on the established disease. Unfortunately the rarity of prostatic cancer in animals has so far prevented any confirmatory investigations.

TABLE I—REPEATED BIOPSIES IN PROSTATIC CANCER DURING TREATMENT WITH ŒSTROGENS

Case	No. of biopsies	Intervals between biopsies	Total dosage of œstrogens
1	4	5 months, 16 months, 1 year	6130 mg. S
2	2	30 months	3548 mg. S
3	3	10 days, 17 months	4380 mg. S
4	2	10 months	1792 mg. S
5	2	6 months	500 mg. D
6	2	1 year	1560 mg. D
7	3	39 days, 10 months	1150 mg. D
8	2	9 months	960 mg. D
9	2	16 days	200 mg. D
10	2*	23 months	4641 mg. S
11	2*	10 months	2326 mg. S

* Biopsy supplemented by necropsy. S, stilbœstrol; D, dienœstrol.

VARIATIONS IN PROSTATIC CARCINOMA

The pathology, symptoms, and clinical course of carcinoma of the prostate vary widely. Differences in the cellular arrangements of the tumour are common, all gradations being met with, from anaplastic forms through glandular to scirrhous types. Even in the same prostate the histological appearance is seldom uniform, though this may be due in part to anatomical factors. I am prepared to believe that most growths originate in that portion of the gland lying below and behind the verumontanum; but, from a dissection of many adult prostates, I am now inclined to think that there is no well-demarcated posterior lobe. No part of the prostate need ultimately remain exempt, and in a high proportion of cases the growth is already widespread when detected. Very occasionally the reverse obtains, and a small area of unsuspected malignant tissue may be found in what was considered clinically to be an "adenomatous" prostate.

TABLE II—ACID PHOSPHATASE IN PROSTATIC TISSUE

Source	Acid phosphatase (King-Armstrong units per 100 g. of moist tissue)	
	Lateral lobe	Posterior part
Necropsy:		
Benign glands (6 cases)..	1410	4840
	960	14,500
	8420	10,900
	1900	10,340
	2190	11,670
	9800	11,500
Biopsy:		
Benign glands (20 cases)	Average 7300; highest 15,600; less than 1000 in 4 cases	
Carcinomatous glands (14 cases)	Average 11,784; highest 28,200; less than 1000 in 1 case	

Differences in the dissemination of metastases are common and explain much of the disparity between general and urological symptoms. In this connexion I would emphasise the frequency of superficial lymphatic metastasis—a point liable to be overlooked.

Variations in the clinical course are determined largely by the metastases, and the disease may sometimes pursue a relatively asymptomatic course for years, only being detected at necropsy.

It is important to appreciate fully such variations before assessing the merit of any treatment.

TREATMENT OF PROSTATIC CARCINOMA

In a review of 1000 cases of prostatic carcinoma, Bumpus (1926) showed that two-thirds of the patients, if untreated, died within a year of coming under observation. If metastases were detected when first seen, this period was reduced to nine months.

With improved methods of treatment the average survival period became somewhat longer, but few procedures gave any constant relief. In some instances the complications of therapy proved a greater affliction than the disease. Many of the methods, however, remain of value, and, with the addition of castration and œstrogen therapy, now constitute the basis of treatment of prostatic cancer. Omitting radical prostatectomy as applicable in only a small proportion of cases, treatment in the remainder falls into three categories:

(1) *Palliation of symptoms by medical means.*—This is entirely non-specific and has no direct application to the growth.

(2) *The surgical relief of urinary obstruction* by urethral dilatation, cystotomy drainage, or perurethral resection. With œstrogen treatment, the indications for cystotomy drainage are becoming less frequent. It remains of value in patients almost moribund from uræmia, and in cases where involvement of the external urinary sphincter leads to incontinence.

(3) *The suppression of neoplastic activity* by radiotherapy, œstrogen treatment, castration, or irradiation of the testes.

It has been the experience of many observers that the addition of castration or œstrogen therapy is often

* Abridged from a Hunterian lecture given at the Royal College of Surgeons of England, June 13, 1946.

followed by a degree of relief not achieved by other methods. This evidence, though significant in its volume, is necessarily based largely on the subjective statements of patients. A similar criticism may be levelled against the uncorroborated clinical findings of the surgeon, particularly those relating to repeated rectal examinations during treatment. In other words, though in many cases the giving of œstrogens is apparently accompanied by a satisfactory response, such an opinion is often open to the objection of the wish being father to the thought.

METHOD OF INVESTIGATION OF RESULTS OF ŒSTROGEN TREATMENT

Hoping to overcome such criticism, I decided in 1942 to carry out repeated biopsies of the carcinomatous prostate, and of any accessible metastases in suitable cases during continued œstrogen therapy. This method of investigation appeared of additional value in affording a positive control by means of which primary errors in the diagnosis of prostatic carcinoma could be definitely excluded—a risk which might otherwise lead to false claims for œstrogen therapy (Fergusson and Pagel 1945).

My preference for conducting this survey with œstrogens, instead of following the results of castration, was based on a hope that I might also discover the optimum dosage. Further, if such treatment proved ineffective, it would still be possible to resort to operation.

Opinion seems to vary geographically as to the value of retaining the male genital glands, and in many reports from transatlantic clinics a preference is expressed for bilateral orchidectomy. Such treatment is often mitigated and even embellished by the substitution of a plastic prosthesis, but the psychological effect is liable to be disturbing. On the other hand, with prolonged administration of œstrogens the testicular atrophy and loss of desire are more gradual and are accepted with an equanimity seldom evinced after castration.

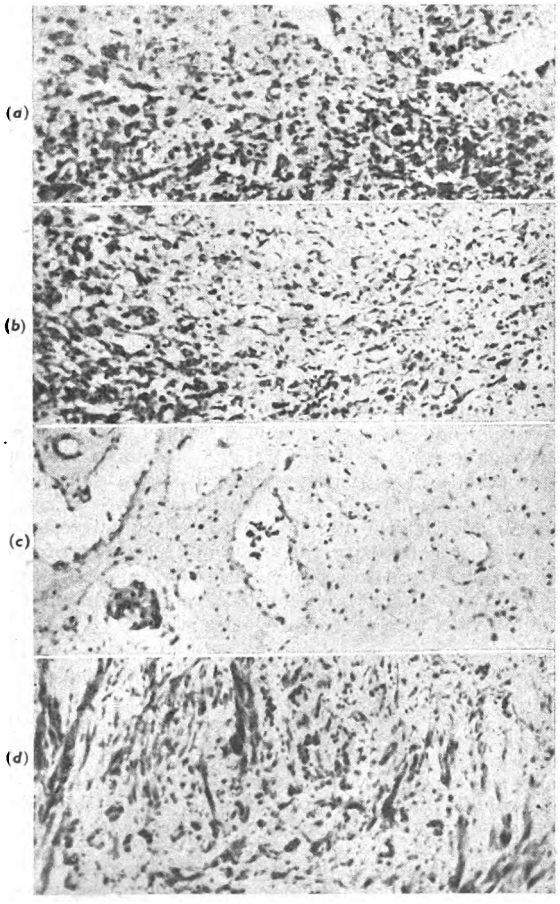


Fig. 1—Serial biopsy specimens of prostatic carcinoma during œstrogen treatment, showing regression of tumour and replacement fibrosis: (a) initial; (b) after 5 months; (c) 16 months later; (d) a year later.

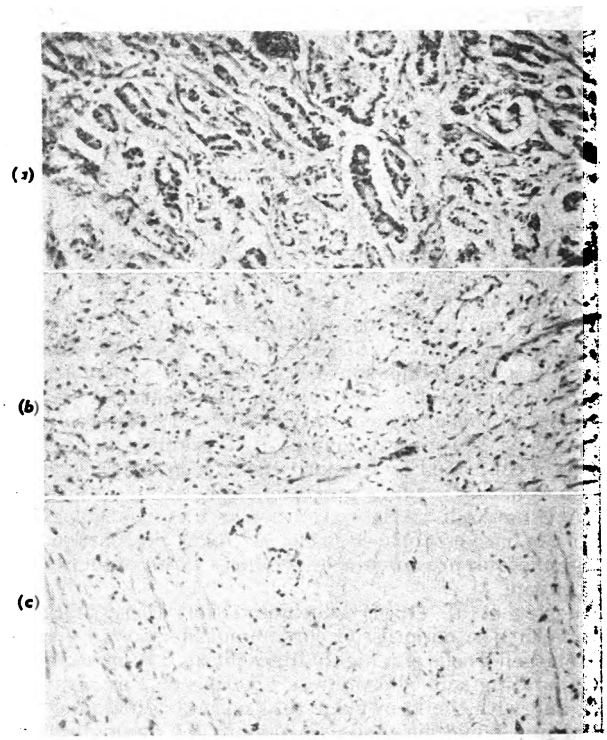


Fig. 2—Serial biopsy specimens of prostatic carcinoma during œstrogen treatment, showing regression of tumour: (a) initial; (b) after 10 days; (c) 17 months later

When I started my survey during œstrogen treatment I was unaware of a parallel investigation by Schenken et al. (1942) conducted for two months in the United States, but my longer-term results agree closely with theirs. I have since been able to corroborate the histological findings by simultaneous estimations of the acid-phosphatase content of the affected tissues.

It was clear from the outset, in view of the known variations in the histology of the growth, that such a comparison of serial biopsy material might be unreliable. Therefore the following conditions had to be satisfied:

(1) All the patients should have a *proved* prostatic cancer. In 23 cases treated with œstrogens since 1942 the diagnosis was confirmed by biopsy in 21, the remaining 2 having indisputable clinical, radiographic, and serological evidence.

(2) The patients should preferably show a good clinical response to œstrogens since, if they did not, no well-defined histological changes could be anticipated. The ideal case would thus be one showing relief from pain, increase in weight, and general well-being, but in which a degree of urinary obstruction persisted requiring surgical relief.

(3) Any tissue for comparison should be removed from the same site as far as possible on each occasion, and care taken to avoid at the first biopsy undue trauma which might affect the later histological appearances. To satisfy this condition I carried out every biopsy with the Gershom Thompson "cold punch" resectoscope, removing tissue from behind the posterior quadrant of the urethra above the verumontanum. I do not believe that there is any great risk of stimulating metastatic spread by this technique. Diathermy hæmostasis is reduced to a minimum to avoid subsequent necrosis, and bleeding is preferably controlled with a Foley's bag catheter. A control series of repeated resections of "adenomatous" prostates made in a similar manner showed negligible traumatic reactions.

(4) Enough tissue should be removed on each occasion to minimise any error due to vagaries of anatomical structure and distribution of the growth.

RESULTS OF REPEATED BIOPSIES

On these lines I carried out repeated prostatic biopsies on nine of the cases receiving œstrogens (table I). The intervals between these biopsies varied from 10 days to 23 months, and in a few instances additional biopsies were undertaken over periods extending up to 3 years. A minimum of 1·5–2·0 g. of tissue was removed on each occasion for examination. In a further two cases, where after preliminary biopsy and initial response to treatment the patient later deteriorated, valuable serial material was obtained at necropsy.

Every patient received continuous œstrogen treatment, and any adjuvant therapy was on uniform lines. Œstrogen was administered as stilbœstrol or dienœstrol in doses of 2–15 mg. a day. As each successive biopsy was performed, serial sections were made and stained simultaneously for accurate comparison.

The preliminary visual impression on examining the sections suggested that in nearly all cases the neoplasm was regressing considerably during treatment. The collections of cells forming the tumour units were decreasing not only in size but also in number. The general trend appeared to be away from a glandular adenocarcinomatous to a less cellular scirrhous form. This is well exemplified in fig. 1, which shows the histological appearance on four occasions extending over nearly 3 years. The photomicrographs are entirely representative of many serial sections. Fig. 2 shows a similar picture of three biopsies extending over 17 months.

In the remaining seven cases similar findings were obtained.

A more detailed histological examination was undertaken in several instances, involving a computation of the tumour units in microscopic fields of standard size, and a measurement of the nuclear diameters of the tumour cells, which in the later specimens appeared to be smaller. These examinations were conducted by skilled laboratory technicians for whose impartiality and ability I have the highest respect; and the results obtained fully confirmed the original visual impressions. The reduction in average size of the nuclei is shown in fig. 3, where in three cases the nuclear diameters are plotted against the number of nuclei.

During the last 18 months it has been possible to substantiate these findings by examining half the fresh biopsy material for tissue acid phosphatase. There are two ways of detecting it—biochemical estimation of the enzyme, and demonstration by the lead-nitrate and ammonium-sulphide staining method used by Gomori (1941). The methods seem to give comparable results in that a positive staining reaction visible to the naked eye appears to develop with reasonable uniformity when the concentration of the enzyme exceeds 1000 King-Armstrong units per 100 g. of tissue.

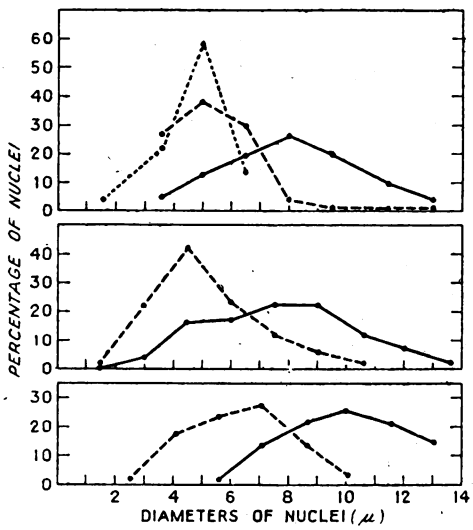


Fig. 3—Decrease in nuclear diameters of tumour cells of prostatic carcinoma during œstrogen treatment: solid lines, diameters at initial biopsy; broken lines, diameters at subsequent biopsies. A shift from right to left denotes reduction in diameters.

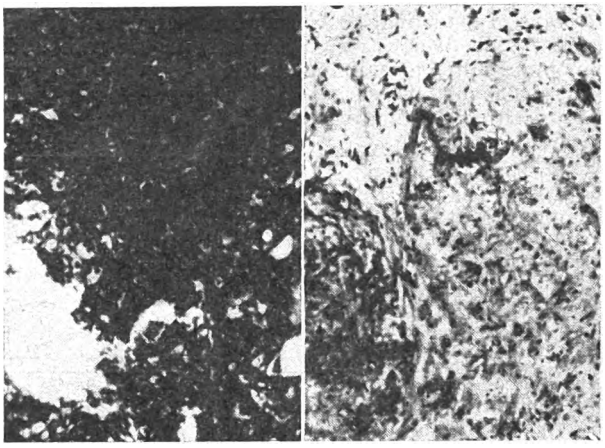
When I first tried the staining method I had two objects in view. Besides hoping to find a demonstrable reduction in the amount of enzyme in carcinomatous prostates as treatment progressed, I was anxious to discover whether the amount was greater in the posterior portion of the normal gland, a point which might possibly have a bearing on the frequency of malignant change in this situation. After a considerable number of normal adult prostates had been stained, my findings agreed with Gomori's (1941) view that the quantity and the distribution of the enzyme vary widely throughout the gland.

A few physiological adult prostates do not stain sufficiently to be visible with the naked eye, but in most, despite irregular distribution, there is evidence that a greater concentration of enzyme is common in the posterior part of the gland. This finding may, however, be influenced by potential "adenomatous" changes in the lateral lobes. Fig. 4 shows sections from two benign prostates differing in the distribution of the black-staining phosphatase, but in each case showing a quantity of enzyme in the posterior part behind the verumontanum. (Incidentally, staining of the complete female urethra to detect acid phosphatase has so far given no indication of a prostatic homologue.)

Fig. 4—Transverse sections of adult benign prostates, at level of verumontanum, stained to show acid phosphatase. Notice increased amount of enzyme in posterior part of gland.

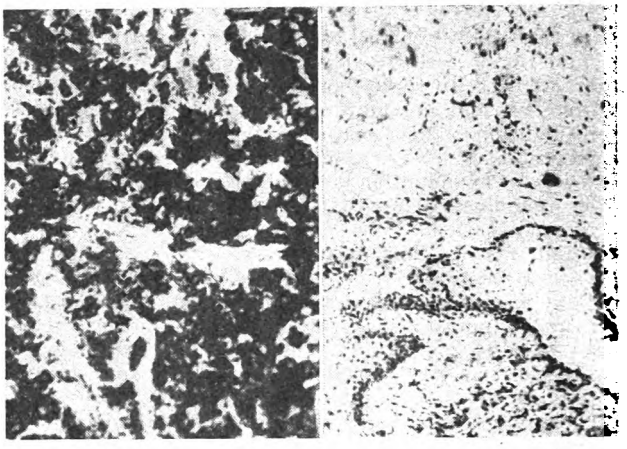
Carcinomatous prostates, on the other hand, generally show a consistently large amount of enzyme throughout their extent. A few quantitative estimations have been made on benign and malignant glands, and table II shows that whenever the whole benign gland was available a greater amount of enzyme was found in the posterior part. In the biopsy material, figures for carcinomatous tissue are slightly above the average for benign glands.

In four of the cases of prostatic carcinoma in which repeated prostatic biopsy was done the histological findings were supplemented by tissue acid-phosphatase estimation. In each case the concentration of the enzyme diminished during treatment, as illustrated in figs. 5 and 6. At the same time quantitative estimations showed decreases in units per 100 g. of tissue as follows: 8000 fell to 200, 3000 to 600, 8000 to 100, and 28,000 to 2000.



(a) (b)

Fig. 5—Serial biopsy specimens of prostatic carcinoma during œstrogen treatment, stained to show decrease in amount of acid phosphatase: (a) initial; (b) after 8 months.



(a) (b)

Fig. 6—Serial biopsy specimens of prostatic carcinoma during œstrogen treatment, stained to show decrease in amount of acid phosphatase: (a) initial; (b) after a year.

These investigations indicate that, in some cases of prostatic carcinoma showing a good clinical response to œstrogens, there is a well-defined improvement in the condition of the primary growth, as shown by the histological changes and corresponding reduction of tissue acid phosphatase. This accords with the clinical finding that the prostate appears, on rectal examination, to lose some of its malignant characteristics. I hasten to add that some cases of prostatic carcinoma do not seem to respond to œstrogens, and that, apart from anaplastic forms as noted by Sullivan et al. (1942), I have been unable to correlate this failure with any particular histological picture.

Another point of importance is that there is no intimate connexion between the concentration of acid phosphatase in the affected prostate and the amount in the blood-serum. The serum value undoubtedly derives from the quantity elaborated by metastases as well as by the primary growth. Out of 50 cases of prostatic carcinoma treated since 1940, the serum value exceeded 3 units per c.cm. in 90% of 39 patients with radiological metastases.

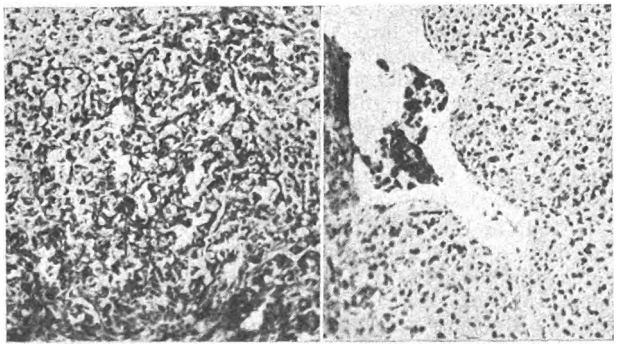
BEHAVIOUR OF METASTASES

Though most metastases from prostatic carcinoma are not readily accessible for histobiochemical investigation, superficial lymph-nodes are not uncommonly involved. The opportunity, however, seldom presents for comparative study of these affected tissues, since this would presuppose identical malignant involvement of at least two glands at the outset.

So far as clinical evidence is allowable, one of my cases did comply with this condition. The patient had two affected glands in the right axilla, similar in size and consistence, and showing equal clinical evidence of carcinomatous involvement. One gland was removed at the start of œstrogen treatment, and the other, which became noticeably smaller and softer, 24 days later. The microscopical findings are depicted in figs. 7 and 8, which show that the second gland exhibits less malignancy and contains a much smaller concentration of acid phosphatase. Normal lymph-glands show no acid-phosphatase staining reaction. This comparison is undoubtedly open to criticism, but, taken in conjunction with clinical evidence in other cases, gives reason for the belief that œstrogens may produce a beneficial, if temporary, effect on metastases.

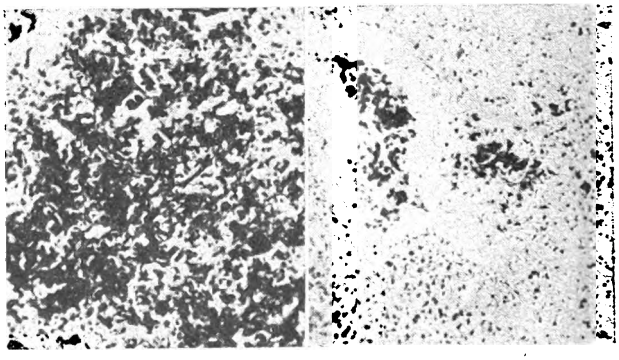
No further opportunity for comparison has yet arisen, but in several other cases I have carried out phosphatase staining on solitary lymph-glands affected with prostatic cancer. In every case where the primary growth showed a positive staining reaction the gland did likewise.

I then tried to discover whether secondary involvement from other types of primary growth was accompanied by acid-phosphatase production, and to decide whether glandular biopsy with phosphatase assay would be of any value in diagnosis. Many lymph-glands affected by various pathological processes, including malignant disease, were examined, but acid phosphatase was rare except in secondary prostatic carcinoma. It was noteworthy that several tuberculous glands gave a



(a) (b)

Fig. 7—Sections from two similar axillary lymph-glands, affected by metastases from prostatic carcinoma, during œstrogen treatment. Gland (b) was removed 24 days after gland (a) and appears less malignant.



(a) (b)

Fig. 8—Same sections as in fig. 7, stained to show acid phosphatase. Gland (b) has less enzyme than gland (a).

moderate staining reaction, and I suspect this may be connected with subsequent calcification (fig. 9). Of the malignant glands examined, only two, apart from those affected by prostatic carcinoma, gave a positive reaction. These were glands secondarily affected by carcinoma originating in the stomach in one case, and in the penis in the other.

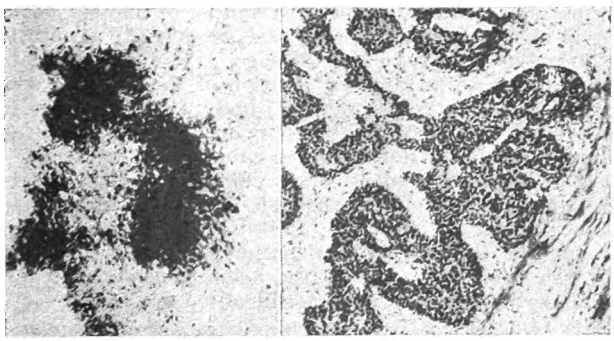
It seems therefore that the presence of much acid phosphatase in a secondarily affected gland strongly suggests a primary growth in the prostate, but does not prove it.

SIDE-EFFECTS OF ŒSTROGEN THERAPY

Most of the side-effects of œstrogens, particularly in large doses and over long periods, are relatively harmless, and in several instances I have used dienœstrol 40–50 mg. daily without adverse results other than occasional vomiting.

Changes in the male breast appear in about two-thirds of the cases. There may be tenderness of the nipple area, diffuse mammary swelling, and pigmentation. Pigmentation is usually confined to the areola but may rarely involve the surrounding skin (fig. 10). The breast changes do not seem to bear any constant relation to the prostatic response.

Shrinkage of the testes and *diminution of sexual feeling* have taken place in about a quarter of my patients but have been accepted with equanimity. Microscopy of such testes shows no special changes beyond those associated with senile atrophy. (I have incidentally found œstrogen therapy of considerable value in cases of benign so-called prostatism associated with sexual aberrations.)



(*a*) (*b*)

Fig. 9—Sections of (*a*) tuberculous lymph-gland and (*b*) lymph-gland affected by metastasis from prostatic carcinoma, both stained to show acid phosphatase. Note amount of enzyme in (*a*).

Change in Complexion.—Though I have been unable to detect any conspicuous loss of hair in my patients, it has been pointed out to me that many who have received prolonged treatment develop a choir-boy countenance.

Vertigo.—Apart from these minor side-effects and sporadic mild skin rashes and œdema, the only therapeutic complication which I thoroughly respect is vertigo. Several cases have been recorded in which patients died of a cerebral castastrophe, and I have had one such case. It is difficult to ascribe such an event to the giving of œstrogens, particularly in elderly patients, but I have the impression that vertigo may be the precursor of this disaster. How far it is vascular in origin, and thus possibly akin to the spasmodic vascular affections of females, is a matter for speculation.

On the whole it may be said that, compared with many other methods of treatment for prostatic cancer, œstrogen therapy seldom has disturbing sequelæ.

RESULTS OF TREATMENT

Of 50 cases of prostatic cancer which I have treated during the last six years, 27 were treated on standard lines without œstrogen, and the remaining 23 received, in addition, continuous œstrogen therapy. I have excluded any cases of more recent date than December, 1945. From this small series, observed over a relatively short period, no conclusions are justifiable in respect of cure, but the survival-periods are interesting (fig. 11). Many of the surviving patients are in good health and appear likely to remain so for some time to come.

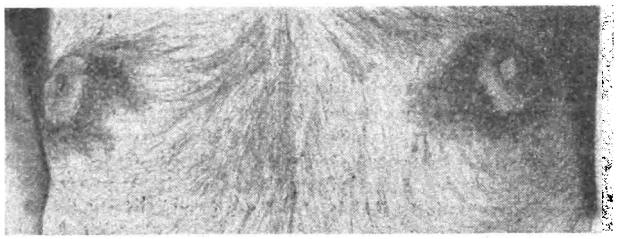


Fig. 10—Circumareolar pigmentation of male breast in patient receiving œstrogen treatment.

DISCUSSION

Roughly speaking, patients dying during œstrogen treatment can be divided into three classes:

(1) Patients who are moribund or in an advanced stage of renal failure when treatment is begun.

(2) Those who, though otherwise apparently eligible, show no reaction to œstrogens, and in whom the natural course of the disease proceeds unchecked. Probably many such patients have anaplastic tumours, possibly of a type that does not produce acid phosphatase.

(3) Patients who show a satisfactory initial response, as judged clinically, biochemically, and histologically, in whom a delayed and often sudden relapse takes place, as if all sensitivity to œstrogen was abruptly lost.

About half the deaths in the group receiving œstrogens fall into this last category of delayed reactivation of the growth. At necropsy in three of such cases almost complete regression of the primary prostatic growth was found, despite the coexistence elsewhere of widespread metastases, many of which, from clinical evidence, were of recent origin. In all these cases prostatic biopsy at the start of treatment had shown a highly active primary growth. A similar finding after castration has been reported in the United States by Huggins (1942) and by Gilbert and Margolis (1943). One is reminded forcibly of the observations of Prym (1925) on the spontaneous inactivation of primary chorionepithelioma of the testis in conjunction with spreading metastases, and of the sporadic success of oöphorectomy performed for mammary cancer.

Two questions arise:

(1) Is this peculiar behaviour limited to neoplasms of the sexual apparatus? If so, may it not be possible that the action of œstrogen is physiological, primarily affecting the organ in which the growth arises?

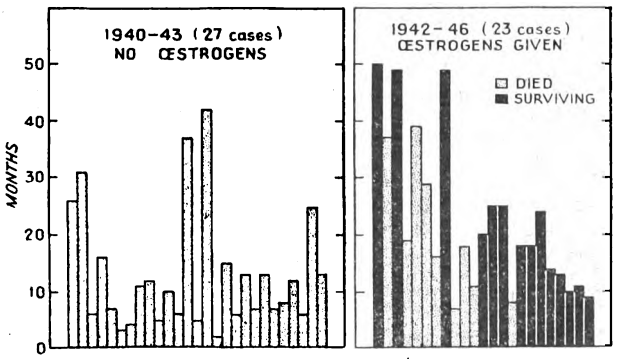


Fig. 11—Survival periods of patients with carcinoma of prostate, with and without œstrogen treatment.

(2) If this is not so, may it not still be possible that the action of organic chemotherapy is pre-eminently directed against the primary growth, and that metastases by virtue of their ectopic position sometimes acquire a degree of immunity. I know of no instance where, from the clinical aspect, metastases have undergone regression without corresponding changes in the primary tumour.

In view of this apparently delayed reactivation in several cases, one may ask whether specific treatment should not be reserved for the terminal stages of the disease. With an irrevocable form of treatment like castration this may be advantageous, but with œstrogen therapy it seems very doubtful. Besides the difficulty of determining the onset of the final decline before starting treatment, it seems to me that any prospect of cure, however remote, is thereby abandoned. In the present state of knowledge therefore it appears that œstrogen treatment, if it is to be adopted, should be used early and continuously, and the underlying pathology should be confirmed as far as practicable by biopsy. In pursuing such a course it is possible that accumulating information may lead to the advancement of organic chemotherapy in other spheres of malignant disease.

SUMMARY

The pathology, symptoms, and clinical cause of prostatic carcinoma vary widely, and this must be borne in mind in estimating the value of any form of treatment.

A method of investigating the results of œstrogen therapy of prostatic carcinoma by repeated biopsies is described.

The results obtained by this method in 9 cases are given. In nearly all of them the neoplasm regressed during treatment, as judged both by ordinary microscopy and, in 4 of the cases, by tissue acid-phosphatase estimation. But some cases of prostatic carcinoma do not appear to respond to œstrogens.

Some evidence is produced that œstrogens may exert a beneficial effect on metastases.

In an attempt to discover whether the presence of acid phosphatase in metastases in lymph-glands was pathognomonic of prostatic carcinoma it was found that acid phosphatase was rarely present in other conditions; but it was found in one lymph-gland secondarily affected by carcinoma of the stomach, in another by carcinoma of the penis, and in some tuberculous lymph-glands. The presence of much acid phosphatase in a lymph-gland therefore strongly suggests, but is not proof of, a primary growth in the prostate.

The side-effects of œstrogen therapy include changes in the male breast, shrinkage of testes and diminution of sexual feeling, change of complexion, and vertigo. Vertigo may possibly be the precursor of a cerebral catastrophe.

The average survival periods of 23 patients treated with œstrogens were longer than those of 27 patients not so treated.

About half the deaths of patients receiving œstrogens were due to delayed, and often sudden, reactivation of the neoplasm.

With great pleasure I acknowledge my indebtedness to Dr. W. Pagel and his assistants in the pathological laboratory at the Central Middlesex County Hospital, without whose willing coöperation these investigations could hardly have succeeded.

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DIAGNOSIS OF SCHISTOSOMIASIS

INTRADERMAL TEST USING A CERCARIAL ANTIGEN

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THE diagnosis of schistosomiasis by the present methods of microscopical examination of excreta for the eggs of the schistosome worms is costly of staff, time, and equipment, and is ill-suited to a country with a small and scattered population. Unless the disease is so widespread that it can be assumed that all the inhabitants are infected, as in some parts of Egypt, no campaign of large-scale treatment should be undertaken unless the infestation can be diagnosed in each person.

In Southern Rhodesia schistosomiasis is found practically everywhere, but previous surveys have shown that the intensity of infestation varies greatly from place to place. There may be very few cases at higher altitudes on the central plateau. Any campaign of mass-treatment must therefore be preceded by diagnosis.

DIFFICULTIES IN DIAGNOSIS

Diagnosis by the examination of samples of excreta for the eggs of the parasite is made difficult by biological and technical factors. Biological factors which may affect the production of eggs and their evacuation in stool or urine are (1) an infection with worms of one sex, or a great disproportion between the sexes; (2) a natural rhythm in the production of eggs; (3) misdirection of eggs, owing to an unusual position of the female worm at the time of laying; and (4) inability of the eggs to penetrate the wall of bladder or bowel because of fibrosis resulting from previous damage.

The technical factors affect chiefly the diagnosis of *S. mansoni* infestations, though they may operate to some extent in urinary infestations. These factors include (5) the collection of specimens in the wrong way by the patients; and (6) the examination of too few slide preparations of the centrifugalised deposit.

(1) *Infection with Worms of One Sex, or a Great Disproportion between the Sexes.*—Mayer and Pifano (1942), in experiments on mice infected with *S. mansoni*, have shown that eggs are produced in the fæces only in those cases where the proportion of male and female worms is about equal. Necropsy of mice which were not passing eggs in the fæces showed a preponderance of one sex—e.g., one mouse had 22 male worms and only 1 female; another had 20 male and 1 female, and in both instances a few eggs were found in the liver. In their opinion the most important cause of absence of eggs in the fæces is infestation by worms of a single sex. This type of infestation, they consider, may occur by chance if the person is infected by a single exposure.

Girges (1934) amassed a large body of evidence favouring his thesis that Egyptian splenomegaly is due in almost all cases to infestation with male worms. He distinguishes two types of *S. mansoni* infestation: the hepatic, and the intestinal. In 40% of his hepatic cases no eggs were ever found in the dejecta while in the remainder very few eggs could be seen; this, he says, is associated with a disproportionate number of male worms.

(2) *Natural Rhythm in Production of Eggs.*—Orpen (1916) investigated the egg output in a case of *S. hæmatobium* infestation. Three drops from the deposit of 2·5 c.cm. of residual urine was examined daily for over two months in the rainy season. No eggs were found on fifteen days; 1–3 eggs were found on thirty-four days; 4–6 eggs were found on eleven days; 7–9 eggs were found on six days; and over 9 eggs were found on six days. The record output was 31 eggs on one day. If egg output follows this pattern, it is obvious that there are many occasions on which schistosomiasis would not be diagnosed by microscopical methods.

Mayer and Pifano (1942) state that in their experience egg production is greatest when the worm has just reached maturity. If this conclusion is correct, it seems logical to

assume that with increasing age a stage will be reached when the worm no longer produces eggs, although all the toxic signs and symptoms due to its presence will still be manifest.

(3) *Misdirection of Eggs owing to Unusual Position of Female Worm.*—There have been many published examples of the discovery of worms and eggs in unorthodox places. In Southern Rhodesia, for instance, schistosomal appendicitis is relatively common, and the eggs found have invariably been those of *S. hæmatobium*. In very few of these cases is it possible to demonstrate the eggs in either stool or urine.

(4) *Inability of Eggs to Penetrate Wall of Bladder or Bowel.*—In many cases in Rhodesia intensive efforts to establish a diagnosis of schistosomiasis by the demonstration of eggs has failed although when such cases come to necropsy eggs can be found in the bladder and bowel wall. Tissue reaction by the formation of "tubercles," in which the eggs are effectively sealed off, is also a common finding.

Begg (1944) has advocated cystoscopy in every suspected case of schistosomiasis. He claims that in a very high proportion of his positive cystoscopy cases no eggs can be found in the urine. Ottolina and Atencio (1943) are even less satisfied with microscopical examination of stools. They advocated biopsy of the liver, but gave up this drastic procedure in favour of biopsy of the rectum. They found 11 cases of *S. mansoni* infestation by this means in 100 patients whose stools were negative.

(5) *Collection of Specimens by Patient in Wrong Way.*—It is accepted that a positive diagnosis is most often obtained by examining the last portion of the early morning urine voided after straining. With stools, when the whole specimen cannot be collected, the surface of the stool, particularly any portion containing blood or mucus, should be scraped off. It is difficult enough to persuade educated Europeans to adhere to instructions for the collection of excreta, but vastly more so when a primitive African population is to be examined.

(6) *Examination of Too Few Slide Preparations of Centrifugalised Deposit.*—In our experience, when light infestations are common, it is possible to examine several slide preparations from the one centrifugalised deposit of urine before an egg is seen, although there may be large numbers of red blood cells present, and a single examination would obviously miss this type of case.

Heavy infestations with *S. mansoni* in cases giving a history of dysentery are not often seen in Southern Rhodesia. Light infestations with *S. mansoni* in dysentery patients present an even greater problem than do light infestations of the urine. The handling to which the stool specimen must be subjected before it can be examined microscopically may lead to the loss of some of the few eggs present, and it is also more difficult to recognise eggs in a stool slide preparation. To overcome these difficulties Senra (1942) discusses the methods of Fulleborn and Hoffman by which the whole stool is broken up first in warm saline and then diluted with distilled water. If eggs are present, the miracidia hatch and can be seen in the supernatant fluid with the aid of a hand lens. Scott (1942) uses a combination of dilution count and sedimentation methods on a 6-g. sample of fæces and claims 93% accuracy. Neither of these methods is practicable in this country owing to lack of skilled staff and the need for examining both urine and stool, a problem which does not face workers in South America.

TESTS WITH ANTIGENS

Attempts to overcome these inherent difficulties in diagnosis have included the use of skin-tests and complement-fixation tests with antigens derived from various helminth products. This is a logical development and seems to be the only one likely to confirm a diagnosis in situations such as have been discussed above.

Fairley was apparently the first worker to attempt diagnosis by a skin-test (Fairley and Williams 1927). He used livers from snails infected with *S. spindale* as his antigen. Other workers have since tried to devise antigens from whole worms, using either one of the schistosomes or worms of a related species. Kan (1936) used adult *S. japonica* reared experimentally in animals, and Culbertson and Rose (1942) used the lung fluke of frogs, *Pneumoneces mediopleæus*. There are various unsatisfactory features of the use of snail liver as an antigen. Taliaferro and Taliaferro (1931), for instance, found that 16% of 120 persons, some of whom were not infected, reacted to normal snail-liver extracts.

Adult schistosomes grown to full maturity are difficult to obtain. For this reason, working with W. R. Blackie in 1938, we attempted to use miracidia of *S. hæmatobium* obtained by scraping the wall of urinary bladders removed at necropsy. This antigen gave satisfactory results in a few cases, but obviously an antigenic substance obtained from such a source is not ideal. Work was stopped by the war and was not resumed until 1942, when Alves began to experiment with the use of cercariæ as antigen. Risquez and Boza (1941) used cercariæ of *S. mansoni* obtained from "washed" *P. guadaloupensis*. They do not describe the method of preparation of the antigen nor do they advance any claims for this method as a diagnostic procedure.

PREPARATION OF ANTIGEN

Wild physopsis snails are collected and brought to the laboratory in Ball jars holding several hundred snails. These snails are taken from two habitats; and, although several thousand have been obtained there, it is always possible to find four or five hundred snails in the same place a few weeks later. The proportion of infected snails remains remarkably constant at about 10%. The habitats are, in the Rhodesian winter, very slowly moving streams with much vegetation.

Tubes 3 in. × 1 in., filled with clean pond-water, are used for the study of the snails, two of which are placed in each tube. The tubes are placed in the morning sun, and about 10% of the snails can be seen to be shedding human-type cercariæ within forty-eight hours of collection. With this high infection-rate we have found it unnecessary to keep the snails under observation for more than a few days, when the uninfected ones are discarded. The infected snails are put into individual tubes and kept there until many cercariæ are seen. It is not unusual, in our experience, to get 3000–4000 cercariæ from one snail in forty-eight hours.

When enough cercariæ have been produced, the snail is transferred to another tube; and the water, containing cercariæ, snail fæces, and any detritus, is filtered through a very fine muslin bag. The cercariæ pass through this filter, but the undesirable matter is held up. The filtrates thus obtained are pooled and passed through filter paper which traps the cercariæ but lets through bacteria and other microscopic matter. We have aimed at a concentration of about 10,000 cercariæ per circle of 15 cm. diameter of filter paper, but this is probably not of great importance. It is undesirable to prepare much liquid antigen at a time, unless it can be used quickly, so the papers are allowed to dry and are stored, without any special precautions, until required.

For the preparation of the liquid antigen the dry filter papers are cut up into pieces about 1 cm. square and placed in a flask with sufficient 1% carbol saline to give about 2000 cercariæ per c.cm. The flask is agitated from time to time and is left at room temperature for twenty-four hours. The surplus fluid, of which there is usually very little, is decanted and saved, and the mass of wet filter paper is then squeezed until as much fluid as possible is expressed. To prepare large quantities of antigen it would probably be advisable to devise some type of small metal wringer.

This fluid has never contained any pathogenic organisms and is in fact often sterile, but we have made a practice of filtering it through a Seitz filter. The filtrate is then diluted with an equal quantity of sterile normal saline, so that the final product contains 0·5% phenol and the extract of about 1000 cercariæ per c.cm. It is stored at refrigerator temperature in rubber-capped

vaccine bottles. So far no loss of potency has been demonstrable, even in antigen kept at room temperature for six months. Before general use each batch of antigen is tested on a known positive subject and a known negative subject.

Since human-type cercariæ from physopsis have been used exclusively, it is probable that the antigen is composed largely of *S. hæmatobium* products; but we feel, on epidemiological grounds, that these snails must be acting as intermediate hosts of *S. mansoni*, and we intend to investigate this question later. For the purposes of the skin-test the question is of academic interest only, since all workers agree that there is a common antigenic factor in the schistosomes.

PERFORMANCE OF TEST

We use the ordinary intradermal technique, with a tuberculin-type syringe and a fine-bore short bevelled needle. Influenced by Coca (1931), we inject as little of the antigen as possible, the aim being to use a dose of 0·01 c.cm., which usually raises a weal 3–5 mm. in diameter. The injection is made into the skin of the flexor surface of the forearm, choosing if possible an uninjured hair-free area. The importance of securing a true intradermal injection cannot be over-emphasised. If a small intradermal bleb is not obvious when the needle is withdrawn, the injection should be repeated at once in another place.

In view of suggestions that phenol per se may produce non-specific positive reactions in intradermal tests for trichiniasis (Spaeth 1942), we made control injections of carbol-saline in 200 of our cases. They included both positive and negative reactors to the antigen, but no positive reactions to the carbol-saline injection were seen.

We have been careful not to use ice-cold antigen direct from the refrigerator, since it is believed that false positives due to cold allergy may be encountered.

READING OF TEST

The reaction of the skin to the intradermal injection of the antigen is observed at 10, 15, and 20 min. In the *negative reactors* the original weal may disappear so completely that only the injection prick enables the site to be located. In other negative reactors the weal has not entirely disappeared at the end of this period but is certainly no larger than the original weal. Erythema is of no significance and is often seen in young children and women.

The commonest type of *positive reaction* is the formation of a disk-like button-weal which appears to be raised above the level of the normal skin. The elevation of this weal is often more apparent to touch than to sight. The increase in size of the weal varies enormously, and a weal 25 mm. across has been observed. In many positive reactors a ninefold increase in weal area is seen. Another type of weal commonly seen is characterised by an irregular outline and the pushing out of "pseudopodia" into the surrounding skin. In white-skinned positive reactors erythema round the weal can also be seen. In the flat type of weal it is often necessary to grasp the dorsum of the forearm and stretch the skin of the flexor aspect to blanch the erythema which may mask the outline of the weal.

LATE REACTIONS

We have no first-hand information about late reactions as described by Risquez and Boza (1941)—in fact, we have not had described to us any reaction at the site of injection. One patient described a transient œdema of the fingers of the arm into which the injection was made; he was a negative reactor, and the alleged œdema occurred six hours after the test. Another patient, a boy who was a positive reactor and in whom eggs of *S. hæmatobium* were subsequently found in the urine, developed, mainly on the trunk, ten days after the injection, a scarlatiniform rash sufficiently severe to cause his parents to call their doctor. The rash faded in twenty-four hours.

MATERIAL AND RESULTS

We performed skin-tests on three population groups—European schoolboys aged 12–17 years, Eurafrican schoolboys aged 7–17 years, and African young adult males enlisted in the S. Rhodesian native regiment; a total of 592 subjects. Urine and stool specimens were obtained from each subject at the time of testing, printed instructions having been issued on the best methods of collection. Further stool and urine specimens were examined from all skin-test positive cases until four sets of specimens had been obtained, or until eggs were demonstrated. Some of the subjects defaulted in the submission of specimens. The results are summarised in tables I and II.

It is difficult to obtain reliable histories of previous treatment from Africans and the Eurafrican children. These children particularly were so unreliable that no attempt has been made to classify treated and untreated. The African treated group, however, had all received treatment in the Army in 1943–45. The treated group of European boys had been treated by private practitioners in 1940–45. All the cases shown as positive were passing at least a proportion of viable eggs.

There appears to be a significantly higher percentage of active infections in the treated than in the untreated European schoolboys. Whether this is due to insufficient

TABLE I—COMPARISON OF RESULTS OF SKIN-TESTS AND OF EXAMINATIONS OF SPECIMENS, AND ANALYSIS OF INFECTIONS

—	197 European schoolboys	150 Eurafrican schoolboys	245 African men
Skin-test −ve / Specimens −ve	93	57	47
Skin-test −ve / Specimens +ve	0	0	0
Skin-test +ve / 1st specimen +ve	23	41	87
Skin-test +ve / 2nd specimen +ve	4	3	15
Skin-test +ve / 3rd specimen +ve	6	5	17
Skin-test +ve / 4th specimen +ve	4	1	8
Skin-test infection-rate %	*52·5*	*62·0*	*80·8*
Infection-rate % of egg passers found on a single specimen	*11·7*	*27·3*	*35·5*
Infection-rate % of egg passers found on examination of 4 specimens	*18·7*	*33·3*	*51·8*
HELMINTH INFECTIONS			
S. hæmatobium	26	37 (*a*)	103
S. mansoni	12	19	29
Double infections—urine and stool	1	7	5
S. mansoni in urine	..	1	1
S. hæmatobium in stool	..	1 (*b*)	3
Hookworm	3	6	20
Strongyloides stercoralis	..	1	4
Trichiuris trichiura	1	8	..
Tænia spp.	..	..	1
Ascaris lumbricoides	3	2	..
Enterobius vermicularis	4	2	..
Hymenolepis nana	..	..	1

(*a*) Includes two infections with eggs passed of *S. bovis* (*S. matthei*) type.
(*b*) An infection with eggs passed of *S. bovis* (*S. matthei*) type.

treatment or to liability to reinfection on returning to their usual environment, we do not know. One boy, aged 16 years, gave a history of no fewer than seven courses of antimony in the past eight years, and is still passing viable eggs of *S. mansoni*.

DISCUSSION

Value of Negative Result of Test.—The tables show that we have not encountered a negative skin reaction in a patient who passes schistosome eggs. It must be admitted that many of the negative skin reactors have only been examined once, and by our own showing single examinations of excreta for eggs are unsatisfactory. Nevertheless we feel that in the many hundreds of controlled examinations we would have at some time encountered such a phenomenon if the test were not sufficiently sensitive. We therefore think it justifiable to assume freedom from infection in patients who have no skin reaction. In a country where schistosomiasis must be considered in all obscure and indefinite illnesses such an exclusion test as this will be of great value to clinicians and laboratory workers alike. In mass-treatment campaigns it can reliably be used to weed out the non-infected. We have already discussed the varying district incidence of schistosomiasis in Southern Rhodesia, and such a rapid "screening" will be of the utmost importance in saving drugs, material, staff, and time.

Value of Positive Result of Test.—In the earlier work carried out by one of us, the antigen could be used only on a small scale, and it was decided to attempt to assess the antigen by skin-testing hospital patients passing eggs. These patients, 90 in all, had positive skin reactions.

Table I shows that we have not succeeded in completely correlating positive skin-tests with the passage of eggs in the excreta. Nevertheless, the follow-up data indicate that the gap lessens as the number of repeat examinations is increased. We have not been able to do as many repeat examinations as are desirable; patients are lost sight of or may become reinfected. In any case we believe that there must always remain a hard core of infected persons whose infections will never be diagnosed by microscopical methods and in whom proof will be forthcoming only at operation or necropsy.

We would, however, cite our experience in examining a group of 50 children as opposed to adults. These children were Eurafricans in an orphanage. Of the 50 children examined, 25 were skin-test positive, and on the first examination of their excreta 16 infections were diagnosed. On the first re-examination of the remaining 9, 2 more infections were discovered; on the second re-examination of the remaining 7, 2 more were found; and on the third re-examination of the remaining 5, 1 more infection was diagnosed. A fourth re-examination did not reveal any further infections, but blood-counts revealed eosinophilia in all of the 4 remaining cases.

In our opinion the patient who presents a suggestive history and has a positive skin reaction, and in many cases an eosinophilia, should be given specific treatment. Positive reactors seen in mass investigations should also receive treatment. Some of these patients may not be infectious in that they are not passing eggs, but the debilitating and damaging effect of this disease would justify their treatment on public-health and economic grounds.

Value of Skin-test in Treated Cases.—Treated cases may be placed in one of several categories:

(1) Patients who can be shown to be passing viable eggs soon after a course of treatment, when sufficient time for reinfection has not elapsed. We have seen several such cases; they are all skin-test positive.

(2) Patients who cease to pass viable eggs but whose clinical condition shows only a transient improvement. This failure to maintain improvement may be due to two factors: tissue damage may have been so extensive that it cannot be ameliorated by drug therapy alone; or all the worms in the body have not been killed.

TABLE II—ANALYSIS OF RESULTS OF SKIN-TESTS

—	197 European schoolboys		150 Eur-african school-boys	245 African men	
	Tr.	Untr.	Total	Tr.	Untr.
No. in group	35	162	150	50	195
Skin-test −ve / Specimen −ve	9	85	57	13	34
Skin-test +ve	26	77	93	37	161
1st examination +	8	15	41	11	76
1st examination −	18	62	52	26	85
2nd examination +	3	1	3	7	8
2nd examination −	15	60	46	11	71
3rd examination +	2	4	5	2	15
3rd examination −	12	52	38	7	53
4th examination +	1	3	1	2	6
4th examination −	10	47	34	4	40
Skin-test infection-rate %	*74·3*	*47·5*	*62·0*	*74·0*	*82·5*
Infection-rate % of egg passers found on examination of four sets of specimens	*40·0*	*14·2*	*33·3*	*44·0*	*53·8*

Fairley et al. (1930) present evidence that, in experimental infections, male worms are more resistant than females to treatment with tartar emetic. Fairley (1924) records positive complement-fixation tests in patients who have been treated with tartar emetic and are passing no eggs, and he later (1926) postulated the survival of the more resistant male worms.

Many of our patients who have received by ordinary standards an adequate course of treatment fall into the second group; their skin-tests are positive. On the other hand, patients are met whose skin-tests are negative but whose clinical condition remains unsatisfactory.

(3) Patients who cease to pass eggs and whose clinical improvement is maintained and whose skin reaction becomes negative. In our series of 100 cases treated with intensive antimony (Alves and Blair 1946) many such cures were obtained. It was possible to demonstrate in some of these a negative skin reaction two months after the cessation of treatment, whereas others showed negative reactions after three months. This reversion to negative after two months probably represents too rigorous a standard for clinical application, but we have no reason to believe that in a cured case the skin reaction will remain positive after a period much in excess of this.

We therefore suggest that further treatment is needed in cases showing positive skin reactions six months after treatment. We have been much impressed with the apparent failure of the ordinary course of antimony and sodium tartrate to cure even those subjects who coöperate completely in adhering to the prescribed routine.

The several groups of treated cases may therefore be summarised as follows:

(1) *Complete Failures.*—Passage of viable eggs, no improvement in clinical condition, positive skin-test. Further treatment indicated.

2. "*Public-health*" *Cures.*—No eggs passed, possible clinical improvement, positive skin-test. In mass campaigns no further treatment.

3. *Partial Failures.*—(*a*) No eggs passed, possible clinical improvement, positive skin-test; further treatment indicated for the individual patient. (*b*) No eggs passed, little or no clinical improvement, negative skin-test; further drug treatment useless.

4. *Perfect Cure.*—(*a*) No eggs passed, clinical improvement manifest, negative skin-test. (*b*) Passage of dead eggs,

possibly for considerable periods after cessation of treatment; clinical improvement and negative skin-test.

SUMMARY

Routine microscopy in the diagnosis of schistosomiasis is inaccurate and expensive.

The preparation and use of a cercarial antigen for intradermal testing is described.

A higher proportion of cases of schistosomiasis is revealed by this antigen than can be detected even by repeated microscopical examinations.

The efficiency of treatment of this disease can be measured more accurately with the skin-test.

Since no negative skin reactors have been found to be passing eggs, the test can be used as a rapid and accurate "screen" in mass-treatment campaigns.

Its use in indicating the need for further treatment is also outlined.

Our thanks are due to Dr. A. P. Martin, O.B.E., medical director, Southern Rhodesia, for permission to make this communication.

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PENICILLIN IN INFANCY AND CHILDHOOD *

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PENICILLIN can be given to infants and young children (1) by continuous intramedullary, intramuscular, or intravenous drip; (2) by intermittent intramuscular injection; or (3) by mouth.

Injection into the bone-marrow near the lesion has been successfully used in acute osteomyelitis (Aird 1945). Alternatively, the sternal marrow may be used. But intramedullary injection or infusion carries a risk of infecting the marrow with penicillin-insensitive organisms and ought not to be undertaken without skilled supervision.

Intravenous injection presents special difficulties in young patients because their veins are small and readily thrombosed; and since the veins may later be required for blood-transfusion it is inadvisable to cut down on more than one. Also children need frequent nursing attention which tends to displace the needles, with added risk of infection.

Despite nursing difficulties, continuous intramuscular injection by drip is the method preferred in the surgical wards of the Royal Hospital for Sick Children, Glasgow, for patients over the age of 2 years. Since children's small muscles have a limited power of absorption and less resistance to infection than adult tissues, particular care must be taken not to distend them and to avoid infection at the site of the needle-punctures.

The standard dose for the intramuscular drip in this hospital is 100,000 units per 24 hours, and the apparatus used is the 'Eudrip' no. 3 (McAdam et al. 1944). With this dose the blood-penicillin level is usually adequate, but occasionally, when the infecting organism is relatively penicillin-resistant, dosage is doubled, and in exceptional cases it may even be increased to 500,000 units per 24 hours. Table I shows the maximum dilutions of serum producing complete inhibition in eleven cases selected from various age-groups and receiving penicillin 100,000 units per 24 hours by continuous intramuscular drip. The slide-cell method of estimating the level of serum inhibition was used (Bigger et al. 1944), and the test organism was the Oxford staphylococcus. Complete inhibition in a serum dilution of 1 in 32 was accepted as equivalent to 1 unit of penicillin per c.cm. of the patient's serum.

TABLE I—MAXIMAL DILUTIONS OF SERUM PRODUCING COMPLETE INHIBITION IN CASES RECEIVING PENICILLIN 100,000 UNITS PER 24 HR. BY CONTINUOUS INTRAMUSCULAR DRIP

Case	Age (yr.)	Dilution of serum*
1	1½	Undiluted
2	3	1 in 4
3	5½	1 in 8
4	6	Undiluted
5	7	1 in 16
6	7½	1 in 32
7	8	1 in 4
8	8	1 in 16
9	9	1 in 4
10	9½	Undiluted
11	10	1 in 2

* Serum diluted with broth.

In the medical wards of this hospital intermittent intramuscular injection and oral administration are employed for infants and young children. Bodian (1945) advocated injection into muscle of 1000 units per lb. of expected body-weight per 24 hours in divided doses at 3-hourly or 4-hourly intervals, and obtained complete bacteriostasis in undiluted serum up to 4 hours after injection in only 60% of children. It is generally accepted that the basic principle of penicillin therapy is to maintain a minimum therapeutic level constantly in the blood, and Garrod (1944) and Kolmer (1945) consider inhibition in undiluted serum adequate. Our experience showed that penicillin 1000 units per lb. of body-weight per 24 hours was often insufficient to attain this, even in young infants in whom, presumably owing to inefficient excretion by kidneys not yet fully functioning, the blood-penicillin level tends to be higher than in other age-groups. Accordingly the dose was doubled, and further blood tests were performed. Fig. 1 shows that 2000 units per lb. per 24 hours maintains inhibition in undiluted serum. Since, however, occasions might arise where higher levels would be desirable—e.g., in infections with less sensitive organisms—experiments were undertaken with 4000 units per lb. of expected body-weight per

TABLE II—BLOOD-PENICILLIN LEVELS WITH INTRAMUSCULAR PENICILLIN 5000 UNITS (APPROX.) PER LB. OF EXPECTED BODY-WEIGHT PER 24 HR. (6-HOURLY INJECTIONS OF 25,000 UNITS FOR CHILDREN UNDER 2 YEARS OF AGE, AND OF 50,000 UNITS FOR THOSE AGED 2–5 YEARS)

Case	Blood-penicillin level	
	½ hr. after injection	5½ hr. after injection
1	Inhibition— complete at 1 in 64 partial at 1 in 128	Inhibition— complete in undiluted serum
2	complete at 1 in 64 partial at 1 in 128	partial in undiluted serum
3	complete at 1 in 128 partial at 1 in 256	partial in undiluted serum
4	complete at 1 in 32	complete in undiluted serum
5	" " 1 in 64	" " " "
6	" " 1 in 64	" at 1 in 2

* Work done during the tenure of a McCunn scholarship.

24 hours. Fig. 2 shows results resembling those in fig. 1, but with the blood-penicillin level better maintained. Accordingly, we regard 4000 units per lb. of expected body-weight per 24 hours given intramuscularly at 3-hourly intervals as the optimum dose. This view conforms to the latest recommendation on adult dosage (Hudson et al. 1946, Agerholm and Trueta 1946) and supersedes the 1000 units per lb. originally suggested as the standard adult dose by Florey (1944).

Since penicillin is relatively non-toxic, the optimum dose may be exceeded for ease in dispensing. For example, in this hospital the practice is to maintain in the ward refrigerators solutions of penicillin in strengths of 5000, 10,000, and 15,000 units per c.cm., and of 25,000 and 50,000 per 2 c.cm., prepared in phials or ampoules in the laboratories with pyrogen-free sterile saline. For children under the age of 3 months 5000 units is given eight times a day by injection or by mouth, and for children aged 3–6 months 10,000 units eight times a day by injection. These doses correspond approximately to

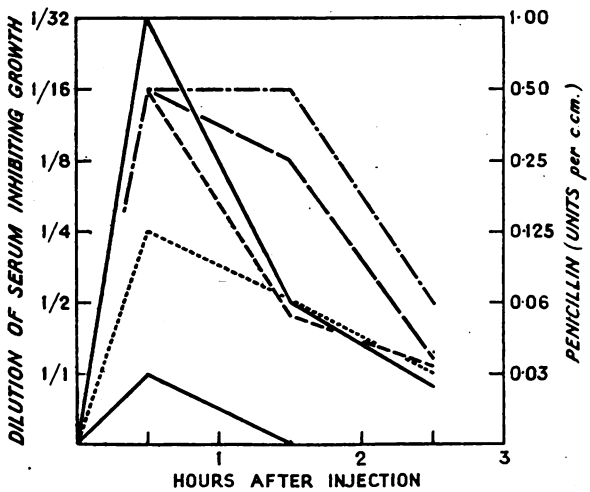

Fig. 1—Blood-penicillin levels of children having 2000 units per lb. of expected body-weight per 24 hours by intramuscular injection at 3-hourly intervals.

4000 units per lb. of normal body-weight per 24 hours. Though an adequate serum-penicillin level can be reached by 3-hourly intramuscular injections, the repeated punctures, with risk of infection, are a disadvantage, especially in infants and young children, and it seemed advisable to reduce the frequency of injection if this could be done without therapeutic loss. Accordingly 6-hourly injections of 25,000 units were given to children under the age of 2 years, and 50,000 units to those aged 2–5 years. This dosage approximates to 5000 units per lb. of expected body-weight per 24 hours and maintains a constant therapeutic blood-penicillin level. Turner (1944) also found 6-hourly injections satisfactory in infants and children, and Fleming et al. (1944) recommend 6-hourly injections of large doses. Table II shows the blood-penicillin levels obtained by this method.

ORAL PENICILLIN

Administration by mouth, if proved as effective as intramuscular injection, would make penicillin therapy simpler for the doctor and the nurse and less trying for the patient. In adults it has been demonstrated that oral administration is practicable, at least in infections with the most sensitive organisms, but only by expenditure of four or five times the amount of penicillin needed systemically.

Since Rammelkamp and Helm (1943) have noted that saliva, succus entericus, and bile do not exert a destructive effect, the main inactivating factor is the acid of the stomach (Abraham et al. 1941, Rammelkamp and Keefer

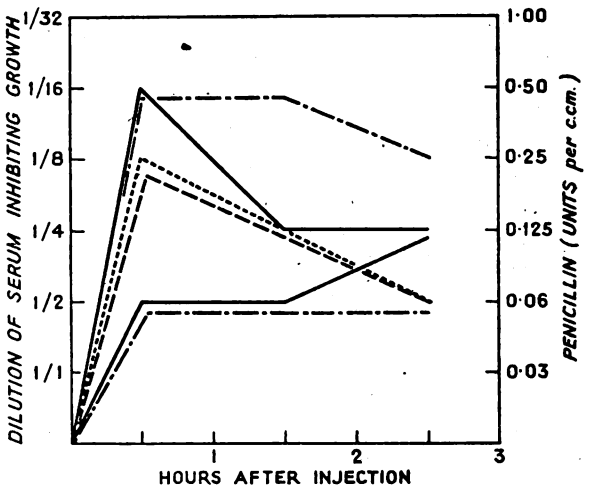

Fig. 2—Blood-penicillin levels of children having 4000 units per lb. of expected body-weight per 24 hours by intramuscular injection at 3-hourly intervals.

1943). Levinson and MacFate (1937) and Miller (1941, 1942) investigated the gastric juice in infancy and found low acidity, both total and free, except in the first few days after birth. Acidity, which then approximated to the adult level, did not again reach that level until the age of 3 years. The degree of free acidity appears to be correlated with the birth-weight, and a large proportion of the premature infants investigated had achlorhydria. It has been found in this hospital (F. M. Earle, personal communication) that, as a general rule, infections materially reduce the amount of free hydrochloric acid in the gastric juice. In view of these facts, it was considered feasible to explore the possibilities of oral administration to babies under the age of 6 months—the age-group in which a method other than intramuscular injection is most desirable.

A series of 25 babies was investigated, some in the sick nursery of the Royal Maternity Hospital, and others in

TABLE III—LEVELS OF SERUM INHIBITION AFTER ORAL PENICILLIN

(*a*) ½ hr. after penicillin; (*b*) 2½ hr. after penicillin; (*c*) 3½–4 hr. after penicillin

Case	*Serum inhibition*
1.	(*a*) Partial at 1 in 2; complete in undiluted serum (*b*) Complete in undiluted serum (*c*) Partial in undiluted serum
2.	(*a*) Partial at 1 in 16; complete at 1 in 8 (*b*) (*c*) Complete at 1 in 2
3.	(*a*) Complete at 1 in 16 (*b*) Complete at 1 in 2 (*c*) Complete in undiluted serum
4.	(*a*) No inhibition in undiluted serum (*b*) Inhibition in undiluted serum (*c*) Complete at 1 in 2
5.	(*a*) (*b*) Complete at 1 in 4
6.	(*a*) (*b*) Complete at 1 in 4
7.	(*a*) (*b*) Complete at 1 in 8
8.	(*a*) Complete at 1 in 2; partial at 1 in 4 (*b*) Complete at 1 in 4
9.	(*a*) Complete at 1 in 4; partial at 1 in 8 (*b*) Complete at 1 in 8
10.	(*a*) (*b*) Complete at 1 in 8
11.	(*a*) Complete in undiluted serum; partial at 1 in 2 (*b*) Complete at 1 in 2
12.	(*a*) Complete at 1 in 2 (*b*) Complete in undiluted serum
13.	(i) (*a*) Complete at 1 in 4 (*b*) Complete at 1 in 2 (ii) (*a*) Complete in undiluted serum; partial at 1 in 2 (*b*) Complete in undiluted serum
14.	(*a*) Complete at 1 in 16 (*b*) Complete at 1 in 8
15.	(*a*) Complete at 1 in 16 (*b*) Complete at 1 in 8
16.	(*a*) Complete at 1 in 2 and at 1 in 8 (*b*) Complete at 1 in 2
17.	(*a*) (*b*) Complete at 1 in 4
18.	(*a*) Complete in undiluted serum; partial at 1 in 2 (*b*) Complete at 1 in 2
19.	(*a*) Complete at 1 in 2 (*b*) Complete in undiluted serum
20.	(*a*) Complete at 1 in 4 (*c*) Complete at 1 in 2
21.	(*a*) (*c*) Complete at 1 in 8
22.	(*a*) Complete in undiluted serum; partial at 1 in 2 (*c*) Complete in undiluted serum
23.	(*a*) Complete at 1 in 8
24.	(*a*) (*c*) Complete at 1 in 8
25.	(*a*) Complete at 1 in 2 (*c*) Complete in undiluted serum

the Royal Hospital for Sick Children, most of the infants being in the first month of life. The penicillin was given in the first $^1/_2$ oz. of the 3-hourly or 4-hourly feed, in the dosage of 4000 units per lb. of expected body-weight per 24 hours. The first 4 babies were healthy, and the penicillin by mouth was experimental. In the other 21 babies penicillin was given therapeutically for various neonatal infections. The immediate clinical results of oral administration were on the whole striking, though there were a few relapses which responded to prolonged treatment. Two cases of clinical jaundice with liver enlargement did not respond to oral penicillin but improved on changing to parenteral penicillin. The blood-penicillin levels after oral administration in this group of infants are recorded in table III.

These results show serum-penicillin levels at least as good as those obtained by intramuscular injection—in fact in many cases inhibition is maintained longer. This, as has been mentioned, is due mainly to the fact that the kidney of the very young infant, especially the premature infant, is relatively inefficient (McCance and Young 1941). Probably the adult type of function is not acquired until the end of the first year of life.

It may therefore be said that administration of penicillin in feeds to infants, especially to premature babies, gave results both clinically and serologically comparable with those following intramuscular administration.

The number of babies and premature infants is too small to warrant detailed analysis, but there is no doubt of the striking clinical improvement in the children to whom penicillin was given by mouth. Most of the infections were respiratory and, though the causal organisms, owing to the difficulty of obtaining material, were not identified, the exhibition of penicillin was followed immediately by a fall in temperature, an increase in weight, and improvement in general nutrition. Ross Couper (1945) has already published equally favourable clinical findings.

Oral administration to older children, in whom free hydrochloric acid is present in the gastric contents, is a problem similar to that of its administration to adults. Many vehicles have been used for this purpose (*Lancet* 1945). Experience in this hospital has been limited to penicillin-in-egg mixture (Little and Lumb 1945) and to penicillin combined with aluminium hydroxide (Welch et al. 1945). The former proved nauseating; and, though it was possible to achieve adequate serum-penicillin levels with repeated loading doses of the aluminium-hydroxide mixture, the results on the whole were inconsistent.

SUMMARY

Using intramuscular injections of penicillin, 2000 units per lb. of expected body-weight per 24 hours is required to maintain constant bacteriostasis, with the standard Oxford staphylococcus as the test organism.

It is recommended, however, since infecting organisms vary in their penicillin sensitivity, and to leave a margin of safety, that for general therapy this dose should be doubled.

In infants under 6 months, owing to the low hydrochloric acid content of the gastric juice, penicillin can be administered satisfactorily by mouth in feeds.

Penicillin 4000 units per lb. of expected body-weight per 24 hours given orally to infants has yielded results clinically and serologically comparable to those obtained by injection and should be the method of choice.

I wish to thank Dr. G. L. Montgomery and Dr. K. J. Guthrie for their help both in the work involved and in the preparation of this paper; Dr. Stanley Graham for his valued advice and criticism; and Dr. F. M. Earle for permission to quote some results of her work.

References at foot of next column

OBSERVATIONS ON FIBRINOLYSIS

PLASMINOGEN, PLASMIN, AND ANTIPLASMIN CONTENT OF HUMAN BLOOD

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THE clots formed by normal whole blood, or by recalcified citrated or oxalated plasma, will remain intact in their own serum for days, or even weeks, if bacterial growth is prevented. In certain circumstances, however, this stability is lost, so that soon after coagulation they break up and disappear. This phenomenon, called by Dastre (1893) "fibrinolysis," was until recently mainly of academic interest; now there are indications that it may prove to be a manifestation of a fundamental physiological process.

Nolf (1905, 1908), one of the principal workers on this subject, produced fibrinolysis experimentally in dogs by complex procedures involving hepatectomy and peptone shock. Later (1921, 1922) he studied the fibrinolytic activity that can be produced in plasma by treatment with chloroform "in vitro." He concluded that the fibrin was digested by the proteolytic action of thrombin, an agent considered by him to consist of two factors ("thrombozyme and thrombogen") whose proportions determined proteolysis. Part of this conclusion is supported by the work of Tagnon et al. (1942), who confirmed the early observation of Delezene and Pozerski (1903) that chloroform-treated plasma becomes capable of digesting casein and gelatin, and related this proteolytic activity to the destruction of fibrin and fibrinogen by such plasma. They considered that an enzyme resembling trypsin is liberated in some way by chloroform, but that it is not thrombin.

Recently a new aspect of the process has been revealed by Kaplan (1944), Christensen (1944, 1945), and Christensen and MacLeod (1945). They have shown that the familiar fibrinolytic power ascribed to culture-filtrates of certain strains of β-hæmolytic streptococci is actually due, not to direct action of the filtrate on the fibrin, but to its activation of an enzyme precursor present in normal plasma and likely to contaminate the usual preparations of fibrin. Christensen and MacLeod (1945) have found that the enzyme so activated, though proteolytic, is not trypsin. It is associated with the

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globulin of the plasma, and is apparently identical with the enzyme activated by chloroform. They suggest the name "plasmin" for the enzyme, "plasminogen" for its inactive precursor, and "streptokinase" for the bacterial activator. A fourth component must be added to these. It has long been recognised that normal plasma or serum contains an antiproteolytic factor (Delezene and Pozerski 1903) associated with the albumin fraction (Opie and Barker 1907). This factor is probably concerned with the absence of fibrinolysis in normal blood, and may be called, for convenience, "antiplasmin."

The recognition of these components of a proteolytic system existing in normal blood greatly facilitates an approach to the problem of spontaneous fibrinolysis in man. It is most probable that the disappearance of fibrin in blood taken after sudden death (Yudin 1936), trauma (Macfarlane 1937), or burns and hæmorrhage (Tagnon et al. 1946) is due to the activation of this system. The possible significance of such a process becomes the more apparent when it is realised that the plasminogen of normal blood is of a potential activity sufficient to destroy the total fibrinogen of the body in a few minutes, and the more interesting since it is apparently associated with the problematical condition of "shock." Further investigation is desirable, and might be divided into studies of three aspects of the problem—first, the interaction of the plasma factors culminating in fibrinolysis; secondly, the nature of the physiological process that activates the proteolytic system; and thirdly, the effect on the living subject of the proteolytic enzyme when present in the bloodstream. The present paper describes some observations on the first of these. Later publications will be concerned with the other aspects.

EXPERIMENTAL TECHNIQUE

A first necessity in the study of the inter-relations of plasminogen, antiplasmin, and plasmin is a method for the quantitative assay of plasmin. Since this is a proteolytic enzyme, it would have been desirable to measure its activity by determining the rate of digestion of a pure substrate such as gelatin or casein. Fibrinolysis, indicated by the disappearance of a fine clot formed by the action of thrombin on dilute fibrinogen, has proved, however, to be a far more sensitive index of plasmin activity than protein degradation. In human material, activity, though present, may be so low that fibrinolysis is the only demonstrable effect, and in consequence it has been adopted as the indicator in these experiments. It has the disadvantage that only the presence or absence of the clot can be determined; the extent of partial lysis cannot easily be measured with any reliability. Plasmin activity could therefore be assessed either in terms of the time required for the lysis of a certain amount of fibrin, which is inconvenient, or by determining the greatest dilution of the sample that will lyse an amount of fibrin in a given time. The latter has been adopted here, though it was realised that other reactants besides plasmin would be involved in the dilution, which might lead to complications. As will be seen, complications did arise but were themselves of interest.

The basic technique was as follows. Blood obtained by venepuncture was mixed with 1/9th of its volume of 3·8% sodium citrate solution and spun in the centrifuge at 2500 r.p.m. for 10 minutes; the plasma was then separated. The plasma was diluted with twice its volume of buffer-merthiolate-saline* containing any agent required. After any other necessary treatment 9 serial twofold dilutions of the mixture were made using a 0·1% solution of fibrinogen prepared by the method of Milstone (1941) in the buffer mixture. Three volumes of each dilution were placed in a Wassermann tube and one volume of thrombin solution† added to each tube of the series. Clotting took place in about 30 seconds, and was firm enough to allow the tubes to be inverted without spilling. The final dilutions of the plasma were 1 in 4, 1 in 8, 1 in 16, and so on, to 1 in 2048 in the 10th tube of the series. Assuming that the fibrinogen content of the original plasma was about 300 mg. per 100 c.cm., the fibrinogen concentration in each tube was approximately constant at 75 mg. per 100 c.cm.

After 24 hours' incubation at 37° C, the contents of the tubes were examined for lysis of the fibrin. The end-point was usually sharp, one tube containing an intact clot, the next in the series nothing but clear fluid and a slight amorphous precipitate.

"Chloroform plasma" was prepared by the method of Tagnon et al. (1942) and then treated as described. "Active plasma"—that is, plasma showing spontaneous fibrinolytic activity—was obtained from suitable subjects.‡ The "globulin" fraction was separated by dialysing plasma against moving distilled water in the cold for 24 hours, bringing its pH to 5·5 (estimated by the glass electrode) with $N/10$ acetic acid, and separating the precipitate. The precipitate was then washed with distilled water saturated with CO_2, and finally dissolved in a volume of buffer mixture equal to the original volume of plasma. The "albumin" fraction remained in the supernatant fluid after separation of the globulin precipitate at pH 5·5. The last traces of the latter were removed by spinning at 4000 r.p.m. for 15 minutes, and the pH was then brought to 7·2 with $N/10$ caustic soda. These fractions were treated in the way described for plasma, except that fibrinogen was added to the albumin solution to a final concentration of 300 mg. per 100 c.cm. The globulin contained the fibrinogen of the original plasma.

Dry streptokinase was prepared by the method of Christensen (1945) by Dr. E. S. Duthie and used in a final concentration of 0·1%. It had no action alone on the fibrin prepared in these experiments, but, as a precaution, after 30 minutes' incubation with the plasma or plasma fraction to be studied, it was inactivated by the addition of a predetermined amount of antiserum also prepared by Dr. Duthie.

EXPERIMENTAL RESULTS

The results of the experiments (*A–E*) are shown in the table, each horizontal row indicating the presence (+) or absence (0) of fibrinolysis at a particular dilution. They are representative of a number of repetitions.

A—Dilutions of normal plasma show no lysis in 24 hours.

B—Incubation of normal plasma with streptokinase before dilution results in lysis in tubes 4 to 9, this last dilution (1 in 1024) representing the titre of the activated plasmin. The surprising absence of lysis in the first three tubes is important. It is probably due to the presence of an inhibitor which loses its effect on dilution.

C—"Chloroform plasma" destroys fibrin to a dilution of 1 in 256 (tube 7), but without any initial inhibition.

D—Streptokinase added to chloroform plasma increases the plasmin titre to 1 in 2048 (tube 10), suggesting that chloroform alone does not activate all the enzyme precursor.

E—Spontaneously active plasma lyses fibrin to tube 6, with inhibition in the first tube.

F—Streptokinase added to "active plasma" extends lysis to tube 8, without inhibition, suggesting that there is a

* The buffer is made as follows: 1·72 g. glyoxaline and 90 c.cm. of $N/10$ HCl are made up to 100 c.cm. with water; 5 c.cm. of this is added to 245 c.cm. of 0·9% saline containing 0·001% merthiolate.

† A 1/250 dilution in buffer mixture of "clotting globulin" prepared by Lederle Laboratories Inc., New York. This thrombin preparation has no fibrinolytic activity. Preparations of human thrombin have been used but are sometimes spontaneously fibrinolytic.

‡ The methods by which spontaneous fibrinolytic activity can be produced in human subjects will be described in a later publication.

reduction of inhibitor but incomplete activation of the enzyme precursor in "active plasma."

G—Normal globulin is spontaneously active to tube 5, without inhibition in the first tubes.

H—The activity of normal globulin is increased to tube 8 by streptokinase. It contains, therefore, both active enzyme and its precursor.

I and J—Albumin has no activity, even when treated with streptokinase.

K—The spontaneous activity of globulin is lost when it is re-combined with albumin in the normal proportions.

L—The albumin from chloroform plasma has no inhibitory power on normal globulin.

M and N—The globulin fraction from chloroform plasma is more active than normal globulin, but is completely inhibited by normal albumin.

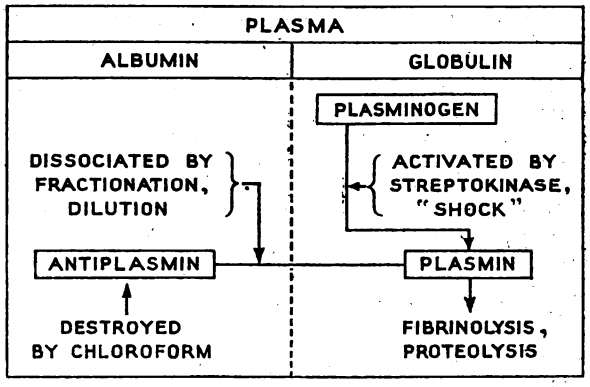
O—The albumin fraction from plasma treated with streptokinase inhibits normal globulin in the first three tubes, but there is lysis in tubes 4 and 5. This may suggest that there is some reduction of the potency of the inhibitor after treatment with streptokinase, but it is possible that some of the kinase was carried over with the albumin fraction to activate the globulin.

P and Q—The globulin fraction of spontaneously active plasma is more lytic than normal globulin, but, in this experiment, is completely inhibited by normal albumin. In other experiments, however, with more active globulin, normal albumin may not completely inhibit lysis.

R—The albumin from "active plasma" does not completely inhibit normal globulin.

DISCUSSION AND CONCLUSIONS

From these experiments it appears that normal plasma contains at least three factors concerned in fibrinolysis. In the "globulin fraction" is a certain amount of active plasmin, and a further quantity of its precursor, plasminogen. It might be argued that the activity observed in this fraction was induced by the technique of separation, but, since it is lost on re-combination with albumin, it is reasonable to suppose that this proportion of plasmin exists in normal blood in combination with the antiplasmin of the albumin fraction. If this is so, the combination is a loose one, being broken by fractionation. Moreover, if the plasmin content of plasma is



for any reason increased, fibrinolytic activity first becomes apparent in the higher dilutions of the plasma, suggesting that dilution favours dissociation of the plasmin-antiplasmin complex, though in normal plasma there is a sufficient excess of inhibitor to prevent activation. This dissociation explains the results of Macfarlane (1937), who found diluted plasma a more sensitive index of fibrinolysis than whole blood. A similar effect of dilution has been observed on trypsin-antitrypsin mixtures (Hussey and Northrop 1923) and on toxin-antitoxin mixtures (Glenny and Barr 1932).

It is alteration of the plasmin-antiplasmin balance, therefore, that determines the presence or absence of fibrinolytic activity in blood. Alterations resulting in an increased activity have been observed as follows:

(1) Streptokinase increases the plasmin content of the plasma by activating available plasminogen, but does not appear greatly to affect the antiplasmin, a conclusion in conformity with that derived by Christensen and MacLeod (1945) by other methods.

(2) Chloroform destroys antiplasmin, thus releasing the plasmin normally in combination with it. It has been previously observed that the antiproteolytic action of serum is destroyed by chloroform (Jobling and Peterson 1914, Dale and Walpole 1916, Teale and Bach 1919).

PRESENCE OR ABSENCE OF FIBRINOLYSIS IN DILUTIONS OF PLASMA OR PLASMA FRACTIONS WITH VARIOUS REAGENTS, AND CONSTANT FIBRINOGEN

Exp	Reagents	Tube number and dilution of plasma or plasma fraction									
		1	2	3	4	5	6	7	8	9	10
		1/4	1/8	1/16	1/32	1/64	1/128	1/256	1/512	1/1024	1/2048
A	Normal plasma	0	0	0	0	0	0	0	0	0	0
B	Normal plasma + streptokinase	0	0	0	+	+	+	+	+	+	0
C	"Chloroform plasma"	+	+	+	+	+	+	+	0	0	0
D	"Chloroform plasma" + streptokinase	+	+	+	+	+	+	+	+	+	+
E	"Active plasma"	0	+	+	+	+	+	0	0	0	0
F	"Active plasma" + streptokinase	+	+	+	+	+	+	+	+	0	0
G	Normal globulin	+	+	+	+	+	0	0	0	0	0
H	Normal globulin + streptokinase	+	+	+	+	+	+	+	+	0	0
I	Normal albumin	0	0	0	0	0	0	0	0	0	0
J	Normal albumin + streptokinase	0	0	0	0	0	0	0	0	0	0
K	Normal albumin + normal globulin	0	0	0	0	0	0	0	0	0	0
L	"Chloroform" albumin + normal globulin	+	+	+	+	+	+	0	0	0	0
M	"Chloroform" globulin	+	+	+	+	+	+	+	+	0	0
N	Normal albumin + "chloroform" globulin	0	0	0	0	0	0	0	0	0	0
O	"Kinase" albumin + normal globulin	0	0	0	+	+	0	0	0	0	0
P	"Active" globulin	+	+	+	+	+	+	+	+	0	0
Q	Normal albumin + "active" globulin	0	0	0	0	0	0	0	0	0	0
R	"Active" albumin + normal globulin	0	+	+	+	+	0	0	0	0	0

Such an action was considered but rejected by Christensen and MacLeod (1945), who did not suppose that plasmin was normally present in the blood.

(3) The spontaneous fibrinolytic activity observed in our subjects is due to an increase in plasmin, and also, apparently, to a decrease in antiplasmin, an observation that requires further confirmation and investigation. The mechanism by which plasminogen is activated in these subjects is at present unknown.

The foregoing conclusions can be illustrated diagrammatically (see figure). Such a scheme, it is realised, is hypothetical, and further work may require fundamental alterations.

Our thanks are due to Dr. E. S. Duthie, of the Lister Institute, Elstree, for much advice and practical help, and to Dr. A. H. T. Robb-Smith for his encouragement and criticism. The general investigation of fibrinolysis is financed by the Medical Research Council.

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EXERCISE AND CARDIAC HYPERTROPHY *

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PHYSICIANS and physiologists differ in opinion on the subject of cardiac hypertrophy in response to exertion. On the one hand, there is the à priori expectation, the analogy of the musculature of the blacksmith's arm. On the other hand, there is the pronouncement of cardiologists that, provided the cardiac muscle is healthy and there is no valvular disease, hypertrophy does not develop even after the most severe physical exertion of which a human being is capable, whether that exertion be a repetition of occasions of supreme intensity or a long-continued submaximal effort: hypertrophy is regarded as evidence or proof of some pathological condition in the cardiovascular system or in some other system with cardiovascular repercussions. Though the present communication is intended as a criticism which may be at variance with previous experience and admit some vacillation in the retention of a long-established opinion, I have on clinical and radiographical grounds never found occasion to doubt that the healthy heart never hypertrophies, and this belief is founded on very considerable experience of athletes of every variety: of oarsmen; of runners at all distances, from sprinters to Marathon performers; of cyclists engaged in such feats as twenty-four hours' continuous pedalling; and of Channel swimmers.

Analogy with the blacksmith's arm may well be fallacious; cardiac muscle is not the same thing as voluntary skeletal muscle. Moreover, I have always felt that undue emphasis is laid on the function of the heart in considering the capacity for athletic distinction and regarding it as the limiting factor for endurance. Admittedly the work done by the heart in extreme exertion is of a very high order: each ventricle at maximal pressure delivers thirty-four litres of blood a minute. But, though the argument is specious, it seems to me a gratuitous assumption that, granted a peculiarly superlative circulation ensuring an unlimited provision of blood, a corresponding delay or avoidance of fatigue would result. The capacity for physical effort depends on various circumstances. It may well be that the super-athlete owes his capability to the quality of his blood; to its viscosity, perhaps, or even to some subtle biochemical factor. It may be that his muscles have exceptional endowments for oxygen utilisation, for tolerance for lactic acid, or for the development of antibodies to ensure its neutralisation. Above all there is the nervous element, not only as a coördinating agent for the most perfect harmonisation of all the factors concerned but also from the psychological aspect.

Comparison with the lower animals is unconvincing. We may measure such details as stroke volume, circulation-rate, vital capacity, and oxygen debt. What are immeasurable and imponderable are such qualities as determination, stoicism, the ability to withstand discomfort and fatigue, or to endure the miseries of heat, cold, hunger, and thirst, and most of all in respect to long-continued exertion, monotony and boredom. The limiting factors of endurance are by no means restricted to the circulation.

AN ILLUSTRATIVE CASE

A man, aged 78, consulted Mr. G. T. Mullally for a swelling of the neck of three months' duration. His previous health had been consistently excellent; his activity until the last few weeks of his life had remained unimpaired. A tumour (probably malignant) of the thyroid gland compressing the œsophagus and invading the right external jugular vein was diagnosed, and deep X-ray therapy was undertaken. Sudden death took place shortly after the start of treatment.

As a necropsy was permitted, I requested particular attention to the heart and blood-vessels. I had not known the deceased in life, but his reputation as an athlete in his youth was of an almost legendary order. In the opinion of authorities he was the greatest long-distance cyclist of any generation. At the age of 18 he broke records for the bicycle and tricycle rides from Land's End to John o'Groats. During eleven years of incessant cycling he created nineteen national records. He had a partiality for the Land's End to John o'Groats achievement, and contemporary members of our profession warned him that every such performance reduced his life expectation by ten years. This effort he accomplished on twenty-four occasions.

After terminating his career as a long-distance cyclist he continued as an outstanding performer at cricket, hockey, swimming, and lawn tennis for the remainder of his life. As a professional soldier he took part in the 1914-18 war (lieut.-colonel and D.S.O.) and in the 1939–45 war with full duties in the Home Guard. I regret that no clinical details—e.g., cardiac rate and blood-pressure—are forthcoming. His height was 5 ft. 11 in., and his weight, which remained substantially unaltered throughout adult life, was just under 11 st. He was a non-smoker and almost a total abstainer from alcohol.

At the necropsy an embolus—the cause of death—was found in the left pulmonary artery.

The lungs were healthy and free from emphysema; there was adherence of the left pleura, with a calcified nodule at the left base. The heart was large, weighing 18 oz., but was "remarkably healthy for a man of his age." The muscle was firm and without fatty changes or infarctions. The coronary vessels were entirely free of atheroma. The aorta was in a remarkable state of health. The valves were normal; the aortic valves appeared larger than normal, measuring 4 cm. × 2 cm.

"The kidneys were quite normal, weight rt. 6 oz., lt. 8 oz. Liver, spleen (weight 4 oz.), and other viscera were quite normal."

DISCUSSION

Here is an example of a man who indulged in the most severe form of violent exercise in his youth

* A communication to the Association of Physicians, April, 1946.

for eleven years and in moderately strenuous exertion for the rest of his life; who survived with perfect health to the age of 78 to succumb to malignant growth of the thyroid and a fortuitous pulmonary embolus; at whose death a considerably hypertrophied heart was discovered, with complete absence of any disease in the cardiovascular system and a condition of exceptional healthiness of all viscera for a man of his age.

It is generally accepted that species or even breeds of animals distinguished for muscular power have unusually large hearts. The ratio $\frac{\text{heart weight} \times 100}{\text{body-weight}}$ is always greater than 0·6 in those capable of severe continued exercise. The qualification *continued* must be stipulated, since animals with very small hearts are capable of extreme exertion for a short time if no considerable oxygen debt is incurred.

But this is not to presume that hypertrophy of the heart can be induced by severe exercise, and clinical and radiological investigations applied to athletes who indulge in long-distance events have provided little evidence of such effect. Admittedly, these investigations, however skilfully performed, are not conclusive. The only proof is that afforded by necropsy, and appropriate opportunities are exceptionally rare. Necropsies of subjects aged 78 are only too likely to reveal degenerative changes which are the usual consequence of age. The factors of inactivity, gluttony, and intemperance all have a bearing; hence the responsibility of physical exertion in earlier life can rarely be incriminated as an isolated factor.

I venture to advance two provocative alternatives as a lesson from this example. Either cardiac hypertrophy, analogous to muscular hypertrophy generally, does develop in response to violent exercise; or some human beings naturally possess exceptionally large hearts and are constitutionally fitted for protracted exertion.

SUMMARY

An example is presented of a phenomenal athlete, who died at the age of 78, in whom at necropsy considerable hypertrophy of the heart was revealed, but whose cardiovascular system was in an extremely healthy state.

The relationship of cardiac hypertrophy to physical exertion is discussed.

I am greatly indebted to Mr. G. T. Mullally for permission to record this note, and to Prof. R. J. V. Pulvertaft for his generous coöperation in respect to the necropsy and information relating to the crucial details.

Reviews of Books

Atlas of Surgical Approaches to Bones and Joints

TOUFICK NICOLA, M.D., F.A.C.S., professor of orthopedics, New York Polyclinic. London: Macmillan. Pp. 218. 25*s*.

BY over 200 diagrams and black-and-white drawings, Professor Nicola cleverly and clearly represents the methods of approach to all bones and joints. The chief features are the large scale of the illustrations—almost life size—and the bold delineation of the structures. Here are no detailed anatomical drawings in the da Vinci style, nor loose impressionist effects, but bold, semi-diagrammatic drawings which certainly get their message across. The approaches are those that Nicola has found of value, and as such should be good enough for most of us. The majority are familiar, but some—such as the deltoid-displacing methods for the shoulder-joint—should be used more often. There are definite advantages in exposing the lumbar spinal cord with the patient in the lateral position, as he describes. For the young, this is a simple textbook of the essentials of orthopædic anatomy, for the old a quick reference work for use before a less familiar operation on bone or joint.

Carbohydrate Metabolism

SAMUEL SOSKIN, director of the research institute, Michael Reese Hospital, Chicago; and RACHMIEL LEVINE, director of metabolic and endocrine research at the hospital. London: Cambridge University Press. Pp. 315. 33*s*.

Claude Bernard's genius is emphasised in this book. The authors return again and again to the views of the great pioneer, upon whose work so much of our knowledge of carbohydrate metabolism is based. And in this the authors show their own greatness, for they set out to provide a book to be used for teaching, bringing the subject matter up to date, and presenting it suitably for the scientifically minded physician. Well designed and critically and sympathetically written, the book could only have been put together by men who had themselves thought and worked for many years at the subject. The diagrams and structural formulæ are helpful, and the summary, in the biochemical section, of the enzymatic processes involved in carbohydrate oxidation is very clear. The section criticising the classical criteria of diabetes is interesting, the authors piling up the evidence against the non-utilisation theory in an instructive manner. The rôle of the endocrine glands in carbohydrate metabolism is fully discussed, and with surprising simplicity. Some of the final chapters will appeal most to clinicians. Some aspects of carbohydrate metabolism which have been almost neglected might with advantage have been included. The references to, and accounts of, the pentose sugars for instance are incomplete enough to be misleading, and there is little description of our growing knowledge of the sugars concerned in nucleic acid metabolism; but perhaps these subjects hardly came within their terms of reference.

Symptomatic Diagnosis and Treatment of Gynæcological Disorders

(2nd ed.) MARGARET MOORE WHITE, M.D., F.R.C.S., M.R.C.O.G., surgical specialist, Three Counties Emergency Hospital. London: H. K. Lewis. Pp. 246. 16*s*.

THIS small book, published in the "General Practitioner" series, covers a wide territory and covers it well. The subject matter is up to date; the diagnosis and treatment are sound, and the illustrations graphic. Miss Moore White counsels expectant treatment in intratubal pregnancy with death of the fœtus, and in abortion of a separated tubal pregnancy. This may be safe for a surgeon of her diagnostic acumen and wide experience, but in writing for general practitioners such advice seems dangerous, since the extra-uterine pregnancy which is likely to bleed and the one which is not may easily be confused, with disastrous results for the patient. The chapter on sterility is among the best in any textbook of gynæcology, and a useful chapter on contraception has been contributed by Dr. Mary Redding. Irradiation therapy is discussed by Mr. I. G. Williams, who adequately covers the needs of general practice.

A Textbook of Surgery

(4th ed.) Editor: FREDERICK CHRISTOPHER, M.D., F.A.C.S., associate professor of surgery, Northwestern University, Chicago. London: W. B. Saunders. Pp. 1548. 50*s*.

THIS new edition has been revised and reset, and two new sections have been added on chemotherapy and military surgery. New readers may or may not dislike the double-column page; and there is some inevitable unevenness associated with the multiplicity of authors, so that the sections on the operative treatment of trigeminal neuralgia or spina bifida are as long as the whole section on tuberculosis of joints. But these are minor criticisms. The illustrations are everywhere good, particularly those of operative procedures, and the style is generally lucid and fluent. This book has always been among the transatlantic productions which British undergraduates could read with profit and pleasure, and they will find it a useful adjunct to our own standard works.

THE LANCET

LONDON: SATURDAY, OCT. 19, 1946

The Curtain

IT is a great misfortune that so many doctors should be dissociated from the Government's effort to create a comprehensive medical service. Now that many of the desires and aspirations of the profession stand a chance of fulfilment, a substantial proportion of its members seem to be chiefly concerned with the inconveniences and risks that are inseparable from any major change. These inconveniences and risks are very far from negligible, but they should not obscure the larger view presented once again in the Lords' debate last week. In that debate one of our spokesmen had to admit that in approaching the Bill "too many of the doctors have merely expressed their fears and prejudices" and "it has been left to the Minister to generate the momentum that overcomes obstacles and to enlist the strenuous support of ardent minds." The House of Lords at least showed itself aware of the significance of the project now being undertaken: "I am quite convinced," said the Archbishop of YORK, "that the National Insurance Act . . . and this Bill . . . will prove by far the greatest social reforms which have ever been passed by Parliament." Its evolutionary, rather than revolutionary, character was emphasised by Lord LISTOWEL: there has been, he pointed out, a deplorable hiatus between the progress of medicine and its social application, and "as a citizen of a country which still cares about social justice and the intangibles that really matter" he welcomed a measure which "by its inclusiveness, by its more even distribution of the nation's medical resources, and most of all by breaking the cash nexus between medicine and the individual, will remove the gravest of the present obstacles to one of the most important forms of equality of opportunity." Lord BEVERIDGE approved of the Bill as giving effect to the vital principle that bread and health for everybody should come before cake and circuses for some. It sets up for the first time, he said, a true Ministry of Health ("a national authority with the duty and with the power of attacking disease as a national enemy") and it means that the medical profession will now be a service rather than in any way a business.

So much for intentions. But, as Lord ADDINGTON remarked, under the new régime "the love, care, and consideration which are so essential to healing cannot be exercised if there is friction between the doctors and the Government or between the doctors and the patients"; and the LORD CHANCELLOR agreed that it would be very foolish to construct the scheme on the basis of a disgruntled and dissatisfied profession. Unhappily that is just what a great many doctors are today—distinctly disgruntled. And perhaps the main reason for their state of mind is that they suppose that the Minister of Health, receiving plenary powers from a political majority, is not paying, and need never pay, any attention at all to the views of their representatives. People who have closely followed the development of the plan for a comprehensive medical service know that, as Lord LISTOWEL argued, it is the outcome of a concerted effort, over a long period of years, in which every view of any importance has been given a fair hearing and prolonged and serious consideration. Nevertheless Mr. BEVAN's treatment of the Negotiating Committee has made it just possible for opponents to assert that the scheme in its final form was thrust on the profession "without consultation." Though he listened repeatedly to the committee's views, expressed both collectively and individually, he believed, rightly or wrongly, that the shaping of the main policy was a matter for himself and Parliament, not to be prejudiced by bargaining in advance. Thus, though there were consultations, it is true that there were, strictly speaking, no negotiations.

Mr. BEVAN evidently looks forward to detailed discussions later; which indeed will be essential. Meanwhile, however, the failure to achieve more genuine coöperation—a failure for which both parties bear some responsibility—has proved singularly unfortunate. Its most conspicuous result at the moment is the trouble over the National Health Insurance capitation fee. The Minister, while recognising that in the light of the Spens report the remuneration of panel practitioners must be increased, was naturally unwilling to discuss this subject except in its relation to remuneration in the National Health Service which will supersede National Health Insurance in eighteen months' time. The Insurance Acts Committee, on the other hand, demanding immediate action on the Spens Committee's findings, declined to discuss remuneration in some hypothetical service which may or may not materialise in 1948. On their refusal, the Minister increased the capitation fee by 2*s*. as a token payment without prejudice—an action which has apparently led countless practitioners to think that such matters will never be decided on their merits, and that, even in a National Health Service, the Ministry will never change its spots. We are thankful to hear of the Minister's new approach; for though both sides have a good case, there is really less need of good cases than of good will.

But mere appeasement between two separate parties—the Ministry and the profession—is not of course enough: we have to construct an organisation whose different parts work harmoniously to a common end. This has to be done, moreover, without dictatorship. Much of the anxiety of the profession arises, as Lord HORDER said, from the centralisation of power in one man, who was compared by several speakers to the commander-in-chief of an army. Lord LISTOWEL gave an assurance that the Minister's duty will be to exercise direction rather than control; and Mr. BEVAN has recognised that every professional member of the new service must remain responsible for his own work. The Archbishop of YORK did well, however, to point out that the staff of the commander-in-chief "will consist largely of those who live and work in Whitehall, and probably the majority of them will be people who have never practised within this profession and fail to understand its spirit." Though the scheme provides mechanisms through which the profession at all stages can profoundly influence the development and administration of the service, "the Minister"—which usually means "the Ministry"—could no doubt by bureaucratic action do much to defeat the object of those who have designed these mechanisms. Against this the best safeguard is that the Minister's staff should include many men who are for part of their

time actually engaged in the practice of medicine. "It is only in this way," said Lord MORAN, "that you can lift the curtain which in recent years has fallen between the Ministry and the profession, leaving so much want of sympathy and understanding." And in this he was endorsing the far-seeing policy by which Sir WILSON JAMESON has been widening the medical staff of the Ministry and intends to widen it further.[1]

The new service will succeed if those who hold office in it, whether medical or lay, prove themselves colleagues and are trusted accordingly. The immediate necessity, however, is effective consultation over the framing of the regulations which will bring the service to life. In these consultations our representatives can certainly wield their proper influence, and they can also prove their readiness for real coöperation. The Government, as Lord ADDINGTON said, has yet to win the confidence of the medical profession and the public; but the profession might itself do more to gain the confidence of its associates in a great, and now inevitable, undertaking.

Circulatory Effects of Osteitis Deformans

WHEN Sir JAMES PAGET[1] described the generalised disease of bone now known by his name he recognised that the bones were hyperæmic, and this led him to think of an inflammatory cause and hence to use the term "osteitis." Orthopædic and cranial surgeons are familiar with the highly vascular state of the affected bones at operation, and CONE,[2] in his studies of the bone pathology, emphasised the importance of this feature. KLIPPEL and WEIL[3] in 1908 observed that the temperature of the skin over an affected bone was higher than normal. For a long time cardiovascular complications of the generalised form of Paget's disease have been recognised. KAY and others[4] were struck by the frequency of high pulse-pressures in a series which they studied. Out of 33 cases, 14 had pulse-pressures over 60 mm. Hg. Cardiac enlargement was often noted, as were systolic murmurs over the precordium. Even in cases in whom the Korotkoff sounds could be heard right down to zero pressure, there was no satisfactory evidence of aortic valvular disease. KAY and his colleagues and also SNAPPER[5] ascribed these findings to arteriosclerosis.

Further light has now been thrown on these phenomena by a detailed study[6] of a case in the British Postgraduate Medical School. A patient with generalised Paget's disease had venous congestion and œdema. Cardiac catheterisation showed that his cardiac output was 13·3 litres per minute, or nearly three times the normal average. This is a state of affairs somewhat similar to that found in arteriovenous aneurysms, and in fact closing the circulation through the legs of this patient produced effects on the general circulation similar to those seen when an arteriovenous aneurysm is partially shut off, including slowing of the pulse and a slight rise in diastolic arterial pressure. This led the investigators to believe that the circulatory phenomena might be explained by a great increase in blood-flow through the affected bones. Direct study of the bone blood-flow was then undertaken. It was shown that when one tibia only is affected by Paget's disease the flow through that leg may be five to seven times as high as that in the normal leg. By an ingenious adaptation of the Grant-Lewis plethysmograph the actual bone blood-flow was estimated in the humerus of a normal person and the patient with Paget's disease. It was found that the normal flow was probably about 1 c.cm. per 100 c.cm. of bone per minute, while that through Paget's bones was about 20 c.cm. Applying these figures to the whole skeleton, the total skeletal blood-flow is normally about 75 c.cm. per minute, while the enlarged skeleton of the case of generalised Paget's disease received a blood-flow of about 3·3 litres per minute.

This work is an important contribution to the living pathology of Paget's disease, but it is also the first time that bone blood-flow has been measured in man. It adds another thought-provoking instance to the group of conditions in which "cardiac failure" is associated with high output, of which severe anæmia constitutes a well-established example.[7] Comprehension of the nature and sequence of events in these cases of apparent heart-failure would shed much light on other ordinary forms of heart-failure, and we may look forward to further results of such research in the next few years.

The Convalescent Home

"LET not thy left hand know what thy right hand doeth," however apt as advice on personal almsgiving, is hardly a suitable maxim for charitable institutions. Yet convalescent homes in England have grown up on this isolationist plan, each pursuing a course of its own, knowing nothing of its neighbour in the next street. No complete list of convalescent homes has ever been compiled; even the Public Health Act of 1936 did not call for a complete survey; and hospital almoners, local health officers, and practitioners must make their own lists of openings available for their patients recovering from illness. Many homes were closed during the war and not all have opened again. Moreover, there is no clear definition of the term "convalescent home." Some offer treatment, others none; some will not take patients for more than a month, others will not take them for less; some insist that patients must be able to look after themselves, others will take the bed-ridden; some of the children's homes are special schools approved by the Ministry of Education, others are not. At many, patients must conform to certain criteria—they must be of a given sex or age-group, or must belong to a given religious sect, fraternity, friendly society, or social class, or must work at or be retired from a given occupation, including the Services, or must live in a given district. The variety of our convalescent homes is an advantage, for the restrictions on the type of patient are designed to make those who are accepted feel more at home, the first essential for pleasant convalescence. A merchant seaman, a distressed gentlewoman, and a resident of West Ham, placed in one home, might be poor company for each other, but they will be at ease among those who share their tastes, whether in

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6. Edholm, O. G., Howarth, S., McMichael, J. *Clin. Sci.* 1945, **5**, 249.

7. Sharpey-Schafer, E. P. *Lancet*, 1945, ii, 296.

navigation, needlework, or darts. The chief feature that the homes have in common is that patients go there after an illness expecting to get better without further active treatment. Almshouses may therefore be excluded from the definition—whatever that is finally decided to be—and classed among provisions for the old; for no-one expects to get better of old age. And so may the active reablement centres which have developed in the last few years, for in these the patients are as much under treatment as they were in hospital, though at a later stage of recovery.

English convalescent homes range in size from those taking more than 200 to those taking less than 20 people; and though those who are planning our National Health Service are said to prefer large units there is little doubt that patients prefer small homes of 10 to 20 beds, especially when these are run with a friendly personal touch. The existing homes vary in this, of course, as in everything else: in one home the children make a friendly rush at the chairman the moment he appears, and the matron speaks of the patients by name; in another the efficient filing system is the keynote of the institution, and the patients are called cases. There is the story of the old lady in a large, clean, airy, perfectly run home in Prague who said with a sigh, "There's nothing left but tidiness." The English may respect institutions but are peculiarly ill-fitted for living in them. The main argument in favour of large hospitals—that only they can afford the special equipment and personnel required for modern diagnosis and treatment—does not apply to the general run of homes for convalescents, who need neither apparatus nor highly skilled care. It does, however, apply to the reablement centres which aim, by active and often complex and expensive methods, to get working men and women back to their jobs. In the no-treatment home large size is a handicap, for it necessitates a medical and nursing staff, whereas the small home can rely on local practitioners to attend to minor ailments and keep an eye open for unexpected complications. The small home where the matron and committee know the patients personally, and where freedom is respected, cups of tea can be had without formality, and no-one is sent packing because he drinks a glass of beer in the local inn, is clearly the right kind for English convalescents.

Variety and small size, then, are qualities in convalescent homes which we should strive to keep. Their weakness lies in their having no connecting link, no central body to which inquiries can be addressed by almoners and others trying to place a patient, or to which the homes themselves can look for advice or help in moments of difficulty. Some degree of central supervision would clearly improve the service that the homes can offer: and most homes would welcome it as relieving them of the responsibility inherent in isolation. A central organisation would simplify the task of almoners: for though there is probably a suitable type of home for anyone who needs it, there is not always a bed waiting for a particular patient at a particular moment; or, if there is, the almoner has no means of knowing it. The central organisation could set up a simple form of admission bureau, on the lines of the bed service run by the King's Fund in London for emergency admissions to hospitals. As a first step the King's Fund and the Institute of Almoners are preparing a detailed list of homes, based on personal inspection. This will meet a real need, and will also show which groups of people are poorly served by the homes already existing, and possibly which have more opportunities for convalescence than they require.

Annotations

WINTER IN EUROPE

IN Europe this winter, and particularly in the occupied zones, hardship is likely to be extreme. The Control Commission recently announced that during the last week of July, in the British zone of Germany, 12 people died of hunger, while 1189 cases of famine œdema were reported in Hamburg alone. During six months the new-case rate of tuberculosis, it was stated, rose by a third. In a pamphlet lately issued,[1] Viennese rations for a day during the past summer are described by Mr. G. E. R. Gedye.[2] They were two rounds of bread (under 9 oz.), a teaspoonful of sugar, a tablespoonful of coffee and coffee substitute, half a square inch of sausage and an equal amount of tinned ham, a tablespoonful each of maize flour, dried peas, oatmeal, and lard, a seventh share in a shell egg, a pinch of egg powder, half a soup cube, a dessertspoonful of salt, and two tablespoonfuls of meat-and-vegetable ration (three-quarters vegetable): the total calorie value being estimated at 1181—about half the figure (2200) regarded as adequate for a non-worker. These embittering privations can only be ended by good harvests and political decisions; but in the meantime there is room and to spare for voluntary effort.

Since 1945 British voluntary societies have been doing welfare work in the British zone of Germany.[3] They are grouped in teams of 12 and represent the British Red Cross and Order of St. John, the Friends Relief Service and Friends Ambulance Unit, the Salvation Army, the Girl Guides, the Save the Children Fund, the Catholic Committee for Relief Abroad, and the International Voluntary Service for Peace. Many of these bodies, of course, are sending help to other distressed countries—to France, Poland, Austria, Italy, Yugoslavia, and Greece. The relief workers in Germany receive their rations, petrol, and other stores through the Army, and use Army vehicles; but they are not paid or regulated by the Army and many of them receive no pay at all. They began by caring for refugees and victims of epidemics and starvation in Normandy, Belgium, Holland, and Rhineland, while the fighting was still going on; later they helped to repatriate displaced persons of Allied nationality in Germany. Later still some of them became free to give help to the German population, and additional teams arrived from England to supplement them. Supplies of course are limited, and are used primarily for children, sick people, and the aged. Wherever possible German organisations which understand local needs are asked to help with distribution.

In towns with a population over 5000 the education branch of Control Commission has arranged for school-children to receive a coupon-free midday meal; and supplementary feeding schemes for children under school age have been arranged by the relief teams. The Swedish Red Cross and the Swiss relief organisation known as Don Suisse are helping with this work. Swedish teams in the Ruhr have provided a daily hot meal for 120,000 children in the past six months, and Don Suisse

1. Have You Thought What Winter will be Like in Europe this Year? Issued by Save Europe Now, 14, Henrietta Street, London, W.C.2.
2. Reprinted from the *Tribune* of August 2.
3. Council of British Societies for Relief Abroad. Leaflet, September, 1946. 75, Victoria Street, London, S.W.1.

are feeding 30,000 children daily in eight towns of North Rhine and Westphalia. Holiday camps have been established for children and young people, and many thousands had a week in the open country or by the sea this summer.

Refugees streaming through the British zone from the east are adding to the heavy burden on the local administration of towns and villages. British and German voluntary societies, working side by side, help with billeting arrangements and personal difficulties, and arrange social and occupational activities for the young people.

Only about 500 British voluntary workers are engaged in these many tasks, a tiny force considering the enormous population needing help. The Council of British Societies for Relief Abroad (COBSRA), however, believe that though they can bring little physical help to those in distress their presence is a token of good will and an example of personal service which will help to restore morale. The COBSRA relief fund has raised £100,000; but the Friends Relief Service, operating not only in Germany but in France, Greece, Poland, and Austria, could use more than that in buying food, medical supplies, clothing, and blankets, over and above the £125,000 required for its regular work in the coming year. The Aid to Austria Appeal Committee needs £20,000 for food, and the Œcumenical Commission for Refugees, under the World Council of Churches, needs £10,000 for the purchase of drugs and medical supplies for Austria and Germany. The Save Europe Now Fund —sponsored by the Bishop of Chichester, Mr. Victor Gollancz (whose pamphlets have done much to make the misery in Europe generally known), Lord Lindsay of Birker, Prof. Gilbert Murray, and the Rev. Henry Carter—is appealing for £150,000 on behalf of these three bodies. The sponsors point out that supplies can be bought immediately, day by day as the money becomes available, so they appeal not only for maximum contributions but for a quick response: a little extra haste in responding may save lives which will otherwise be lost. Cheques should be made out to "Save Europe Now (European Relief Fund)" and sent to 14, Henrietta Street, Covent Garden, London, W.C.2.

FŒTAL RESPIRATION

WHETHER amniotic fluid is inhaled by the fœtus in utero is a controversial question which has been discussed at some length by Windle,[1] who investigated it experimentally in guineapigs. There are two main points at issue—whether the fœtus makes any spontaneous respiratory movements at all, and, if it does, whether these cause the entry of amniotic fluid into the lungs. From general inquiries into fœtal movements there seems no doubt that respiratory movements do occur from time to time in utero, but probably not continuously unless there is some special stimulus. The obvious stimulus is anoxæmia from embarrassment of the placental circulation, and when this is experimentally induced—as by constricting the umbilical cord—most mammalian fœtuses above a certain age respond by respiratory efforts. In investigating the onset and progress of organised movement in the sheep fœtus, Barcroft[2] employed tactile stimuli, the maternal uterus having been opened in a warm bath. The muscular response of the fœtus became more and more brisk and generalised between the 35th and the 50th days of pregnancy, but during the next 10 days inhibition from the higher centres appeared to gain ascendancy, the response becoming less general and the fœtus quiescent. In the phase of rising excitability, the response was more sustained and was rhythmic, being dominated apparently by the respiratory centre. The capacity for respiratory movements, therefore, develops early, but the response to asphyxia does not appear until inhibitory control of the musculature has set in; by this time the likelihood of spontaneous respiratory movements has greatly diminished. Owing to the difficulties of observing the fœtus, demonstrations of the inhalation of amniotic fluid have hitherto not been convincing.

Lately Davis and Potter[3] have introduced thorotrast into the amniotic cavity of human subjects. In twelve therapeutic abortions in which thorotrast was injected 17–48 hours before operation they found that the medium was invariably present in the lungs, while in four where it was administered only ½–1 hour before operation it was absent. The X-ray findings were confirmed histologically. The significance of this experiment is increased by the observation that thorotrast failed, or almost failed, to penetrate the alimentary tract of the four control fœtuses, but penetrated that of all the others. In ten babies delivered by cæsarean section, thorotrast placed in the amniotic fluid 16–48 hours previously was definitely present in the lungs of half, and doubtfully present in the remainder. Although the control experiments included the three smallest fœtuses of the series, the results certainly suggest that aspiration of amniotic fluid may normally take place; but the extent and frequency are uncertain, and its physiological significance remains doubtful.

AN AMERICAN VIEW OF RHEUMATISM

ADDRESSING the Empire Rheumatism Council in London on Oct. 11, Dr. Loring T. Swaim (Boston), former president of the American Rheumatism Association, said that extensive surveys in the United States had shown that more than 1 in 6 of the population had some chronic disease. The commonest disorders were rheumatism, heart disease, arteriosclerosis and high blood-pressure, and asthma; and the most potent causes of disability, reckoned by lost work-days, were nervous and mental disorders, rheumatism, and heart disease.

Much has been done to improve the treatment of rheumatism by better teaching and by the activities of the American Rheumatism Association. In 1942 this association, in conjunction with the American Medical Association, produced a primer in which the rheumatic disorders were classified as (1) the frankly infectious, (2) the probably infectious (such as rheumatic fever and Still's disease), (3) degenerative joint disease (osteoarthritis), (4) arthritis due to physical trauma, and (5) disorders associated with disturbed metabolism (gout). The first aim, in Dr. Swaim's opinion, must be to improve general health. The patient should have at least six weeks' complete rest, if possible in hospital, where he is removed from the environment in which he has become ill and can be rested in splints under the care of physician and orthopædist. It is important that the general nutrition should be maintained, with special regard to vitamin deficiency. Small repeated transfusions may help the debilitated, and benefit may be derived from heat and sunlight, and the conservative removal of infective foci. The prevention of deformities is of paramount importance; the deformities of rheumatoid arthritis can, he held, mostly be prevented. Gold therapy, to which the American approach has hitherto been cautious, is now being more widely tried, but not in doses exceeding 50 mg. For Marie-Strümpell disease irradiation and the control of deformities has proved the most reliable treatment.

Dr. Swaim emphasised the importance of psychic factors, and particularly unsettled circumstances at home or at work. In his experience 70% of the onsets and exacerbations of rheumatoid arthritis are traceable to emotional disturbance, of which bad home relations are the commonest cause. Doctors must, he suggested,

1. Windle, W. F. The Physiology of the Fœtus, London, 1940.
2. Barcroft, J. *Lancet*, 1942, ii, 117.
3. Davis, M. E., Potter, E. L. *J. Amer. med. Ass.* 1946, **131**, 1194.

abandon their preoccupation with the treatment of disease, fascinating as this may be, and, to prevent chronic disease, take a closer interest in the way people live.

CONTROL OF ICE-CREAM

MOST ice-cream manufacturers, and certainly those in a big way of business, are eager to satisfy the public-health authorities; and the neglect by others to ensure reasonable purity may often be due to ignorance of elementary hygiene rather than to carelessness of the consumer's fate. Be that as it may, much of the ice-cream sold today is potentially dangerous to the consumer, who is protected by no general sanctions empowering authorities to inspect ingredients and to supervise manufacture, packing, and storage.

Last week the Ministry of Health published new draft regulations for the heat treatment of ice-cream, which go some way towards filling this deficiency. Where a "complete cold-mix powder" is used, with which only water and colouring or flavouring agents have to be added, the powder is taken to be sterile from the heating it received in manufacture, and no further sterilisation is required, but the powder must be converted into ice-cream within an hour of reconstitution. Other mixtures must be heated to 150° F for 30 minutes, or 160° F for 10 minutes; within $1^1/_2$ hours the temperature must be reduced below 45° F, and it must be kept so until frozen. If, after freezing, the temperature of any mixture should rise above 28° F it must be submitted or resubmitted to heat treatment.

This announcement drew a brisk rejoinder from the Ice Cream Alliance, which, according to the *News Chronicle*,[1] objects that, owing to the difficulty of obtaining suitable machinery, the regulations cannot be met by next May, when they are to come into operation. At a meeting of the Royal Sanitary Institute the view was that the regulations in themselves are admirable, and will eliminate the maker whose factory is the back bedroom and whose showroom is the street. But they do not go far enough. Plant for heat treatment should be fitted with an automatic recording thermometer, which alone can tell the visiting sanitary inspector whether the regulations are being followed. It should, moreover, not be too much to ask that all ice-cream be sold in closed cartons or wrappers. The regulations do nothing to dispose of the carrier, who may infect a mixture made from sterile powder which, under the regulations, is not resterilised. Tragedies such as that at Aberystwyth this summer will recur until there is some control of the personnel engaged in the handling of ice-cream. This can be attained only by rousing the social conscience with or without the support of the law.

ANTI-MIDGE CAMPAIGN

LAST year a subcommittee of eminent entomologists, under the chairmanship of Prof. F. A. E. Crew, F.R.S., set out to find the best way of using dimethyl phthalate (D.M.P.) to ward off the attacks of Scottish midges which were causing serious irritation among tourists and even the Scottish people themselves. An interim report[2] has now been published. Various ointments containing water were discarded as unsuitable owing to a tendency for the D.M.P. or the water, or both, to creep out. A good paste, however, was made (D.M.P. 15 g., kaolin 10 g., zinc oxide 1 g., soft paraffin 5 g.) which could be put up in collapsible tubes and carried in the pocket. But the most suitable preparation proved to be an emulsion (D.M.P. 100 c.cm., water 100 c.cm., 'Lanette wax' 5 g., triethanolamine 9 c.cm., oleic acid 27 c.cm.), which remained reasonably stable for several months. Preparations based on these formulæ have been on sale during the midge season just ended (July-September). Patch tests were performed, mainly on women forestry workers, and in most cases the application of D.M.P. to the skin caused only a slight tingling or burning for a minute or so, which passed off but returned, perhaps a couple of hours later, on washing the face. During washing, care must be taken that no D.M.P. gets into the eyes, and D.M.P. should not be applied to sunburns or soon after shaving; otherwise no adverse effects on the skin were observed. Field tests were made, with controls who did not use the repellent, and were eminently successful with the paste and emulsion already described, one application to exposed parts warding off attack for at least two hours. Preparations with only 35–40% of D.M.P. were not really effective, because the midges were not repelled but merely paralysed after landing and caused annoyance by crawling about on the skin. Experiments also proved that veils impregnated with D.M.P. were completely successful, whereas unimpregnated veils gave no protection.

The opportunity was taken of making a survey of Scottish midges, about which very little has been known hitherto. Fifteen species of culicoides were collected, of which three had not previously been recorded in Scotland. *C. impunctatus* constituted 76% of the midge population of the west of Scotland and was there responsible for 90% of over 800 bites. In nearly all the collections of *C. impunctatus* and of *C. obsoletus* the sex ratio was "very abnormal." For instance, Glasgow records gave only 4% males, and Dundee only 1%. But in a few collections of *C. impunctatus* the sexes were about equal in numbers. The significance of this fact is said to be obscure. In view of the probability that "the female of the species is more deadly than the male," in that she alone bites, the discrepancy may arise from the different methods of collectors, some collecting only from their attackers, others sweeping with nets the natural habitats of the midges.

CÆSAREAN SECTION

IF there is one operation for which by now the indications should be clear and the technique standardised, it must surely be cæsarean section. Yet anyone who cares to compare the figures in different maternity-hospital reports will find that this happy state has not been reached. Cæsarean section can be regarded in two lights according to temperament. The Tory performs the operation only when the indications are so clear as to leave him little choice. The Radical does the bulk of his obstetrical practice by the abdominal route; to him a cæsarean section is the master key to any obstetrical problem, real or imagined.

From the experience of three firms of surgeons over 14 years Waters[1] has tried to assess the indications for the operation. In 75,238 deliveries, cæsarean section was performed 2039 times. Waters objects to the term "elective cæsarean section," and asks who elects and on what foundation. There is, of course, no dispute about the need for the operation in the presence of obvious fœtal-pelvic disproportion, but only a small minority of cases of so-called disproportion fall into this class. Waters frankly admits that in borderline cases he cannot assess the potential capacity for moulding of the fœtal head, the extent of relaxation of the pelvic joints, and the power and efficiency of the uterine contractions. These are imponderables about which no clinician, however experienced, can prognosticate; and patients in the borderline group should be given a short test of labour, when it will be found that very few need a section. Waters finds that of the last 223 cardiac patients only 4·4% were submitted to section; the decision to operate was determined, even with decompensation, solely by strictly coincidental obstetric indications. Among the group loosely classified as antepartum

1. Oct. 11, 1946.
2. Department of Health for Scotland. Control of Midges. An Interim Report of a Subcommittee of the Scientific Advisory Committee. Edinburgh: H.M. Stationery Office. 1946. Pp. 11. 2*d*.

1. Waters, E. G. *New Engl. J. Med.* 1946, **234**, 849.

hæmorrhage not due to placenta prævia, Waters maintains that cæsarean section has little place in mild cases but is important in the severe cases; by severe cases he implies extensive hæmorrhage with an undilated cervix and disruption of the myometrium by interstitial bleeding—so-called Couvelaire's uterus. His maternal mortality in 88 severe cases was 4% after cæsarean section and 5% from vaginal delivery. For pre-eclamptic and eclamptic toxæmias he never performs section until the eclampsia is controlled. Among 879 cases of mild pre-eclampsia section was done in 61; and among 117 cases of severe pre-eclampsia section was done in 26—a high proportion, but 11 had antepartum hæmorrhage, 4 had disproportion, and 11 had other complications as coincident indications for operation. There were 341 cases of placenta prævia, and section was performed in 104 with no maternal death; of the 237 patients delivered by the vaginal route, 2 died.

These indications largely coincide with those accepted in Britain. Some British obstetricians are more conservative and some more radical, but we are tending to become more conservative with the toxæmias and a little more radical with placenta prævia. In this country we do either a classical or a lower-segment operation. Of the 2039 sections in Waters's clinic, 121 were classical, with a mortality of 6·6%; 28 were cæsarean hysterectomy, with a mortality of 10·7%; and 1 was a vaginal hysterectomy. The remainder were some type of lower-segment operation; 1406 were transperitoneal, with a mortality of 0·92%, and 483 extraperitoneal, with a mortality of 1·03%. For these 483 a supravesical operation was employed in 290 and a Latzko operation in 193; mortality from the former was 0·6% and from the latter 1·5%. These are excellent figures, especially for the extraperitoneal methods, which have perhaps not been given a fair trial by British obstetricians. Patients dying after cæsarean section usually die from peritonitis. Waters's contention is that if the peritoneal cavity can be completely avoided these women are being delivered in the safest possible manner, and his figures bear out his contention. The extraperitoneal operation is anatomically fairly difficult but is nevertheless within the powers of any man competent to open the abdomen.

MEDICAL PRACTICE IN NEW ZEALAND

A YEAR or two ago Mr. Douglas Robb, writing as a New Zealand surgeon, suggested [1] that the peculiar scope and discipline of general practice ought to be recognised as a specialty, and receive like rewards and status with other specialties. But he also felt that economic considerations should be secondary: we should be seeking first the *bene esse* of the different branches of medicine. Thinking along the same lines, he has now written on the place of the hospital in medical affairs.[2] The emphasis on organic illness, he says, has attracted much of the total energy of the profession, most of which is released in hospitals; and the hospital is the only professional corporate effort to which a doctor or nurse can belong:

> "A hospital post thus means much more than its face value. It represents social and professional prestige, and constitutes one of the vested interests, struggled for by those who have it not, and clung to by those who have. . . ."

Students grow up with the belief that the hospital teaching staff are the only men worth emulating; and, with notable exceptions, think of general practice either as a necessary evil or merely as a short cut by which they can earn enough to do something more agreeable.

In New Zealand social security legislation has obscured these trends: the large sums to be earned in general practice and midwifery have led to the neglect of specialist practice and salaried posts. But the results, Mr. Robb considers, are not good, in terms of the quality of the service given. The fact that payment is made on the number of acts done has led doctors to do personally "many trivial things which ought to be done by a nurse or a secretary, but are not so done because if the doctor does them they are worth 7*s.* 6*d.* each." Easy money and high taxation tempt doctors to refuse night calls; and the genuine medical emergency is often ill served. Nor is there evidence, he thinks, that the high rewards have encouraged doctors to combine for the benefit of the patient, or even to relieve each other; or that the preventive approach to medicine has been favoured. Relative and absolute neglect of the specialist and the salaried officer have brought a retrograde tendency towards the combination of specialism with general practice, to the detriment of both branches. Established specialists can of course earn a good living in private work, but the young specialist is "haunted by the fleshpots of general practice"; and salaried officers are so poorly paid that it is becoming hard to fill their ranks. Yet "any effort to raise the financial status of, say, an M.O.H. disturbs a swarm of other public officials." Again, there are too few men to fill the higher teaching posts, and the better rewards of private practice draw many of the abler men away; though, as Mr. Robb says, the professor should be the best man of all.

To restore the balance in the various branches of medicine, and to transfer the emphasis from cure to prevention, he would like to see a unifying plan, managed in each area or region by one authority, the health board, which would control the money available for health services, assign their proper duties to hospitals and health centres, see that they were properly equipped, and ensure that they did their work efficiently. Representatives of technical personnel on the board would be elected by their groups—doctors, nurses, and technicians; and a majority of five seats out of nine, or seven out of thirteen, should be given to representatives of the public. Such an arrangement, he thinks, would be better than a lay board with professional advisory committees, because it would put a direct responsibility on the profession to see that the public are well served. A believer in group practice, he would like to see general practitioners working in health centres under good conditions, with time for leisure and study, and opportunities to take a higher degree in their subject. Specialist practice, on the other hand, would be largely confined to the hospitals, where it can be supported by adequate services and equipment.

SALUTE FROM THE BOWLER

Lieut.-General Sir Alexander Hood, director-general of the Army Medical Services, was last Monday presented by war-time Army consultants, now demobilised, with an album containing the consultants' photographs and records, and a sum of money which is to be used for a prize. Sir Heneage Ogilvie, who as a major-general was consulting surgeon to the Army in Africa, said that the presentation was intended as a reminder of a happy association. The British soldier had received better medical attention from the service directed by General Hood than had any other fighting man in history. Sir Alexander, in expressing his thanks, emphasised the value of the consultants' work, mentioning in particular their help with the *Army Medical Department Bulletin*, the useful meetings between them and consultants of the Allied Armies and representatives of the Emergency Medical Service, the Medical Research Council, and other bodies, and their influence in raising the standard of medical practice overseas.

Dr. C. S. MYERS, F.R.S., died at his Somerset home on Oct. 12, at the age of 73. The first president of the British Psychological Society, he was until his retirement director of the psychological laboratory at Cambridge University, and principal of the National Institute of Industrial Psychology.

1. *N.Z. med. J.* 1944, **43**, 248; see *Lancet*, 1945, i, 633.
2. *N.Z. med. J.* 1946, **45**, 183.

Parliament

THE BILL IN THE LORDS

Lord JOWITT, the Lord Chancellor, in moving the second reading of the National Health Service Bill on Oct. 8, said he was no iconoclast, but he did not doubt that our existing institutions must be modified and expanded to fit the new ideal of an integrated medical service. This was not a Bill to preserve ancient monuments.

Summarising the provisions of the Bill, he admitted that part v, dealing with the mental-health services, was obscure. But it was a temporary job and the Government hoped when time permits to review the legislation dealing with mental health. The language of the first clause, simple and curt as the Commandments, defined the greatest task ever placed upon the shoulders of any one man. If these duties were to be placed upon the Minister of Health he could not be denied the wide powers necessary to carry them out. According to the Bill the Minister would exercise these powers through regulations subject to the approval of Parliament, a method which would allow the administration to profit by experience.

THE MACHINERY

Our hospital system, he suggested, failed because it was not a system at all, and modern developments in medicine and surgery demanded more specialised organisations. Admission to a hospital was not enough; the patient must be admitted to the right hospital. Often where the need was greatest the resources were the least, and at present it was nobody's duty to see that hospital services were fairly distributed among the people. Whether we liked it or not, we could no longer run these services on the principle of "drop a shilling into my little tambourine." The proposals in the Bill for hospital administration, Lord Jowitt claimed, would provide an integrated system. The hospital management committees would act on behalf of the regional hospital boards, he hoped without undue interference from the boards, and, he was quite certain, without undue interference from the Minister. For services provided by local health authorities under the Bill reliance was placed, rightly he thought, on the larger units of local government. But the exact division of functions between the hospital side and the local-authority side obviously gave room for argument. For instance, tuberculosis and V.D. clinics had been placed on the hospital side of the line, though no doubt the hospital boards would make use of the health centres by agreement with the local health authority. The Bill expressly provided that the local authority need not themselves provide all these services. For home nursing or health visiting they could rely on existing voluntary organisations, such as the District Nursing Association.

For the general medical services new machinery had been set up to meet the doctors' unwillingness to be placed under the local authorities. No doctor would be compelled to enter the national scheme, but if he entered the scheme there must be two methods of control—the sale of practices was prohibited, and new entrants could not go to areas already fully covered and neglect areas which were not covered. A tribunal was also to be set up to investigate serious allegations against doctors. This machinery, the Government believed, would give full freedom, scope, and opportunity for the exercise of professional skill free from political factors or lay direction.

In paying the doctors the Government did not wish to rely solely on capitation fees; but while they wanted some element of salary they did not think that that should be the sole, or indeed the main, element. The Government would be foolish if they tried to construct this national health scheme on the basis of a disgruntled and dissatisfied profession, and for that reason they appointed the Spens Committee. They must try to arrange with the members of the profession themselves not only the range but also the method of remuneration, and the Minister, Lord Jowitt announced, was anxious to appoint a similar committee to deal with specialists' remuneration.

At every step the organisations in the scheme were interlocked, and its success would depend on the day-to-day coöperation of all the people working under it. He did not doubt that after this Bill had been threshed out all sections and classes of the community would sink their differences and press forward a great ideal for the betterment of the health of the people.

Party Criticisms

The Earl of MUNSTER asked whether it was merely for political and doctrinaire reasons that the whole of the medical profession were to be saddled with a system which they disliked, that institutions which the British people had so generously supported for centuries were to be removed from their control, and that fields in which local authorities had made much progress were to be taken over by the State. He did not believe that a single Government department could run a highly qualified and skilled service such as hospitals. Local administration might well require reform, but to transfer the whole hospital service to a single centre was to ensure that "wisdom at one entrance is quite shut out." For the Lord Chancellor to support such a proposal, he continued, as the confiscation of endowments for specific purposes must be unique in the history of trusteeship. Nothing could give less encouragement to the public to subscribe in future to any charitable enterprise. He did not believe that the Government could have done more to undermine the confidence of the medical practitioners, because the proposals for the general medical services offered no freedom of choice or movement, and little freedom of judgment, and pointed directly to the scheme becoming before long a full-time salaried service.

The Marquess of READING, speaking for the Liberal peers, supported the Bill in general terms, for, he pointed out, they had before them only the scenario of the ultimate Bill which would not have grown into its full splendour of technicolor for exhibition to adult and other audiences till 1948. The gaps would be filled by multitudinous regulations which would demand the closest scrutiny of both Houses. Of 74 clauses, 26 prescribed a regulation. He feared that before 1948 dawned not only the printing presses of the Stationery Office but the permanent officials of the Ministry of Health would be chronically overheated. Yet upon the good sense, good English, and foresight of these regulations the efficiency of the scheme would ultimately depend. He agreed that it was an anachronism that the health of the nation should continue to be left in the hands of voluntary organisations dependent upon charity. But he confessed that he found this rapacious engulfing of all the funds of the voluntary hospitals a considerable mouthful to swallow. Professional men were on the whole conservative—he did not mean politically Conservative, indeed from reading the papers lately he doubted whether anyone was politically Conservative any more—and some doctors were no doubt opposed to the scheme; but he hoped that discussions with the Minister would allay the fears raised by incautious utterances of some members of the Socialist party, and that the profession would lend itself with a good grace in the difficult circumstances at the outset to working the scheme, once satisfied that it was in the interests of the nation as a whole. He had a feeling that those who elected to reign in Hell rather than serve with Bevan would be few in number, secure in practice, and advanced in years.

The Archbishop of YORK, though impressed with the need for a national health service, feared that the Bill in its present form might undermine the independence of the medical profession. In these days when the State must own, control, and plan where once it only acted in a negative capacity, he attached great importance to preserving in the nation associations which had independence of their own. No doubt the Government's scheme made for efficiency, but sometimes efficiency could be bought at too great a price when it meant the loss of freedom.

Professional Criticisms

Lord MORAN, P.R.C.P., said that the surveys of the hospital service carried out during the war showed that drastic and expensive reorganisation was necessary. It was agreed that the money could only come from public funds, and that such expenditure must entail some measure of public control which could only be exercised by the Minister or the local authorities. The medical profession was in no doubt that it preferred the control of the Minister, and it was the removal of the dread that the hospitals might come under the control of the local authorities which had reconciled so many doctors to prefer the hospital provisions of the present Minister of Health to those of his predecessor. But there agreement ended. Many of his colleagues could not agree with the transfer of ownership of hospitals. They argued that the Minister should give the regional boards a block grant for distribution to the hospitals of the region, to be withheld from any hospital which did not put its house in order. But Lord Moran did not believe that any board, particularly one recently created, could thus apply sanctions to a powerful local authority, or that sanctions would be enough to bring about the drastic reorganisation which was essential. If, however, the medical profession felt that these hospital provisions were inevitable it did not mean that they were agreed that the particular provisions in this Bill would necessarily work.

The importance of the hospital service being a university service had, Lord Moran thought, received too little notice. Yet that was the original conception underlying the establishment of the regions. During the war specialists of every kind were sent by the teaching hospitals into the important hospitals in the region. They raised these hospitals almost to university standard. When they were called back at the end of the war he thought that doctors would agree that there was a sharp fall in the efficiency of hospitals at the periphery. In the past specialists had tended to congregate in the great centres. By a university service there could be a redistribution of specialists without duress, because men would willingly be seconded, feeling they were part of one great service.

If there was going to be this essential measure of centralisation in a scientific service, it was perhaps a paradox that there must also be a degree of decentralisation. The powers of the regional boards were but vaguely defined in the Bill. Suppose there was a complaint about dieting or nursing in a hospital, if the Ministry sent its own inspectors to investigate the complaint the board would lose authority. The Earl of Donoughmore had raised the point last April when nursing officers had been appointed who were to be the nursing authority in those regions. These officers would have the power to appoint and dismiss nurses. Were these officers going to exercise their powers through the regional boards, or independently of them? There was no guarantee that the Minister of Health would not interfere in clinical matters. That was not a fictitious vague fantasy; it had actually happened under the Emergency Medical Service during the war. The Minister must trust the regional boards, the hospitals, and the doctors to get on with their job.

THE DOCTOR'S LOT

Speaking of the doctors' fear that they would lose their independence, Lord Moran agreed that if that happened the profession would indeed have received a mortal blow. However effective the reformation of the health services, it would be of no avail if the conditions under which doctors worked did not bring contentment and happiness to them. Looking at this Bill, were these conditions such that the good type of man who had come into medicine in the past would continue to enter it? In the innumerable discussions on the Bill its effect on entry into the profession had hardly been mentioned. It was because the Minister treated the teaching hospitals so sympathetically, and refused to blunt the growing edge of medicine, that in the first instance many doctors examined the provisions of the Bill with sympathy. Those who worked in the academic world in medicine were perturbed at present about the powers and composition of the boards that would govern the teaching hospitals. Medicine in the past had been able to attract exceptional men. Would it continue to do so? How were these gifted few to be protected, and what did they want? First the Bill must be scanned to see that there was nothing in it which encroached upon the leisure which the man had given in the past to research. Leisure was going out of the learned professions, to their detriment. Nowadays the spare time of a specialist was taken up by attendance on committees, which were the drowsy syrup of the democratic State. Many men with the greatest minds were indifferent to material rewards, but it would be folly to handicap medicine in its competition with other professions by a false parsimony. He had given notice to the Lord Chancellor that he would ask the Government to appoint a committee on the lines of the Spens Committee to inquire into the remuneration of consultants, and he was glad to hear that the Government had agreed to that proposal.

At present the number of people seeking to enter medicine had leapt up, and though this was partly due to the effects of demobilisation Lord Moran thought it would continue, because in the past the entrants had come from only a narrow section of the community, many people being unable to afford the cost of training. If the new entrants into medicine were to be subsidised by the State there must be new machinery for selection.

Turning to the work of the general practitioner, Lord Moran pointed out that the present-day tendency of patients who were gravely ill to seek institutional treatment meant that the general practitioner, saw a case whisked out of his hands just when it became professionally interesting. The consultative service under this Bill would accentuate the difference between the general practitioner and the consultant. There was only one remedy. The general practitioner must be brought into the work of the hospital. Lord Moran confessed that he was less happy about the general-practitioner service planned in the Bill than about the hospital service, and that he was gravely disturbed by the fears of the general practitioners as to the future. They said they were against the abolition of the sale of practices, a measure of direction, and the basic salary. But all these came down to one fear—that there would be a whole-time medical service which would interfere with their liberty. He was certain that unless there was an adequate incentive to keep men on their toes, a whole-time service would be an incalculable disaster. In the unfortunate dispute that had arisen at the eleventh hour between the Ministry of Health and the panel practitioners Lord Moran was convinced that the doctors' claims were fair and just. But the dispute was not about terms but about procedure. The Minister wished to discuss the remuneration of panel practitioners at the same time as the remuneration of men in the future service, but the panel practitioners felt they had no

mandate for this. Lord Moran was sure, however, that the Minister would meet the doctors' claims. It would be a disaster if the service were begun with some practitioners feeling that they had had a raw deal.

In medicine, Lord Moran ended, they always made a prognosis in a case feeling that they might be wrong. Men who knew the facts told him that if this service broke down it would be because there were not administrators to run it. If the Bill was to work something unusual must be done. He hoped the Minister would put into the service a small number of experienced men, trusted leaders of the profession, familiar with hospital work, who would give their whole time for about five years, to try to make the regions work. Many doctors working under the Ministry had not practised for 20 years. Men actively engaged in the profession were needed to come into the service. Only thus could the curtain be lifted which had fallen between the Ministry and the profession, leaving so much want of sympathy and understanding. Much of the criticism which the Bill had provoked seemed to him to be tethered to the earth; it had never become airborne, and it had been totally lacking in idealism. The politicians had made debating points and too many of the doctors had merely expressed their fears and prejudices. It had been left to the Minister to generate the momentum that overcame obstacles and to enlist the strenuous support of ardent minds. When it became law Lord Moran believed that despite all past differences the whole medical profession would unite to try to make the service a success.

Lord TEVIOT, speaking as chairman of the inter-departmental committee which had inquired into the condition of the teeth of the nation, described the need of the public for dental improvement as gigantic. The annual intake into the dental profession would have to be increased from 300 to 900.

Lord INMAN pointed out that today the voluntary hospitals were only partially voluntary; last year 45% of the income of Charing Cross Hospital came from public authorities and patients' payments. In a modern community, he believed, the heavy cost of curative and preventive treatment, of buildings and equipment, made financial demands which it was not within the power of voluntary effort to satisfy. This Bill would continue and expand the work of the hospitals, building on their tradition and experience a firm and worthy edifice of which this country would be proud in years to come.

PROPOSED AMENDMENTS

Lord HORDER, F.R.C.P., affirmed that the medical profession were not obstructionists. For the last 20 years they had done their utmost to persuade the powers-that-be to get a move on in integrating the medical services of the country. But the doctors had hoped that it would be through the more natural process of evolution rather than through the present method of revolution. The doctors thought they could have attained more certain benefits with less risk. They believed that they could have rationalised the hospitals without transferring their ownership to the State, covered the health of the dependents of the workers, set up health centres without sacrificing the doctors' liberty, and brought together in a comprehensive whole the industrial medical service and the medical services of the various Government departments. He agreed that this Bill enhanced one desirable thing—the availability of medicine to the citizen. But too much might be paid for that advantage, and it would be a loss to society if through this Bill medicine became stereotyped.

The ideal to be aimed at in framing a national medical service policy was not this terrific centralisation of power in one man, but a maximum of central direction and a minimum of central control. Closer contact with the medical profession during the framing of the Bill would have safeguarded Mr. Bevan and his successors from this danger. The Minister had spoken many times about his "consultation" with the profession, but that had been a euphemism for the most blatant form of *ipse dixit*-ism.

As soon as their Lordships had dealt with the Bill the doctors would be asked by a plebiscite issued by the British Medical Association if they would work the Bill. The answer to the plebiscite might even at this late hour be influenced by what happened during the committee stage in their Lordships' House, because Lord Horder hoped that the Government would sympathetically consider certain amendments to preserve the autonomy of the voluntary hospital, and to safeguard the freedom of the doctors. This Bill went far towards nationalising medicine. Whatever natural talent a doctor had, however ambitious he might be, he was condemned to a dead level of mediocrity. Not only his economic position but also his professional status and prestige had been given a ceiling. Unlike his fellow civil servants of the future, he was to have no chance of promotion. Lord Horder saw no escape from this state of affairs except through the medium of a black-market in doctoring, and his mind boggled at the thought of its probable immensity.

The Minister said it was not possible to insert the terms of remuneration in the Bill, but it should be possible to amend an existing clause so that the method of payment was stated, and this should be the capitation method unless, in the opinion of the executive council in whose area the services were rendered, a different basis was considered necessary. The prohibition placed on the selling of practices, the power of negative direction, and the refusal to allow a doctor charged with some offence under the Bill the right of appeal to the High Court, were surely matters that required amendment. Doctors thought that the standing advisory committees of the Central Health Services Council should be appointed by and take their references from the council, and that they should report through the council to the Minister. They also considered that the Minister should sacrifice his power to vary the proportion of medical and lay representatives on the local executive councils. To retain local interest, hospital management committees, acting for a group of hospitals, should appoint a house-committee in each hospital, subject to the hospital management committee and the regional board. It should also be one of the functions of the hospital management committee, or of the house-committee, to set up a medical staff committee with the right to nominate a reasonable number of its members to the hospital management committee or house-committee. On the side of medical education, the Bill also needed amendment, for it laid on the boards of governors of teaching hospitals no duties to further medical education and research. It was a glaring anomaly that gifts and legacies received by the non-teaching hospitals between the passing of the Act and the appointed day would go direct to the Hospitals Endowment Fund; whereas any gifts and legacies received after the appointed day would be retained by the management committee. We were about to embark on a great experiment, Lord Horder concluded, and it was the doctor's duty to do his utmost to make it succeed. If he could fulfil his paramount duty to his patients through these means he would; if not it would be for the patient to decide how long the sacrifice of efficiency should continue.

CHRONIC DISEASE

In a maiden speech Lord AMULREE, F.R.C.P., spoke of the condition of the chronic sick today. The transfer of the municipal hospitals to the central authority under the Bill would, he thought, benefit these people enormously. In 1944 there were about 60,000 of these patients in the whole country, of whom at least a third were under

sixty-five. In some of the smaller institutions conditions were deplorable and no attempt had been made to classify the patients. Yet with a proper approach much could be done for them. In one big institution of which he knew, about 60% of the patients who came into the chronic sick ward were discharged into their own homes or into hostels for old people. When the Bill was passed he hoped the chronic sick would share the same medical staff as the acute sick. It was difficult to separate elderly people into the healthy and the sick, for when people grow old there was a narrow borderline between sickness and health, and there should be a simple and easy flow to and from hospital. Lord Amulree suggested therefore that sick and healthy old people should all come under the same authority.

The Second Day

The Earl of LISTOWEL opened the second day of the debate by replying to some of the points raised. It was a misunderstanding, he said, to suggest that the Bill proposed that the Ministry of Health should run the hospitals. The Minister must—not may it should be noted—delegate his powers to the regional hospital boards, and from there to hospital management committees or, in the case of teaching hospitals, to boards of governors. The regional boards would not interfere in the affairs of these committees in the daily routine business of the hospitals. Their job was to supervise and plan for the region as a whole. There would be no financial leading strings, for each hospital committee would be free to decide how its money should be spent within the limits of the annual budget. The investigation of complaints and the engagement or dismissal of nursing staff would be delegated to the regions, and there was no real danger of Whitehall interfering in the domestic affairs of the hospitals.

The size of the regions had not yet been decided, but each would, so far as possible, centre upon a university; and after consultation with the interested parties the Minister would define the regions under regulations to be submitted to Parliament. Lord Listowel categorically denied that the Government policy was to institute a full-time salaried medical service, and he promised that when an allocation was made from the Hospital Endowments Fund the wishes of the donors would not be forgotten.

The Minister was anxious to break the deadlock that had arisen between the Ministry and the panel practitioners, and Lord Listowel announced that a meeting between Mr. Bevan and representatives of the profession would take place on Oct. 10. They were not dispensing, he added, with material or moral incentives to an efficient medical service, and there would continue to be a graduated scale of salaries in the hospital service and progressive remunerations for general practitioners.

By wider education and mass publicity campaigns it was hoped that the rising generation would grow up physically as well as mentally literate, and sufficiently sensible not to regard good health as merely a state of not being ill. The Bill was not the product of any single party or Government. It was the outcome of concerted effort over many years, involving doctors, laymen, and Governments, to improve the efficiency of our medical services and to make them more easily accessible to the public. A typically British scheme, it strove to incorporate in the new structure all the serviceable elements of proved usefulness in the old. If it moved a bit further in the direction of State medicine it still combined freedom, for doctors and patients alike, with overall planning, private with public practice, and unpaid voluntary service with salaried contractual obligations. It was as far from the all-embracing State system of medicine practised in Russia as it was from the commercial medicine favoured by the United States of America. By its inclusiveness, its more even distribution of the nation's medical resources, and most of all by breaking the cash nexus between medicine and the individual, the Bill would remove the gravest obstacle to equality of opportunity.

TO BE CONSIDERED IN COMMITTEE

Lord LYLE feared that even with amendments it would be impossible to make what was fundamentally a bad Bill into a good Bill. He regretted that a nation which had vanquished totalitarianism should propose to enslave its medical profession. Under the Bill the Ministry of Health would obtain dictatorial powers affecting the intimate lives and health of every single man and woman in the country. Lord BEVERIDGE on the other hand thought it was a good Bill well worth making better by amendment. For the first time it set up a true Ministry of Health with the duty and power of attacking disease as a national enemy. Health as well as bread for everybody, he asserted, should come before cakes and circuses.

Lord UVEDALE, F.R.C.S., in a maiden speech suggested that in an efficient medical service it was essential that every patient should be free from financial anxiety, and have a free choice of hospital and doctor. Admitted to hospital, he should find himself in pleasant sympathetic surroundings and free from unnecessary and irksome restrictions, for in sickness every man and woman was an individualist. It was also essential that the doctor should have independence in medical treatment, adequate equipment, and ancillary help. Remuneration must be sufficient to attract able men and women, and there must be opportunities for the gifted to attain positions of influence and distinction in the national life. Finally the medical profession must be controlled by the medical profession.

Lord LUKE was disturbed by the hesitancy people were showing at present in subscribing to hospitals, and appealed to the Minister to evolve a formula for this interim period to prevent generous habits being broken. Lord ADDINGTON, speaking as a vice-president of the Association of Municipal Corporations, was distressed that the non-county boroughs should lose their maternity, child-welfare, and other health services. He would like provision made enabling the county councils to delegate their public-health functions to the non-county boroughs which had performed them efficiently. He felt that the local health authorities should be able to nominate their own representatives to the regional hospital boards, hospital management committees, boards of governors of teaching hospitals, and the central council. Lord LLEWELLIN felt that the equalisation of the voluntary hospital endowments was not worth while in view of the difficulties it would create.

Lord JOWITT, in summing up, said he would not go through the detailed points, for they would be dealt with in committee. He promised careful consideration for their Lordships' amendments, but pointed out that great care had been taken in preparing the Bill and that the Minister had already made considerable concessions in another place. He agreed that doctors would much dislike to become salaried civil servants, and he reiterated that the Government had no such intention. If such a thing were done, he pointed out, it would have to be by a regulation which must be submitted to Parliament. In three respects the Government were accused of enslaving the doctors—by payment of part of their remuneration as salary, by negative direction, and by prohibition of the sale of practices. Taking a comparison from his own profession, Lord Jowitt asked if our full-time salaried judges were enslaved. County-court judges were even directed to certain regions. Were they enslaved?

He wished to underline everything that had been said about decentralisation. The nursing inspectors who had

been appointed, for instance, were not inspectors in the ordinary sense. Their function was to go round to the matrons of the various hospitals to try to help them to get staff. Turning to hospital endowments he reminded their Lordships that if he were accused of taking sixpence out of the till he was putting a shilling on the counter, for he was giving from public funds far more than he was taking. When the Minister came to reallocate the funds he would consider whether a particular bequest was obviously for some local purpose. If so it might be treated differently from a bequest which was quite general.

The Bill was read a second time and committed to a committee of the whole House.

QUESTION TIME

Family Allowances

Mr. JAMES GRIFFITHS, Minister of National Insurance, in reply to questions, said he recognised that there had been some disappointment among those in receipt of payments under one or other of the existing social services which already include additions for children, because they have not continued to receive those additions over and above the new family allowances. It had, however, throughout been made clear that so far as existing schemes of social provision for risks arising in civil life provided specifically for children, payments under the Family Allowances Act would be in substitution for or would be taken into account in determining the amount of the additions made for children under other schemes. In the present transitional period improvements in one direction had been made in advance of others which would substantially benefit many of those now affected and would be brought in later under legislation already passed or to be passed. It was the Government's aim to build up the various schemes of social provision as a coördinated whole, and the place of family allowances in them must be looked at in relation not only to existing schemes but also to schemes still to be brought into force. The Government are examining the whole position from this point of view.

In answer to a further question, Mr. T. STEELE stated that, in accordance with the provisions of the Family Allowances Act, family allowances of 5*s*. were being substituted for children's allowances of 3*s*. for the second and subsequent children of widows under the Contributory Pensions Acts in about 35,000 cases.

Shortage of Medical Textbooks

Sir E. GRAHAM-LITTLE asked the President of the Board of Trade if he was aware that the shortage of medical textbooks was a handicap to medical education; that many of the standard books in use by medical students were unprocurable, and that students and practitioners ordering them had been waiting nine months for delivery; and if he would take steps to remedy this position.—Sir STAFFORD CRIPPS replied: The main factors limiting the production of medical and other textbooks, for which there are increasing and accumulated demands, is the shortage of labour and of paper. The numbers employed in the printing and book-binding trades were still well below the pre-war strength, although the labour force increased, in July, 1946, to 74% of its pre-war figure. Publishers' regular paper quotas had been substantially increased over the last 18 months—from 42½% to 80% of pre-war usage. In addition, it was open to any publisher who cannot bring out an important textbook merely from lack of paper to apply for a special allocation for that purpose.

Flour Extraction

Sir E. GRAHAM-LITTLE asked the Minister of Food if he would name the medical adviser mentioned in the secret instruction to Controlled Millers, C.M.C. 646, dated Sept. 19, 1946, as advising the reduction of extraction in national flour from the current 90% to 85%; why, in the same instruction, millers were informed that they must maintain the quota of chalk 14 oz. to 280 lb. in view of the explanation offered by his department that the quota had been doubled to meet the increased extraction of 90%; and whether he would decrease this quota of chalk pari passu with the decrease in the rate of extraction.—Mr. JOHN STRACHEY replied: The medical advisers mentioned in the instruction are the members of the Interdepartmental Standing Committee on Medical and Nutritional Problems. The original recommendation was that 14 oz. of creta præparata should be added to each sack of 280 lb. of 85% extraction flour, but in practice only 7 oz. was added. When the extraction-rate was raised to 90% the addition of creta præparata was raised to 14 oz. per 280 lb. on the grounds of the increased amount of phytic acid in the flour. Now the extraction-rate was being lowered to 85% it was considered inadvisable to lower the rate of addition of creta præparata below the original recommendation as alternative sources of calcium in the diet are short at present, but this course was subject to any further recommendation from the medical advisers.

Saving through Bread-rationing

Replying to a question, Mr. STRACHEY said that the saving in flour achieved by bread-rationing appeared to be about 214,000 tons so far, but he hardly thought that saving would continue at so high a rate.

Medicine and the Law

Alleged Cruelty to Cats

Dr. E. G. T. Liddell, Waynflete professor of physiology at Oxford, did not succeed in his appeal against the magistrates' decision convicting him of causing unnecessary suffering to cats kept by him in the animal-house of the university department of physiology. Quarter sessions, however, after a patient re-hearing which lasted nearly three days, reached findings which went far to justify his appeal. The fine of £25, imposed on him in the magistrates' court, was reduced to £5. The appeal of Mrs. Scragg, the woman who had charge of the cats and who had been fined £5, was allowed.

The allegations of cruelty were indicated in our account of the proceedings before the magistrates (*Lancet*, July 13, p. 64). Dr. Liddell, it may be recalled, was conducting research into the treatment of distemper in cats by sulphamethazine. At the recent quarter sessions the learned recorder held that Dr. Liddell had committed an error of judgment in putting too many cats into the enclosure while they were suffering from distemper. Apart from this overcrowding, said the recorder, Dr. Liddell had acted in a humane and proper manner; he had performed no cruel experiments; his treatment of the animals was a non-painful experiment, designed to cure the disease; none of the allegations against him, except the overcrowding, was proved.

The prosecution was undertaken by the Royal Society for the Prevention of Cruelty to Animals, whose inspectors gave evidence of what they saw when they visited the cats' compound. The recorder made the comment that he thought the witnesses for the society were entirely honest, but they were upset by the sight of this very distressing distemper "and failed, in my judgment, to distinguish between the natural symptoms of distemper, which it was impossible to cure while the disease was raging, and the further aspects of the disease."

An accusation of bad faith, made against Dr. Liddell, was satisfactorily disposed of. The prosecuting counsel had declared that Dr. Liddell was not conducting any experiment upon the cats and that his claim to have done so was an afterthought. The recorder said he accepted the evidence of Dr. Liddell and Mrs. Scragg in its entirety; "Dr. Liddell was conducting experiments on these cats and I accept his evidence entirely on that." There seems indeed to have been an element of exaggeration in the allegations. It was put in cross-examination to one of the society's witnesses that, out of eleven cats which, at the hearing before the magistrates, he had said would have to be destroyed, eight had since recovered. Sir Howard Florey, F.R.S., called on behalf of Dr. Liddell, observed at one point of his evidence that a lot of nonsense was talked by people who transferred human feelings to cats—a remark which involved him in an inconclusive argument with the society's counsel. The recorder put the matter more cautiously when, in deciding the case, he began by stating the opinion that charges of offences against animals often led to "public emotion" and to a certain "lack of judgment."

In England Now

A Running Commentary by Peripatetic Correspondents

THE other week I visited a recovery home for boys which was run, for no obvious reason, on ship's routine. Like all such things it was more naval than the Navy. Lads running up to my guide and asking "Permission to go ashore, sir?" took me back to previous years with a jolt. But it was a form of play-acting that appealed greatly to the boys and could be developed into a handy way of getting them to carry out the routine laid down for their recovery. When, however, it came to the doctor's pennant that was hoisted whenever a doctor came aboard I was out of my depth, my naval duties having always been on the dry side of high-water mark. The final ceremony, however, designed to promote His Majesty's good health, was in the true naval style and left all concerned in a happy frame of mind.

Why is it that some convalescent homes manage to make their inmates enjoy their stay while others just fail? At one institution, run by a religious order to provide convalescent women with a month at the seaside, the sister-in-charge seemed to be responsible for the happy atmosphere. Those who have never encountered religious sisterhoods expect a sister to be rather a remote other-worldly sort of being, but this one altered the visitor's ideas literally in the twinkling of an eye, for she certainly had a twinkle in hers. "You see," she explained, "I am lucky. This place was closed during the war, so I could start afresh and forget tradition. I don't have any rules—why should I? The patients are reasonable people who come here to rest. So I let them. I expect them to be in time for meals and not to sit up late talking—that's only normal good manners and they see the reason for it. Reading in bed? Well, I know they ought not to really, but nor ought I for that matter, and I do so like doing it. So I can't very well stop them." For all her light-hearted air she must have had many troubles in managing such a home in these days of rations, controls, and shortage of domestic staff. But she managed to look as though she hadn't a care in the world.

Then there was that other home, spotlessly clean, where a dozen women were taking a much-needed rest. Two elderly ladies were taking their elevenses in a peaceful sunny room. One of them, seeing a man being shown round, suspected (wrongly!) that he might be a prospective donor and took the opportunity to make a little speech, prefaced by a charming formal bob, saying how happy she had been there. She had never been away before and had come in some doubt and apprehension, but she had enjoyed herself immensely and was sorry to be going next day. "It's the Christian atmosphere that counts, sir," and with another bob sat down again. Here there was no question of a religious order and the atmosphere must have been the result of the unselfish labours of a small committee of local people with their hearts in the right place. There could be no question of a M.B.E. arriving, let alone a title. The work was its own reward. This must have a good deal to do with the secret. The weight of the work rests on voluntary workers who, I suppose, can be taken as the spiritual descendants of the religious orders of medieval days, so that we get back to a common ancestry for the inspiration of both institutions.

Since the dissolution of the monasteries such people have always worked in small and highly individualistic units. How will they fit into a large and tidy organisation such as is now projected? True, the religious orders were once the largest administrative units in the civilised world, but can the secret of organising such people in large units be recaptured, or will they always have to work on the fringe of the State's domain? For work they will.

* * *

The deadly nightshade seems to be commoner than usual this year. Have many cases of poisoning been seen? I am always surprised that people do die from eating these berries, for they do not taste at all pleasant, and a careful exploratory lick would reveal this without doing much harm. Unfortunately, some children will devour handfuls of a berry they have discovered in the hedge regardless of how it tastes, though at home the same children may be particularly finicky about their food.

The detective story in which the victim fell dead after one taste of a nightshade berry put among his fruit is as inaccurate as most accounts of sudden death by poison. Cyanide is no doubt a pretty deadly substance, but in fact it is much slower than in fiction. In some metabolic experiments I had to kill some frogs instantaneously to isolate certain normal substances from the tissues. When KCN solution was squirted into their mouths they pulled a wry face, spat it out, hopped off, and survived quite happily. An injection into the peritoneum caused death in about five minutes. They died in under a minute when it was injected intravenously. But it was quite different from the rich uncle who suddenly slumps into his chair in the library, and the detective notices "the pungent smell of bitter almonds."

* * *

A physician to a teaching hospital has only too many opportunities of appreciating the platitudinous observation that an old dog finds it difficult to learn new tricks. And, with more or less justified self-pity, I have often, when taking stock, considered what proportion of one's knowledge is in fact employed in the actual practice of one's professional life and what proportion represents a concession to the demands of the curriculum and the various examining boards. Such a reflection supplies an easy transition to a comparison between ourselves and the practitioners of our great sister profession. It will be recalled that, after twelve years' retirement from his practice at the Bar to devote himself to national service, Lord Simon returned to preside over a Court of Appeal in his capacity of Lord Chancellor. And, notwithstanding the interval, the great lawyer recommenced his legal activity in full flood. Instantaneously the cogs meshed; the intellectual machine resumed its work without friction. Suppose our profession to possess the analogous office. We are reminded in *Iolanthe* that the Lord Chancellor embodies the law. To suggest that after twelve years' retirement the Lord Physician or Surgeon could embody medicine or surgery would be too ridiculous for even momentary consideration.

The law, I take it, is very nearly static. Its basic principles remain unchanged; any alterations or accretions which result from newly established precedents are in substance comparatively trivial. The possession of judgment; the capacity of persuasive advocacy; the ability to present facts and arguments with clarity and conviction, in part natural talents, in part the result of practice and experience, are not necessarily prejudiced by a period of inactivity even as long as twelve years. But the art of the doctor is one of continuous progress. Admittedly, basic principles remain for all time, but the acceptance of discoveries and innovations is essential in the daily practice of any physician or surgeon. The physician who returned to practice after twelve years' absence would for a time be as puzzled as if he were transported to a strange land of people speaking a foreign tongue. He would be confronted with the names of "new diseases" which, though they must have existed in his day, had never been recognised. He would find that certain conditions which he had accepted as ætiologically obscure and incurable were being rapidly and completely relieved and sometimes even cured. Diabetes by insulin for example; addisonian anæmia by liver; myasthenia gravis by 'Prostigmin.' A vast therapeutic field presents itself under chemotherapy; another by the introduction of sex-hormones. Vitamins, which occupied a few lines in the textbooks of his day, have now acquired a vast bibliography. At first he would be more ignorant and feel more helpless than a first-year student; or, to resume analogy with the other profession, a very young gentleman who has started to eat his dinners.

To what extent would adjustment be possible? Would he in time become again the great man of the day? I doubt it. For one thing, the influence of experience would compel a timid if prudent reluctance to accept all these panaceas, since experience recalls the precocious confidence in the value of so many cures which had failed in the test of time. Yes, the old dog learns new tricks with difficulty.

And so I turn with a sigh to master the principles of the rhesus factor on which I am to lecture tomorrow. For even though by sedulous application I may grasp sufficient for this temporary purpose, I am most unlikely ever to carry its application into practice.

Letters to the Editor

ROYAL COLLEGE OF PHYSICIANS OF LONDON

SIR,—Certain members of the college have written to the medical journals about the representation of members in the counsels of the college. They must know that the President took the initiative in calling a meeting of members of the college in January. This was attended by three hundred members and a committee was appointed to go into the matter. This committee reported to another meeting in April and their recommendations were accepted practically unanimously. The President thereupon brought the matter before the council of the college, who made recommendations to the comitia which involved alterations in the by-laws of the college, and this was put in hand at once. There is no reason to believe that the great majority of members are not satisfied with the procedure adopted.

A few members criticised the method of election of fellows but did not receive substantial support.

Royal College of Physicians, London, S.W.1. H. E. A. BOLDERO Registrar.

CHILDREN WHO SPEND TOO LONG IN BED

SIR,—May I thank Dr. J. A. McCluskie for his most helpful article in your issue of August 31 ? In my three children, ranging in age from 6 years to 2 years, I have noticed many improvements since I cut down their sleep to the times he recommended.

I do not understand the difficulties of Dr. Catherine Storr (Sept. 7, p. 363), as the management of differing hours of sleep is just part of the household routine which must be followed if all the work is to be done ; an understanding husband is of the greatest help in this connexion. Admittedly I have no small baby, but I have no help with the housework. I feel that when we have our next baby I shall be very glad of the guidance given by Dr. McCluskie in the difficult matter of infant sleep.

It is small wonder that the child propped in the pram, his toys around him, should go to sleep ; he does so from sheer boredom. I have always left my infants (quite happy) in the playpen to play, even when they could only lie and kick.

It seems very surprising that a woman as busy as the one described by Dr. Storr should find time to stay in bed after 6 A.M. or have an afternoon rest. Perhaps Dr. McCluskie could give us some guidance on adult sleep requirements.

Pinner. BETTY AINSWORTH.

BOVINE PLASMA AGAIN

SIR,—There is a tendency to regard experiments done on the production of new blood-plasma substitutes as acts of supererogation, although it is conceded that such substitutes may be means of avoiding hepatitis and, less important, of relieving blood-donors of their heavy responsibility. I have long felt that a more favourable attitude is imperative, and anyone who has worked abroad among people who have an atavistic dislike to giving blood will agree. A dramatic presentation of the exsanguinated air-raid casualty will produce volunteer donors, but the equally pitiful case of a cholera patient raises different emotions. An efficient blood-plasma substitute which could be stored without refrigeration in outstation dispensaries and given with the same technique as a hypertonic saline would be one of the greatest blessings science could confer on doctors called on to deal with epidemic cholera or dysentery. The argument applies with equal force to the treatment of surgical and medical emergencies and the protracted treatment of nutritional hypoproteinæmias, biliary cirrhosis, &c.

Your annotation of Sept. 7, evoked by Dr. Massons's article in the same issue, gives certain criteria for assessing the suitability of plasma substitutes—i.e., non-antigenic, non-toxic, free from agglutinins (and hæmolysins), and of an osmotic pressure comparable with human plasma. To these I would add an extension of the criterion " non-toxic " and one further criterion.

The new criterion (making no claim for originality) is that the substitute is capable of being metabolised with profit by the patient. Obviously gum acacia, cellulose derivatives, and colloidal products of polymerised organic substances are excluded under this additional rule ; but so is gelatin, which may still act very efficiently, in producing prolonged hæmodilution, but which is not metabolised (except perhaps when given with a mixture of amino-acids to make up for its constitutional deficiencies) and is in fact excreted in the urine almost cent. per cent. within 24 hours. Dr. Massons does not give data which would enable judgment to be passed from this point of view on his preparation of calf plasma. True he says that the results in the treatment of certain hypoproteinæmic conditions were as good as with human blood plasma, but American investigations have shown that it is extremely difficult to alter the plasma-protein concentration in such states by the administration of human plasma, so the only evidence, apart from the diuretic effects (which could equally well be produced by gum acacia), that true " profitable " metabolisation of the product occurs would be on the basis of nitrogen-balance experiments. This is a request for information and not carping criticism.

The extension of the criterion " non-toxic," possibly implied though not specified in the annotation, is that the substitute should not produce the syndrome which follows the use of macro-molecular substances such as gum acacia or even gelatin, which includes depression of plasma-protein production and prothrombin, an increase in the E.S.R., and a greater or less degree of blocking of the reticulo-endothelial system. Such an effect with colloidal solutions is to be expected unless the substance is metabolised, and each item in the syndrome can be of clinical importance, although these might justifiably be ignored when the infusion is not to be repeated, as in cases of surgical emergency. Cholera in a patient on the verge of, or actually in, a state of nutritional hypoproteinæmia presents such a condition where a further depression of plasma-protein production might just tip the scale between survival with rapid convalescence and death or a protracted convalescence. With salines only, such patients can die with a depressed blood-volume (dehydration) and simultaneous tissue or pulmonary œdema, and only human plasma or serum, or a metabolisable protein substitute, can be useful therapeutically.

Your comment that the osmotic pressure of such a preparation as Dr. Massons has described is probably less than that of human plasma is almost certainly erroneous. The denaturation increases the osmotic tension in this preparation to the extent of about 15% of the *total* osmotic tension of the original plasma, and the increase will be almost entirely due to a rise in the colloid osmotic tension. The probability is that the colloid osmotic tension of the preparation is well above that of human plasma. In any case, within wide limits determined largely by the amount of electrolytes introduced with the colloid, the actual colloid osmotic tension matters little.

Impressed by the great need for an easily available plasma substitute I have made several series of experiments under difficulties. In the first Colonel L. A. P. Anderson, I.M.S., then director of the Pasteur Institute, Shillong, and later director of the transfusion services, G.H.Q., Delhi, prepared bovine serum to which had been added 8·5% glucose and which was then spray-dried. This product was non-antigenic and non-toxic to guinea-pigs and could be sterilised by boiling. However, large-scale spray-drying was then impossible.

Later, after the publication of Edwards's article on " despeciated bovine serum," I started experimenting again and finally decided on egg-white as the protein basis because the whole process could be carried out easily and aseptically, the globulin could be precipitated by dilution with distilled water, and the complications of removing clot and corpuscles did not arise. This preparation was apparently non-antigenic and non-toxic and had quite phenomenal diuretic effects on patients with famine œdema when given as an approximately 5% solution in normal saline 300 c.cm. The criterion I insist on was not then applied for lack of facilities to work out a metabolic balance ; neither was any estimate made of the effect of despeciation on the avidin (antibiotin complex).

An egg shortage and more work brought this experiment to an end ! Although it sounds more bizarre

even than bovine plasma, the application of denaturation to egg-white albumin might well be worth further study—a thing which I will certainly do unless someone better qualified and with better facilities does it first.

I am extremely glad that Dr. Massons has given us the details of his procedure and investigations into the properties of denatured calf plasma, and I hope that he will publish soon the metabolic studies complementary to its use in hypoproteinæmic states.

Brixham, Devon. R. ARTHUR HUGHES.

TUBERCULOUS GLANDS AND CALCIFEROL

SIR,—In his letter of Sept. 28 (p. 473) Dr. Wallace writes that treatment of tuberculous glands with calciferol seems "helpful when sinus formation is present" but that it "has a clinically adverse effect on glands which have not broken down." He admits that this is "little more than an impression." I should like to record that in three cases of tuberculous cervical adenitis of the multiple type, without sinus formation, quite unsuitable for treatment by radical excision, there has been a markedly favourable response to calciferol, resulting in a reduction in size of the masses in the neck sufficient to excite pleased comment from the three patients concerned. It would be ridiculous to draw any conclusions from this. My sole purpose is to register an "impression" quite different from that of Dr. Wallace.

Dr. Wallace is right when he advises that calciferol should be given with caution when pulmonary tuberculosis is present, at any rate until more is known about its effect on this condition. On the theory that the beneficial effect of calciferol on lupus might be due to a specific effect on squamous epithelium I treated four cases of tuberculous laryngitis accompanying pulmonary tuberculosis by the administration of 100,000 to 150,000 units of calciferol daily. This treatment had to be abandoned after 5 days owing to undesirable toxic effects.

Though Dowling and Prosser Thomas [1] declare that the effect of calciferol on lupus does not seem to be related either to symptoms of toxicity or to the serum-calcium level, this point obviously requires further elucidation. Clinically, this might be done by treating a series of cases with parathyroid extract and large doses of calcium or by other measures designed to keep the serum-calcium at an abnormally high level.

Best and Taylor [2] point out that the overdosage effects of parathyroid and irradiated ergosterol are similar. Both cause the same degree of hypercalcæmia, hyperphosphatæmia, and a rise in the non-protein nitrogen of the blood. The symptoms during life and the post-mortem findings after poisoning with either material are identical.

A comparison of series of cases treated by the two methods might shed important light on the mechanism by which calciferol produces its effect on lupus lesions.

Neath, Glamorgan. T. FRANCIS JARMAN.

CONTRACEPTION WITH THE SILVER RING

SIR,—The medical committee feels that a warning should be given concerning the sudden revival of a method of contraception called the silver or Grafenberg ring.

This appliance consists of a small ring, composed of silver, platinum, or other metal, which is inserted into the uterine cavity, where its presence, provided it is retained, is intended to prevent the embedding of the fertilised ovum.

The advantages of such an unexacting method are so manifest that the device was fairly widely studied some fifteen years ago, both here and on the Continent. Unfortunately, the risks in its use have proved greater than were at first anticipated. In addition to the fact that, even in cases where the ring is retained, the failure-rate is high (at least 5%, the ring often being born with the baby), the incidence of pain, menorrhagia, and metrorrhagia has been considerable, and subacute infections and acute salpingitis have been caused in healthy nulliparous women. Moreover, the technique entails the utmost danger to women who have previously had, or who contract, gonorrhœa; one such patient required hysterectomy.

Within the last few months this device has achieved an alarming popularity, for certain practitioners claim it to be the method of choice, even for young nulliparous brides. Members of this committee have met with many cases of infective lesions occurring in such patients, which they will be happy to publish if it appears necessary. It is very difficult for the average practitioner to get guidance on such a matter, and, without it, he is at a great disadvantage when his patients claim to have had friends who have been highly delighted with the method.

In point of fact, no progress has recently been made in the essentials of the ordinary contraceptive technique: for security, either some type of occlusive rubber cap must be used by the wife, in conjunction with a chemical spermicide; or a sheath, preferably with a spermicide, must be used by the husband. Such methods are non-injurious, and offer a high degree of safety (at least 98% used over ten fertile years) provided they are competently chosen and applied.

My committee would be grateful if you would allow this warning to reach fellow practitioners.

Family Planning Association, London, S.W.1. M. A. PYKE Hon. Secretary.

PERFORATED PEPTIC ULCER TREATED WITHOUT OPERATION

SIR,—In reading Mr. Hermon Taylor's article of Sept. 28 and your leader of Oct. 5 I was amazed by the omission of both to refer to previous American articles on conservative treatment. I have a reference dated 1943. A short note on the method describing a small series was published in this country last year. The impression given is that this is a new method invented by Hermon Taylor, which is wrong. Hedley Visick, of York, has adopted conservative treatment for all perforations as a routine for the last two years with, I believe, uniform success. The results of all methods acknowledge the tremendous mortality associated with this catastrophe, a condition of affairs that is regarded with equanimity by most surgeons in that the condition is, as you point out, usually looked upon as only worthy of the attention of a house-surgeon or resident surgical officer. The normal operative mortality is 20%.

You refer to one or two series of operative results in early cases with a small mortality; that this need not be regarded as only to be achieved by a few is shown by my own series of 50 cases with 2 deaths in eight years, cases not selected and including perforations up to three days old. My own routine is to avoid general anæsthesia except in the young and healthy adult, and in all other cases to use spinal or local with morphine; this ensures the absence of those postoperative chest conditions which are so fatal. There is no way in which we can be sure that the perforation is sealed off. My last case was in a girl of 21, severely shocked and with a rigid board-like abdomen. Operation showed a large perforation in the anterior wall of the stomach into which one could put the tip of a finger. In my opinion it would have been criminal not to have operated on this girl. Two days later she was sitting up smiling and on a normal diet. In some cases we can assume from the mildness of the symptoms and the relative well-being of the patient that it is justifiable not to operate, and following the lead of Visick I have treated 4 cases this year conservatively without a death, each being proved radiologically or at subsequent operation.

All surgeons should know that the use of a drainage-tube in a perforation is dangerous as well as useless. Subphrenic abscess and pelvic abscess occur where tubes are used, and intestinal obstruction frequently follows its use in the pelvis. I have not used a drainage-tube in a perforation for over ten years, and I have not had an intestinal obstruction and only one subphrenic abscess. It is unnecessary to use chemotherapy as a routine; as Patey recently pointed out, cases which have been on prophylactic penicillin and/or sulphathiazole will still develop chest complications, and I have had one postoperative death, following a gastrectomy where a chest complication was anticipated, where penicillin and sulphathiazole were both used from.

1. *Lancet*, 1946, i, 919.
2. Physiological Basis of Medical Practice, London, 1943, p. 1189.

before the operation and the patient died of a bilateral bronchopneumonia.

After operation many cases develop pyloric obstruction, and the surgeon must be prepared to recognise this early and perform a further operation within a few days when it is clear that the stomach contents will not pass freely through a pylorus narrowed both by the original ulcer and by the sutures used to obliterate it. No-one who reopens an abdomen a few days after a perforation can fail to be struck by the clean appearance of the abdominal contents and the absence of adhesions, or to realise that it is unnecessary to remove the fluid present at the time of operation and to insert a drainage-tube with the object of letting it off. In any case a drainage-tube does not carry out this function since it is rare for more than a few ounces to exude from it.

My experience as R.S.O. in several hospitals taught me that the mortality following perforations was due to carelessness or ignorance on the part of the operator; the use of general anæsthesia in debilitated patients or those with chest or heart lesions; the failure to recognise postoperative intestinal obstruction until it was too late; the failure to appreciate that the pylorus might be mechanically obstructed; the inability to diagnose subphrenic abscess; and the insistence on draining pelvic abscesses when diagnosed suprapubically rather than through the rectum.

In a hospital where the operative mortality is the generally accepted one of 20%, conservative treatment should have no greater risk and may, by the avoidance of an operation, have a lower one. Where, however, the surgeon can be sure of a reasonable mortality of under 5% then it seems to me that conservative treatment should not be the routine but should be used in selected cases where the crisis of the disease is over and the patient is already recovering.

Halifax General Hospital. H. I. DEITCH.

CHILDREN IN DAY NURSERIES

SIR,—The argument in Dr. Hilda Menzies's paper of Oct. 5 is that since a substantial proportion of the children did not make satisfactory progress as judged by weight gains in the first or second 3 months after admission to the nurseries, and since the children had almost double rations compared with those under the care of their mothers, their unsatisfactory progress was more likely to be due to emotional disturbances than to "anything so simple as lack of proper food."

Broadly, Dr. Menzies found that approximately a third or a quarter of the children admitted at ages between 1 and 2 years had unsatisfactory weight gains in the first 3 months, and approximately the same proportion had unsatisfactory weight gains in the second 3 months. There is no information on fluctuations in weight growth of preschool-children in this country, but if the experience for preschool-children in other countries and for older children in this country can be taken as a guide, then the same sort of fluctuations could be expected for children under their mothers' care as were found for children after admission to the day nurseries.

The practical significance to health of short-term fluctuations in weight growth has not so far been satisfactorily explained. From a recent Australian study,[1] no explanation could be given of them in young children living in child centres; Bransby [2] found short-term fluctuations in weight growth in older children with a good health record and living in a good environment. By all accounts the latter children were happy and contented. The short-term fluctuations in weight growth of these two groups of children might, of course, have been due to emotional disturbances, but they might well have been due to some other physiological or environmental factor. Similarly, emotional disturbance or some other factor may have been responsible for the short-term fluctuations found by Dr. Menzies. Her argument concerning emotional disturbances would have been strengthened had data been presented to show that the children who were emotionally disturbed did, in fact, have unsatisfactory weight gains and vice versa.

Ministry of Health. E. R. BRANSBY.

SIR,—I was extremely interested in the article by Dr. Menzies. It gives confirmation to a thesis on the dangers of separation anxiety in young children which I, in common with other psychiatrists, have held for some time now. My own observations were made on hospitalised children and are embodied in a monograph (Separation Anxiety in Young Children. Genetic Psychology Monographs, 1943). Others have written to you at different times, notably in connexion with the evacuation of children during the war, and a letter in the *British Medical Journal* (1939, ii, 1202) from Dr. John Bowlby, Dr. Emanuel Miller, and Dr. D. W. Winnicott is so apposite that I cannot forbear to quote at least part of it here:

"There are dangers in the interference with the life of a toddler which have but little counterpart in the case of older children. . . . Apart from such a gross abnormality as chronic delinquency, mild behaviour disorders, anxiety and a tendency to vague physical illness can often be traced to such disturbances of the little child's environment [i.e., removal from home] and most mothers of small children recognise this by being unwilling to leave their little children for more than very short periods."

Though the findings of analytic psychiatry on this point have up to now been more or less disregarded, perhaps this corroboration of their views by Dr. Menzies's carefully recorded experience will call more attention to them. To quote again, this time from my own paper:

"In these days with increasing interference of the State in the handling of even very young children it is as well to be aware of all the pitfalls involved. One cannot know too much of the consequences of interference when dealing with two such fundamental biological urges as the parental instinct and its counterpart . . . [the need for] security and dependence. . . ."

Leeds. H. EDELSTON.

SIR ALMROTH WRIGHT AND ANTI-TYPHOID INOCULATION

SIR,—I am much indebted to Dr. Leonard Colebrook for drawing attention in your issue of Sept. 14 to an apparent mis-statement in my *History of Medicine*. I admit that, on page 348, I have unwittingly conveyed the impression that Sir William Leishman was the originator of anti-typhoid inoculation "along with Sir Almroth Wright," although, on a previous page (288), I describe Sir Almroth Wright as "the pioneer of vaccine therapy and of anti-typhoid inoculation."

Of course the title of "originator," although I did not use that word, belongs to Sir Almroth Wright, whose outstanding achievement in the field of preventive inoculation is certainly a landmark in the history of medicine. Sir William Leishman, it would appear, simply gave his powerful support to the introduction of the method into the British Army. I need scarcely add that the paragraph will be revised in any future edition of my book.

Edinburgh. DOUGLAS GUTHRIE.

SPLANCHNIC BLOCK, ELECTROLYTE BALANCE, AND URÆMIA

SIR,—Recent correspondence on uræmia following trauma or abortion has suggested that this condition can be successfully treated by restoration of the renal circulation, either by splanchnic block or by correction of the electrolyte balance. While I do not propose to question the correctness of both these procedures, I should like to draw attention to their limitations.

Although successful cases of splanchnic block in the human have been reported, Porritt et al.[1] were not impressed by its use in the casualties from B.L.A. The reason for this failure lies in the fact that the kidney will withstand ischæmia for only a limited period,[2] and, should the renal circulation be deranged long enough to

1. Commonwealth of Australia Department of Health (1945): The Lady Gowrie Child Centres. Commonwealth Government Printer, Canberra.
2. Bransby, E. R. *Med. Offr*, Sept. 22, 1945.

1. Porritt, A. E., Debenham, R. K., Ross, C. C. *Brit. med. J.* 1945, ii, 377.
2. Allen, F. M. *J. Urol.* 1943, **49**, 515. Scarff, R. W., Keele, C. A. *Brit. J. exp. Path.* 1943, **24**, 147. van Slyke, D. D., Phillips, R. A., Hamilton, P. B., Archibald, R. M., Dole, V. P., Emerson, K. *Trans. Ass. Amer. Phys.* 1944, **58**, 119. Badenoch, A. W., Darmady, E. M. (in the press).

cause massive degeneration of the kidney epithelium, death will certainly follow from accumulation of waste products.

I am hoping to show in a paper to be published shortly that in some cases, even if electrolyte balance is established early, death from uræmia still occurs. Moreover, that when the syndrome is fully developed there is considerable risk in giving fluid intravenously, since not only is the alkali reserve, sodium and chloride, difficult to maintain but there is also danger of overloading the circulation.

The area and extent of the renal necrosis must be the factor which determines unassisted recovery, but if the accumulation of waste products—in particular potassium—can be removed until such time as the kidney regenerates there is greater chance of the patient surviving. An apparatus for such a purpose, consisting of pump and dialysing membrane, has already been put forward by Kolff and Berk [3] and recommended by Bywaters [4] and Snapper.[5]

Simplification and modification of these methods are now under consideration at this laboratory and show promising results.

Pathological Dept., Salisbury Infirmary, Salisbury. E. M. DARMADY.

PILONIDAL SINUS

SIR,—After reading the article on postanal pilonidal sinus by Patey and Scarff in your issue of Oct. 5 I cannot understand their readiness to relegate the developmental theory to a secondary place. They state that an uninfected sequestration dermoid—ought it not to be dermoid fistula or cyst ?—is almost never encountered ; but does not this depend on whether it is looked for ? I have found a few, symptomless, in patients complaining of other conditions. It does not seem to be appreciated by many practitioners that the congenital opening is extremely small and sometimes multiple. I have seen an eminent rectal surgeon demonstrate, to his own satisfaction, that no external opening was present by using a probe with an end as big as a match-head. Another case recurred after a drastic excision which had left the congenital opening intact. To demonstrate this opening I find a fine straight sewing needle, used eye end first, a useful probe.

Patey and Scarff seriously suggest that the fine hairs found in this region are capable of penetrating the skin, but an examination of the hairs in the sinus will show that they are often of considerable length, and must have grown from the wall of the sinus. Their conclusion that the pilonidal sinus in the hand was due to puncture by a hair seems incorrect in view of the histological picture, which showed a hair follicle in the wall of the sinus. The explanation of the recurrent sinus, longer than the original, containing dead hairs may simply be that the upper end of the sinus was not excised ; hairs and debris from the remnant continued to collect and formed a sinus in the dead space left by operation.

On the choice of operation your editorial puts the position fairly. If it is undertaken in the " cold " stage, with careful excision of the track and its offshoots and care in suturing to obliterate dead spaces, there should be no need for any of the fanciful operations devised.

Plymouth. EDRIC WILSON.

SIR,—Patey and Scarff state that this condition in the majority of cases is not of congenital origin. They base this dogmatic statement on the slender and inconclusive evidence of being unable to find an epithelial lining in 13 out of 21 cases, and a description of an interdigital sinus in a barber's hand.

In 1933 (*Brit. J. Surg.* 1933, **21**, 219) I fully described the condition under the title of Coccygeal Sinus, and (as I thought) conclusively proved with histological evidence that such sinuses are congenital in origin. They can, of course, be easily confused with other septic conditions. A coccygeal or pilonidal sinus is a definite clinical entity and is always characterised by one or several minute openings situated accurately in the middle line. It requires careful observation to detect these openings. I have seen them many times in the newborn, the adult, and elderly, causing no symptoms whatever. It is only when they become infected that they give rise to trouble, with the resulting secondary sinus lined with granulation tissue.

I venture to suggest to the authors that if they were to restrict their observations to the true pilonidal sinus and were to take serial microscopic sections of the excised tissue they would in all cases find the epithelial lining. Having operated upon a very large series of these cases I am confident that the theory I advanced is the true one.

It seems a pity that a paper emanating from the Bland-Sutton Institute of Pathology should make no reference to Sir John Bland-Sutton, that supreme and accurate observer, who in his classic book *Tumours Innocent and Malignant* regarded these sinuses as due to faulty coalescence of the skin. He even suggested they were comparable to the interdigital pouch of the sheep and stated that similar interdigital pouches occur in connexion with webbed fingers in man.

Manchester. R. L. NEWELL.

DISTRIBUTION OF DISSEMINATED SCLEROSIS

SIR,—Disseminated sclerosis is well known to be common in some countries (e.g., Switzerland) and very rare in others (e.g., South Africa). Its incidence varies also in different parts of a country, for it is more common in north than in south Switzerland.

Investigations at present being carried out indicate that disseminated sclerosis is relatively common in England, and that patients suffering from the disease number 2–4 per 10,000 population. There seem, however, to be certain parts of the country where it is much more common than this, and others in which it is rarely, if ever, seen.

Information regarding its geographical distribution is being collected here for research purposes, and if any doctor can give information regarding its local incidence, or has been impressed by its frequency or rarity in his district, we should be grateful if he would communicate with us. Areas of the country where the disease does not occur are just as important as those in which it is frequent.

W. RITCHIE RUSSELL.

Radcliffe Infirmary (Neurology), Oxford.

EARLY OVULATION

SIR,—The conclusions that Dr. Sevitt draws in his article of Sept. 28 may be unintentionally misleading. He says : (1) ". . . ovulation can occur on any day of the first half of the cycle " ; (2) ". . . it appears therefore that premature ovulation is not uncommon " ; and (3) ". . . it follows that there is no safe period in the first half of the cycle."

Of his 10 cases there is not one with a normal menstrual history. All except 2 are menorrhagias, which may be due to an endocrine disturbance, as in fact he seems to prove with the sections. The other 2 were cases of severe leucorrhœa. One of the causes of " functional " menorrhagia is claimed to be an excessive development of the secretory endometrium. Dr. Sevitt seems to confirm this and even shows that ovulation seems to occur early in this type of case—i.e., the luteal phase lasts longer than the normal 14 days and presumably gives rise to an abnormally thick endometrium, though he has no sections to confirm this.

In case 6 he found an early secretory endometrium during the bleeding phase. I cannot see why he postulates a new corpus luteum, since the same findings can surely be expected with a persistent corpus luteum or with an incomplete shedding of the endometrium, imperfectly stimulated to secretion by the corpus luteum of the previous cycle. In case 9, the only evidence he gives for a " very early secretory phase " is vacuolation and basal nuclei with some dilated glands of the endometrium. This change can be produced by a high œstrogen blood-level in the absence of a functioning corpus luteum, and therefore ovulation.

I feel therefore that the conclusions I have quoted can stand only if the words " in some cases of menorrhagia " are added at the end of each.

London, N.W.6. W. P. HIRSCH.

3. Kolff, W. J., Berk, H. T. J. *Acta med. scand.* 1944, **117**, 121.
4. Bywaters, E. G. L. *Brit. med. Bull.* 1945, **3**, 107.
5. Snapper, I. *J. Amer. med. Ass.* 1946, **131**, 251.

Obituary

STANLEY WYARD

M.D. LOND., F.R.C.P.

Dr. Stanley Wyard, physician to the Cancer Hospital and the Princess Beatrice Hospital, London, who died on Sept 29, was a first-class physician whose clinical acumen was founded on experience as a clinical pathologist. The son of the late Rev. G. L. Wyard, of Bournemouth, he was educated privately and at the University Colleges of Cardiff and London. After graduating M.B. Lond. in 1909 he held house-appointments at the West London Hospital before taking up a research assistantship in pathology at Leeds. He returned to London to set up in consulting practice, joining the staff of the Bolingbroke Hospital, the Belgrave Hospital, and the Victoria Hospital, Chelsea. His earliest bent was thus for pædiatrics, but he retained his interest in pathology, and alongside his other work he found time to act as medical registrar at the Cancer Hospital, where he was later appointed to the staff. Besides the well-known *Clinical Atlas of Blood Diseases*, of which he was part author, he also published in 1927 a *Handbook of Diseases of the Stomach* which reflected his wise judgment and wide experience. The first world war interrupted his clinical work, for he served in France with the R.A.M.C. as a pathologist. In the last war he took on additional work as temporary consulting physician to Hounslow Hospital and, under the E.M.S., as physician at the South Middlesex Hospital.

His clinical work was characterised by the great interest he took over every aspect of each case, which won him the confidence of patient and doctor alike. Scrupulously upright and honest in all his dealing, as a colleague writes, "he had no axe to grind but just did a good job of work." With his command over affection and respect he made an excellent chairman of the medical committee at the Princess Beatrice Hospital, and until lately he also served as chairman of the board of management of the Victoria Hospital. Behind his quiet exterior he had tremendous moral courage, and when many months ago he realised that he was suffering from a fatal illness, he told no-one inside or outside his family but carried on as long as he could with no change in manner or appearance. His ambition had been to retire when he was 60—just about his age when he died—and go to live in South Africa where he hoped to find leisure and light for his favourite recreations—photography and biology—and to continue his games of golf which the war had interrupted.

ARTHUR NORMAN BOYCOTT

M.D. LOND.

Dr. A. N. Boycott, who died on Sept. 17, was a well-known figure in St. Albans, where he had lived since his appointment as medical superintendent to Hill End Mental Hospital in 1898. The third son of the late Richard Boycott, of Rugeley, he was born in Lucknow in 1866 and was educated at Monmouth School, where he was a brilliant scholar and a good athlete. He qualified at St. Thomas's Hospital in 1888, winning the Cheselden medal in surgery, and in 1893 took his London M.D. After holding a house-appointment at St. Thomas's under Sir William MacCormac he went to Cane Hill Hospital in 1890 as assistant medical officer to start a long and successful career in mental diseases. At the age of 32 he was appointed to Hill End Hospital, where as the first medical superintendent he was responsible for organising and equipping the new hospital. He worked hard to raise the standard of medical and nursing care and to improve the welfare of his patients and his staff, and his kindly administration earned him a lasting reputation and affection. A member for many years of the Royal Medico-Psychological Association, he took a great interest in improving the training of mental nurses. In 1925 he retired from the superintendentship of the hospital, but he continued to work as a consultant to the Hertfordshire county council until the early years of the war.

Apart from his professional work Dr. Boycott had many other activities. As secretary and later treasurer of the St. Albans branch he was intimately connected with the Red Cross in Hertfordshire, and during the second world war he spent much time doing Red Cross work for the relatives of prisoners-of-war. He was also a governor of the St. Albans School and a trustee of the Kentish Educational Foundation. His friends in the profession and in St. Albans will miss him not only for his work but for his kindly quiet manner and his steadfastness.

In 1905 he married Lota, the eldest daughter of the late Edward Griffith Brewer, who survives him with their only daughter.

RICHARD JAMES CAMPBELL THOMPSON

C.M.G., D.S.O., M.D. DURH., M.R.C.P.

Lieut.-Colonel R. J. C. Thompson died on Oct. 2 in St. Thomas's Hospital, London, where he had been secretary to the medical school for over twenty years. Born in 1880, the son of R. P. Thompson, of Stamford, he came to St. Thomas's as a medical student in 1898 from Marlborough, and became a prominent member of one of the great rugby football teams which the hospital produced at that period. He qualified in 1904, and after doing hospital appointments in 1905 he joined the R.A.M.C. Five years later he was seconded to the Egyptian Army to serve on the Sudan Sleeping Sickness Commission where Andrew Balfour was one of his associates. As a result of the investigations of the commission extensive measures were introduced which have proved successful in controlling sleeping sickness in the southern Sudan. Returning to the R.A.M.C. in the first world war he established a reputation as commanding officer of one of the best casualty-clearing stations in France. An injury to his leg led to his being invalided out of the Service. From 1919 to 1922, while acting as physician and surgeon to the Royal Hospital, Chelsea, he took the M.R.C.P. and the M.D. Durh. To this period also belong his papers on the problems of old age. For a short time he practised in Bordighera, but his main life's work began when he returned to St. Thomas's Hospital as secretary to the medical school.

Tommy Thompson, as he was generally called, was a man big in physique and heart, whose charm of manner brought him friends wherever he moved. He had the power of evoking affection, and consequently willing work from all his staff and subordinates, and he filled his post as secretary with energy and success. The death of his only son, whose plane failed to return from an Atlantic patrol, was a crushing blow from which he never entirely recovered, and after he retired a few weeks ago from St. Thomas's he seemed to have little zest left for life.

HENRY BEECHER JACKSON

M.A. CAMB., M.R.C.S.

Dr. Beecher Jackson, who died in the Wilson Hospital, Mitcham, on Oct. 8, succeeded his father as coroner for Croydon, and together they held office for nearly sixty years. From Epsom College he obtained an open exhibition to Clare College, Cambridge, and on leaving the university he was admitted to the roll of solicitors. In 1918 he obtained his medical qualification at St. Bartholomew's Hospital, after serving in the first world war as a temporary surgeon in the Royal Navy. In 1919 he succeeded his father in the office to which he had an obvious vocation, and for which he had assiduously prepared himself by constant attendance at the London coroners' courts. He was noted for his attention to detail, his courtesy, and his consideration. In 1939 he presided over the Coroners' Society. He leaves a widow and one daughter.

". . . Rifle bullets kill men, but atomic bombs kill cities. Our defense is not in armaments, nor in science, nor in going underground. Our defense is in law and order. . . . I do not believe that we can prepare for war and at the same time prepare for a world community. . . . Science has brought forth this danger, but the real problem is in the minds and hearts of men. We will not change the hearts of other men by mechanisms, but by changing *our* hearts and speaking bravely."
—Prof. ALBERT EINSTEIN, *New York Times Magazine*.

On Active Service

AWARDS

O.B.E.

Wing-Commander C. W. COFFEY, M.R.C.S.
Wing-Commander DONALD MAGRATH, M.B. Birm.
Squadron-Leader R. A. CUMMING, M.B. Aberd.

M.B.E.

Flight-Lieutenant F. A. FORBES, M.B. Aberd.
Flight-Lieutenant JOHN LILLIE, M.B. Belf.
Flight-Lieutenant F. W. PARKE, B.M. Dubl.
Flight-Lieutenant F. R. PHILPS, M.B. Lond.
Flight-Lieutenant W. N. RILEY, M.R.C.S.
Flight-Lieutenant W. F. TIERNEY, M.B. N.U.I.
Flight-Lieutenant C. B. I. WILLEY, M.C., B.M. Oxfd.

The following have been mentioned in despatches:

R.A.M.C.

Brigadiers.—J. P. MacNamara, R. R. Bomford, P. Wiles.

Colonels.—R. A. Anderson, O.B.E., J. D. Driberg, P. J. Stokes, A. B. Dempsey, R. R. Leaning, O.B.E.

Lieut.-Colonels.—P. H. R. Anderson, A. J. Dalzell-Ward, G. T. Ashley, H. L. Ellis, G. J. Evans, P. P. Fox, W. R. N. Friel, W. G. Garrow, W. H. Graham, K. H. Harper, G. C. Hernan, M. S. Holman, C. H. Hoskyn, O.B.E., R. H. Isaac, K. Kumar, D. A. Lowe, G. G. Mer, O.B.E., R. S. Ogborn, R. A. Philp, R. K. Pilcher, M.C., J. R. Squire, H. Stevenson, J. C. Watts, M.C., A. L. Wilson, I. Calvert-Wilson, T. K. Howat, H. L. Wolfe.

Majors.—A. M. Hutton, J. C. Coates, A. Colbert, J. O. Collin, H. W. F. Croft, J. P. Donnel, H. F. Ferguson, A. Gould, E. J. Harrison, R. G. Henderson, J. Hemphill, N. Leitch, P. F. Maguire, A. L. R. Mayer, A. I. McCallum, J. A. McPherson, R. Murray, J. O'Hara, N. C. Porter, J. A. Ritchie, W. T. Walker, M.B.E., G. Wynne-Griffith, K. T. Grey, J. W. Miller, W. G. Mills.

Captains.—R. M. Allan, R. F. Antonio, G. D. G. Barnes, R. H. Bowie, E. G. Dryburgh, R. C. Evans, J. A. S. Forman, C. R. Forrest, P. Fuchs, J. C. Heskith, K. Heslop, L. P. Hodgson, N. B. Jones, S. H. Madden, W. D. Mail, P. L. Masters, S. J. T. Merryfield, C. E. S. Myers, M.B.E., B. A. Protheroe, I. Reubin, A. C. Ritchie, P. R. Robinson, K. R. Urquhart, J. A. K. Wallace, G. L. Whitmore, K. W. Andrews, J. W. Hitchens, F. H. Kelland, G. W. Park, D. H. Rea, A. Smith, R. B. C. Smith, M. W. Stock, W. T. Stone, S. D. Cuthbertson, A. Harrop, A. T. Makin.

Lieutenants.—F. Birch, A. E. Davies, H. Harris, A. I. Hyman, D. I. Jones, J. W. Lewis, G. F. Strickett.

R.A.F.

Squadron-Leader D. A. Duthie.

Flight-Lieutenants.—R. G. Blackledge (deceased), M. H. Kinmonth, L. C. Liddell, J. Simpson, C. B. I. Willey, M.C.

I.A.M.C.

Colonels.—F. R. Cawthorn, O.B.E., B. R. Tandon, Avyaktanand, M.B.E., D. R. Cattanach, D. K. L. Lindsay, O.B.E.

Lieut.-Colonels.—K. M. Unnikrishnan, G. V. Chaphekar, M.B.E., A. N. De Monte, M.B.E., M.C., G. T. M. Hayes, J. R. Kerr, D.S.O., W. N. Niblock, J. P. O'Riordan, G. A. Ransome, F. W. Snedden, G. B. R. Walkey, J. L. M. Whitbread, B. Bhattacharjya, W. F. J. M. Thom, V. R. Mirajkar.

Majors.—A. H. Vatsyayan, C. R. K. Carroll, A. L. D'Cunha, C. A. Fegredo, F. M. F. Forrest, M. W. Grunstien, F. G. Millar, M. G. Hyder, A. C. Molden, N. U. Khan, Pattanath Shankaran, S. K. Sen, D. S. B. Stephens, U. P. D. Gupta, E. Watson, J. G. Webb, G. S. Dhaliwal, K. L. Chittwal, J. J. D. Lobo, A. S. Reilly, J. H. York.

Captains.—A. K. Bose, B. S. Dhillon, B. N. Chatterjee, B. N. Bali, Brindaban Bakhshi, C. M. Patnaik, C. K. Kurup, C. J. David, C. L. Bahl, V. N. Datar, G. W. D'Sena, D. H. Biswas, G. S. Godiwalla, M. R. G. Aratham, K. Govindarajulu, H. K. Ray, H. B. Parelwali, Husain Reza, J. M. Bose, K. V. G. Kurup, Mohindar Sinjh, Monoranjan Dutt, Mvu Raja, C. P. Nair, M.B.E., N. M. Maitra, Nezamuddin Talukdar, N. S. Ahluwalia, C. M. Patnaik, J. M. Pinto, P. P. Ramadivi, R. N. Dutta, S. P. Ghose, Sarju Prasad, S. K. Mazumdar, Swwan Sinjh, R. M. S. Terry, Thekkepat Karunakaran, P. S. Bhat, B. R. Chaudhuri, D. B. Patnaik, C. R. Peck, Prem Chandra, Rangaraj, N. N. Santhanam, Shrivastava, T. R. Sibramanian, A. K. Mitra.

Lieutenants.—I. A. Khan, J. N. Ghosh, S. J. Mascarenhas.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED OCT. 5

Notifications.—Smallpox, 0; scarlet fever, 1079; whooping-cough, 1311; diphtheria, 319; paratyphoid, 20; typhoid, 11; measles (excluding rubella), 1781; pneumonia (primary or influenzal), 411; cerebrospinal fever, 32; poliomyelitis, 23; polio-encephalitis, 2; encephalitis lethargica, 2; dysentery, 63; puerperal pyrexia, 163; ophthalmia neonatorum, 80. 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. 2 was 839. During the previous week the following cases were admitted: scarlet fever, 56; diphtheria, 28; measles, 17; whooping-cough, 26.

Deaths.—In 126 great towns there were no deaths from scarlet fever, 2 (0) from enteric fevers, 2 (0) from measles, 12 (3) from whooping-cough, 5 (0) from diphtheria, 39 (3) from diarrhœa and enteritis under two years, and 7 (1) from influenza. The figures in parentheses are those for London itself.

Leeds and Oldham each reported 1 death from an enteric fever. Liverpool had 7 fatal cases of diarrhœa and enteritis.

The number of stillbirths notified during the week was 253 (corresponding to a rate of 26 per thousand total births), including 33 in London.

Births, Marriages, and Deaths

BIRTHS

BELL—On Oct. 11, the wife of Mr. A. C. Bell, F.R.C.S., F.R.C.O.G.—a daughter.
BURKITT.—On Oct. 7, the wife of Dr. Eric Burkitt, of Wimbledon—a son.
DENT.—On Oct. 4, the wife of Dr. Charles Dent—a daughter.
HALLPIKE.—On Oct. 6, in London, the wife of Dr. C. S. Hallpike—a son.
HART.—On Oct. 3, Dr. Bridget Hart (*née* Egan), the wife of Dr. J. A. G. Hart, of Londonderry—a son.
HARWARD.—On Oct. 7, at Odiham, Hants, the wife of Dr. R. L. Harward—a son.
HICK.—On Oct. 8, at Chippenham, the wife of Dr. A. P. Hick—a son.
LEIGH.—On Oct. 5, at Romsey, the wife of Dr. R. E. Derek Leigh—a son.
MITCHELL.—On Sept. 25, in London, the wife of Dr. Herbert Mitchell—twin sons.
MOLESWORTH.—On Oct. 7, at St. Albans, the wife of Dr. David Molesworth—a son.
MORGAN.—On Oct. 6, at Southborough, the wife of Dr. C. R. Morgan—a son.
MOSELHI.—On Oct. 5, at Carlisle, the wife of Dr. A. Moselhi—a daughter.
MOYNAGH.—On Oct. 4, at Bristol, the wife of Dr. Kenneth Moynagh—a son.
NOBLE.—On Oct. 3, the wife of Dr. Andrew Noble, Stonehaven—a son.
REILLY.—On Oct. 9, in London, the wife of Dr. M. C. T. Reilly—a daughter.
SCADDING.—On Oct. 12, in London, the wife of Dr. J. G. Scadding—a daughter.
SCHOFIELD.—On Oct. 4, at Harpenden, the wife of Dr. Theodore T. Schofield—a son.
SMYTH.—On Sept. 28, at Dublin, the wife of Lieut.-Colonel S. Smyth, I.M.S.—a son.
WOOLF.—On Oct. 5, at Edinburgh, Dr. Cecil Mary Drillien, wife of Mr. Barnet Woolf—a daughter.

MARRIAGES

CALDER—HERRIOT.—On Oct. 1, at Glasgow, Francis Robert Murray Calder, M.B., to Janet Whitson Herriot, M.B., captain R.A.M.C.
KONSTAM—RITCHIE.—On Oct. 12, at Alford, Aberdeenshire, Peter G. Konstam, F.R.C.S.E., lieutenant R.A.M.C., to Sheila T. Ritchie, M.B.
O'NEILL—PEARSON.—On Sept. 30, in London, Desmond Francis O'Neill, M.C., M.B., to Ruth Mary Pearson.
ROCHE—HARDY.—On Oct. 4, in London, James Wallace Roche, M.B., to Margaret Joan Hardy.
WALTON—TRUMP.—On Sept. 21, at Salcombe Regis, Richard Walton, surgeon lieut.-commander R.N.Z.N.V.R., to Barbara Trump.

DEATHS

BAKER.—On Oct. 10, Arthur Ernest Baker, M.R.C.S., L.D.S., of Bromley, Kent, aged 83.
BEARD.—On Oct. 12, at Epsom, Frederic Beard, M.B. Camb., aged 84.
BRIGGS.—On Oct. 7, at Wigston, Christopher Duffield Briggs, M.R.C.S.
HARDWICK SMITH.—On Oct. 6, at Wellington, New Zealand, Henry Hardwick Smith, F.R.C.S.
HARVEY.—On Oct. 7, Willoughby Henwood Harvey, M.A. Camb., M.D. Toronto, of Cambridge, aged 65.
JACKSON.—On Oct. 8, Henry Beecher Jackson, M.A. Camb., M.R.C.S., aged 67.
MYERS.—On Oct. 12, Charles Samuel Myers, C.B.E., M.D., SC.D. Camb., F.R.S., of Minehead, aged 73.
RIPPON.—On Oct. 4, in London, Thomas Stanley Rippon, O.B.E., M.R.C.S., late wing-commander R.A.F.
ROYSTON.—On Oct. 6, at Moordown, Bournemouth, Charles James Royston, M.B. Aberd., aged 46.

Notes and News

NURSERY WORKERS IN SCOTLAND

To ensure a sufficient supply of properly trained workers in nurseries, nursery schools, and children's homes, Mr. Joseph Westwood, Secretary of State for Scotland, has decided to institute a new course for a nursery nurses' certificate to be awarded to girls in nurseries of all types who have followed a course of practical and theoretical training and have passed an examination conducted by a Nursery Nurses Examination Board which has just been set up. The course, details of which will be announced later, will cover two years, and will include practical work and training in nurseries or nursery schools, and vocational study and general education. The age-limits will be 15–25 at the start of training, and candidates will probably be required to have completed three years in a secondary school, and to serve for a probationary period before being accepted. The written part of the first examination by the board—to be taken by girls already in training—will be held on Nov. 16, and the oral and practical part on Dec. 3, 1946.

FOR CHILDREN AT TROGEN

THE Swiss exhibition of planning and building now open at the Royal Institute of British Architects, 66, Portland Place, London, W.1, illustrates a pleasant contribution to international understanding in the section of child welfare and youth service. This is the Pestalozzi children's hamlet at Trogen, Appenzell, where houses have been built on a lovely hillside to receive children of various nations. Building is not yet completed, but in each house 16 homeless children of both sexes, ranging in age from 3 to 15, will live with foster parents, and some 400 children will be given something like a normal home life for several years. Groups of houses will be occupied by children of one nationality, speaking their own language and keeping their national character, but each group will take part in the central organisation—an international community of children.

The hamlet is voluntarily financed, and school-children and students from Switzerland, France, Holland, and Austria have volunteered to help in building it. The Swiss had much experience during the war in dealing with tens of thousands of refugee children; the hamlet is therefore being founded under happy auspices.

MEDICAL AND DENTAL DEFENCE UNION OF SCOTLAND

THE membership of this union has in the past year increased by 279 to a total of 5742. The surplus on the year's working was £727, and the total surplus of assets over liabilities now amounts to £35,048. The union has still further strengthened its position notwithstanding the loss of revenue through the waiving of subscriptions from members in the Forces, who numbered 1883 at the beginning of the financial year. These figures are given in the annual report, which also contains this advice to a member threatened with a claim: (1) to report all the facts to the secretary, and send copies of all records of treatment; (2) to obtain and forward any relevant hospital, X-ray, and other reports; (3) to make no statement which might later be construed as an admission of liability; (4) to send to the secretary, without replying to them, any letters received from patients or their agents in connexion with the case; and (5) not to divulge that he or she is a member of a defence union.

University of Cambridge

Titles of degrees were conferred on the following during the months of August and September:

M.B., B.Chir.—R. S. J. Baker, H. F. Barnes, K. A. C. Bowen, J. E. G. Brieger, F. M. Fountain, J. F. Grant, M. C. Hare, M. Hobson, P. A. Howard, E. G. Howe, G. M. Hunt, H. M. J. Lawn, B. M. Leach, J. Raymond, A. M. Sibly.

University of Sheffield

Dr. R. S. Illingworth has been appointed full-time professor in charge of the new department of child health. It is expected that Dr. Illingworth, who is now assistant to the Nuffield professor of child health in the University of London, will take up his duties in the New Year.

Dr. A. R. Kelsall and Dr. J. Pemberton have been appointed full-time lecturers in medicine.

British Social Hygiene Council

Dr. Fred Grundy, medical officer of health for Luton, has been appointed chairman of the executive committee in the place of the late Dr. Otto May.

Royal College of Surgeons of England

A quarterly meeting of the council was held on Oct. 10, with Sir Alfred Webb-Johnson, the president, in the chair. Mr. J. P. H. Davies, of Lewes County School, was admitted as a Macloghlin scholar. Dr. R. J. Last and Mr. H. F. Lunn were appointed anatomical curators.

The council decided to hold an additional primary fellowship examination in January, and an additional final fellowship examination in February, 1947.

Diplomas of membership were granted to P. T. Ballantyne, Hans Dasch, and D. A. Richards.

Diplomas were granted jointly with the Royal College of Physicians to the following candidates:

D.T.M. & H.—C. G. Bree, D. J. Conway, Madjdeddine Mir-Fakhrai, S. T. Nakib, C. J. A. O'Kelly, A. W. Woodruff.

D.O.M.S.—Solomon Abel, H. Y. Bakre, P. B. Banaji, Edgar Benjacar, W. M. de C. Boxill, Mary Campbell, Prem Chandra, D. G. Cracknell, R. P. Crick, P. R. Day, D. W. Degazon, K. J. L. de Silva, E. F. J. Dunlop, J. D. J. Freeman, A. I. Friedmann, J. G. Gillan, Irene D. R. Gregory, C. D. Gun-Munro, K. J. Higham, J. J. Kennedy, Marian Lones, Edward Lyons, R. L. McKernan, J. M. Mallett, R. M. Mathers, R. C. E. Moffat, Louis Mushin, J. M. G. Nixon, G. N. Pattison, A. J. G. Pullar, K. B. Redmond, H. N. Reed, Edward Riley, C. C. Ring, J. A. Robertson, M. J. Roper-Hall, E. L. N. S. Sack, John Smallpiece, Helen S. C. Smith, A. H. Staples, R. W. Stephenson, Charles Swanston, H. J. R. Thorne, C. R. Todd, H. J. Wales, E. P. Walsh, J. J. Walsh, W. F. Walton.

D.C.H.—Daphne S. A. Anderson, D. C. Arnott, Katharine M. D. Bailey, C. L. Balf, A. C. Blandy, Andrew Bogdanovitch, P. T. Bray, Lorna M. Brierley, Marion Brown, F. R. Buckler, A. E. Buckwold, D. J. Conway, N. J. Cook, Pamela J. Coope, Janet E. W. Copland, P. J. N. Cox, W. H. Craike, Rosemary Davies, Walter Dickson, J. H. Diggle, Margaret D. D. Dudley-Brown, Vera S. Emanuel, G. A. Emmerson, Ethel R. Emslie, Linde E. U. Ewald, Ruth M. Fawcett, A. A. H. Gailey, W. H. Galloway, R. E. Glennie, S. G. Hamilton, J. D. L. Hansen, E. W. Hart, Denise O. Henry, Isabella Hood, A. M. Jelliffe, Marion E. Jepson, C. C. Joannides, A. O. John, Cyril Josephs, Nest Kahan, Gwendoline M. E. Keevil, Elizabeth M. Kingsley Pillers, Kathleen M. Lane, Margaret J. Lezema, H. A. Leggett, K. R. Llewellin, Muriel J. Lowe, Patrick Macarthur, Alison D. McDonald, N. R. McEvoy, Mary S. McGladdery, Bessie R. Mackenzie, Douglas McLean, Antoinette M. H. MacMahon, W. J. Matheson, J. B. Mehta, E. W. Miles, Mary Milnthorpe, Enid E. Mitchell, Lucille M. Morgan, J. M. Mounsey, Agnes D. D. Murray, P. J. O'Reilly, B. D. Patel, S. H. Patel, Jean W. Paul, J. D. Pickup, E. M. Poulton, P. J. Preston, Ruth Prothero, L. B. Robinson, Sutcliffe Ruttle, Gwladys M. Sewart, Mary D. H. Sheridan, Katherine V. Smith, Helen M. Wagstaffe, H. R. E. Wallis, L. L. R. White, T. K. Whitmore.

D. Phys. Med.—J. H. Crosland, C. R. L. Orme, J. D. Stewart.

Scottish Universities By-election

Colonel Walter Elliot, F.R.C.P., F.R.S., will stand as Unionist candidate in the forthcoming election caused by Sir John Orr's resignation. Colonel Elliot, who is a graduate of Glasgow University, has been Minister of Agriculture (1932–36), Secretary of State for Scotland (1936–38), and Minister of Health (1938–40).

Society for the Relief of Widows and Orphans of Medical Men

At a meeting of the court of directors held on Oct. 9, with Dr. R. A. Young, the president, in the chair, it was stated that in the last half year £1940 had been given to widows in relief. Membership of the society is open to any registered medical man living within twenty miles of Charing Cross. Full particulars may be had from the secretary, 11, Chandos Street, London, W.1.

Empire Rheumatism Council

Mr. Aneurin Bevan and Lord Horder will receive the guests at the reception which is to be held at the Apothecaries' Hall, Black Friars Lane, London, E.C.4, on Monday, Oct. 28, at 4 P.M., to celebrate the tenth anniversary of the foundation of the council. The guests of honour will be Mr. M. G. B. Prytz, the Swedish minister, Prof. J. A. Höjer, chief medical officer of the Royal Swedish health department, and his deputy, Dr. B. Strandell, and Dr. Loring T. Swaim, of the American Rheumatism Association.

Family Allowances

That family allowances are intended to assist in improving the standard of health of the most needy section of the community and must therefore not be reduced for any reason, was the view expressed by the council of the Socialist Medical Association at their recent meeting. At present those receiving special allowances for tuberculosis, workmen's compensation, and other contingencies are liable to have their total income cut by the amount of the family allowance, robbing the latter of all the beneficial effects it was intended to have. The association supports the strong protests being made and asks that family allowances be given as a right and without any reference to the total income.

Biochemical Society

A joint discussion on Quantitative Biochemical Analysis by Microbiological Response will be held by the Biochemical Society and the Society for General Microbiology at the London School of Hygiene, Keppel Street, London, W.C.1, on Saturday, Nov. 2, at 11.15 A.M.

Course on Diseases of the Chest

A course of lectures and demonstrations will be held at the London Chest Hospital, Victoria Park, E.2, on Fridays at 5 P.M., from November till March. Those to be given this year are: Nov. 1, Dr. S. Roodhouse Gloyne, Industrial Diseases of the Lung; Nov. 8, Mr. S. C. Suggit, Carcinoma of the Larynx and Pharynx; Nov. 15, Dr. Shirley Smith, the Heart in Pulmonary Disease; Nov. 22, Mr. Holmes Sellors, Surgery of the Heart; Nov. 29, Dr. J. R. B. Hern, Asthma; Dec. 6, Dr. Browning Alexander, Consideration of Diagnosis and Treatment of Lung Abscess; Dec. 13, Dr. Franklin Wood, Recent Advances in the Radiology of Lungs.

Field Marshal Montgomery on Morale

The Lloyd Roberts lecture will be delivered at the Royal Society of Medicine on Monday, Oct. 28, at 3 P.M., by Field Marshal Viscount Montgomery. His subject is to be Morale, with Particular Reference to the British Soldier.

At a scientific reunion of the Société Internationale de Chirurgie Orthopédique et de Traumatologie in Brussels on Oct. 3 and 4, Prof. Louis Ombrédanne was re-elected president, and Dr. Jean Delchef secretary-general; Prof. Harry Platt and Dr. San Ricart were elected vice-presidents; and Dr. Henry Meyerding, of the Mayo Clinic, was elected president of the next congress, which will be held in Amsterdam in September, 1948.

Medical Diary

OCT. 20 TO 26

Monday, 21st

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
5 P.M. Prof. Harry Platt: Localised Cystic Disease of Bone.

Tuesday, 22nd

ROYAL COLLEGE OF SURGEONS OF ENGLAND
5 P.M. Mr. Geoffrey Keynes: Surgery of the Anterior Mediastinum.
ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5 P.M. *Medicine.* Dr. Maurice Davidson: Judgment in Medicine. (Presidential address.)
LONDON SCHOOL OF DERMATOLOGY, 5, Lisle Street, W.C.2
5 P.M. Dr. W. J. O'Donovan: Psychosomatic Dermatoses.

Wednesday, 23rd

ROYAL COLLEGE OF SURGEONS OF ENGLAND
5 P.M. Mr. A. C. Palmer: Ætiology, Symptoms, and Treatment of Procidentia.
ROYAL SOCIETY OF MEDICINE
5.30 P.M. *Endocrinology.* Mr. L. R. Broster, Dr. E. F. Scowen, Dr. F. L. Warren: Over-activity of the Adrenal Cortex.
RESEARCH DEFENCE SOCIETY
3.15 P.M. (26, Portland Place, W.1.) Prof. N. Hamilton Fairley, F.R.S.: War-time Research in Malaria and other Tropical Diseases of Military Significance. (Stephen Paget lecture.)

Thursday, 24th

ROYAL COLLEGE OF SURGEONS OF ENGLAND
5 P.M. Mr. W. B. Gabriel: Causation and Treatment of Anal Incontinence.
ROYAL SOCIETY OF MEDICINE
8 P.M. *Urology.* Mr. R. H. O. B. Robinson: Problems of Renal Lithiasis. (Presidential address.)
LONDON SCHOOL OF DERMATOLOGY
5 P.M. Dr. G. Duckworth: Virus Diseases of the Skin.
MEDICO-LEGAL SOCIETY
8.15 P.M. (26, Portland Place, W.1.) Mr. L. Le Marchant Minty, PH.D.: Legal Aid to Assisted Persons.

Friday, 25th

ROYAL COLLEGE OF SURGEONS OF ENGLAND
5 P.M. Mr. R. C. Brock: Surgery of Lung Abscess.
ROYAL SOCIETY OF MEDICINE
2.30 P.M. *Epidemiology and State Medicine.* Brigadier Tom Kennedy, Colonel Horsburgh, Colonel H. A. Raeburn: Health Problems in Germany.
5 P.M. *Pædiatrics.* Professor Debono: Kala-azar in Infancy.
ROYAL MEDICAL SOCIETY, 7, Melbourne Place, Edinburgh
8 P.M. Major-General P. H. Mitchiner: Aftermath of War in Medicine.

Saturday, 26th

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES, 11, Chandos Street, W.1
2.30 P.M. Dr. F. R. Curtis: Venereal Disease in Occupied Germany.

Appointments

GOVAN, A. D. T., M.B. Glasg., PH.D. Birm., F.R.F.P.S.: director of research, Glasgow Royal Maternity and Women's Hospital.
GRIERSON, A. M. M., M.B. Edin., D.P.H.: deputy medical officer of health, City of Manchester.
HARTLEY, J. B., M.D. Durh., F.F.R., D.M.R.E.: radiologist (diagnostic department), Christie Hospital and Holt Radium Institute, Manchester.
LINDAHL, J. W. S. H., M.CHIR. Camb., F.R.C.S.: second laryngologist, King Edward Memorial Hospital, Ealing.
MAIN, T. F., M.D. Durh., D.P.M.: medical director, Cassel Hospital for Functional Nervous Disorders, Stoke-on-Trent.
PEROIVAL, R. C., F.R.C.S., M.R.C.O.G.: gynæcological surgeon, King George Hospital, Ilford.
WARIN, J. F., M.D. Leeds, D.P.H.: deputy medical officer of health, City of Leeds.

Guy's Hospital, London:
BAKER, C. G., O.B.E., M.D. Lond., M.R.C.P.: assistant physician.
BLACKBURN, GUY, M.B.E., M.CHIR. Camb., F.R.C.S.: assistant surgeon.
CRISP, E. J., M.B. Camb.: physician in charge of physiotherapy department.
DREW, A. J., F.R.C.S.: surgical registrar.
EVANS, P. R. C., M.D., M.SC. Lond., F.R.C.P.: director of the department of child health and physician to children's department.
HILLS, T. H., M.B. Lond., D.M.R.E.: director of department of diagnostic radiology.
HORTON, R. E., M.B. Lond.: surgical registrar.
KENSHOLE, H. H., D.S.O., T.D., M.R.C.S., L.D.S.: assistant dental surgeon.
KESSON, C. W., M.R.C.P.: children's registrar.
LILWALL, B. G. A., F.R.C.S.: surgical registrar.
NICHOLAS, C. P., F.R.C.S.: surgical registrar.
PRINGLE, K. E., L.D.S. R.C.S.: assistant dental surgeon in children's department.
RIPMAN, H. A., M.B. Lond., D.R.C.O.G.: obstetric registrar.

Royal Waterloo Hospital for Children and Women:
ANSON, B., M.R.C.S., D.A.: anæsthetist.
ARMSTRONG, J. R., F.R.C.S.: orthopædic surgeon.
BAYNES, T. L. S., M.D. Lond., F.R.C.S.: gynæcological registrar.
BLACKBURN, F. H., M.B. Durh., M.R.C.S., D.A.: anæsthetist.
BLOOM, ROSS, F.R.C.S.: surgical registrar.
BRADDON, I. G., M.R.C.S., D.A.: anæsthetist.
EXNER, G., L.D.S. R.C.S.: dental surgeon.
LANCKENAU, N. I., M.D. Lond.: physician in charge of physical medicine.
MYERS, G., F.R.C.S.: surgical registrar.
SPIERS, B. G., F.R.C.S., M.R.C.O.G.: gynæcological registrar.
WIGODER, L., M.B. Dubl., M.D.S.: dental surgeon.

Royal Sussex County Hospital:
ALLEN, T. S., F.R.C.S.E.: ear, nose, and throat surgeon.
BINNING, REX, M.R.C.S.: anæsthetist.
BOURNE, W. A., M.D. Camb., M.R.C.P.: physician.
CRAWFORD, J. H., M.R.C.S.: anæsthetist.
DOWNER, H. G., M.B. Melb., D.L.O.: ear, nose, and throat surgeon.
FORRESTER-WOOD, W. R., F.R.C.S.: surgeon.
FRASER, G. A., M.B. Edin., D.L.O.: assistant ear, nose, and throat surgeon.
JONES, E. C., M.B. Lond., M.R.C.S.: assistant dermatologist.
MCCURRICH, H. J., M.S. Lond., F.R.C.S., M.R.C.O.G.: surgeon.
MCGREGOR, H. G., M.D. Lond., M.R.C.P.: physician.
MILLINGTON, E., M.R.C.S., D.M.R.: radiotherapist.
PRICE, R. K., M.D. Lond., M.R.C.P.: physician.
WATT, A. W., M.B. Glasg., D.P.M.: psychiatrist.
WAUCHOPE, GLADYS M., M.D. Lond., F.R.C.P.: consulting physician.
WILLIAMSON, J. C. F. L., F.R.C.S., M.D. Camb.: assistant surgeon.

Warwickshire Hospitals Council:
BERRILL, T. H., M.B. Brist., F.R.C.S.: visiting general surgeon.
WATSON, A. J., M.B. Lond., F.R.C.S.: director of accident and fracture services.

Oldham Royal Infirmary:
DAVIES, J. H. T., M.B. Camb.: visiting dermatologist.
HESLOP, J. F., M.B. Manc., F.R.C.S.: visiting genito-urinary surgeon.
JELLY, G. O., B.M. Oxfd, M.R.C.P., F.R.C.S.: visiting surgeon.
KENYON, A. L., B.SC., M.B. Manc., F.R.C.S.: visiting surgeon.
MURRAY, A. R., M.B. Edin., F.R.C.S.: first assistant to orthopædic and accident service.
NICHOLSON, W. F., M.A., M.D., M.CHIR. Camb., F.R.C.S.: visiting thoracic surgeon.
NISH, J. N., M.B. Melb., F.R.C.S.: orthopædic surgeon.
RACKER, D. C., M.B. Manc., M.R.C.O.G., F.R.C.S.E.: visiting gynæcologist.
RICHARDSON, A. H., O.B.E., M.R.C.S., D.M.R.: visiting radiologist.
SMITH, V. T., M.D. Manc., F.R.F.P.S.: visiting ear, nose, and throat surgeon.
SYKES, R., B.SC., M.D. Lond., M.R.C.P.: visiting physician.
TAYLOR, W. V., M.B. Lond., D.M.R.: assistant radiologist.

Swansea General and Eye Hospital:
BOWEN, J. G., M.B. Lond., F.R.C.S.: assistant surgeon.
BOYLE, H. H., H.D.D. & L.D.S. Glasg., H.D.D. Edin.: surgeon dentist.
CELLAN-JONES, C. J., M.D. Durh., F.R.C.S.E.: surgeon.
DAVIES, V. J., M.D. Lond., F.R.C.S.E., D.R.C.O.G.: gynæcologist.
EVANS, I. Q., F.R.C.S.E.: assistant surgeon.
HOWELL, H. W., M.D. Lond., M.R.C.P.: assistant physician.
JONES, D. S., L.M.S.S.A., D.A.: anæsthetist.
JONES, G. W., M.R.C.S.: assistant radiologist.
JONES, W. H., M.B. Wales: anæsthetist.
MACLEAN, W., M.D. Manitoba, F.R.C.S.E.: surgeon.
MORGAN, J. C., L.D.S. R.C.S.: surgeon dentist.
TANNER, C. H., M.B. Lond., F.R.C.S.: assistant surgeon.
THOMAS, I. J., B.S. Lond., F.R.C.S., F.R.C.S.E.: assistant gynæcologist.

CORONARY DISEASE

THE HARVEIAN ORATION OF 1946*

Sir MAURICE CASSIDY
K.C.V.O., C.B., M.D. Camb., F.R.C.P.
PHYSICIAN TO H.M. THE KING; CONSULTING PHYSICIAN TO ST. THOMAS'S HOSPITAL, LONDON

HARVEY was one of the first, and perhaps the most famous, of the experimental physiologists; certainly he is the most venerated. Even after the lapse of three hundred years our admiration for his genius is mingled with affection engendered by the many endearing facets of his character. His operative technique was of necessity somewhat crude. For instance, in the introduction to *De Motu Cordis* he refers to Galen's experiment:

> "An artery having been exposed is opened longitudinally and a reed, or other pervious tube, is inserted into the vessel through the opening, and the wound is closed."

Harvey comments:

> "I have never performed this experiment of Galen, nor do I think it could very well be performed in the living body, on account of the profuse flow of blood that would take place from the vessel which was operated on."

In the second disquisition to Riolan, however, Harvey describes the performance of this operation and notes obscure pulsation of the artery distal to the "pervious tube," and that blood escapes in spurts from this distal portion on section of it. But he goes on to lament that "the effusion of blood from the wound confuses everything, and renders the whole experiment unsatisfactory and nugatory." When watching Dr. Crafoord, of Stockholm, excise an aortic coarctation, and perform the almost incredible feat of effecting an end-to-end anastomosis of the thoracic aorta above and below the coarctation (Crafoord and Nylin 1945), I thought how delighted Harvey would have been with this triumph of modern surgery. He would also have shared with us our admiration of the skill which enables the surgeon of today to undertake the ligation of the patent ductus arteriosus with little more trepidation than before appendicectomy. He would have joined with us in congratulating Blalock, who successfully anastomoses the innominate or the subclavian artery with the right or left pulmonary artery (Blalock and Taussig 1945), and thus relieves some of the inconveniences of Fallot's tetralogy.

Harvey would surely have appreciated splanchnic sympathetic resection as an interesting physiological experiment, and would, like us, have been delighted to hear that the extensive lumbodorsal splanchnic resection devised by Smithwick (1944) can rob essential hypertension of much of its terror, for some years at any rate. But perhaps Harvey's admiration would be tinged with a little not unnatural envy were he to witness the work of his successors in the field of experimental animal surgery—the work, for instance, of Murray, Wilkinson, and Macgregor (1938), of Toronto, who excise a portion of the mitral valve and repair it with a strip of external jugular vein, with complete recovery of the animal. What would Harvey have thought of Cutler's cardio-valvulotome, or of cardiac endoscopy as practised by Harken and Glidden (1943)? Who can doubt that before long the surgical treatment of valvular stenosis in man will become a justifiable and successful operation?

I have to confess that I have had neither the opportunity nor the aptitude to obey Harvey's injunction "to search and study out the secrets of nature by way of experiment," except so far as every clinician experiments in a desultory sort of way in respect of treatment. But at last we physicians are beginning to recognise the value of controlled, as opposed to haphazard, experimental treatment. The brilliant results of the treatment of bacterial endocarditis with penicillin under the ægis of Prof. R. V. Christie and his committee would not have been achieved so quickly or so successfully on the old haphazard lines.

PREVALENCE OF CORONARY DISEASE

For many years I have been especially interested in cardiology, and I have been impressed, like many others, by the increasing prevalence of coronary disease. Even during so short a period as the last twenty years this increasing prevalence seems to be beyond question. In the year 1926, 64,465 persons died in this country of all forms of heart disease. Ten years later this number was almost doubled, 126,584 to be exact. The figures for coronary disease are even more startling: 1880 died in 1926; 14,095 in 1936; and 19,496 in 1939. The crude death-rate from all causes per 1000 persons living fell from 22 in the decade 1851–60 to 12 in 1930, and has subsequently remained almost stationary at about that figure. The similar crude death-rate from heart disease, and particularly from coronary disease, has risen in a spectacular fashion during this period, especially during the last twenty years. In the case of coronary disease the figures increase rapidly year by year: 48 per million living in 1926; 148 in 1930; 473 in 1939.

Part of this rapidly increasing death-rate from coronary disease is no doubt attributable to the increasing age of the population. In 1900 there were 1,750,000 persons over 65 years of age in Great Britain; in 1937 there were over 3,750,000 (Dudley Committee 1944). It is true that the standardised death-rate, corrected for ageing, for policy holders of the Metropolitan Life Insurance Company (1946), of New York, shows a 70% decline for diseases of heart, arteries, and kidneys in 1940–45 compared with 1911–15. But this astonishing decline in mortality is for ages 1–74. When the figures for the different age-groups are examined, it is clear that the improved mortality affects chiefly persons up to the age of 25, and is no doubt attributable, in part at least, to more efficient treatment of the acute infections which are largely responsible for cardiovascular and renal deaths in this lower age-group. Between the ages 35 and 64 the standardised mortality among men shows little or no decline in the past two decades, and there is in fact an increased mortality now compared with the level reached in the early nineteen-twenties.

The crude death-rates in America, without correction for increasing age of population, have increased as they have done in this country; thirty-five years ago cardiovascular diseases accounted for less than a quarter of all deaths. Now they account for nearly half.

Part of this mounting coronary mortality has been ascribed by some to increasing accuracy of certification. But I cannot believe that increasing accuracy of certification can play a very important part. The position here is very different from that in such a disease as bronchial carcinoma, for example, where accurate diagnosis largely depends on refinements of investigation, such as are afforded by bronchoscopy and radiography. Angina pectoris is one of the easiest of all diseases to recognise. Its clinical features have been well known to every doctor since Heberden recounted them before this college in 1768. In most cases of angina pectoris electrocardiographic and radiographic investigations are superfluous aids to diagnosis.

Certainly the clinical recognition of coronary thrombosis has till recently been hidden from us. Though first well described clinically by Herrick (1912), its diagnosis did not become widespread in America till about 1920. Curiously enough it was not until 1925 that McNee brought to the notice of physicians in this country the clinical picture of coronary thrombosis as first described by the American cardiologists, and the rapid increase in the certification of deaths from coronary thrombosis since that date must be partly attributable to this. Even so, I have the impression that coronary thrombosis is

* Delivered before the Royal College of Physicians of London on Oct. 18.

far more prevalent than it was. Looking through my notes of patients seen twenty or thirty years ago, I come across occasional cases where I failed to recognise the coronary thrombosis, which now, on paper, is the obvious diagnosis. But such cases are surprisingly few. It is interesting to read now James Mackenzie's notes of case 112, one of the 160 case-records in his book on *Angina Pectoris* (1923). He describes this as "one of the most puzzling cases I have met." It is now evident to us that this patient had at least two attacks of coronary infarction, the second associated with pericardial friction, and that six months later the consequent myocardial degeneration brought on three attacks of acute pulmonary œdema, the last fatal.

It is odd, too, that coronary thrombosis figures so seldom in the post-mortem reports of thirty years ago, despite the fact that the very astute morbid anatomists of those days were fully alive to the existence of this condition.

Consider, too, the clinical experience of great physicians of the past. Mackenzie (1923) states that "380 patients consulted me for angina pectoris." Osler (1910) says:

> "It is a disease for seniors to discuss, since juniors see it but rarely; indeed I had reached the Fellowship before I saw a case in hospital or in private practice. During ten years I did not see a case at the Montreal General Hospital, and only one case at the University Hospital, Philadelphia.... A consultant in active practice may see 10, 15, or more cases in the course of a year, and this is about the figure reached in this country by a consultant with recognised cardiovascular leanings."

He goes on to say that he has now seen 268 cases, which included 42 "of the mild neurotic or pseudo form." Contrast these figures with those of the modern cardiologist, who counts his coronary patients by thousands rather than by hundreds, and remember that there was but one James Mackenzie, and one William Osler, whereas the modern cardiologist's name is legion! During the ten years 1898–1908 Sir Richard Douglas Powell (1909) saw 96 cases of angina, 26 of which he classified as vasomotor angina. Surely Osler, Mackenzie, and Douglas Powell were at least as competent to diagnose angina pectoris as are physicians of this generation.

DIAGNOSIS

What is the explanation of the increasing prevalence of coronary disease? In an attempt, and I confess at once a vain one, to find some answer to this question I have analysed the notes of 1000 cases of coronary disease, including both coronary occlusion and angina pectoris, seen in consulting practice. I have notes of approximately another 1000 cases which I have not analysed. I was careful to include only those cases where I was reasonably certain that coronary disease was present. And here may I put in a plea for the abandonment of such terms as angina minor, angina innocens, and (worst of all) pseudo-angina? Either the patient has angina—or he has not. If he has, we believe that some portion of his myocardium is ischæmic, usually as a result of coronary atherosclerosis, with or without a coronary thrombosis or a subintimal hæmatoma. Syphilis is a rare cause of true anginal pain, and embolism a rarer cause still. A severe anæmia may play a part, probably in association with some degree of coronary atherosclerosis, for I have never seen a severe anæmia cause angina in a young subject, though this happens commonly in the more elderly. Alastair Hunter (1946), however, has described 12 cases of anæmic angina, of which 10 were in women, and 5 in persons aged 40 or less, the youngest being 31, which certainly suggests that anæmia alone may cause anginal pain.

Anginal pain is sometimes a symptom of rheumatic heart disease, but I have not included such cases in my series, because in my experience they do not conform to the clinical picture of the atherosclerotic type, though we know that rheumatic infection may produce somewhat similar coronary changes (Karsner and Bayless 1934). I have never seen a coronary occlusion complicate rheumatic heart disease, nor do I feel that anginal pain in a young rheumatic subject has the same serious significance as in the atherosclerotic patient.

We can conceive of the possibility of spasm of a healthy coronary artery producing a localised myocardial ischæmia with consequent coronary pain; but we have no proof that this does in fact ever happen, though we may suspect that an unstable vasomotor control may play a part in the clinical picture of the patient, familiar to us all, who suffers, perhaps for years, from anginal paroxysms of great severity, provoked by trivial physical effort, and especially by emotion. Findings on physical examination may be surprisingly negative; and consequently these patients are often regarded as cardiac neuropaths till at last the diagnosis of organic coronary disease becomes only too clear, perhaps as a result of the sudden and unexpected death of the patient.

Some years ago I used to diagnose "vasomotor angina" not infrequently in patients who complained of anginal pain of typical distribution, this pain being provoked by effort, but especially by emotion, without physical signs of organic cardiovascular disease and with a normal electrocardiogram. Sometimes there was evidence of vasomotor instability, such as easy flushing, or Raynaud-like phenomena, or a history of migraine. But increasing experience has convinced me that sooner or later these patients present undoubted evidence of organic coronary disease. If the same amount of effort constantly provokes substernal pain or even discomfort, however slight, and if this discomfort disappears promptly with rest, I think we may assume with confidence some degree of coronary obstruction, however negative the findings may be.

As for that large heterogeneous group of so-called false angina, we can only speculate as to the explanation of their pain, feeling assured that it is not of coronary origin. Many of them are suffering from a cardiac anxiety state. There is an interesting, and sometimes a diagnostically difficult, group of patients, usually women, who have severe paroxysms of precordial, usually not sternal, pain, which may radiate into the arms, back, or jaws. These paroxysms may be provoked by emotion, or there may be no obvious exciting cause. They come after, rather than during, effort, and they are usually widely spaced, with periods of robust health, without limitation of physical effort, between them. The subjects of these attacks, though sometimes temperamental, are often quite stable psychologically. Their symptoms are very real and severe, and may indeed be alarming. Possibly these paroxysms may be due to spasm of the œsophagus or of the cardiac sphincter. Radiological confirmation of this is obviously difficult to obtain, though I understand that William Evans has made some interesting kymographic observations in this class of case. Diagnosis is made more difficult here by the fact that nitroglycerin gives relief; but perhaps it does so by relaxing gastric or œsophageal and not coronary spasm.

I submit that in the differential diagnosis between true angina and these non-coronary pains, careful history-taking is even more important than physical, including instrumental, examination, and that the characteristic and constant relationship between anginal pain and effort is fundamental.

ÆTIOLOGY

Sex-incidence.—Turning now to my own statistics, out of 1000 patients, 779 were males, 221 females, giving a female-to-male ratio of 1 to 3·5, which seems to be about the usual ratio found in the literature, though in a recent report from the Mayo Clinic on 3440 anginal patients the female-to-male ratio was 1 to 4·3 (Parker et al. 1946). This far heavier incidence of angina on males rather than on females has never, so far as I know, received a satisfactory explanation. In the past no doubt women led a more sheltered life. But certainly

today no-one would contend that men work four times as hard as women; in fact some might argue that the reverse is true. I have not been able to satisfy myself that the incidence of angina on women has increased of recent years compared with that on males. If smoking plays an important part in the causation of coronary disease, which I doubt, we should certainly expect a more equal sex-incidence during the next ten years or so.

Nor is there any satisfactory explanation of the unquestionably heavier incidence of coronary disease on the non-hospital as opposed to the hospital population.

Age-incidence.—My figures are much the same as those of the Mayo Clinic:

Age	Under 30	30–40	40–50	50–60	60–70	70–80	80
Females ..	0	1·3%	11·7%	29%	39%	15%	4%
Males ..	0·2%	3·2%	14·6%	33·9%	36%	11·1%	1%

About 70% of all patients were aged between 50 and 70 at the onset; 58% of women and 48% of men were over 60 at onset, which confirms the general impression that coronary disease tends to become manifest at a later age in women than in men. In 26 males the age at onset was under 40, in 2 under 30, the youngest being 26. There were only 3 women under 40 and none under 30.

It has become evident that coronary disease in young subjects is not so rare as used to be thought. French and Dock (1944) have reported 80 cases of coronary disease in American soldiers aged 20–36 during the recent war, and Newman (1946), in this country, 50 cases of coronary occlusion in Service men and women, aged 25 or less. Of Newman's patients 22 were under 30, the youngest aged 20. At autopsy atheromatous changes were found, in several instances accompanied by extensive calcification.

Stolkind (1928) reported 4 personal cases of angina in children and collected a further 25 cases from the literature. Many of these cases were in rheumatic children, and in some the evidence of angina was not very convincing.

Family history plays a notorious part in the ætiology of cardiovascular disease, and it did so in almost exactly half my cases. But this leaves another 50% of patients whose coronary disease cannot be attributed to inheritance.

Stress.—Mental or physical stress is often thought to be responsible for early cardiovascular death, and coronary disease has been brought into the ever-increasing ambit of psychosomatic disease (Halliday 1945). But does the population really work harder or live more strenuous lives than their grandfathers did? I sometimes doubt it. Certainly we eat and drink much less than they did. I have looked carefully through the histories of my patients, and in only 20% of them do I find evidence of subjection to outstanding stresses. Many of them in fact seem to have lived remarkably placid and sheltered lives. Dr. Paul White, of Boston, on a recent visit to this country told us that in the first edition of his book *Heart Disease* a sentence emphasising the relationship between angina and stress was in italics, in the second edition in ordinary print, and in the third deleted.

Nor am I familiar with the "coronary-disease personality," as described at some length by Arlow (1945):

> "A stubborn self-willed child who early entered into competitive relationship with a much feared and envied parent; the conflict is repressed and identification made with the parent. . . . He attempts to equal his superiors, to surpass and dominate others. A masochistic trend may be noted in the manner in which these patients neglect themselves and make themselves martyrs to their own ideals. . . . The compulsive striving for achievement and mastery never seems to end. Success brings no gratification nor release from tension."

Tobacco has long been thought to be a factor in the causation of arterial spasm, and there seems to be convincing experimental evidence of this. Numerous workers—e.g., Stewart et al. (1945), Evans and Stewart (1943), and Roth et al. (1944)—have demonstrated that the smoking of two cigarettes usually lowers the peripheral skin temperature, diminishes the peripheral blood-flow, and raises the systolic, and still more the diastolic, blood-pressure. It is said that these changes may be evident not only during the smoking of the cigarettes but also sometimes for as long as 30 minutes subsequently. This is depressing information to the smoker, but he will be encouraged to hear from Goetz (1942) that very similar results are obtained if the subject is alarmed, or asked to do a difficult sum, or even to take a series of deep breaths. Goetz concludes that the driving of a car in traffic would produce more adverse circulatory effects than the smoking of several cigarettes in an armchair at the club.

I always advise sufferers from intermittent claudication to stop smoking, and usually this brings no amelioration of their symptoms. But very occasionally the results are dramatic, and I have seen a relapse if smoking is resumed. So far as so-called "tobacco angina" is concerned, I have never encountered such a condition, and certainly I have never seen angina cured by stopping smoking. Statistically 17·6% of my coronary patients were non-smokers, 42·6% smoked moderately—i.e., not more than twenty cigarettes a day—and 39·8% were heavy smokers. As a control I investigated the smoking habits of a small series of non-cardiac cases, and found much the same figures.

PROGNOSIS

Coronary disease persisted more than twenty years in 11 of my patients, more than thirty years in 2 of them. The record duration was fifty-two years, in a lady who had her first attack of angina at the age of 30; she was leading a busy life at the age of 80, though still liable to angina whenever she walked. She died suddenly at the age of 82.

It has long been known that quite extensive coronary disease is compatible with an active life and need not necessarily be associated with angina. In fact this used to be put forward as an argument against the view that angina is due to coronary ischæmia. Coronary occlusion often antedates angina. It did so in 225 (22·5%) of my cases. Yet before coronary occlusion can occur there must almost always be coronary disease. Moreover, a remarkably complete functional recovery is possible after a coronary occlusion. One of my patients played vigorous games after a coronary occlusion at the age of 39. He had a second attack at the age of 48, and, against advice, was playing tennis regularly two years later, without any angina. Now at the age of 58 he is at work, plays golf, and mows his lawn without cardiac symptoms.

It is common for coronary disease to be entirely latent till sudden death takes place. Professor Hume, of Newcastle, tells me that since 1911 he has performed or attended post-mortem examinations on 160 miners who had died suddenly and unexpectedly in the pit or in close proximity to it. The cause of death in each instance was coronary atheroma, and most of the men had been working regularly, without complaint, up to the moment of their fatal collapse. Only 40 had premonitory symptoms. In 1 case there was a clear history of an attack of coronary thrombosis two years previously, after which the man had resumed his normal work in the mine and continued it till his sudden death. In about half the 160 cases there were old fibrotic scars in the heart muscle.

The explanation of coronary disease without symptoms is presumably that a wonderfully efficient collateral circulation may be formed if arterial obstruction develops sufficiently slowly. As Lowe and Wartman (1944) point out:

> "Complete obstruction may, gradually produced, effect no disturbance whatever in the blood-supply to the tissue. On the other hand, should the parent vessel supplying the anastomotic circulation become suddenly blocked, the

area deprived of blood-supply will be much greater than that following blockage of a similar vessel in a normal circulation."

Hence, presumably, the sudden fatal attacks in Hume's coalminers with previously symptomless fibrotic hearts. In this way too we find an explanation for the fact that, on the whole, angina in those aged over 70 runs a more benign course than it does in those aged under 50.

RELATION TO HYPERTENSION

Investigating the relationship between hypertension and coronary disease, I classified my cases as having a normal blood-pressure where the readings were below 160/100, moderate hypertension above these figures but below 200/120, and gross hypertension above 200/120. Throughout the entire series, in 44·6% the pressure was normal, in 33·7% moderately, and in 21·7% grossly increased. Excluding those cases in which an existing or recent coronary occlusion was thought to be responsible for a low blood-pressure, the figures were normal tension 30·6%, moderate hypertension 42·3%, gross hypertension 27·1%. So nearly 70% of my anginal patients without coincident or recent coronary occlusion were hypertensives. These findings surprised me, for I had not realised that the proportion of hypertensives was so high.

Fisher and Zukerman (1946) say that, in the literature, hypertension antedating coronary occlusion has varied between 33% and 73%. Of their own 108 cases of coronary occlusion, hypertension antedated the occlusion in 65% of the women and 39% of the men. They point out that negroes, though more liable than whites to hypertension, show a significantly lower incidence of coronary disease. Nevertheless, one cannot help suspecting that there may be some ætiological factor in common between hypertension and coronary disease. But unhappily, in spite of all the intensive investigation of hypertension during the last decade, fruitful though it has been, we are still abysmally ignorant of its ætiology—in the words of Harvey, "all we know is infinitely less than all that still remains unknown." Is it possible that in the remarkable sex-incidence of coronary disease we may find some clue to ætiology? Can it be that masculinity predisposes one to coronary disease, and that femininity safeguards from it—that perhaps cholesterol metabolism is vitiated by maleness? In this connexion it is interesting to note that some maintain that it is the more masculine type of woman who is prone to develop coronary disease—though I confess that this has not been my experience.

ENVOI

During the past few months I have often asked myself how Harvey would have approached the problem which I have here so lamentably failed to solve. Certainly not by speculations, nor by clinical impressions; and I very much doubt whether the statistical approach would have made much appeal to him. He would have agreed with Fernel that "We cannot be said to know a thing of which we do not know the cause" (Sherrington 1946). When asked *why* the blood circulated, he replied that he could not say. Harvey was interested only in proving by experiment that it did circulate: "it is shown by the application of a ligature that the passage of the blood is from the arteries into the veins" (Harvey 1616). I hope that today he would have accepted coronary arterial disease as the cause of angina, and I believe that he would be one of the many workers who are endeavouring "to search and study out the secrets" of hypertension and of arterial disease by experiment, whether in the laboratory or at the bedside.

In conclusion I recall the indenture of Harvey, dated June 26, 1656, in which he conveyed to the college the gift of his patrimonial estate of Burmarsh, in Kent. He exhorted the fellows and members to search and study out the secrets of nature by way of experiment; and also for the honour of the profession, "to continue in mutual love and affection amongst themselves, without which neither the dignity of the college can be preserved nor yet particular men receive that benefit by their admission into the college which else they might expect, ever remembering that *Concordia res parvæ crescunt, discordia magnæ dilabuntur*."

Never before was it more vital to the college, to the profession, and to the State, that these exhortations of Harvey should be faithfully obeyed.

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SERUM-PROTEIN LEVEL OF INDIAN SOLDIERS

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IT is now generally accepted that the specific gravity of the serum, estimated by Van Slyke's copper-sulphate method, is a reasonably accurate measure of the serum-protein level. We used the method as part of a nutritional and hæmatological survey of Indian Army recruits (Hynes et al. 1946), but our results were so at variance with expectation that we could not be satisfied of their validity without a more detailed investigation, which is reported here. The work was done deep in the jungle with very limited laboratory facilities, and it is a fair criticism that it raises more problems than it solves.

If it is accepted that the sp. gr. of the serum of our subjects bears the usual relation to the serum-protein level, then we have shown that the recruit, fresh from a life of extreme poverty on a grossly protein-deficient diet, has a serum-protein level higher than that of the trained soldier. We found also that the effect of exercise on the sp. gr. of the serum was considerably greater than we had anticipated from the literature, but we present data to show that this effect can be avoided by simple precautions.

This work was done in Harihar, Mysore State, 1700 ft. above sea-level, during August, September, and October, 1945. The weather was cool but rather humid, with early-morning temperatures of about 75° F, and a maximum not exceeding 90° F.

TABLE I—FREQUENCY DISTRIBUTION OF ELEVATION OF SERUM-PROTEIN LEVEL BY 15 MIN. WALKING, CALCULATED FROM SERUM SP. GR. AT 0 AND 60 MIN. AFTER EXERCISE

Serum-protein (g./100 ml.)	Below	Above resting level							Total cases	Elevation	
	0·18	0	0·18	0·36	0·54	0·72	0·90	1·08	1·26		Mean	S.D.
Recruits	6	12	29	31	23	6	4	—	1	112	0·33	0·2623
Trained soldiers ..	2	3	17	11	4	4	1	—	—	42	0·30	0·2375

The subjects belonged to a Madrasi Pioneer Battalion and were either recruits with less than a month's service or trained soldiers (mostly junior N.C.O.s) with over a year's service. The recruits' mean height was 63 in., S.D. 1·92 in., and mean weight 102 lb., S.D. 8·51 lb. The mean gain in weight of a recruit during six months' training is about 10 lb. All the men were aged 18–30, and most of them about 20.

METHOD OF INVESTIGATION

The men rose at dawn, 7 A.M., had a light breakfast of tea and chapattis (unleavened bread) at 7.30 A.M., walked to the laboratory, and rested until 8.30 A.M., when the experiment began.

Exercise consisted of either marching or pack test. For marching the men wore shirts, shorts, and chaplis (sandals). They marched on flat ground at the normal army pace for 15 min. For the pack test they wore shirts, shorts, and Army boots, and carried a third of their own weight in a pack. They mounted a 15-in. step (both feet up) thirty times a minute for 5 min., or for a shorter time until they were completely exhausted. They then sat down for $4^1/_2$ min. while the pulse-rate was counted. Few men took the full thirty steps a minute, but even so this was a most severe test. As each man completed his prescribed exercise he walked a few yards into the laboratory and squatted on the floor (sepoys are not comfortable on chairs). He remained in the same place until the observations were completed.

Venepuncture.—Blood was taken from an arm vein with a syringe sterilised with hot liquid paraffin. No tourniquet was used, but if necessary the veins were made prominent by the pressure of a hand not exceeding 10 sec. Blood for serum (3 ml.) was allowed to clot in a sloped position; the serum was withdrawn and its sp. gr. determined after 4–6 hours. Blood for hæmoglobin and hæmatocrit determinations (2·5 ml.) was mixed with Wintrobe's dry anticoagulant (Whitby and Britton 1942), and the hæmoglobin pipette and hæmatocrit were immediately filled before sedimentation began.

Specific Gravity of Serum.—This was determined by Van Slyke's copper-sulphate method (Phillips et al. 1945). The stock solution was made by dissolving 170 g. of $CuSO_4.5H_2O$ in 1002·4 g. of water, and the standard solutions were made by dilution of this stock. The sp. gr. of the stock solution and of a standard solution (usually 1028) were checked by weighing.

For the sake of clarity in our calculations and tables we use the notation 1000 (not 1·0) for the sp. gr. of water. Our standard solutions were 1 unit apart in this notation—i.e., 1020, 1021, &c.—and we estimated the sp. gr. of the serum to the nearest 0·5.

We renewed a standard solution when about a fiftieth of its volume of serum had been added. According to Phillips et al. (1945) the sp. gr. of the solution at this time would be decreased by about 0·4; hence the mean sp. gr. of our solutions during their life was about 0·2 below their initial value. We have made no allowance for this rather variable error in the sp. gr. figures given in this paper.

In calculating mean serum-protein levels we have tried to allow for the degradation of our solutions by using a modification of van Slyke's formula:

$$\text{Serum-protein} = (\text{serum sp. gr.} - 1007{\cdot}2) \times 0{\cdot}36.$$

Hæmoglobinometry.—Blood 0·02 ml. was mixed in N/10 HCl 0·4 ml., allowed to stand for 80 min., diluted to 1·59 ml. with distilled water, and matched against the glass wedge of the Zeiss hæmometer. The standardisation of this instrument has been described elsewhere (Hynes et al. 1945, 1946). The standard error of a single reading is ±0·16 g. of hæmoglobin. When two hæmoglobin determinations were made on the same person, the same pipette and dilution tube were used on each occasion, and the same worker matched the colour without reference to the previous reading.

Packed Cell Volume.—The blood was spun for 45 min. at 3000 rev./min. in Wintrobe hæmatocrits. The same tube was used for both determinations on each person.

RESULTS OF EXERCISE

Marching.—Both in recruits and in trained soldiers, marching for 15 min. raised the mean serum-protein level (calculated from the serum sp. gr.) about 0·3 g. above the resting level. The course of the return to normal is shown in fig. 1. The recovery was 75% complete after 15 min. rest and complete after 30 min.

The statistical significance of these findings was tested by analysis of the variance of the serum sp. gr. figures between times and between persons (Fisher 1942, 1944). From the residual mean square we calculated the standard error of the difference between means and then tested the significance of these differences by the t test. Both in recruits and in trained soldiers the mean serum sp. gr. after 0, 15, and 30 min. rest differed very significantly from one another (P less than 0·001), but there was no significant change after 30 min.

There was a wide variation between individuals in the degree of elevation of the serum-protein level after marching (table I). The mean elevation in recruits was not significantly higher than in trained soldiers (t : 0·636, P : 0·5).

Pack Test.—We first determined the serum sp. gr. when the men had sat down for 30 min. before the test, and then after the test at intervals from 5 to 95 min. This violent exertion caused an elevation of the serum-protein level twice as great as did gentle exercise (marching), and the return to normal took twice as

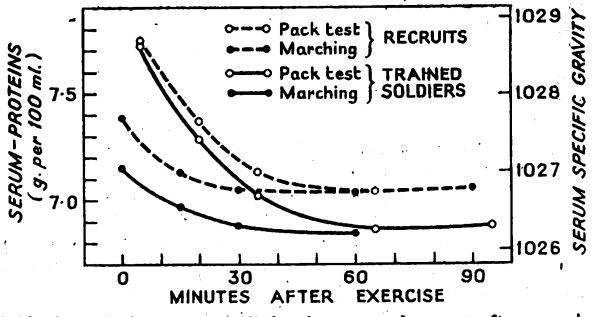

Fig. 1—Return of serum-protein level to normal on rest after exercise.

long (fig. 1). The recovery curve followed the same pattern both in recruits and in trained soldiers—after 20 min. rest the serum-protein level had fallen half-way towards its resting level; after 35 min. recovery was 85% complete; and the resting level was reached in an hour.

Statistical analysis showed that the mean serum sp. gr. 5, 20, 35, and 65 min. after the exercise differed very significantly, but there was no significant difference between the means after 65 and 95 min. rest, nor did these differ significantly from the mean resting sp. gr. before the exercise.

There was wide variation between individuals in the degree of elevation of the serum-protein level by the pack test (table II). The mean elevation was 20% greater in trained soldiers than in recruits, and the difference was definitely significant (t : 2·777, P : 0·01,

TABLE II—FREQUENCY DISTRIBUTION OF ELEVATION OF SERUM-PROTEIN LEVEL BY VIOLENT EXERTION, CALCULATED FROM SERUM SP. GR. AT 5 AND 65 MIN. AFTER PACK TEST

Serum-protein (g./100 ml.)	Above resting level										No. of cases	Elevation	
	0·18	0·36	0·54	0·72	0·90	1·08	1·26	1·44	1·62	1·80		Mean	S.D.
Recruits	2	6	12	19	11	2	1	—	—	1	54	0·70	0·2678
Trained soldiers ..	1	2	7	10	14	10	2	2	—	—	48	0·85	0·2649

(In tables I and II, 1 sp. gr. unit is taken as equivalent to 0·36 g. of serum-protein per 100 ml.)

from the serum sp. gr. figures). It is impossible to assess the meaning of this difference, for the trained soldiers were better disciplined than the recruits and undoubtedly worked harder at the pack test.

The change in serum sp. gr. bore no relation to the pack-test score, which is supposed to measure physical efficiency, but our subjects coöperated in the test so badly that we place little reliance on the scores.

Concomitant Measurements.—We measured the serum sp. gr., hæmoglobin, and packed cell volume (P.C.V.) immediately after exercise and 90 min. later after rest in 67 recruits after marching and in 30 trained soldiers after the pack test. The results are shown in table III.

TABLE III—EFFECT OF EXERCISE ON MEAN SERUM SP. GR., SERUM-PROTEIN LEVEL (G./100 ML.), PACKED CELL VOLUME (P.C.V.), HÆMOGLOBIN (G./100 ML.), AND MEAN CORPUSCULAR HÆMOGLOBIN CONCENTRATION (M.C.H.C.)

—		Serum sp. gr.	Serum-protein	P.C.V.	Hæmoglobin	M.C.H.C.
67 recruits	Marching	1027·91	7·46	43·55	14·75	33·98
	At rest ..	1027·12	7·17	42·74	14·39	33·78
30 trained soldiers	Pack test	1028·87	7·80	52·52	17·47	33·28
	At rest ..	1026·57	6·97	48·55	16·58	34·15

Values obtained at 0 and 90 min. after marching and 5 and 95 min. after pack test.

After marching, the hæmoglobin and P.C.V. increases were of the same degree as the elevation of the serum-protein level; the range of the changes is shown in tables IV and V. The resting mean corpuscular hæmoglobin concentration (M.C.H.C.) was slightly lower than the working value, and the mean difference, 0·197%, S.D. 0·6764, was significantly different from zero (t : 2·384, P : 0·02). The suggestion is that the red cell is a little larger at rest than during gentle exercise, but so slight a change might well be extraneous rather than physiological.

After violent exercise the changes in hæmoglobin and P.C.V. were much greater (tables III, IV, V). The average increase in hæmoglobin was 0·9 g. (range 0–1·6 g.), and the average P.C.V. increase was 4% (range 2–6%). The working M.C.H.C. was considerably below the resting value, and the mean difference, 0·873%, S.D. 0·7182, differed very significantly from zero. The working mean corpuscular volume must therefore have been about 2·5% above the resting volume.

If we assume that the return of the serum-protein level to the resting level after exercise is effected solely by the addition of protein-free fluid to the circulating plasma, then the resting plasma volume must be:

$$\frac{P}{P'}\,B(100-H) \quad .. \quad .. \quad .. \quad .. \quad (1)$$

where B, H, and P are the working blood-volume, P.C.V., and serum-protein level respectively, and P′ is the resting serum-protein level. If we neglect the slight expansion of the red cells after gentle exercise demonstrated above and assume the circulating red-cell volume to remain unchanged at B.H, then the new P.C.V., H′, should be given by the equation:

$$H' = \frac{100.\ B.H}{B.H+P(100-H).B/P'} = \frac{100.\ H.P'}{100P-H(P-P')} \quad .. \quad (2)$$

Such an equation, containing three estimations subject to experimental error, must be very inaccurate; but, if our hypothesis is true, it should give an equal number of positive and negative errors. We calculated the equation for our 67 results after marching and found that the mean difference (observed − calculated value) was +0·124, which was less than its standard error of ±0·1259. Our results are therefore consistent with the hypothesis that the return of the serum-protein level after gentle exercise to the resting level is due simply to the addition of protein-free fluid to the circulating plasma. (It should be noted that we have not proved this hypothesis, we have merely failed to disprove it.)

The pronounced change in mean corpuscular volume after the pack test necessitates a more complicated calculation. If we assume that after the pack test no red cells went out of circulation, then the resting blood-volume would be given by $B\,\frac{Hb}{Hb'}$, where B is the working blood-volume, and Hb, Hb′ are the working and resting hæmoglobin levels respectively. The equation (1) derived above for the plasma volume may therefore be equated to:

$$\frac{P}{P'}\,B(100-H) = \frac{Hb}{Hb'}\,B(100-H')$$

or

$$Hb' = \frac{100-H'}{100-H}\cdot\frac{P'}{P}\,Hb \quad .. \quad .. \quad .. \quad (3)$$

This equation contains five estimations subject to experimental error; but again, if our hypothesis is true, it should give an equal number of positive and negative errors. We calculated the equation for the 30 results after the pack test and found the mean difference (calculated − observed value) to be +0·393, S.D. 0·5741. So great a difference from zero would not occur one time in a thousand by chance (t : 3·783), so we must conclude that our hypothesis is wrong. The discrepancy would be explained either if the new fluid added to the circulating plasma had a small protein content, or if

TABLE IV—FREQUENCY OF DISTRIBUTION OF ELEVATION OF HÆMOGLOBIN LEVEL BY EXERCISE

Hæmoglobin (g./100 ml.)	Below	Above resting level				No. of cases	Elevation	
	0·5–	0–	0·5–	1·0–	1·5–		Mean	S.D.
Marching ..	17	25	20	5	—	67	0·36	0·3921
Pack test ..	—	4	14	8	4	30	0·89	0·4185

Calculated from the figures immediately and 90 min. after exercise.

TABLE V—FREQUENCY OF DISTRIBUTION OF ELEVATION OF PACKED CELL VOLUME BY EXERCISE

P.C.V. (%)	Below	Above resting level							No. of cases	Elevation	
	1–	0–	1–	2–	3–	4–	5–	6–		Mean	S.D.
Marching ..	13	26	19	9	—	—	—	—	67	0·81	0·9573
Pack test ..	—	—	—	7	9	6	6	2	30	3·97	1·2313

Calculated from the figures immediately and 90 min. after exercise.

a substantial volume of red cells were abstracted from the circulation during the hour after the pack test.

THE RESTING SERUM SPECIFIC GRAVITY

Table VI shows the frequency distribution of the resting serum sp. gr. in recruits, trained soldiers, and a few young European men who had been in the station for at least three months. Fig. 2 shows the Indians' distribution in terms of serum-protein. There was no significant difference between the mean serum sp. gr. of the Europeans and the trained Indian soldiers (t : 0·460, P : 0·65), but the recruits' mean was very significantly above that of trained soldiers (t : 3·994) and significantly above that of Europeans (t : 2·348, P : 0·02).

TABLE VI—FREQUENCY DISTRIBUTION OF RESTING SERUM SP. GR. IN INDIAN RECRUITS AND TRAINED SOLDIERS AND IN EUROPEANS

Serum sp. gr.	1023	1023·5	1024	1024·5	1025	1025·5	1026	1026·5	1027	1027·5	1028	1028·5	1029	1029·5	No. of cases	Mean	S.D.
Recruits ..	2	—	1	3	7	14	29	31	29	21	11	9	9	5	171	1026·81	1·2213
Trained soldiers	—	—	—	1	8	10	27	23	14	6	—	1	—	—	90	1026·25	0·7238
Europeans ..	—	—	—	1	1	5	5	4	3	1	1	—	—	—	21	1026·17	0·8416

The mean hæmoglobin in the 171 recruits was 14·67 g., S.D. 1·424, range 9–17 g.; in 90 trained soldiers 16·31 g., S.D. 0·9073, range 13–19 g.; and in 21 Europeans 15·85 g., S.D. 0·7048, range 14–17 g. In none of these groups was there any suggestion of a correlation between the hæmoglobin level and serum sp. gr. If blood is taken from incompletely rested subjects, a spurious correlation between the hæmoglobin and serum-protein levels must be created. Each hæmoglobin group will contain a proportion of men who on further rest would fall back into lower hæmoglobin and serum-protein groups. The highest hæmoglobin group is always numerically the smallest; hence it will contain a high proportion of subjects who, if their hæmoglobin and serum-proteins had reached the resting levels, would be in the larger penultimate hæmoglobin group. The highest hæmoglobin group as observed will therefore have an artificially high serum-protein level. It is easy to see that this will apply to all classes on the descending part of the hæmoglobin frequency distribution curve; and by the reverse process groups on the ascending part of the curve will be given an artificially low serum-protein level.

We have shown elsewhere (Hynes et al. 1946) that in these recruits there was a clear correlation between malnutrition, as assessed clinically, and the hæmoglobin level, but we found no similar correlation between nutrition and serum sp. gr.

DISCUSSION

The Medical Research Council (1945) has emphasised the importance of taking blood for serum-protein estimations after a strictly standardised period of rest. Our figures re-emphasise the necessity of this precaution not only for serum-protein estimations but also for other blood investigations. The very moderate exertion of walking a mile raises the average serum-protein level 0·3 g. per 100 ml., and the increase is often three times as great. When the subject sits down, the protein level falls within 30 min. to a stable resting level; three-quarters of this fall takes place in the first 15 min.

Very violent exertion for 5 min. raises the average serum-protein level 0·75 g., and an increase twice as great is not uncommon. After 20 min. rest the serum-protein level has fallen only half-way towards its resting level, and after 35 min. only 85%. The resting level is reached in an hour.

Vaughan (1945) has suggested that these variations are greater in untrained persons. We found no difference between recruits and trained soldiers in the elevation of the serum-protein level after gentle exercise, and after violent exertion the trained men showed the greater change. They had, however, worked harder.

The raised serum-protein level is largely due to a diminution in the plasma volume on exertion, and the other blood constituents naturally reflect this change. The average hæmoglobin level after walking a mile is 0·4 g. per 100 ml. (3% Haldane) above the resting level, and differences exceeding 1 g. (7% Haldane) are often seen. The average P.C.V. is 1% higher, and in individual cases often 2% higher. After violent exertion the mean increase in the hæmoglobin level is 0·9 g. (6% Haldane), and the increase may exceed 1·5 g. (10% Haldane). The mean rise in the P.C.V. is 4%, and an increase of 6% is not uncommon.

It is recognised (Medical Research Council 1945) that there is an appreciable increase in the volume of the red cell as the blood passes from the arterial to the venous state. Our data show that a person's activity affects the size of his venous red cells, presumably in an analogous fashion. We calculated that the red cell was very slightly smaller after walking a mile than after sitting down for 90 min.—presumably in walking an increased venous return without an appreciable increase in oxygen consumption increases the oxygenation of venous blood. On the other hand, the cells of men still in oxygen debt from violent exertion were some 2·5% larger than in the resting state.

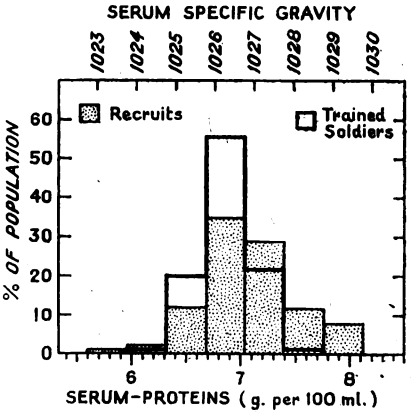

Fig. 2.—Frequency distribution of serum-protein level in Indian recruits and trained soldiers.

We have shown that our data are compatible with the hypothesis that the increase in plasma volume on rest after gentle exercise is due simply to the addition of protein-free fluid to the circulating blood. After violent exertion, however, a more complex change must take place; besides an increase in plasma volume and a contraction of the red cells, either protein must pass into the circulation or red cells must be abstracted from it.

Since hypoproteinæmia is a feature of famine starvation, it has been supposed that less absolute degrees of dietary protein deficiency will be reflected in the serum-protein level. Verma (1946) has shown that the civilian diet of our recruits was grossly deficient in animal protein and low in vegetable protein, yet we found that their serum sp. gr., and presumably serum-protein level, was definitely higher than that of trained soldiers of the same race. We could correlate anæmia, but not the serum sp. gr., with the degree of malnutrition. It does not necessarily follow that this was true before the recruits left their villages. When we examined them, they had enjoyed the Army ration (animal protein 20 g., vegetable protein 100 g. daily) for 1–4 weeks, and it is possible that this unaccustomed protein richness had raised their serum-protein from an abnormally low to an abnormally high level. Alternatively a change

in the level of some other blood constituent—e.g., cholesterol—may have been responsible for the increased serum sp. gr. On either hypothesis, with custom would come tolerance to protein and a fall of the serum sp. gr. to normal.

We may conclude by re-emphasising the importance of strictly standardised conditions in any hæmatological survey. The change in the plasma volume after exercise not only depends on the amount of exercise, but also there are wide individual variations in the response to a given amount of exercise. A stable value is only reached after $^1/_2$–1 hour's rest, and it is essential that the subject should rest for this period before he is bled, and be bled where he has rested. The variations seen after a less complete period of rest may be unimportant in the individual case, but they are large enough to introduce serious errors into the statistical analysis of even moderately large series.

It remains an open question whether the serum-protein level may be taken as an index of the protein adequacy of the diet. Certainly we have shown that the serum sp. gr. is above rather than below the normal level in men who after a lifetime of protein semi-starvation have eaten a good diet for two or three weeks. It is to be hoped that this problem will be further investigated with the aid of the biochemical methods which were not at our disposal in the jungle during this investigation.

SUMMARY

We estimated the serum-protein level of Indian recruits and trained soldiers by the copper-sulphate serum sp. gr. method.

Gentle exercise caused average increases of 0·3 g. per 100 ml. in the serum-protein level, 0·4 g. per 100 ml. in the hæmoglobin level, and 1% in the packed cell volume (P.C.V.). The increases were sometimes three times as great as this.

These blood values returned to their resting level after 30 min. rest. This change may have been due simply to the addition of protein-free fluid to the circulating blood.

Violent exertion caused average increases of 0·75 g. per 100 ml. in the serum-protein level, 0·9 g. per 100 ml. in the hæmoglobin level, and 4% in the P.C.V. The increases were sometimes twice as great as this.

The resting levels were again reached after an hour's rest. This change was largely due to an increase in the plasma volume, but also the red cells contracted, and either protein passed into the circulation or red cells were abstracted from it.

Our findings re-emphasise the importance, in any large-scale hæmatological survey, of taking blood after an adequate and strictly standardised period of rest.

There was no difference between the resting serum sp. gr. of trained Indian soldiers and Europeans, but the resting serum sp. gr. of newly joined Indian recruits was significantly higher than that of either. Possible explanations are briefly discussed.

Our thanks are due to the D.M.S. in India for permission to publish this paper; Prof. E. J. King for his very helpful advice and criticism; Mr. C. K. Dilwali, statistical officer (research), General Headquarters, India, for advice on statistical methods; and Lieut.-Colonel G. M. Holland, commanding no. 3 Training Battalion, I.P.C., and his officers for their help and coöperation.

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LEPTOSPIROSIS CANICOLA

A CASE TREATED WITH PENICILLIN

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Leptospira canicola is morphologically and culturally similar to *Leptospira icterohæmorrhagiæ*, from which it can be distinguished by serological tests and by the fact that it is carried and transmitted solely by dogs (Walch-Sorgdrager and Schüffner 1938). In the dog *L. canicola* produces a variety of symptoms, from trivial to severe, but generally referable more to kidney damage than to liver involvement (Dhont et al. 1934). Thus various forms of nephritis, particularly that variety recognised clinically as Stuttgart disease, are common, and jaundice is rare. After recovery the animal is liable to become a carrier, though usually for a few months only (Klarenbeek and Voet 1933). Leptospiræ are then found lying in masses within the lumina of the kidney tubules, in exactly the same situation as *L. icterohæmorrhagiæ* are found in the rat, and are excreted similarly in the urine. *L. canicola* is highly infectious to dogs, but its pathogenicity is much less than that of *L. icterohæmorrhagiæ*, and its invasive power in other animals, such as guineapigs, is very much less. This may explain why the number of human infections recorded has been so small.

The first instance of human disease was identified in Holland by Dhont et al. (1934), and by 1941 Raven noted that 22 such infections had been discovered: 12 in Holland, 1 in Austria, 7 in Denmark, and 2 in California. Since that time 2 cases have been claimed by Bruno et al. (1943), and another by Tievsky and Schaefer (1944), all in the U.S.A. The first case in Norway has lately been recorded by Aalvik (1946). Other cases may have been reported in journals inaccessible during the war, but the incidence is unlikely to be high. Tiffany and Martorana (1942) investigated sera from 1351 persons in New York City without finding any positive to *L. canicola*.

In Britain no disease directly ascribable to *L. canicola* has so far been recorded. Stuart (1938) found low-titre agglutinins to this organism (proved to be specific by absorption tests) in the serum of a woman tripe-scraper, aged 43, who gave no history of illness. The dog-transmitted leptospiral disease recorded by Gardner (1943) was ascribed by him to a serologically distinct organism, *L. icterohæmorrhagiæ* 5260.

SYMPTOMS OF LEPTOSPIROSIS CANICOLA IN MAN

Walch-Sorgdrager (1939) discussed the largest series of human cases so far recorded. She pointed out that clinically the disease was very variable in signs and symptoms; jaundice, however, was rare, and mortality nil. The typical syndrome produced by *L. canicola* in the dog—the serious kidney disorder leading to uræmia—was not found in man, though albuminuria, with leucocytes, red blood cells, and casts in the urine, was often present for a few days. On the other hand, the frequency of meningitis or meningismus was notable ("in 4 out of 12 patients"). The cerebrospinal fluid (C.S.F.) was hazy or frankly purulent, usually with polymorphs predominant. In general, patients exhibited symptoms like those of influenza with an acute onset, fever, headache, shivering, and muscular pains. Convalescence was often protracted but occasionally dramatically brief. Our patient showed many of these features.

CASE-RECORD

A boy, aged 11 years, previously healthy, was admitted to hospital on Sept. 10, 1945, with hæmaturia, malaise, headache, and pains in the calves for two days. He felt nauseated but had not vomited. He admitted to moderate frequency

of micturition, and thought his urine had been slightly red for two or three days. He noticed puffiness of the eyelids three days before admission.

His past history had been uneventful, except for a slight sore throat after bathing in the Thames twenty-one days before. This cleared up in a few days, and he had again bathed in the Thames twelve days before entering hospital. No-one else in the family had been ill recently.

He was a well-developed intelligent boy, looking acutely but not seriously ill. Temperature 102° F, pulse-rate 108, respirations 22 per min. There was slight but definite puffiness of the eyelids, chiefly of the upper lids, but no peripheral œdema. Skin hot and dry, breath fœtid, tongue furred, and mild marginal gingivitis. Throat slightly injected. No abnormal physical signs in heart and lungs. Liver, spleen, and kidneys not palpable. Except for a suggestion of neck-rigidity, examination of the central nervous system revealed nothing unusual. Urine contained visible blood and much albumin, with numerous cellular and granular casts but no organisms. Blood-urea 37 mg. per 100 c.cm. Blood-pressure 120/60 mm. Hg. A tentative diagnosis of acute glomerulo-nephritis was made.

Next morning the boy seemed better, and his temperature had fallen to 100° F, but it rose during the night to 104° F and then fell to normal. Throat-swab culture was negative for hæmolytic streptococci, but a white-cell count showed 8900 cells per c.mm. with polymorphs 73%, lymphocytes 20%, and monocytes 7%.

On the 14th his temperature again rose to 101·8° F and he still complained of headache. Photophobia was well marked, but there was no conjunctivitis. Neck-stiffness was more evident, and slight blurring of the optic disk was seen on examination of the fundi. A lumbar puncture was performed, and turbid C.S.F. under raised pressure was obtained; this contained 690 cells per c.mm. (lymphocytes 70%, polymorphs 30%) but was sterile on culture; chlorides were 690 mg. per 100 c.cm., and an excess of globulin was present.

Leptospirosis was suspected by this time, so penicillin therapy was begun the same day, 10,000 units being given intrathecally, followed by the same dose intramuscularly, the latter being repeated every three hours. In twelve hours the boy seemed perfectly well, his temperature was normal, urinary abnormalities had disappeared, and he made a dramatically swift recovery. Penicillin treatment was discontinued on the 17th, after 22 doses (220,000 units) had been given. On that day, however, the C.S.F. was still turbid and contained 300 white cells per c.mm., with lymphocytes predominating but no excess of globulin. Chlorides were 740 mg. per 100 c.cm. Culture was again sterile. Confirmation had been received from the hospital laboratory of the presence of antibodies to *L. icterohæmorrhagiæ* in a specimen of blood

TABLE I—DIRECT RESULTS OF SEROLOGICAL TESTS

Strain	Type	Titre of serum obtained on		
		Sept. 22	Oct. 15	Nov. 24
Wijnberg ..	*L. icterohæmorrhagiæ* AB	300	100	100
McIntyre ..	*L. icterohæmorrhagiæ* B	1000	300	300
Utrecht IV	*L. canicola*	10,000	10,000	3000
Berlin 4129	*L. canicola*	10,000	30,000	10,000
L.5260 ..	..	30	30	..
Moscow V...	*L. grippo-typhosa*	0	..	..
..	*L. pomona* ..	0	..	..
..	*L. sejroe*	100	100	30
..	*L. autumnalis A*	0	..	..
..	*L. autumnalis B*	0	..	..
..	*L. bataviæ* ..	0	..	..

taken on Sept. 18, but the peculiar features of the case suggested the desirability of a more extensive investigation than was possible locally. This later investigation is described below.

The patient was discharged from hospital on Oct. 1 quite well and remained free from symptoms till Nov. 15, when he was readmitted with a history of slight hæmaturia. His main complaint was headache, but his C.S.F. showed no increase in cells or protein; his urine, however, contained numerous red blood cells. In hospital he had no symptoms, and in two days his urine was normal, his blood-urea 41 mg. per 100 c.cm., and a urea-concentration test gave normal results. Blood-pressure was not raised. Before his discharge on Dec. 1 a further sample of blood was obtained for serological tests.

Serological Investigation.—Serological tests were carried out according to Schüffner's method as described by Davidson et al. (1934). Both living and formolised culture antigens were used in parallel tests, but the results were practically identical. The strains of leptospira used were "Wijnberg," a typical "complete" strain of *L. icterohæmorrhagiæ* (Gispen and Schüffner 1939); "McIntyre," an incomplete strain (proved by reciprocal agglutination to be identical with strains "Hickey" and "Wien I"); "Utrecht IV," a typical strain of *L. canicola* used by Prof. W. Schüffner; and "Berlin 4129," another strain of *L. canicola*, obtained from Professor Schlossberger. "L.5260" was provided by Prof. A. D. Gardner, and most of the other strains by Dr. Lépine, of the Pasteur Institute. Absorption tests were carried out according to the technique followed by Buckland and Stuart (1945). Table I shows the results of the direct tests on the patient's sera, and table II the necessary absorption tests. Titres are given as the reciprocal of the dilutions in each case.

TABLE II—ABSORPTION TESTS ON SERUM TAKEN SEPT. 22

Titre with	Unabsorbed	Absorbed with	
		L. icterohæmorrhagiæ B	*L. canicola*
L. ictero. AB ..	300	0	0
L. ictero. B ..	1000	30	30
L. canicola ..	10,000	3000	0
L. sejroe ..	100	..	0

The titres with both strains of *L. canicola* were higher than the corresponding titres with strains of *L. icterohæmorrhagiæ*, and the former tended to rise and the latter to fall as the disease progressed. The *L. canicola* antibodies are shown to be specific by the absorption test, where *L. canicola* removes both homologous and heterologous antibodies from the serum, whereas a *L. icterohæmorrhagiæ* strain leaves the *L. canicola* antibodies practically intact.

DISCUSSION

Since this is claimed to be the first case of *L. canicola* infection discovered in Britain, it is unfortunate that an opportunity did not arise to isolate the organism from the patient, but on serological grounds the evidence is quite definite. Para-specific serum titres to *L. canicola*, sometimes greater than to *L. icterohæmorrhagiæ*, have been encountered occasionally by one of us (R. D. S.) in the early stages of Weil's disease and have been recorded by Gispen and Schüffner (1939). Such reactions are reputedly associated mainly with infections caused by the "incomplete" B type of *L. icterohæmorrhagiæ*, though there is no evidence that this type has any greater antigenic similarity to *L. canicola* than the usual AB type. Petersen (1938) made the observation that within the classical type of *L. icterohæmorrhagiæ* was a subtype which lacked an antigenic factor present in the others. Subsequently this "incomplete" subtype was represented by the letter B, while the "complete" strains were indicated by the letters AB. There is apparently no clinical difference in the diseases caused by these respective strains, but the serological investigation of cases is often helped considerably by an appreciation of these antigenic variations. In Weil's disease the para-specific serum reactions to *L. canicola* invariably decline as the disease progresses, and the specific antibody response becomes dominant; they are also readily removed by absorption with a *L. canicola* culture, which has little or no effect on the specific antibody. Absorption of such a serum, however, with a *L. icterohæmorrhagiæ* culture removes both specific and para-specific antibodies. In the present case the dominance of *L. canicola* antibodies throughout the illness, their resistance to absorption with *L. icterohæmorrhagiæ*, and the almost complete absorption of both *L. icterohæmorrhagiæ* and *L. canicola* antibodies with *L. canicola*, leave no doubt that in this instance *L. canicola* was the infecting strain.

The manner of infection can only be surmised. The boy did not possess a dog, nor did he play with dogs.

Most probably the infection was acquired while bathing; and, though this is unusual, there are fully authenticated instances of leptospirosis canicola acquired in this way (Walch-Sorgdrager 1939, p. 336). There is no reason against the occurrence of bathing infections with *L. canicola*; dogs can contaminate water just as effectively as rats, though one must admit that there are fewer dogs and a smaller relative percentage of leptospiral carriers. The last figure is quite unknown. The incidence of canine infection, however, has been determined, chiefly by serological methods, in many parts of the world and is known to be high. In Amsterdam it seems to be greater than 30% (Walch-Sorgdrager 1939), in Philadelphia it is about 25% (Raven 1941), and in Glasgow Stuart (1946) has found antibodies to *L. canicola* in over 40% of street dogs. Klarenbeek (1938) states that more than 50% of dogs excrete leptospira for a variable period following infection; but since this period is often short, the percentage of dog "carriers" at any one time is probably small.

The clinical features of the present case generally accord with previous descriptions of leptospirosis canicola. The prominence of the renal symptoms, however, is noteworthy owing to the similarity of the disease as it occurs in dogs, but in the human case there is no evidence of a developing chronic nephritis. One cannot tell if the brief recurrence of nephritic symptoms is ascribable to the previous leptospiral disease. The dramatic change in the clinical condition following penicillin treatment is interesting and is in accordance with the experimental work of Larson and Griffitts (1945). On the other hand, a similar clinical course has been observed in patients where no specific therapy has been used. The disease is naturally self-limiting, and therefore no claim can be made for a specific therapeutic effect of penicillin.

SUMMARY

A case of leptospirosis canicola in a boy is ascribed to bathing in the Thames.

The diagnosis was established by the demonstration of a rising serum antibody titre to *L. canicola* during the course of the illness and by absorption tests with homologous and heterologous strains of leptospira.

The patient was treated with 220,000 units of penicillin, and dramatic clinical improvement followed.

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"... Of course there are important differences between the medical profession and the university teaching profession. I think the main difference is that the medical profession has, on the whole, to work a good deal harder, also it has to work at less regular hours, and, on the whole, its job is not so pleasant because there are many patients who are not quite so attractive to deal with as the young men and young women in universities. For that very reason, I personally think you ought to pay the medical profession better than you pay the teachers. It would be quite easy to do that without paying them very much."—Lord BEVERIDGE, *Hansard*, Oct. 9, par. 94.

MALIGNANT GRANULOMA OF THE NOSE

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PROGRESSIVE ulceration of the nose, palate, and wall of the antrum, known to ear, nose, and throat surgeons as malignant granuloma of the nose (Woods 1921), was probably first described by McBride in 1896 (see McBride 1926), and about a dozen cases have since been published (Woods 1921, McKenzie 1922, McArthur 1925, Chatellier 1929, Kraus 1929, Goodyear 1930, Stewart 1933, Hall 1933, Dempsey 1933).

The lesion begins on the inferior concha or nasal septum and proceeds to sloughing of the concha and perforation of the septum and hard palate, the ulcerated areas having clearly defined margins. An abscess may form in the soft tissues of the cheek, with perforation of the anterior wall of the antrum. There is usually no regional lymphadenopathy. The lesions are not painful. There is a peculiar odoriferous bloodstained discharge from the affected nostril. The disease is usually rapidly fatal, though the precise cause of death is often obscure.

Fig. 1—Perforation of cheek and anterior wall of antrum exposing lateral wall of nose with necrotic anterior end of inferior turbinate bone.

Bacteriological investigations have not incriminated any pathogenic bacteria, fungi, or protozoa, and Stewart (1933) reported negative results on animal inoculation. The Wassermann and Kahn tests have always proved negative, and there has been a complete lack of response to arsenicals (McArthur 1925). Apart from the local lesions in the nose, mouth, and antrum, necropsies have not revealed any specific changes, though in one of Hall's (1933) cases small nodules of reticulum-like cells were found in the lung and cortex of the kidney.

The histology of the local lesion presents the general features of invasion by a cellular granulation tissue, with necrosis of bone and cartilage.

Muir examined McBride's (1926) case and stated that the condition did not correspond to any known type of ulceration, and in particular syphilis, yaws, and tuberculosis could be excluded.

O'Sullivan, examining Woods's (1921) case, reported a zone of granulation tissue extending into the healthy tissue and breaking down behind.

In McArthur's (1925) case, Dew stated that the lesion did not conform to any known type of malignancy though bearing some resemblance to an atypical spheroidal-celled carcinoma.

Kraus (1929) described infiltration of bone and cartilage by a cellular granulation tissue and thought that sarcomatous change had supervened on an infective granuloma.

With regard to the granulation tissue, Chatellier (1929) thought there were resemblances to lupus pernio, and Ewing, examining Wood's (1931) case, thought that the changes resembled syphilis though they were not typical. Case, examining the same material, diagnosed tumour, and Weidman classified the condition as a granuloma.

Stewart (1933) described a round-celled infiltration of granulation tissue, engorged vessels, and scattered hæmorrhages; proliferating blood-vessels showed thickened walls and endarteritis with hyaline changes. Bone was actively destroyed. In one case the appearances suggested a fibroma.

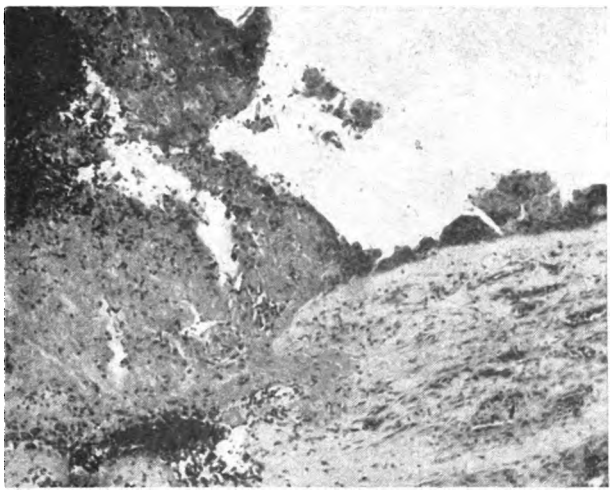

Fig. 2—Photomicrograph of section of ulcerated inferior turbinate bone. Note demarcation between necrosis and slough on the left and myxomatous connective tissue, with its colonies of fibroblasts and capillaries on the right. (×90.)

Opinion seems to be more or less equally divided between describing the condition as an infective granuloma of uncertain ætiology and attributing the changes to a tumour growth.

All forms of treatment have been tried, from chemical cautery and surgical excision to radium implantation and X rays. Woods's (1921) second case was healed by radium needles placed in dental wax upon the ulcer-perforation. McArthur's (1925) case derived no benefit from radium, but showed satisfactory healing after three full doses of X-ray therapy. All other reported cases have been resistant to any form of treatment, and death has usually resulted from a vague cachexia or toxæmia coupled with repeated blood-loss from the lesion.

CASE-RECORD

A farmer, aged 58, was first seen by his doctor in May, 1945, with a history of a neuralgic pain involving the distribution of the second division of the 5th nerve. The teeth were carious, and it was thought that the neuralgia was due to sepsis in the upper jaw. He did not take his doctor's advice to have dental treatment. The first upper right premolar, canine, and lateral incisor teeth fell out during the next four weeks, followed by ulceration and necrosis of the adjacent alveolar margin.

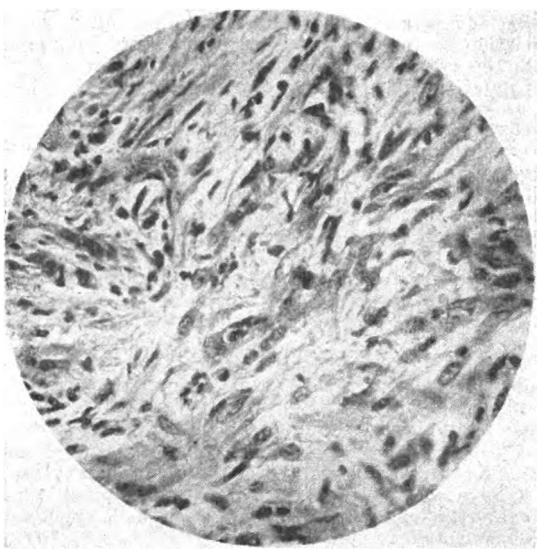

Fig. 4—Photomicrograph of cellular granulation tissue. (×320.)

The ulceration spread along the premaxillary region of the hard palate, destroying the mucosa. This was followed by a sloughing and necrosis of the bone, with formation of a fœtid sinus opening into the floor of the nose.

On August 29, 1945, the patient was seen at the Royal Salop Infirmary, when a hole 1 in. in diameter was found in the premaxillary region of the palate and the alveolar margin. There was also a tender red swelling over the anterior wall of the maxilla. A tentative diagnosis of syphilis was made, but the Wassermann reaction was negative. The patient was told to report in a week but did not, and was sent for on Sept. 17.

On the 19th the patient was seen again as an outpatient. He was cachectic from toxic absorption, with a very pale face, and had a temperature of 100° F. He talked with a nasal voice. The anterior end of the inferior turbinate was covered with a dirty greyish slough blocking the right nasal passage. The lateral wall of the nose beneath the inferior turbinate was eroded, and the whole of the anterior half of the floor of the nose was absent. Necrosis also involved the floor of the antrum. The septum was intact, and the disease was limited to the right nasal cavity. The middle turbinate was not involved.

After the sloughs had been removed from the nose the posterior third of the inferior turbinate was seen to be intact. This was seen with a nasopharyngoscope, it being impossible

Fig. 3—Photomicrograph showing linear edge between slough on the upper left and granulation tissue. Note obliterating endarteritis. (×60.)

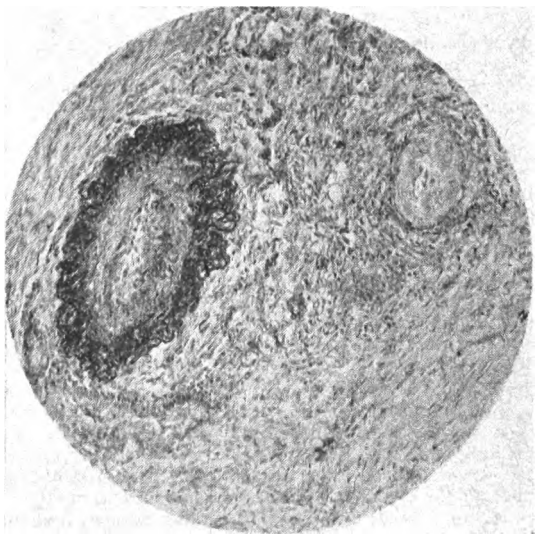

Fig. 5—Photomicrograph showing almost complete occlusion of two arteries. Note thick reduplicated external elastic lamina of the larger artery (orcein stain). (×115.)

to use a postnasal mirror owing to pharyngitis due to pus passing downwards. The bone forming the alveolar margin in relation to the right incisors, canine, and first premolar teeth, the anterior portion of the floor of the antrum, the right anterior half of the hard palate, and the medial half of the anterior wall of the antrum extending into the bony margin of the right nares and upwards towards the ascending process of the maxilla were absent. The floor and anteromedial margin of the orbit were intact.

The antrum contained a blackish-grey slough, which was removed with hydrogen-peroxide swabs. Beneath the slough there was a granulating surface with punctate hæmorrhages. The hole in the face (fig. 1) had a punched-out appearance, and its edges were smooth. The invading edge in the skin was spreading towards the vestibule of the nose medially, the spreading edge being hyperæmic, with a slough on its surface.

The ears and larynx were normal, and there were no glands in the anterior and posterior triangles of the neck.

He was admitted as an inpatient on Sept. 19.

Radiography showed the medial wall of the right antrum bulging into the right nasal fossa. Illumination of this antrum by X rays was normal. The remaining sinuses appeared normal. Radiography of the chest showed kyphoscoliosis (due to infection in childhood).

Treatment.—The cavity was swabbed three times a day with hydrogen peroxide to remove the sloughs, and insufflated with penicillin and sulphanilamide powder.

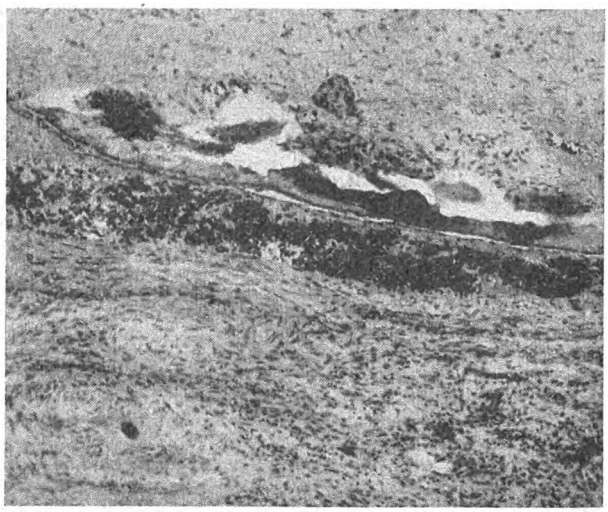

Fig. 6—Photomicrograph showing hæmorrhage and necrosis surrounding spicule of bone. (×90.)

Intramuscular penicillin 25,000 units was given three-hourly for three days. On this treatment the spread of the lesion was arrested, and the patient's condition appeared to be improving slightly; but he caught a "cold" and developed pneumonia, dying on Sept. 25.

Laboratory Findings.—The Wassermann and Kahn reactions were negative on two separate occasions, and the Sachs-Georgi test negative on one occasion.

Six swabs were taken on the 25th from different parts of the affected antrum, with identical results. Films showed numerous gram-positive cocci and diphtheroid bacilli only. Cultures gave growths of hæmolytic streptococci, a non-pathogenic *Staph. albus* (coagulase test negative), and diphtheroid bacilli of the xerosis type. No evidence of tuberculosis, actinomycosis, or mycosis. No growth of anaerobic bacteria.

Necropsy (Sept. 25).—Spine: kyphosis and lordosis presumably due to old-standing tuberculosis, with no evidence of present activity. Brain, skull, and middle ears normal. Right lung congested; some serofibrinous fluid in left pleural cavity secondary to lobar pneumonic consolidation of both upper and lower lobes. Kidneys small and shrunken; capsules stripped with difficulty, the microscopical appearances being those of atherosclerosis. Liver showed cloudy swelling. Remaining organs appeared to be normal. The appearances of the maxilla and face have already been described.

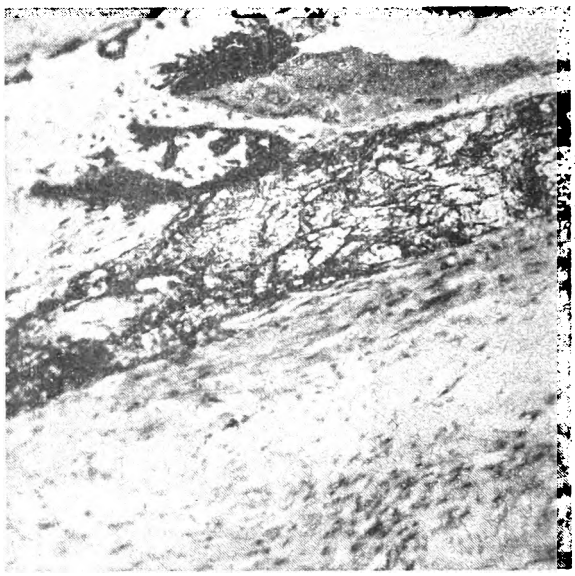

Fig. 7—Photomicrograph of part of same section as in fig. 6, showing fibrinoid type of degeneration which was an early lesion found closely applied to bone (Mallory's fibrin stain). (×160.)

Death was certified as due to lobar pneumonia and toxæmia from necrosis of right maxilla.

Histology.—Several pieces of tissue from the inferior turbinate bone (fig. 2), the hard palate, and the edge of the ulcerated area of the antrum were examined. The appearances throughout were similar, but were most pronounced in the edge of the perforation in the wall of the antrum. The mucosa was ulcerated away, and the surface was formed by a slough, consisting of masses of red cells, polymorphs, eosinophils, and plasma cells. Immediately under this superficial area was a wide zone of necrosis, where the outline of blood-vessels and connective tissue was just recognisable. There were no inflammatory cells in this area.

There was a sharp line of demarcation (fig. 3) between this zone and the next, which showed very cellular tissue (fig. 4) composed of closely packed interlacing fibroblasts and a few capillaries. Deeper still, the fibroblasts were arranged in long parallel lines and there was a moderate amount of collagen. Here also there were tortuous small arteries showing gross pathological changes. The adventitia was not clearly demarcated from the surrounding cellular tissue and showed infiltration with lymphocytes. The media was thickened, and

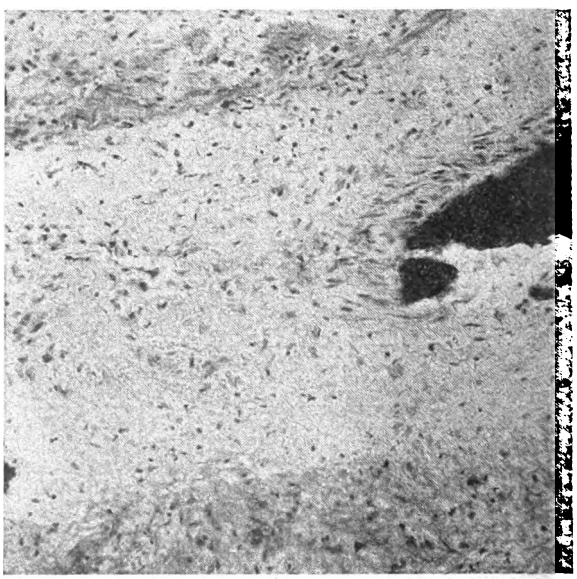

Fig. 8—Photomicrograph showing start of fibrinoid necrosis preparatory to sloughing. A spicule of bone is being isolated (Van Gieson). (×160.)

the intima showed irregular proliferation; so the lumen was almost completely obstructed (fig. 5). In some of the arteries the external elastic lamina showed much reduplication and a peculiar fragmentation. Outside the vessel wall were collections of red cells within a web of necrotic connective tissue. Isolated spicules of bone were not invaded by the fibroblasts but were surrounded by œdematous fibrous tissue undergoing necrosis (figs. 6–8). There was no evidence of amyloidosis.

In sections taken from other areas the necrosis was more clearly seen to involve bone and periosteum. It extended in bands which surrounded the periosteum of isolated spicules and was associated with much hæmorrhage. Here the structure of the granulation tissue was much less defined, and there were isolated colonies of fibroblasts separated by myxomatous fibrous tissue, in which were several irregular capillaries. There was no evidence of tuberculosis, syphilis, or carcinoma, and no protozoal or fungal elements were seen.

Specially stained sections showed the only bacteria to be gram-positive cocci and scanty gram-positive bacilli in the outer margin of the zone of sloughing. By similar means the presence of more pathogenic bacteria, such as *B. lepræ*, *B. mollei*, and spirochætes, either in this zone or deeper ones, was confidently excluded.

DISCUSSION

There seems to be little doubt that the present case was one of malignant granuloma of the nose; the clinical features correspond closely to those of previously published cases. In our case the lesion began near the base of the carious teeth. The sloughing of the premaxilla, with perforation of the hard palate, preceded a spread of the disease to the anterior wall of the antrum and to the inferior turbinate bone. The absence of bleeding from the lesions was noteworthy. A slight point of difference in our case from those previously reported was the absence of any gross hæmorrhages, even when large adherent sloughs were removed.

The most interesting feature of this condition is its ætiology. As regards the theory that the condition is infective, no specific organism, protozoön, or fungus has ever been incriminated. In our case a hæmolytic streptococcus was isolated, but it is not suggested that its rôle was more than that of a secondary invader. In our case, as in the previous ones, the serological tests for syphilis were negative, and the appearances of the diseased cartilage and bone did not suggest any known infection. If the cause is an organism, perhaps a hitherto unidentified one, as suggested by Dempsey (1933), the reaction of the tissue is unique among infections, for there is virtually no evidence of the customary cellular defence mechanisms. Thus the necrotic area is sharply defined from the subjacent granulation tissue, but there is a complete absence of inflammatory cells at the interface of these zones. The absence of cellular defence has been emphasised by Stewart (1933) and well exemplified in a case described by Hall (1933).

As regards the theory that the condition is a true tumour, it may be conceded that there are certain arguments to support this view. In some published descriptions specific reference has been made to the similarity of the tissue to that found in fibromata and sarcomata. The failure of the usual treatment of a granulomatous lesion, and the reports of beneficial effects following the exhibition of X rays or radium, may be cited as evidence in favour.

In our case the noteworthy histological features were the presence of necrosis and degeneration, the cellular granulation tissue composed of young fibroblasts, and a process of obliterating arteritis within and behind this cellular zone. Though the histological changes appeared to suggest a new growth, no such tissue was found; the whole process seemed to be an erosion of existing normal tissue. We believe that this can be explained by the coexistence of two pathological changes keeping pace with one another: (1) a locally spreading lesion, the cellularity of which indicated the property of new tissue formation, whether this abnormal tissue be granulomatous or neoplastic; and (2) the obliterating arteritis, to which can be attributed the "fibrinoid" degeneration of the connective tissue with its accompanying small hæmorrhages, and the complete necrosis of more distant tissue. The resultant state was one of infarction; and both normal and abnormal tissues, if the latter were being produced, were afterwards lost in the sloughing of the infarcted area.

SUMMARY

A case of malignant granuloma of the nose in a man aged 58 is described.

The main feature was a rapidly spreading ulcerative condition involving the antrum, nose, and palate.

No specific organism appeared to be responsible, and serological tests for syphilis were negative.

Necropsy disclosed no specific changes apart from the local lesion.

The histological picture was that of an acute granuloma with necrosis.

It is impossible to decide whether the condition was due to an unidentified infection or to an unusual type of sarcomatous change.

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PSYCHIATRY AT THE CORPS EXHAUSTION CENTRE

TECHNIQUE OF RAPID PSYCHIATRIC ASSESSMENT

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J. L. ROWLEY, M.B. Belf., CAPTAIN R.A.M.C.

THE corps exhaustion centre was established to prevent psychiatric casualties from impeding the evacuation and treatment of the wounded and sick when fighting was severe; to check secondary deterioration; and to select and deal with the relatively few men who would be fit for early effective return to fighting duties.

The exhaustion centre is a small medical unit staffed by a specialist psychiatrist, a psychiatrically experienced medical officer, and specially trained nursing orderlies. It is attached to another medical unit and so sited that patients can reach it within a few hours of being evacuated from their units.

In dealing with these patients the principal feature is the initial psychiatric interview, which usually has to be restricted to about 15 minutes. Its outcome determines whether the man has a reasonable prospect of effective return to action after not more than four or five days' retention at the centre. If there is no such prospect, he must be evacuated farther.

No elaborate treatment is provided. Arrangements are made to exclude or mitigate various likely sources of deterioration, suitable conditions for recuperation are provided as far as possible, and various adjuvant systems of medication may be prescribed; but recovery is largely spontaneous.

PSYCHOPATHOLOGY

Cases admitted to the corps exhaustion centre can be divided into three main groups, although they are seldom of unmixed type.

(1) *Normally Constituted Men who have Broken Down under Unusually Severe Stress.*—Situations sometimes arise in battle that render psychologically incapacitated for the time being any man involved, no matter how "tough" he may be. We have known all the unwounded survivors of some such incident arrive at the centre. Less intense psychic traumata will break down temporarily a normal man whose resistance is reduced by physical exhaustion or other minor illness. Repeated traumata tend to be cumulative. Other factors may

coöperate. Many of these men respond well to a few days' care at the centre. They constitute a minority of our admissions and are most numerous during heavy major actions.

(2) *Neurotically Disposed Men who have Developed Neurotic Symptoms under Stress.*—Most of these have to be evacuated. We will not discuss the psychopathology of these two groups; it has been discussed fully and often enough elsewhere.

(3) There remains a third group, which has been somewhat neglected. It is larger than the other two and often constitutes the majority of our cases at this level. The men in this group are not ill with a neurosis. They may even show little or no overt anxiety by the time they reach the centre. They may be said to have had their anxiety threshold lowered—a recurrence of the anxiety reaction facilitated. They may be men whose initial "anxiety threshold" was not high, or whose "anxiety tolerance" is low. But "low anxiety threshold" and "low anxiety tolerance" are not neuroses. Probably some of these men would develop neurotic symptoms if forced to continue in fighting duties, but they are not yet neurotic. They are simply men who have been badly frightened and are habitually too incapacitated by fear to be capable of effective action under fire. But their fear is appropriate to the conditions in which it arises; it is not pathological.

Some stigmatise these men as simply lacking in "guts." While deploring the emotional and subjective attitude implied in the use of the term "gutlessness," we have to admit that the reality concealed behind this appellation is the central factor in this type of psychiatric casualty and has to be estimated at the psychiatric interview.

These men may be evacuated from the line as casualties because, during a period of special stress, they have broken down, weeping and trembling and obviously unable to control themselves; they may be sent for psychiatric examination because their officers have found them to be useless and even burdensome "passengers"; or they may be sent for a psychiatric report because they are facing trial by court martial for desertion in face of the enemy. In its crudest form their disability manifests itself in the following features, which appear with the presence or threat of severe danger: inability to advance, inability to refrain from flight, inability to take appropriate action, inability to refrain from taking inappropriate action—they may leap from their trenches and rush about wildly while mortar bombs are bursting around, sometimes even rushing towards instead of away from the enemy's guns—or inability to appreciate clearly what is going on round them. These features may appear singly or combined. One or more may predominate in a given man. They have an impaired capacity, on the one hand, to maintain contact with reality and, on the other hand, to control their impulses in accordance with reality requirements. In other words, their basic ego-functions are involved. These men suffer from inadequate development of the ego. That is their essential disability. Accordingly, the main task of the psychiatric interview at the centre is to estimate the strength of the patient's ego.

TECHNIQUE OF RAPID PSYCHIATRIC ASSESSMENT

We have to provide for men who have no neurotic illness a 15-minute psychiatric interview which will reveal any subclinical neurotic trends and enable us to estimate the strength of the patient's ego. The taking of a standard psychiatric case-history is of very limited value and takes far too much time.

The ego is developed in childhood, especially in early childhood. It depends on the strength and constitution of the instincts, the anxieties and tensions connected with them, and the mechanisms used to master them, and is influenced by external conditions, especially the family pattern, the emotional attitudes and behaviour of the parents and others, and the social tensions within the home. But simple information about these external conditions tells us very little about the ego's development or of the strengths and weaknesses of the total personality. These external influences do not act in a direct mechanical way on the growing child. What is important is to know not that the father was harsh but exactly how the child interpreted this harshness; what phantasies he based on it; with what attitudes of submission or revenge he reacted; what forms of identifications, introjections, and projections it stimulated; what particular anxieties were aroused, and how they were dealt with; how all these and other processes influenced one another; how they influenced the general economic situation; and, in particular, how they advanced or retarded the adaptation of the ego to reality. These processes are detailed and complicated. They lie obscurely buried, largely in non-verbalised forms, in the depths of the patient's unconscious. They are protected by an elastic defence in depth of many and varied resistances, each of which would require painstaking, time-consuming, and patient efforts to breach. In short, their thorough assessment would require a prolonged and skilled analysis, which is obviously out of the question at a corps exhaustion centre.

We therefore had to devise a method compatible with a single interview lasting 10–15 minutes. The method we have adopted developed from our recognition that, after working laboriously through our routine examinations, we were really influenced very little by the facts we elicited from the patient. What really decided our disposal of him was our intuitive judgment of his personality, based on his appearance, manner, and behaviour throughout the interview.

Psychiatric intuition, to be reliable, requires the maximum of behavioural activity from the patient, so that its judgments may be adequately grounded. This in turn requires the establishment of good rapport—i.e., some degree of positive transference. The adoption of any stereotyped systematic technique, approaching in any way a questionnaire, militates against the establishment of these necessary conditions; by its rigidity and its impersonality it reduces transference, and by increasing the activity of the psychiatrist it reduces that of the patient.

On the other hand, the value of intuition has serious limitations. It will vary from one psychiatrist to another and even from day to day in the same psychiatrist. The interview must be so conducted that the patient will provide the richest display of behaviour suitable for the stimulation of psychiatric intuition, along with the maximal content suitable for rational evaluation in terms of ego strength.

The function of the ego is the integration of emotional attitudes and behaviour so as to ensure the greatest advantages in relation to environment and to avoid painful intrapsychic tension. Successful function of the ego therefore depends on extensive and accurate testing of reality and on competent control of conscious and unconscious psychic forces.

The weak ego manifests its weakness in its relative failure in these various directions. Contact with reality is too limited, insufficiently firm, and incoherent; the individual's behaviour is poorly integrated and too strongly swayed by unconscious motives and instinctual demands. The positive findings would include, for example, restriction of range of interests; deficiency of externally directed activity, either habitual or in the face of real difficulties; more or less complete loss of contact with reality under special stress, followed by undue delay in full resumption of reality testing; diffusion of effort through inconstancy or incompatibility of aims; decreased ability to postpone satisfaction of desires or to tolerate their frustration; and a general lack of good sense in the conduct of affairs. Such findings justifiably support the decision that a patient's ego is excessively weak.

The interview is simply a short conversation with the patient, in which we ensure that he does very much the greater part of the talking. We open it with some commonplace greeting and let it take its course, guiding it as unobtrusively as possible to the subjects we think will be most helpful. So long as the topic is effective in stimulating affective and other responses from the patient, we allow or urge him to continue. So soon as we feel we have exhausted the fruitfulness of any topic, we intervene, as easily and as naturally as possible, to change the direction of the deliberately one-sided conversation. Any topic may be found suitable. We may induce him to discuss his sources of pleasure and enjoyment or his difficulties in civil or in Army life, his interests, his family relationships, other domestic matters, &c. We do not set ourselves to cover any particular ground,

and in general it is very much better to get a vivid and detailed account of some limited aspects of his experience than to spread the inquiry more broadly and so get more superficial responses.

In our experience one topic has usually occupied the foreground of our interviews, and it is one that, along with family matters, is most liable to be spontaneously introduced by the soldier. It is also especially relevant to our more specific aims. This is an account of his latest battle experience. We try to get it as full and as detailed as possible, trying in particular to gain the maximal insight into his affective responses to battle, his particular fears and his defences, and the quality of his behaviour on the battlefield. Because of the freshness of our cases, the affective responses are often more accessible to study here than they would be farther back along the line of evacuation; many of our patients, when they reach the exhaustion centre, still show the tail-end of the physiological anxiety reactions that were stimulated in battle.

Such an interview gives us information on the existence and importance of "neurotic increments" which may be indicated by accounts of subclinical neurotic reactions, such as avoidance of quarrels or excitement, nervousness in company, difficulties with superiors, excessive fearfulness in the dark, &c. But, most important of all, it gives us a short sample of the patient's active living behaviour, on which we can base our intuitive assessment, the most decisive factor in deciding our disposal of the case.

CRITICISM

The technique we have described is open to a number of objections. We shall mention only three that seem important.

(1) Our intuitive judgment of the patient is not really a direct assessment of the strength of his ego. What we gain is an impression of his personality, his externally perceptible qualities. We do not know what relationship exists between ego and personality in this sense. We have taken an impression of weakness of this personality as an indication of the weakness of the ego. This is an assumption without theoretical backing.

(2) We have treated weakness of the ego as a unitary condition. It is probably not so. Weakness of one set of ego functions does not necessarily imply weakness of all the others. Thus, because a man has excessive difficulty in restraining the desire for flight, it does not follow that he is excessively prone to lose touch with reality under stress. This is obviously very relevant to the decision about his disposal.

(3) Finally, weakness of the ego is probably much more variable than, for instance, weakness of the intellect. The ego may be fortified by such factors as good unit morale and leadership. It is therefore difficult to decide what degree of apparent weakness precludes operational effectiveness.

In spite of these and other shortcomings we think that this is about the best that we are at present able to do in so short an interview. We get a rough but clearer and probably more accurate picture of the patient and a fuller insight into his military effectiveness than results from adherence to the standard routine of attempting to take a full psychiatric case-history in the time available.

We hope that the method here described may be of some use to civilian psychiatrists. With the increased demand for psychiatric services that seems likely to arise now that peace has returned, it may well be that, for some time at least, similar superficial methods may be required. Even apart from this, occasions arise when we wish to gain a quick picture of our patient at our first interview, and some appraisal of the ego strength is necessary in deciding the form of therapy and in making a prognosis.

Cases seen at the front are in an emotional state which renders the "impressionistic" technique indicated especially fruitful. This is far less so in cases seen under ordinary circumstances. However, it still seems worth while to draw attention to the ego functions, to the importance of assessing their effectiveness, and to the general lines of inquiry along which such an assessment may be conducted.

SUMMARY

The nature and functions of the forward military psychiatric unit (corps exhaustion centre) are described.

Cases seen comprise (1) normal men who have broken down under excessive stress, (2) neurotically predisposed men who have developed neurotic symptoms under stress, (3) men who merely do not function effectively as soldiers under stress.

The psychopathology of the third group is discussed. Weakness of the ego is considered to be the essential defect.

The most suitable technique for a psychiatric interview aimed at assessing ego strength and restricted to 10–15 minutes is discussed. Reliance on psychiatric clinical intuition as the main decisive factor is recommended.

Our thanks are due to Brigadier J. H. Bayley, D.D.M.S. 5 Corps, for permission to publish this paper.

MALTED FOODS FOR BABIES

TRIALS WITH YOUNG RATS

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A MALTED food for infants to provide a supplement or substitute for milk, when this is very scarce, was by Dr. G. Caprino in the laboratories of Peroni's brewery in Rome and was called by him 'Maltavena.' His formula was brought to the notice of the health division of the European Regional Office of UNRRA, at whose request we have tested on young growing rats the value of such mixtures as sources of proteins and B vitamins.

The maltavena preparations supplied to us were of two types: one containing, on a solids basis, extract of malted barley about 80%, wheat flour (80% extraction of the grain) about 10%, and skimmed-milk powder about 10%; the other containing 10% soya flour in place of the milk powder. Both the wheat flour and soya flour had also been subjected to digestion with the enzymes of malt extract for a short time. Of the materials tested in the following experiments, two, A and C, were of the first type, and three, B, D, E, contained soya flour; their percentage composition was approximately as follows:

Maltavena preparation	*Malt extract*	*Wheat flour*	*Soya flour*	*Skimmed-milk powder*
A	80	10	—	10
B	80	10	10	—
C	80	10	—	10
D	80	10	10	—
E	70	10	10	10

All were supplied in the dry form and were ground to a fine powder before being fed to the rats.

EXPERIMENTAL

The criterion adopted was the capacity to support growth in newly weaned rats. For this purpose, diets were constructed which consisted mainly of the malted food to be tested and their value was estimated in comparison with that of diets containing a similar percentage of protein derived from milk powder. The proportion of protein, carbohydrate, and fat was similar in all the diets on which growth was compared.

The following procedure was adopted in all the experiments quoted unless otherwise stated. The young rats (Lister pied strain) received the experimental diets a few days after weaning, when their body-weight was about 40–50 g. Litter mates were divided into groups of equal average body-weight, with equal distribution of males and females, and to these groups were allotted the different diets to be tested. To provide a standard for comparison, each experiment included a control group maintained on a diet containing an equal content of protein derived exclusively from skimmed-milk powder. The diets made with the malted foods contained about 90% of these materials, with 2% of a salt mixture

TABLE I—COMPOSITION OF DIETS (PARTS PER 100 g.)

Material	Expt. II			Expt. III			
	Diet 3	Diet 4	Diet 5*	Diet 6	Diet 7	Diet 7a	Diet 8*
Maltavena C ..	89	..	..	85	..	..	..
Maltavena D ..	..	89	..	..	85·5	88	..
Extra soya flour ..	..	..	..	..	..	6·1	..
Extra milk powder	10	9	35	11	7·9	..	31
Lard	..	..	..	3·4	1·8‡	0·4‡	4·0
Sucrose	..	..	64	..	4·4	4·4	64
Salt mixture† ..	0·9	0·9	1·0	0·9	0·9	1·7§	1·0
Average nitrogen content (% on air-dry wt.) ..	1·70	1·77	1·79	1·74	1·77	1·67	1·65

* Milk control. † McCollum's no. 185.
‡ These amounts were given to bring the total to about 4%; the soya flour contained 22% fat.
§ Extra salt mixture added as diet 7a contained no milk powder.

(McCollum's no. 185); in some trials extra fat was added to bring the total up to about 4%. In the experimental diets the malted food provided the protein and the carbohydrate; in the milk-powder control diets sucrose was added to make a corresponding proportion of carbohydrate. The composition of some representative diets is shown in table I.

Each rat received daily 2 drops of cod-liver oil, to supply vitamins A and D, and (except in experiment IV) 1 c.cm. of a protein-free aqueous yeast extract (=0·5 g. of dry yeast), to provide B vitamins. The proportion of nitrogen, reckoned on a solids basis, was arranged to be about the same in the diets compared in any one experiment; it varied in the different trials from 1·6% to 1·8%, representing about 9·5–11·0% of "crude" protein. These amounts are suboptimal for the growth of young rats and were purposely so arranged to ensure that the protein content was the factor limiting growth. All other essential nutrients were present in adequate amounts.

Expt. I.—In this test comparison was made of the nutritive value of the protein and other nitrogenous substances present in maltavena A and B. The diets 1 and 2, incorporating products A and B respectively, as fed to the rats, contained 1·6% of nitrogen, or about 9·6% of crude protein. The control diet with skimmed-milk powder also contained 1·6% of nitrogen.

The rats on diet 2 thrived better than those on diet 1, but less well than those on the control skimmed-milk-powder diet. The rats on the control milk-powder diet developed a scaly condition of the skin on paws and tail after about seven weeks owing to the lack of unsaturated fatty acids. The condition improved with the addition of 4% of lard. Rats receiving soya flour (diet 2) had no skin affection, because the fat in the soya bean contains a high proportion of unsaturated acids (Durkee 1936).

Expt. II.—The malted products C and D tested in this experiment and in experiment III had a total nitrogen content of 1·3–1·5% on the dry weight, which is too low for a satisfactory test with young rats. Accordingly 10% of skimmed-milk powder was added to each. In this way the percentage of nitrogen in diets 3 and 4, made with these two products respectively, was raised to 1·7–1·8% (the crude protein being 10–11%). The milk-powder control diet 5 was arranged to correspond (see table I).

This increase in protein content was accompanied by a better rate of weight increase than in experiment I. On diet 4, containing maltavena D with soya flour, the rats progressed almost as well as on the milk-powder control diet; the performance on diet 3 was inferior. The average weekly weight increase in 32 days on diets 3, 4, and 5 was, respectively, 10·0, 13·6, and 13·9 g. (see figure).

Expt. III.—In this test lard was added to each diet in amount to make the proportion about 3·5% in the diet (see table I). The performance of the young rats was compared on diets 6 and 7 (table I), which contained the malted products C and D respectively, after the addition of extra milk powder to each, as in experiment II. An additional diet, 7a, was tested, in which 6% of soya flour was added to maltavena D to provide an amount of nitrogen equal to that in the extra milk powder. The control diet 8, with all protein derived from the milk powder, was included in the experiment.

In all groups the rate of weight increase was satisfactory, in view of the low level of protein in the diets for these rats. With diets 7 and 7a, containing soya flour, growth was as good as with the milk-powder control diet 8, the average weekly weight increases being 15·5, 14·4, and 14·6 g. respectively. On diet 6, containing malt extract with wheat flour and skimmed milk powder, the weight increase was less (average weekly increase 12·8 g.) in spite of the fact that about half of the protein was derived from milk protein (see table II).

It may be concluded that the growth-promoting value of the mixture of proteins of malt extract, wheat, soya flour, and milk as contained in diet 7, and that of the mixture of those of malt extract, wheat flour, and soya flour as contained in diet 7a, were equal to the value of milk proteins.

TABLE III—EXPT. IV (DURATION OF TEST 49 DAYS)

Diet 9	Composition (parts per 100 g.)	—	No. of rats	Av. body-weight (g.)		Av. weekly increase (g.)
				Initial	Final	
Maltavena E	94	With yeast extract 1 c.cm. daily	4	44	139	13·6
Salt mixture	1					
Lard ..	4	Without yeast extract	4	43	132	12·7
Nitrogen content (%)	1·7					

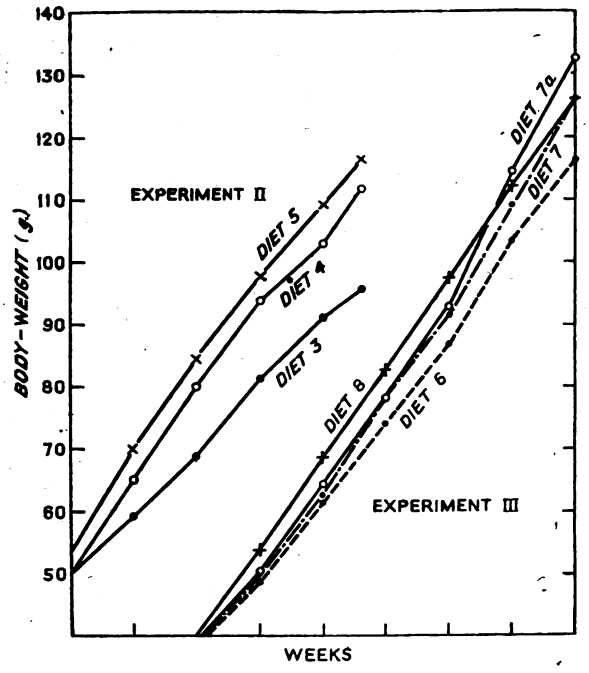
Expt. IV.—Extracts of malted barley and the soya bean are both known to be good sources of B vitamins. For this test diet 9 was composed of maltavena E with salt mixture and lard; the nitrogen content of the diet was 1·7% (see table III).

A single litter of newly weaned rats was divided into two groups of 4 rats; both groups received this diet with the usual daily dose of 2 drops of cod-liver oil. One group received additional B vitamins as 1 c.cm. of yeast extract daily; the other group received none. After seven weeks there was a slight, but doubtfully significant, advantage in the average body-weight of the rats on extra B vitamins, the respective figures for the two groups being 139 and 132 g. and the average weekly increases 13·6 and 12·7 g.

TABLE II—EXPT. III (DURATION OF TEST 6 WEEKS)

Material tested	Diet no.	Av. nitrogen content (%)	Protein (N×6) content (%)	Percentage (approx.) of protein derived from—				No. of rats	Body-weight (av.)	
				Malt extract	White flour	Soya flour	Skimmed-milk powder		Initial (g.)	Av. weekly increase per rat (g.)
Maltavena C* + extra skimmed-milk powder 10%	6	1·74	10·4	32	10	..	58	6	39·5	12·8
Maltavena D* + extra skimmed-milk powder 10%	7	1·77	10·6	34	11	30	24	5	39·0	15·5
Maltavena D* + extra soya flour 6%	7a	1·67	10·0	34	10	56	..	6	39·7	14·4
Milk-powder control diet	8	1·65	9·9	..	..	..	100	6	38·2	14·6

* See table I.



Average weight curves of 5-6 rats on diets in which nitrogen was derived from the malted preparations, compared with those of rats on control diets containing an equal proportion of nitrogen derived from milk. For particulars of diets see tables I and II. Diets 5 and 8 are milk-powder control diets.

This result indicates that maltavena containing soya flour, if used for baby food, would not need supplementation with food yeast or synthetic B vitamins.

DISCUSSION

The results of the tests indicate that a combination of malt extract about 70 parts, wheat flour about 10 parts, and soya flour about 16 parts (on a solids basis) possesses a mixture of proteins whose growth-promoting value for young rats is about equal to that of the proteins of milk. When 10 parts of skimmed-milk powder replaced about half of the soya flour, the growth was not increased to a significant extent (experiment III). It is concluded that the enhanced worth of the mixture is due to the supplementary action for one another of the proteins contained in the different ingredients. The proteins of the soya bean, in common with those of other legumes, have been shown to have a supplementary effect for those of rice or of white wheat flour (Indian Research Fund Association 1946; Jones and Divine 1944). We have confirmed this fact for white wheat flour and the sample of soya flour used in the manufacture of the foods tested in the present work (Chick and Slack 1946). It is possible that the protein in the malt further supplements those in the wheat and soya flours. Everson et al. (1944) have shown that the nutritive value of soya protein is increased by germination of the beans. We, however, did not find any enhancement of the growth-promoting value of barley after malting.

With the experimental rats in the present work, better growth and healthier animals were obtained when the diet contained about 1·8% of nitrogen or about 11% of crude protein (on a solids basis) than when the proportion was lower. The human baby, however, with its much lower growth-rate, presumably requires less protein in its diet than the rat, judging from the low proportion of protein in human milk compared with that of the rat. But since the biological value of the proteins in human milk may be greater for the human infant than that of any artificial mixture, a proportion of about 11% of protein in the diet would not seem too high.

The composition of these malted foods was originally so arranged that, when diluted for consumption, it should equal that of human milk in calorie value and in content of proteins and total minerals, and the results of our experiments indicate that the maltavena preparations containing about 16% soya flour, owing to the supplementation of the various proteins contained in the constituents, may meet the protein requirements of an infant and provide a sufficient supply of B vitamins.

Maltavena, however, even when compounded with soya flour in the amount included in diet 7a, is very deficient in fat (possessing about 1/6 of that in human milk) and in fat-soluble vitamins. The latter can be easily supplied by a small dose of cod-liver oil. To what extent the fat in a food for infants can be replaced by an isodynamic equivalent of carbohydrate is uncertain. Owing to milk shortage in Vienna during the war of 1914–18 attempts were made at the University Kinderklinik to feed babies on dilute skimmed cow's milk to which sugar was added to bring the calorie value up to that of human milk. These results were unsatisfactory, but the importance of fat-soluble vitamins was not appreciated at that time. As a routine measure the director, Prof. C. von Pirquet, reduced the fat in the diet of the babies in the clinic to half and substituted an amount of cane-sugar of equal energy value. The infants thrived during the summer on this diet but developed rickets in the winter; the addition of cod-liver oil prevented the rickets (Chick et al. 1923).

Only clinical trials can decide whether the human infant will thrive on a diet which, though containing enough good protein, suitable carbohydrate, and the necessary minerals and vitamins, has a fat content which is only a small fraction of that in its natural food.

CONCLUSIONS

The nutritive value of the proteins contained in the different samples of maltavena received, and in modifications of these, was measured by their power to support the growth of young newly weaned rats, in comparison with that of milk proteins.

Of the mixtures tested, the one containing malt extract 70%, wheat flour 10%, soya flour* 10%, and powdered skimmed milk 10%, with total nitrogen about 1·8%, proved the most advantageous. The combined supplementary action of the different proteins it contained rendered the mixture equal in growth-promoting value to the mixture of proteins in milk, when fed in a diet of equal nitrogen content.

Though the mixture of malt extract with wheat flour 10% and soya flour 16% was as efficient as that in which skimmed-milk powder 10% was substituted for about half the soya flour (experiment III), it would seem safer, on general grounds, to include a small proportion of milk powder in any infant food.

We wish to thank Glaxo Laboratories Ltd. and Ovaltine Research Laboratories (A. Wander Ltd.) for the supply, on behalf of UNRRA, of the maltavena preparations; Mr. G. W. Flynn for his technical assistance; and Sir Charles Martin for his hospitality at Roebuck House, Cambridge, where the work was carried out, and for his constant support and helpful criticism.

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* Soya flour is well provided with calcium and phosphorus, containing about two-thirds of the amount present in dried cow's milk, but there is less calcium than phosphorus, whereas in milk the reverse is true. Many workers using soya flour for infant feeding have therefore added a small amount of a calcium salt (see Mackay 1940).

Reviews of Books

Child and Adolescent Life in Health and Disease

W. S. CRAIG, B.SC. Glasg., M.D. Edin., F.R.C.P.E., formerly first assistant in the department of child life and health, the University of Edinburgh; with a foreword by Prof. Charles McNeil, F.R.C.P. Edinburgh: E. & S. Livingstone. Pp. 667. 25*s*.

THIS book appears appropriately at a time when the child-health services are under review, and when pædiatrics is taking an increasingly important place in the training of both medical students and postgraduates. Professor Craig has divided his comprehensive work into four main sections and a number of appendices. The first part, which is historical, deals with the early development of systematised care for children from the haphazard and often chaotic results of private philanthropy and poor-law administration. The second, and major, part deals with care of child life at the present time. This section includes particulars of organisations dealing with homeless children, provisions for juvenile delinquents and for handicapped children, the maintenance of health, treatment of the sick, and care of children under conditions of total war. The third section, on "the spirit of future endeavour," is surprisingly slight considering the importance of the subject, and barely touches many of the problems suggested by the subtitles. Finally there is a first-class summary of the more important legislation dealing with child health and care. Where there is so much to praise, it is perhaps mere carping to suggest that there are rather too many pleasing studies of child life among the illustrations. Regarded as a social study, the book is unique at present and contains a great deal of information not readily accessible elsewhere. It should be useful both to the public-health worker and the clinician concerned with child health.

The Osseous System

VINCENT ARCHER, M.D., professor of roentgenology, University of Virginia. Chicago: Year Book Publishers. London: H. K. Lewis. Pp. 320. 33*s*.

THIS is the fourth of a series of six handbooks on radiological diagnosis. It is well produced with many good illustrations of the common bone diseases and abnormalities. The text is brief and to the point and references between text and illustrations are very easy to follow. These handbooks are a cross between an atlas and a textbook—a difficult species to breed with success. This one is a success because rarities are omitted and emphasis is placed on common mistakes observed over a period of twenty years in a teaching hospital. The best section is on bone abnormalities in childhood, and the book can be heartily recommended to students studying for a radiological qualification.

Tropical Nutrition and Dietetics

(2nd ed.) LUCIUS NICHOLLS, M.D. Camb. London: Baillière. Pp. 370. 27*s*. 6*d*.

NUTRITION in the tropics differs but little from nutrition in temperate regions as regards the quantity and the quality of the food which is essential to preserve health; the differences lie chiefly in the fact that the inhabitants of the tropics eat foods which differ in their composition from those eaten in temperate regions. There have been very few investigations in the tropics concerning whether more or less of any dietary constituent is required to maintain the body in a state of good nutrition, but a book of this kind should review them. The increased requirement of sodium chloride in the warmer parts of the tropics is lightly passed over, however, and the severe deficiency arising in heat exhaustion is not mentioned. In all who live in the tropics the basal metabolic rate is believed to be reduced by some 10%; but none of the published observations on this important point are specifically mentioned.

The author shares the belief of some other doctors in the tropics that the indigenous people need less food, though no colour bar has been detected in the field of human nutrition. Thus he affirms that an adult male labourer in the tropics, in view of the fact that he weighs only 52 kg. (almost certainly because he is poorly nourished), needs only 1500 calories for basal metabolism, 600 calories for minor activities outside his working hours, and 400–500 calories for his work. His protein requirements, however, are set at 65 grammes and his fat requirements at 50 g.—both liberal estimates. Other requirements are assessed at calcium 0·5 g., iron 8 mg., vitamin A 1800 units, nicotinic acid 20 mg., ascorbic acid 40 mg., and thiamine 0·4 μg. for each non-fat calorie. Some of these figures are distinctly low when compared with those which are generally accepted in other parts of the world. The discussion on the vitamins and minerals is otherwise detailed and accurate; the section on thiamine and beriberi is exceptionally good, largely because in this field workers in the tropics have made a unique contribution to knowledge. Such effects of protein deficiency as nutritional œdema, however, are too briefly discussed, and there is almost no mention of necrosis of the liver or of cirrhosis. Casein hydrolysates and the administration of plasma are not mentioned; kwashiorkor is dismissed as of no account; and nutritional iron-deficiency anæmia is considered to be almost an impossibility in the male.

The tables on the analyses of tropical foodstuffs are useful and accurate, but the approximate wastage in preparation might have been indicated. The discussions on the different tropical foodstuffs and public-health aspects of nutrition are some of the best in the book. On the whole Dr. Nicholls fairly presents what is known in the field of tropical nutrition, but sometimes fails to discriminate between the established facts—all too few—and the speculations—all too many.

Evolution of Plastic Surgery

MAXWELL MALTZ, M.D., SC.D. New York: Froben Press. Pp. 368. $5.

IT was a happy inspiration of Dr. Maltz to give us an outline of the history of plastic surgery from primitive times to the present day. Reparative surgery began in the hard school of war, and today ample scope has been given for the skill of modern surgeons, especially in facial plastic surgery—though some of the new modern methods are but refinements and improvements of the old. The Greeks and Arabs made little contribution to the evolution of plastic surgery. In the 10th century the Jews gained fame as physicians and surgeons but in 1267 the Council of Venice prohibited Jews from practising on the body of any Catholic believer, and the study of anatomy was likewise forbidden. During the Middle Ages plastic surgery languished, for the Fathers of the Church regarded anything pleasing to the eye as a temptation of the devil. It was only after the foundation of Salerno University that the Italian physicians revived surgical art in modern Europe. The University of Bologna followed, where in the 16th century the great Tagliacozzi—sometimes called the father of plastic surgery—arose and gave his name to an operation for rhinoplasty. General and local anæsthesia have favoured the evolution of modern surgery. Gillies's use of the direct-flap method is fully described, and the author pays tribute to his brilliant pioneer work and that of Vilray Blair of the United States.

Pneumoperitoneum Treatment

A. L. BANYAI, M.D., F.A.C.P., associate clinical professor of medicine, Marquette University, Milwaukee. London: H. Kimpton. Pp. 376. 33*s*.

OUTSIDE the world of pulmonary tuberculosis pneumoperitoneum is generally known as an occasional diagnostic and therapeutic measure. The use of intraperitoneal oxygen or air in the treatment of tuberculous peritonitis dates back 50 years, but it is only in the past few years that the indirect effects of pneumoperitoneum on the lungs have been used at all extensively. The air in the abdomen pushes the diaphragm up into the chest, and thus affects the capacity of the thorax. When used in conjunction with paralysis of the phrenic nerve the elevation of the diaphragm can be considerable and is a valuable addition to collapse therapy. It is usual to use pneumoperitoneum in conjunction with phrenic-nerve interruption or artificial pneumothorax, since its effects alone are not extensive enough to be of great value. In a comprehensive and detailed study, Professor Banyai deals with all aspects of the procedure. Generally speaking complications are rare, though peritoneal effusion is sometimes encountered; the risk of damage to bowel is not likely to be overlooked by the operator.

THE LANCET

LONDON: SATURDAY, OCT. 26, 1946

A Joint Enterprise

MEDICINE and nursing are one art, its aim the care of the patient. If medicine goes on growing, as it must, while nursing is suffering a decline, the achievements of one will be offset by the failures of the other. However sure the diagnosis, neat the operation, or apt the drug the patient dies or suffers if he is badly nursed. Doctors have thus towards the nursing profession a duty of which nowadays they seem hardly aware. In the early days of modern nursing the nurse looked to the doctor for advice and help in developing her specialty, and the results of that collaboration have been an example to the world. Indeed, many of the principles laid down in that atmosphere of confidence and endeavour have stood the test of a century of nursing practice. The founding of the State examination, which placed nursing finally on the footing of a profession, should have strengthened the partnership, doctors and nurses working together as colleagues. In practice there has been something of a break, for which both professions must accept blame. The doctors, probably from inertia, have lost interest in the training of the nurse, and the nurses, from a natural wish to cultivate their own garden, have drawn away from the doctors. It will not do: any disunity—anything short of complete and sympathetic collaboration—means too much risk to the patient.

The neglect of nurses by the doctors has helped to bring nursing into disrepute with possible candidates. Miss MURIEL EDWARDS, of the Nursing Recruitment Centre, tells us that when she talks in a girls' school on nursing as a profession she often has a long queue of eager questioners to answer at the end; but girl after girl says, "I want to do something in a hospital—not nursing, of course." Asked what, then, she would like to do, the girl says she would like to "do therapy." She does not know what kind of therapist she wants to be: she hardly understands the meaning of the word. All she knows is that a "massage" student is on a very different footing—not only with the doctors but with the general public—from a nurse. To her, nurses are hack workers of whom little scientific ability but much domestic work is expected; and unfortunately the lack of domestic help in hospitals has lately given fresh colour to this old prejudice. Theory in the present nursing curriculum, illogically based on the course of the medical student, is wide in scope and shallow in content, bewildering for the simple girl, yet leaving the girl with brains unsatisfied. Nursing should mean an intimate personal study of the patient; yet bedside nursing, the core of the whole art, is taught in hasty snatches by a sister who is fully occupied in other ways, and by a sister-tutor who is confined to the classroom, and must somehow invest an unresponsive dummy with the appeal of a living patient. Research in nursing is unknown under that name; for though many an ingenious sister contributes impromptu devices to nursing, there is no recognised way of spreading new methods from one hospital to another, and techniques which might have a universal value are stillborn, or live only as long as the local need persists. Again, nurses have no proper control over the equipment they use; these women, who should be as good with their hands and as thrifty with their strength as an old sailor, put up with much pointless exertion because a nurse is not expected to knock in nails, rig pulleys, or put screws in the ceiling when these would make things easier for the patient or for herself. The very aspect of nursing that should appeal most, alike to the intelligent and to the handy girl, has been allowed to sink into a hurried routine in which bedmaking and bedpans, the clock and the sister, have become dreary phantoms, crowding and diminishing the patient.

We believe that the medical profession must take a full and responsible share in restoring nursing to the position in which FLORENCE NIGHTINGALE placed it: as an absorbing and stretching career for women with brains, as well as a satisfying occupation for women who, though not academic, are physically and emotionally apt for the care of the sick. And we think that an important step in this reablement might be achieved by the founding of an experimental school of nursing in which new departures in the curriculum, as well as in the conditions of the nurse's life, might be given a fair trial. A large training hospital might offer the best opportunities for this venture, and it is possible that funds might be forthcoming from various sources to meet the expenses: certainly the Royal College of Nursing was in communication with the Rockefeller Foundation, before the war, about the establishment of a demonstration school of nursing, though this was probably dedicated to another type of experiment.

In this school, we suggest, a medical dean of nursing should be appointed, to work with the matron, the sister-tutor, and the ward sisters in devising a theoretical curriculum oriented to the nurse's needs—for example, with less emphasis on anatomy and physiology and far more on bacteriology and spread of infection. The school might explore the possibilities of a two-year basic training for all entrants—in which bedside nursing was given the honourable place it deserves—and of a senior course, making good use of the mental capacities of the girl who wishes to become a sister. The medical dean of nursing should, in our view, 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, and should bring his or her medical colleagues to share more fully in the education of student nurses, especially by taking ward rounds. An example of this kind could not fail to benefit the standing of nursing, besides renewing its standards.

The Bleeding Peptic Ulcer

THE treatment of gastroduodenal bleeding, in common with other hæmorrhagic conditions, has benefited from the war experience of blood-transfusion. This has brought home to the surgeon what large amounts of blood can and often should be given—one of LOUTIT'S[1] patients, for instance, received the equivalent of 17 litres in fifteen days. Moreover, administration has become technically easy and,

1. Pappworth, M. H., Loutit, J. F. *Lancet*, 1943, ii, 469.

with reasonable care, hæmatologically safe. The number of recognised agglutinins, it is true, is increasing, but their recognition has made it simpler to avoid the dangers of sensitisation. The amount of blood to be transfused must be based on the amount lost, but investigations on blood-volume in shock and hæmorrhage, initiated for gastroduodenal bleeding by BENNETT and his collaborators [2 3] before the late war, revealed the fallacies of clinical estimations of blood-loss. It is now clear that after hæmorrhage the fluid and corpuscular elements of the blood are restored to a certain extent independently of each other, and at completely different rates. The hæmoglobin level is therefore not in itself a reliable guide to the blood-loss; moreover, it is usually impossible to make any allowance for previous anæmia. The level is not immediately altered by a brisk and heavy bleeding, when corpuscles and plasma are lost in the same proportions; it is only later, when the plasma has been replaced and the patient's condition therefore improved, that the hæmoglobin, now lowered, gives some measure of the seriousness of the hæmorrhage. It is true that hæmodilution usually takes place within a very few hours, but it may take up to 24 hours,[2] and the picture is further complicated if the bleeding continues or recurs. The patient's general condition is of course important in estimating severity, and measurement of a large hæmatemesis or melæna will give a rough minimum estimate of the blood lost; the blood-pressure is also a valuable clue, particularly if the normal level is known, and a low pulse-pressure may help in the recognition of the collapsed hypertensive. Nevertheless, accurate criteria of severity are still lacking, and without them it is difficult to confirm and evaluate reports of treatment. What is most needed is an easy and reliable method of determining the blood-volume.

The controversy round treatment usually turns on whether the bleeding from chronic ulceration should be treated surgically or medically, and, if surgically, at what stage. Results are best where coöperation between physician and surgeon is closest.[4] Chronic ulceration accounts for 80% of cases of gastroduodenal hæmorrhage,[5] but where hæmatemesis or melæna is the first manifestation the differential diagnosis must be considered. The patient bleeding from an acute erosion or through cirrhotic congestion or a hæmorrhagic disease, such as purpura, is not a suitable subject for gastric exploration, though FINSTERER [6] believes that when doubt exists the risk in operating is outweighed by the danger of leaving a chronic ulcer bleeding. He even advocates gastrectomy for the gastrostaxis of multiple erosions, though this is an extreme view and his quoted fatalities, whether operated on or not, by modern standards received woefully inadequate transfusions. On the other hand, his plea for operation on the known bleeding ulcer within the first 48 hours is well founded. Protracted hæmorrhage is to be anticipated from an ulcer with a big vessel open in its base; and though, if it is not too severe, the blood-loss can continually be made good, the patient's final condition, with very little of his own blood left, is not so satisfactory for operation as at the beginning. The bleeding often stops, thus dispelling the need to operate during the period of hæmorrhage; but sometimes it continues, and by procrastination the surgeon is finally offered a debilitated poor risk. The problem is to decide in which case the bleeding will stop. With a known or strongly suspected ulcer, if the bleeding is not appreciably lessening after 24 hours of adequate treatment, it is wise to step up the transfusion until the hæmoglobin is at least 60%, and then take the patient to the theatre with the drip running. Where the diagnosis is in doubt, the best course is probably to replace blood for blood and to make every effort consistent with safety to establish a diagnosis. Some still say that transfusion, by raising the blood-pressure, will start hæmorrhage afresh. This is not supported by experience with drip methods, and indeed the bleeding sometimes stops as soon as the first pint has been absorbed. In any case it may be essential to raise the blood-pressure if life is to be saved.

Diet is important, whether the patient is being treated medically or surgically. A bland semi-solid diet, as recommended by WITTS,[7] is perhaps the most generally useful. There is need to go slow with feeding for the first 24 hours; for the patients often feel sick, and vomiting is liable to start the bleeding again. Opinion is not yet settled as to the advisability of emptying the stomach of its blood contents with a tube; the smooth clot covered with mucus makes for nausea and interferes with the sealing of the bleeding vessel. After 72 hours, well-cooked cereals, custards, junket, soft-boiled egg, and puddings may be given in greater quantities. Vitamin C, up to 500 mg. a day, should be given. Absolute bed rest may be supplemented by morphine, which should be given in moderate doses since these patients are prone to serious lung complications. Morphine should be replaced by barbiturates after 24 hours. In the convalescing patient the hæmoglobin and blood-pressure should be frequently estimated; the hæmoglobin should not be allowed to remain low, for a further hæmorrhage would then be disastrous. Packed corpuscles are at this stage superior to whole blood, and should be given in repeated small infusions.

When operation is decided on, its nature will obviously vary with the patient and the surgeon. To open the stomach (or duodenum) and insert mattress sutures over the ulcer is the simplest, and with bad risks the best, procedure; and it may be necessary to combine this with ligature of the bleeding vessel. With the induration and distortion that is often present it may not be easy to establish which vessel needs tying or to expose it. Here detailed knowledge of anatomy is essential, and it should include an understanding of the anomalies of vessels at the pyloric end of the stomach which GORDON-TAYLOR [8] describes. He emphasises that operating for ulcer hæmorrhage is not synonymous with gastrectomy. The object is to stop the bleeding and prevent its recurrence; this may in fact be sometimes most readily attained by gastrectomy, and it is reasonable

2. Bennett, T. I., Dow, J., Lander, F. P. L., Wright, S. *Ibid*, 1938, ii, 651.
3. Bennett, T. I., Dow, J., Wright, S. *Ibid*, 1942, ii, 551.
4. Gordon-Taylor, G. *Brit. J. Surg.* 1946, **33**, 336.
5. Eads, J. T. *J. Amer. med. Ass.* 1946, **131**, 891.
6. Finsterer, H. *Surg. Gynec. Obstet.* 1939, **69**, 291.
7. Witts, L. J. *Brit. med. J.* 1937, i, 847.
8. Gordon-Taylor, G. *Brit. J. Surg.* 1937, **25**, 403.

to consider this surgical cure if it does not add excessively to the risk. Some of the figures for gastrectomy show how remarkably results have improved with adequate transfusion—but it must not be forgotten that the results of medical treatment have also improved.

If the physician is to do his best for the patient he must learn to differentiate early between the case in which there is but a slow intermittent ooze and the serious hæmorrhage from the open large vessel, unlikely to yield to simple medical measures. The patients who die are usually those over the middle forties. This is not because of any associated arteriosclerotic brittleness of the vessels, but because these patients have almost certainly had ulcers of long standing; the bleeding vessel is encased in a fibrotic mass and is unable to retract and contract. Thrombosis in the vessel is the only hope of stemming the leak. The case with a long history, and particularly with previous bleeding, is the one where the need for surgery requires strongest consideration. Before the late war it was generally held that to operate after 48 hours' bleeding was nearly always disastrous, especially as the bowel suture lines seemed to make no attempt at adequate healing. With the adoption of massive rapid transfusions this is no longer true, and results in this country show that such "late" surgery is now being successfully undertaken. Nevertheless, cases requiring surgical intervention are relatively few, and medical management must still form the first line of treatment.

Infected Food

THE increasing incidence of food-poisoning since the start of the late war may be due, in part, to the growing number of residential institutions and communal feeding centres. Unfortunately, investigation of the toxic form is hampered by the lack of a susceptible animal. Moreover, no outbreak can be fully investigated unless it is notified at its very beginning; this rarely happens, and anyone working on the subject is familiar with the disappointment of arriving to find that all the suspected food has been thrown away or that only some empty tins remain, stinking and fly-blown after days in a dustbin. It is from the comparatively few outbreaks which have been fully investigated that our understanding of the condition is derived.

Ducks' eggs have been repeatedly incriminated as a source of salmonella infection. Lately *Salmonella typhimurium* (*ærtrycke*) of identical phage type was isolated from a patient who had eaten an egg and from the duck itself [1]; and the Ministry of Health's war report [2] records altogether nine outbreaks from this source. MALLAM and ALHADEFF,[3] in recording another case, urged that ducks' eggs for eating should come from healthy birds, be gathered daily, and be laid in dry and uncontaminated surroundings. The hen's egg, in the "shell-egg" form, appears to be a rare source of infection; the first and only certain example was reported last year by WATT,[4] who isolated *S. montevideo* from eggs of the batch used for the mayonnaise from which an outbreak originated. However, *S. pullorum*, the cause of bacillary white diarrhœa, remains the most important source of fatal septicæmia in young poultry, and other salmonella organisms pathogenic to man are now causing serious epidemics in poultry. It was therefore natural that dried eggs, which began to arrive here in 1941 and were first distributed on a large scale in 1942, should be investigated for this group of organisms. Since 1942 there have, in fact, been outbreaks with many new types; to *S. typhimurium*, *enteritidis*, *thompson*, and *newport* have been added *S. oranienburg*, *montevideo*, *sundsvall*, *meleagridis*, and others hitherto unknown in this country. During 1942 vast numbers of American troops were arriving here; but, though they mixed with the civilian population, they took no part in the preparation of its food, and are thus unlikely to have had any notable effect. Investigation, in fact, confirmed that dried eggs were the source, for in them the new types, including *S. oranienburg* and *S. montevideo*, were identified. During the war altogether ten outbreaks of salmonella infection in man were attributed to this source,[5] although the instructions for reconstitution had been amended to direct that the fluid mixture should be used immediately, so as to minimise the time during which the organisms could multiply.

Cooked-meat products have always been regarded as an important cause of food-poisoning, especially because the salmonella group is pathogenic to both bovines and pigs; *S. dublin* and *S. enteritidis*, for example, are a cause of diarrhœa in cows and may give rise to symptoms in humans who drink infected milk. But cooked meat, particularly in brawn and meat pies, is probably most commonly infected from extraneous sources, such as food-handlers, rodents, or flies. The food is commonly harmless when eaten soon after being prepared, but, by the multiplication of bacteria in such an admirable medium, may cause serious illness when consumed a few hours later. Last year an extensive and explosive outbreak in three eastern States of the U.S.A. was traced [6] to cheese, which was found to contain *S. typhimurium* although it had been stored at 43°–48° F for 302 days after manufacture. Occasionally, outbreaks of food-poisoning have been attributed to members of the dysentery group; one such outbreak, probably due to infected ice-cream, occurred at Aberystwyth four years ago.[5] Whatever the causative organism, the clinical syndrome is usually much the same, with headache, upper abdominal cramps, nausea, diarrhœa, and sometimes vomiting and fever; recovery is complete within a week. With severe infection, particularly in the young and old, the symptoms are more varied, and meningitis, septicæmia, or an acute abdominal condition may be simulated.

The toxic form of food-poisoning is now well known in Britain. Of 296 outbreaks, the toxic products of bacterial growth were blamed in 115, injurious chemicals in 6, and salmonella organisms in 38. The clinical picture can hardly be mistaken: after a short incubation period, usually of about 4 hours, there is an acute onset, with vomiting, abdominal pain, and usually diarrhœa and prostration, which are followed

1. Gordon, R. F., Buxton, A. *Mon. Bull. Min. Hlth & E.P.H.L.S.* 1945, **4**, 46. Gillespie, E. H. *Ibid*, 1946, **5**, 157.
2. On the State of the Public Health during Six Years of War, 1939–45. London, 1946.
3. Mallam, P. C., Alhadeff, R. *Lancet*, 1946, **i**, 887.
4. Watt, J. *Publ. Hlth Rep., Wash.* 1945, **60**, 835.
5. *Mon. Bull. Min. Hlth & E.P.H.L.S.* December, 1942, p. 4.
6. Tucker, C. B., Cameron, G. M., Henderson, M. P., Beyer, M. R. *J. Amer. med. Ass.* 1946, **131**, 1119.

by rapid recovery. The commonest organism is the coagulase-positive *Staphylococcus aureus*, whose toxin is relatively heat-stable and may resist cooking; it may find its way into the food from handlers with minor septic hand infections or with heavy nasal infection. Outbreaks have been traced to other organisms, including non-hæmolytic streptococci, the proteus group, and various anaerobic bacilli, but no cases of *Clostridium botulinum* infection have been recorded in this country since 1936.

The existence of human carriers of the food-poisoning organisms has often been denied; but BURT [7] has described a patient who carried *S. typhimurium* for 4 years; and TOMLINSON and LINSELL [8] found that convalescents carried *S. thompson* for up to 6 weeks. Such people would be dangerous to others if they were in charge of food-preparation. Much can be done to prevent the disease by the education of kitchen staffs in personal hygiene and by suitable arrangements for the washing of hands and utensils. During the war cook-house personnel of the Army and R.A.F. were investigated for organisms of the salmonella group. If this simple investigation were extended to food-handlers in all the larger feeding centres, carriers could be identified and diverted to some less dangerous occupation.

7. Burt, H. *J. Path. Bact.* 1944, **56**, 209.
8. Tomlinson, A. J. H., Linsell, W. D. *Mon. Bull. Min. Hlth & E.P.H.L.S.* 1946, **5**, 117.

Annotations

CRISIS AND CONSEQUENCES

THE crisis over the capitation fee, which endangered the chance of good relations between insurance practitioners and the Ministry of Health, has now been resolved. Up and down the country a great many doctors stood ready to resign from the National Health Insurance service at the call of the Insurance Acts Committee. The new approach came a fortnight ago from the Minister, who recognised no doubt how wide was the feeling of injustice created by his refusal of separate discussions on the application of the Spens report to the current capitation fee. As a result a formula has been reached which the I.A.C. is recommending the Panel Conference to accept. "The Minister," we are now told, "is willing fully to apply the Spens report to the current capitation fee with effect from Jan. 1, 1946, the increase of 2*s.* being regarded as a payment on account. To this end, he invites the I.A.C. to enter into discussions on the report forthwith, with special reference to the current capitation fee. The discussions will be conducted expeditiously."

No doubt the Panel Conference (which meets as we go to press) will find this proposal acceptable. It could hardly do otherwise, for the Minister has accepted without qualification the very demand made to him by the I.A.C.—failing acceptance of which, resignations were to be invited. That an agreement is within sight is good, and better still is the promise that discussions will be started at once and conducted expeditiously. It is to be hoped that an early and generous settlement can now be negotiated, that the long frustration which has marred relations with the Ministry will be removed, and that the way will thus be cleared for dispassionate consideration of the problems which will crowd upon us with the enactment of the National Health Service Bill.

Nevertheless the controversy now ending is bound to have repercussions when the time comes for asking members of the profession individually whether they favour discussion on the regulations to be made under the Act. Lest too easy conclusions should then be drawn, it would be well to record now, and to remember later, that the doctors have gained their point this time chiefly because they had a case, a good case, and one on which they felt genuinely united. It may be, too, that the Minister has been accommodating because the very reasonableness of the practitioners' case, and of its presentation by the I.A.C., placed him in a vulnerable position. In the larger issues shortly to be met the circumstances will be different. Lord Listowel, speaking for the Government in the House of Lords, expressly said: "We all desire the coöperation of the medical profession in working out the machinery for the new health service." Mr. Bevan, at the annual dinner of the British Orthopædic Association, reported on another page, remarked that his relations with the British Medical Association grow more friendly week by week, and that before very long, he is sure, they will reach a cordial understanding and obtain coöperation in carrying out the great work of the health service. We hope he is not being over-optimistic; and we believe the profession will accept his sincere desire to have full coöperation from its representatives in drafting the regulations which will shape the new service. It would be a mistake, however, to suppose that, with his health policy newly endorsed by both Houses of Parliament, he will be either willing or able to buy such coöperation by any deviation from the policy now expressed in the Bill. The profession will have much to gain by negotiating liberalising regulations under the Act when time and opportunity offer; but it will achieve nothing positive if its contribution takes the form of general condemnation and boycott of the new Act.

TRAINING IN CHILD WELFARE

THE education of girls has been modelled so closely on the education of boys that most girls leaving school at 16 or 18 have little experience of cooking, domestic management, or the care of children, and moreover have acquired an impression that time spent on such things is wasted. (Those who leave school at 14 may have a better chance of learning these basic arts, for they often come of larger and poorer families where it is natural for everyone to lend a hand.) Yet the care of children in the home, as we had occasion to say not long ago,[1] is at least as important as the care of the machine in a factory; and the output of the home takes precedence of the output of industry.

A group committee of the National Council for Maternity and Child Welfare have published a report [2] on courses of training in the care of healthy children of all ages, not only for students taking higher posts in children's homes and nurseries but also for teachers in the subject. They contemplate the development of a new profession of child welfare, having equal status with nursing and teaching. At present the only recognised training specifically for child care is the elementary course for the National Nursery Certificate, planned for girls between 14 and 16, and only dealing with children of nursery age. Those who wish to take responsible posts in nurseries or nursery schools must train, after the age of 18, as hospital nurses or nursery-school teachers; but a nurse's training, with its bias towards the care of sickness, is not the ideal background for holders of these posts, while nursery-school teachers concentrate mainly on children between the ages of 2 and 5 and learn nothing of the care of children under 2. The Curtis Committee on the care of children recently suggested [3] that there should be training for the house mothers and house fathers who take charge of residential

1. *Lancet*, Sept. 28, p. 458.
2. Training in Child Welfare. Second Report of the Group Committee of the National Council for Maternity and Child Welfare. Published by the National Society of Children's Nurseries, 117, Piccadilly, London, W.1. Pp. 17. 1*s.*
3. See *Lancet*, 1946, i, 618.

foster homes, but this has yet to be started. In Scotland a new course for nursery workers is about to be instituted.[4]

Child welfare must be taught by good teachers; and these, the committee suggest, should be trained in child-welfare colleges—or departments of existing colleges—associated with a university, and especially with university departments of child health and education. They would also be associated with centres offering allied courses, such as teachers' and domestic-science colleges. Those intending to become teachers would take the full course, lasting three years, and those wishing to take posts in nurseries or children's homes would take a two years' course. They would study the child and his needs in relation to the family, including his physical, mental, and emotional development from infancy to adolescence. The course would cover nutrition, from breast-feeding to a full mixed diet, and clothing, from the layette to the dress of well-grown young people; there would be training in home management, lectures on existing social services in this country and others, practical work in nurseries, play centres, youth organisations, and residential homes, and instruction in the teaching of child welfare. A six months' course would also be provided for those who, having qualified in an allied profession—as teachers, nurses, or health visitors—wished to become child-welfare workers or teachers. The outlines of the syllabus are sketched in an appendix.

The second part of the report sets out plans for better instruction in child care in secondary schools and county colleges. A study of 77 infant deaths at Barnsley[5] shows that among 31 deaths classed as preventable, 19 were attributed to such interrelated factors as poor social and economic conditions, poor mothercraft, poor coöperation by the mother, and poor team-work by the hospitals or public-health staff. The committee believe that a gain in children's health, and ultimately that of the whole community, would be achieved if girls were given more instruction in child care—a view which we warmly share.

RHEUMATISM RESEARCH CENTRES

In 1945 the Ministry of Health's medical advisory committee recommended that a number of diagnostic and research centres should be established for the study of chronic rheumatism and for the improvement of diagnosis and treatment. The special centres, it was felt, should be located in university medical schools and teaching hospitals, and the Nuffield Foundation has now made a grant of £100,000, spread over ten years, towards the establishment of such a centre at the University of Manchester. There is to be, first, a diagnostic and research centre at the teaching hospital, the Manchester Royal Infirmary, to deal with short-stay inpatients and outpatients who will be referred from peripheral clinics in the region. For long-stay inpatients there will also be a clinic at a nearby base hospital, provided by the Manchester public-health committee, and a second base hospital in the country, the Devonshire Royal Hospital at Buxton. At these base hospitals lengthy investigations will be carried out and problems of reablement and resettlement will be studied. This scheme will ensure ready access to a very large number of cases, especially those in an early stage. At the centre the work will cover two main fields—the clinical, sociological, and industrial aspects of the disease, and the fundamental study of the rheumatic process. The clinical work will be directed by a physician, who will have the help of the departments of orthopædics and physiotherapy of the Manchester Royal Infirmary as well as of the university dental school. The social aspects of rheumatism, and its industrial implications, will be studied in coöperation with the university department of industrial health. Bone and joint pathology will be investigated under the direction of a pathologist expert in the subject. It is hoped that the scheme will lead to diffusion of the knowledge gained at the university centre.

Readers will recall that the British Legion recently set up a 50-bed rheumatism research and treatment centre at Fairfield Hospital, near Letchworth.[1] This is closely linked with the parent hospital in London, the Royal Free.

SULPHONAMIDE GRANULOPENIA IN CHILDREN

The effects of sulphonamide drugs on the blood-forming tissues are now well known—hæmolytic anæmias, agranulocytosis, and sometimes aplastic anæmia. The manifestations may be of an allergic type, appearing suddenly during a first or subsequent course of treatment; or they may be toxic in character, appearing gradually during the treatment. Menten and her associates[1] have been watching the effects in children and have noted that there have been far more cases of aplastic anæmia and neutropenia—short of agranulocytosis—in a children's hospital since sulphonamides became commonly used, particularly for infections of the upper respiratory tract and other infections, such as cellulitis. Aplastic anæmia is uncommon in childhood; only 1 case was seen in this hospital between 1928 and 1942 but there were 6 between 1942 and July, 1945. Of these 6 cases, 5 had received sulphonamide drugs shortly before the diagnosis was made, and the dose was often on the large side—over 30 g. in children of 6–13 years. All were fatal. Granulopenia shows a similar increase,[2] from 2·9% of admissions to the hospital in 1939 to 12% in 1944, the peak year; the 12% all had at some time less than 3000 granulocytes per c.mm., and about half of them had less than 2000 per c.mm. In 1945, when penicillin was beginning to replace sulphonamides, the incidence fell to 7·6%, but analysis of the cases showed that in 1944 and 1945 about 20% of all children receiving sulphonamides developed a definite granulopenia at some stage.

In animals with experimental granulopenia induced by sulphonamides it had been noted that folic acid would bring about, or at least accelerate, recovery of the blood-forming tissues. Menten and Graff[3] therefore treated some of their granulopenic children with folic acid. At first results were negative; because of favourable published reports pyridoxine was then added, 150 mg. being given by mouth daily. The effects were, on the whole, encouraging; 13 out of 22 children treated showed a rise of granulocytes towards normal levels; the rise was not rapid, most patients requiring treatment for a week to a fortnight. In some the blood-count relapsed when the treatment was stopped, and in some a further dose of sulphonamide produced a relapse. The 9 patients who did not respond—or only responded poorly—were all in hospital for upper respiratory infections; 3 had had treatment with folic acid alone for two or three days only (too short a period), 2 were taken home just when observations might have proved useful, and 4 showed no definite effect. To give folic acid and pyridoxine separately is expensive, and an attempt was made to get results by adding yeast to the diet; in practice the attempt failed because the yeast, either live or in powder, produced too much intestinal gas and abdominal distension.

Unfortunately no figures are available to show the speed of recovery of children whose sulphonamide drug was stopped—as it was in all cases—and who were given no other treatment; experience in adults suggests

4. *Ibid*, Oct. 19, p. 585.
5. Lewis, J. T., Blackwood, M. W. *Mon. Bull. Min. Hlth & E.P.H.L.S.* September, 1946, p. 190.

1. See *Lancet*, 1946, i, 870 (Lord Horder), and 1946, i, 947.

1. Denny, H. M., Menten, M. L. *Amer. J. med. Sci.* 1946, **211**, 659.
2. Menten, M. L., Graff, E. *Ibid*, p. 666.
3. *Ibid*, p. 672.

that the recovery would not be much less rapid than in the patients treated with folic acid and pyridoxine. Neither of these substances is easy to obtain in this country, but the combination is clearly worth a trial in persistent cases of granulopenia. Menten's observations remind us that toxic depression of hæmopoiesis is a factor to be reckoned with when using sulphonamides in children's diseases.

THE DEMOBILISED SPECIALIST

THE last few months before demobilisation is for many medical officers an anxious period, filled with questioning about their civilian prospects. Of those who want to be specialists, some already have the qualifications and experience expected of applicants for senior civilian appointments; but even for these the way has not been easy. Registrarships, supernumerary or otherwise, have offered a temporary refuge; but the number of posts offering a livelihood to fully qualified specialists has been far below that of the suitable candidates. At any time there would have been some delay before all these men were absorbed; but the extent and the duration of unemployment and uncertainty have been magnified because most young specialists now expect to receive a substantial proportion of their income from a hospital, while the hospitals are disinclined at present to enter into new commitments.

Some months ago the Minister of Health showed himself alive to these circumstances by encouraging hospitals to create new senior paid appointments, and he promised to come to their rescue if they should get into financial difficulties. Perhaps judging its terms to be too vague, the hospitals showed themselves somewhat unresponsive to this appeal. Now Mr. Bevan has intervened again with an unequivocal offer: local authorities and the larger voluntary hospitals are invited to increase their senior establishments by creating additional whole-time posts, at salaries of about £1000 a year, the cost of which is to be charged to the Treasury. The Minister also proposes to ease the lot of the junior specialist by increasing the number and the duration of supernumerary registrar appointments, and he has made the important concession that these appointments shall be open also to those who were specialists in the Forces, though they had not previously shown an intention to specialise. The continued training of graded specialists is still under discussion; the usual practice at the moment is for them to spend six months in a grade I appointment before being advanced to registrar status. These fresh concessions, the need for which we stated last June,[1] will prevent many from drifting, through economic necessity, into other fields, where they would be lost to specialist practice; and it has doubtless not escaped the Minister that those who benefit under this scheme will form a useful nucleus when the new service, with its unprecedented demand for specialists, begins to operate.

What of the future general practitioner? The only word the Minister spares for him is that a grade I appointment will be provided as soon as possible after demobilisation. Nevertheless, the general practitioner, no less than the specialist, has his problems, some of which we have already indicated.[2] They include the difficulty, if he takes a grade I appointment, of managing his affairs on the salary of a senior houseman; the scarcity of assistantships; the reluctance of principals to accept new partners or to sell their practices; and the heavy responsibility of investing capital in a house or practice, if one can be found. Possibly doctors with panel practices may be more ready to employ assistants now that the capitation fee is likely to be further raised; but even given an assistant's salary the man with family responsibilities may still wonder how to make ends meet.

1. *Lancet*, 1946, i, 855.
2. *Ibid*, p. 968.

ENCEPHALOMENINGITIS OF VIRUS ORIGIN

SOONER or later most practising doctors come across the healthy young patient who, after a few days' headache and malaise, falls acutely ill with fever, headache, drowsiness or even stupor, and meningism, with or without increased tendon reflexes and an extensor plantar response. The first sigh of relief is expressed when the chloride content of the cerebrospinal fluid is found to be normal; and the next when the fluid, which may be clear or only faintly opalescent, is proved to contain no organisms. The cells—mostly lymphocytes—number up to 200 per c.mm., and there is a slight increase in protein. At the end of a week or so the temperature falls, the patient embarks on the road to convalescence, and the doctor's bewilderment is forgotten in his relief that the condition, whatever it may have been, has left no mark.

Even the elect may find it impossible to explain such an illness. Acute encephalitis lethargica, poliomyelitis, and acute lymphocytic choriomeningitis must all be borne in mind during the early days, but the truth seems to be that this clinical picture can be produced by a large variety of viruses, some of which usually, and some only rarely, attack the nervous system. In addition to those mentioned these include lymphogranuloma venereum, psittacosis, infectious mononucleosis, and mumps. St. Louis encephalitis and the two varieties of equine encephalitis have so far only been observed in the United States. Doubtless other hitherto unidentified viruses may also be the cause. Instances of this syndrome are constantly occurring sporadically, and are seldom diagnosed until recovery or complications set in.

Since June a good many examples of an illness of this kind have been seen in the London area. The characteristics of this particular outbreak are its scattered distribution and the rarity with which two members of the same family are affected; observation has been complicated by a concurrent outbreak of poliomyelitis. In some patients cranial nerve palsies have been recorded, but fortunately recovery from these as from the other manifestations has almost always been complete. Little new light has been thrown on the ætiology, though there is renewed suspicion that the infection may be transmitted through animals, including such domesticated creatures as the cat. Many of these neurotropic viruses have been shown to infect animals or birds, from which they may be transmitted to man by insect vectors such as mosquitoes or ticks.

PRACTICAL NURSES IN CANADA

IN 1945 the Province of Manitoba passed an Act to authorise "the training, examination, licensing, and regulation of practical nurses." The Act defined a practical nurse to be "a person who being neither a registered nurse nor a person in training to be a registered nurse at a school of nursing recognised by the Minister undertakes nursing for remuneration." With the approval of a qualified medical practitioner, a licensed practical nurse may perform nursing duties "(*a*) during the convalescence of a patient, (*b*) after childbirth where there are no complications necessitating the services of a registered nurse, (*c*) in mild types of illness, (*d*) in chronic illness of long duration not requiring the services of a registered nurse, or (*e*) in any other cases prescribed in the regulations."

The council entrusted with the administration of the Act contains representatives of the Manitoba Association of Registered Nurses and anticipates the formation of an association of practical nurses who will also be represented on it. The aid of the various organisations of registered nurses throughout the Dominion has been enlisted, and instruction of practical nurses is being carried out under their direction. The first class for practical nurses was opened at the beginning of the year

at St. Joseph's Hospital, Winnipeg. The course, lasting a year, includes 3 months of classroom work and 9 months' experience in hospital, of which $1^1/_2$ months must be spent in a tuberculosis sanatorium.

A course in Ontario, lasting 9 months, is divided into three equal parts, devoted to the classroom work, supervised practice in the hospital and community, and practical work in hospital on a small salary.

The *Canadian Hospital* for September, after surveying what has been done, raises a number of questions about possible developments. As regards legislation it is thought better to have one controlling Act dealing with all the nursing services than to follow the example of Manitoba. The risk of competition with registered nurses is not considered serious; even if there were a depression, there would be new openings for registered nurses. A suitable name has been much discussed, and "practical nurse" is definitely first favourite. The journal holds that this new grade is likely to be permanent.

BETWEEN TWO CENTURIES

THE first medical officer of health, Dr. W. H. Duncan, of Liverpool, was appointed on Jan. 1, 1847; and this approaching centenary was the theme of Sir Allen Daley's presidential address to the Society of Medical Officers of Health on Oct. 17.[1] He found much to be thankful for. Contrasting the national statistics of 1847 and 1945, he showed that, while the birth-rate declined from 31·5 per 1000 to 16·1, the death-rate fell from 24·7 to 11·4, infant mortality from 164 per 1000 live births to 47, and maternal mortality from 4·52 to 1·84. Against the acute infectious diseases, to which the public-health service has paid special attention, considerable success has been attained; but this does not apply to all of them, and the increase of the tuberculosis death-rate early in the war showed the precariousness of our attack. Nor does Sir Allen think that the increases in the deaths from respiratory and circulatory diseases and from cancer can be lightly dismissed on the ground that we must all die of something:

> "Many of these deaths are preventable in that they are curable if treated early. Very many, particularly the respiratory disorders, occur in young children. Coronary thrombosis carries off many of our most able citizens in middle age. Death from rheumatic carditis can be largely reduced, if not prevented. Cancer is a serious cause of death well before the age of 65. It is gratifying that increasing attention is now being given to gerontology, or the study of old age, and its causes, but we must recall Professor Crew's words: the real problem is not 'how to give years to life but life to years.'"

Unfortunately, continued the president, the M.O.H. still does not possess the tools needed for his job: he ought to have complete morbidity figures for his own area, and, if it is large, for the various sections of it. In the future every doctor must be imbued with the principles of preventive medicine, asking himself, for each patient, "Why is he ill? Could this illness have been prevented? If so, how?" Before very long there will no longer be the two camps of curative and preventive medicine, for all who look after patients will combine curative and preventive work. Nevertheless there will always be room for the specialist in preventive medicine, and his rôle will be increasingly important, covering communal hygiene, industrial hygiene, epidemiology, the care of the convalescent and the disabled, the teaching of health, and administration. At the health centre "we will have administrative duties in which we are all well trained. The duty of an administrator is to ensure that the proper tools, auxiliary staff, and accommodation are provided for the executives to do the job." Freedom from the pressing cares of managing a hospital service will give the M.O.H. more time to develop his functions as a specialist in preventive medicine.

At the beginning of their second century, Sir Allen Daley called on his hearers to carry on the torch of preventive medicine, which should illuminate with increasing strength the whole medical field.

1. To appear in full in the November issue of *Public Health*.

ANÆSTHESIA IN RETROSPECT

THOUGH a hundred years have passed since Robert Liston operated under ether, we should not, in celebrating this memorable centenary, ignore many earlier successes. Prof. Charles Singer, who took the chair at the Royal Society of Medicine's meeting on Oct. 16, had the agreeable task, fulfilled with elegance, of reminding those present of Adam, of the anæsthetic sponge, of mandragora, henbane, and prickly lettuce, of mesmerism, of Boccaccio's *Decameron* (suitably expurgated), and of the poet Southey's view that the atmosphere of the very highest heaven is composed of laughing gas. Dr. Barbara Duncum, who had the more mundane duty of outlining the development of inhalation anæsthesia in the second half of the nineteenth century, contributed solid facts to an informative afternoon. The modern development of anæsthesia was confided to Dr. Joseph Blomfield, who told of the year 1900 when we had chloroform, ether, and nitrous oxide and nothing else; of ethyl chloride, useful for short operations on children; of open ether ("some of you may even have given it"); of spinal anæsthesia; of Knapp's venous congestion, rectal ether, oral chloroform given with paraffin and followed by half a glass of port; of premedication, endotracheal ether, intravenous anæsthetics, and many another technical advance or experiment.

At the end of the meeting Dr. E. Ashworth Underwood startled the company with an original piece of research, bringing strong evidence to show that Liston's famous amputation was not the first operation in Europe to be done on a patient under general anæsthesia, but that two surgeons in his native town of Dumfries, at the instigation of a fellow Scot, Dr. James Fraser, had quietly performed an amputation on an etherised patient about a month or six weeks before Liston got round to his. Fraser knew Morton in America, and when he came home on a visit he seems to have persuaded Dr. McLaughlin and Dr. Scott, at the Dumfries Infirmary, to try sulphuric ether on a patient with a fractured limb—probably some time in November, 1846. Liston, of course, did his operation on Dec. 21, 1846.

This painstaking piece of historical research, which seems likely to carry the priority honours from England to Scotland, was unfortunately delivered at the end of the session to a closely packed hall whose atmosphere was itself somewhat anæsthetic. More justice was done to it, however, at the Wellcome Historical Medical Museum, where an exhibition on the history of anæsthesia was opened by Lord Moran later in the afternoon. Here some of the relevant documents were well displayed, together with early works on analgesics, and many types of inhaler used in early experiments. The case for the patient, too, has been generously included in the form of a song, to be sung to an air from "The Beggar's Opera," which appeared in the *Illustrated London News* of Jan. 30, 1847:

> How happy could I be with Æther
> Were mesmeric charmers away,
> But while they perplex me together
> The Devil a word can I say.
> Sing Robinson, Thomson, and Cooper,
> Fol Lol de Rol, Lol de Rol, Lay
> There's nothing like Æther and Stupor
> For making a hospital gay.

WE have to record that Dr. T. WARDROP GRIFFITH, emeritus professor of medicine in the University of Leeds, died on Oct. 21. He was in his 86th year.

Special Articles

THE SPIRIT IN WHICH WE WORK

THOUGHTS ON ST. LUKE'S DAY *

Sir ALFRED WEBB-JOHNSON, Bt.

PRESIDENT OF THE ROYAL COLLEGE OF SURGEONS

IT is the tradition of our calling that the poorest and humblest has just as great a claim on our services as the highest and most affluent. The measure of their need is the measure of our help. Thus it was that Sir Frederick Treves, when his Sovereign, King Edward VII, thanked him for his life-saving attentions, was able to reply with pride: "Sir, you have had as much care and skill in your illness as the humblest of your subjects."

Such is the service that it is our privilege and duty to render, but we have been only too conscious of the limits of our ability—limits imposed by lack of adequate facilities. We have known that there were serious gaps in our service, and have realised that those gaps could only be filled with the help of the State.

The State is about to take a great part in British medicine. This is not surprising, for medicine is of wholly unique importance for the very existence of social life. But, "as the master builder must care for the whole building—so he that undertaketh to set it out (and use it) must seek out fit things for the adorning thereof." This will be our special and immediate task. We must first ensure that the conditions of service are such as to allow intellectual freedom, and to give character as much chance as cleverness. We must avoid the development of Molière's type of doctor, who thought it more honourable to fail according to rule than to succeed by innovation.

We must guard against uniformity, for the highest products of the human mind are the outcome of freedom and variety rather than of uniform organisation. Independence, which inspires fearless advice, must be preserved. In fact, if any of the essential freedoms of a great profession are threatened, then, in the interests of the people, there must be revision of the plan. Even when a system has been formed there may still be much to add, to alter, and to reject.

A PERSONAL SERVICE

The doctor's work is primarily a personal service, and his calling exacts the utmost that man can give—full knowledge, exquisite judgment, and skill in the highest, to be put forth, not at any self-chosen moment, but daily at the need of others. But illness is essentially a personal event. It consists of the individual himself. The patient is not limited by his outer covering. His surface is not his real frontier. A man may be more interested in his environment than in his own body. His position in the community or some work to which his passion drives him may appear to be of more importance than life itself. Thus it is that the family doctor has often to be his patient's confidant and friend, for, as Francis Bacon said: "No receipt openeth the heart but a true friend to whom you may impart griefs, joys, fears, hopes, suspicions, counsels and whatsoever lieth upon the heart to oppress it."

Then again, in Trotter's words, "the well-equipped clinician must possess the qualities of the artist, the man of science, and the humanist, but he must exercise them only in so far as they subserve the getting well of the individual patient." He must feel directly responsible *to* his patient, not *for* him—to someone else. It is a hard doctrine, but none the less true, that this essential function of the doctor—the care of the given patient—may involve the forgoing of exactly scientific diagnosis, of the artistic perfecting of an operation, or even of the interests of society at large. In his care for the individual the method of the doctor is so different from that of Nature:

> "So careful of the type *she* seems,
> So careless of the single life."

Those of us whose work lies in the hospitals must be prepared for changes under a new organisation. We must see to it, however, that we carry into the national hospitals the same spirit which inspired us in the great voluntary hospitals. There we learned to scan gently our brother man—judging not, asking no questions, but meting out to all alike a hospitality worthy of the Hôtel-Dieu, and deeming ourselves honoured in being allowed to act as its dispensers.

We must keep the souls and individuality of our hospitals alive, for hospitals are human institutions. No rigid plan, without margin or elasticity, will suffice or succeed. Above all, the State must not try to control development too strictly, for hospitals are also scientific institutions, and the essence of science is change.

MORAL RESPONSIBILITIES OF SCIENCE

We are vitally concerned with the application of scientific discoveries for the benefit of mankind. In our own time inventions and developments have followed each other fast as falling leaves, and the great blessing is that the leaves from the tree of science have been largely for the healing of the people. Advances have been achieved by the method of experiment—the method which, beyond all shadow of doubt, is the most effective implement for the advancement of knowledge ever invented by man. Moreover, it satisfies man's inveterate instinct not to confide his weight to a branch until he has tested it.

The greatest discovery in modern medicine is the detection of the minute bodies which cause many diseases, and the means by which they are carried. We now know that the carriers of many death-dealing diseases are not angels or demons, messengers of wrathful gods, but common things like flies, mosquitoes, lice, and fleas. We have but lately realised that we may be able to control or destroy these winged vectors of disease. Millions on millions of lives could be saved and the morale of native peoples raised by the prevention of malaria alone.

The millions that are saved must be fed. They must be reckoned with. This will be a problem for future generations—our task and duty are clear. As Carlyle wrote: "Let a man do his work; the fruit of it is in the care of Another than he." And again: "it is not thy works, which are all mortal, infinitely little, and the greatest no greater than the least, but only the spirit that thou workest in, that can have worth or continuance."

That is the point—*the spirit that thou workest in.* Scientific discoveries are powers for evil as well as for good. Is it not time that we decided that their use for the wholesale and indiscriminate destruction of human life should be outlawed? It is not only physical and chemical knowledge that can be misapplied, for biological discoveries might also be used for bacterial warfare. Is it not more in accord with our traditions and ideals to follow the example of Jenner, who, when England and France were at war, sent Woodville to Paris to help to control an epidemic of smallpox which was raging in the French capital! To commemorate this humanitarian action there stands at Boulogne today a statue to Jenner inscribed: "À Edward Jenner—La France Reconnaissante."

It may be that Man is at the cross-roads. Will he proceed higher and further, or will he bring about the catastrophic ending of the whole human story? Will he be swept aside by the Great Creator as an experiment that has failed? It is for man to decide his own fate.

* Part of an address delivered in Liverpool Cathedral on Oct. 20, 1946.

His further and higher development depends on his own conscious efforts.

As more and more secrets are wrested from Nature we realise more and more clearly that there is no real conflict between faith and science. The laboratory can satisfy many of our needs, but not those of the spirit, so:

"Let knowledge grow from more to more,
But more of reverence in us dwell."

Belief is the healthy act of a man's mind. And does not every true man feel that he is himself made higher by doing reverence to what is really above him?

In order to realise the moral responsibilities of science we must look to something higher, and something beyond our own little lives. We must turn our minds to things which have immortality. We inherit ideas and teachings which are imperishable and everlasting.

Our best works are inspired by the thought that we are making a contribution to the good of our successors, or to the advancement of ideas, institutions, and causes which have continuity and permanence. As Lord Balfour said, at the end of a long life of public service: "By so much as we give of ourselves, our labour, and our loyalty to things which have immortality, by so much shall we increase the joy of life and remove the sting from death."

DOCTORS IN GOVERNMENT DEPARTMENTS

UNIFIED SALARY SCALES

THE different Ministries have hitherto had different scales of pay for doctors in their employ. With effect from the beginning of this year these scales have now been unified in Government departments generally and also in the principal health departments, including the Ministry of Health, the Ministry of Education, the Ministry of Labour, the Department of Health for Scotland, the Welsh Board of Health, and the Board of Control. We understand that the whole subject of salaries for medical staffs in Government departments may again be reviewed when the remuneration of other doctors participating in the National Health Service has been settled. Meanwhile the scales for London will be:

GENERAL SERVICE.—*Medical Officer*, £1000 on entry at age of 35, with annual increases of £30 to £1300, and thence by £50 increments to £1400. (The starting salary is reduced by £30 for each year of age under 35, and increased by £30 for each year of age over 35, up to 40.) *Principal Medical Officer*, £1400, with annual increases of £50 to £1600. *Director*, £1600, with annual increases of £50 to £1800.

HEALTH DEPARTMENTS.—*Medical Officer*, £1150 on entry at age of 38, with annual increases of £30 to £1300, and thence by £50 increments to £1500. (The starting salary is reduced by £30 for each year of age under 38, and increased by £30 for each year of age over 38, up to 40.) *Senior Medical Officer*, £1500, rising annually by £50 to £1700. *Principal Medical Officer*, £1600, rising annually by £50 to £1800.

NOTE.—In the Ministry of Health, since changes were made a few months ago (*Lancet*, 1946, i, 932), the grade of medical officer has included those engaged in the health services and the regional and deputy regional medical officers in the insurance service. The grade of senior medical officer includes the former principal regional medical officers, the insurance divisional medical officers, and certain former senior medical officers. Two of the posts of principal medical officer (insurance and epidemiology) at present carry salaries of £2000, without increments. The new arrangements make certain provisions for safeguarding the "expectations" of doctors already in Government service.

In about a dozen large provincial towns the London standard rates as set out above will be reduced by £40 per annum on salaries up to £1300, and by £50 on salaries above that figure. Elsewhere in the provinces the deductions will be £80 and £100 respectively. Under present arrangements most of the more senior appointments in the health departments are in London.

The scales apply equally to men and to women.

BRITISH ORTHOPÆDIC ASSOCIATION

MINISTERS AS GUESTS

A DINNER held in London on Oct. 18 in connexion with the association's annual meeting, was attended by the Prime Minister, the Minister of Health, the Minister of National Insurance, and a number of overseas guests.

Sir HENEAGE OGILVIE, proposing The Association, outlined the rapid progress of orthopædics from the time, not so long ago, when its exponents had been an oppressed minority. Mr. GEORGE PERKINS, replying as president, avowed the need in each region for orthopædic centres, which should be centrally directed by a consulting orthopædic surgeon; there should also be a large orthopædic teaching centre, under a full-time staff. Salaries should be sufficient not only to attract good men but to enable orthopædists to visit other clinics.

Sir REGINALD WATSON-JONES, who proposed The Guests, welcomed, among others, Dr. Henry Meyerding (U.S.A.), the new president of the International Orthopædic Association, and Prof. E. Sorrel (Paris). He thought it time to end the anomaly by which the man who breaks his leg on Saturday afternoon receives less compensation than he would for the same injury sustained at work on Saturday morning; compensation is, he said, the community's responsibility and should be uniform. He declared himself against controls, preferring the wild English rose to ordered rows of cultivated tulips.

Mr. C. R. ATTLEE, in his reply, said that "we have to be careful today, when our man-power position is as acute as it was in time of war, that we do not waste our population, either by leaving unremedied remediable disabilities, or allowing the unnecessary creation of disabilities"; and he looked very much to the work and influence of the orthopædic surgeon. The National Health Service Bill would be placed on the statute-book by Parliament, but its implementation depended on the whole population. The happiest people, he suggested, quoting the example of Denmark, are to be found in the most equalitarian countries. "We do not want to see people regimented; but I believe just as in a good army, without loss of discipline, there is scope for initiative and energetic action by individuals, so in all our health activities there will be freedom, but freedom on an ordered plan of coöperation."

Mr. ANEURIN BEVAN contrasted the acrimony among politicians with the harmony between doctors. Each branch of medicine, he had noticed, considered the others to be its superior. "Members of the Royal College of Physicians emerge flushed with enthusiasm for the Royal College of Surgeons; and fellows of the Royal College of Surgeons regret there is not room for their college in Trafalgar Square"; specialists were concerned for the general practitioners, and general practitioners for the specialists. "The most eloquent politicians in Great Britain are to be found in the medical profession. Indeed, I've been learning quite a few tricks in the last year or two, and I hope to use them for the benefit of the medical profession." The politician's duty was to universalise the best. He had seen men suffer because they did not have the benefit of existing knowledge: "the specialist is not always available when he is needed." The health service must be organised in the most effective manner. "It is not my task to stand between the doctor and his patient. It is the task of the public-health services to put the best kind of medical apparatus in the hands of the profession, and it is for the profession to use it freely and independently for the benefit of their patients. . . . I am happy to say that enthusiasm grows. My relations with the British Medical Association grow more friendly week by week. Before long I am quite certain that we shall reach a cordial understanding and obtain coöperation in carrying out this great work."

Mr. JAMES GRIFFITHS said that insufficient attention had been given to the Industrial Injuries Act which had taken the injured person out of the grip of the employer; in its field, it was the best thing for half a century. Miners, he said, deserve special recognition, for among them occur half the country's industrial injuries.

LONDON'S VOLUNTARY HOSPITALS

THE continued practical interest of the public in the voluntary hospitals of London during 1945 is well demonstrated in the Annual Statistical Summary for that year just published by the King's Fund.[1] Despite a decrease of £67,000 in the income from public authorities, the total maintenance income of the 164 hospitals reached a record figure of £6,879,000; in addition £156,000 was given for endowment and £439,000 for building and equipment, making a grand total of £7,474,000, or £523,000 more than in 1944.

Income from subscriptions and donations rose by £135,000 to £1,276,000; patients' contributions by £227,000 to £1,120,000; and contributory schemes by £175,000 to £912,000. Legacies, a source of income which many predicted would suffer as the result of death duties, high taxation, and other adverse economic conditions, rose by £121,000 to £676,000. If "free legacies" are included, no less than 74·5% of the total maintenance income came from sources other than public authorities. Maintenance expenditure amounted to £6,466,000, or £625,000 more than in 1944, leaving a surplus for 1945 of £413,000.

The number of new inpatients rose from 206,000 to 236,000, and the average number of beds occupied daily from 10,447 to 12,797. The number of new outpatients was 1,641,000 and the number of outpatient attendances 7,888,000.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED OCT. 12

Notifications.—Smallpox, 0; scarlet fever, 1106; whooping-cough, 1362; diphtheria, 269; paratyphoid, 6; typhoid, 3; measles (excluding rubella), 2005; pneumonia (primary or influenzal), 351; cerebrospinal fever, 37; poliomyelitis, 22; polio-encephalitis, 1; encephalitis lethargica, 1; dysentery, 44; puerperal pyrexia, 156; ophthalmia neonatorum, 69. 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. 9 was 835. During the previous week the following cases were admitted: scarlet fever, 59; diphtheria, 22; measles, 13; whooping-cough, 35.

Deaths.—In 126 great towns there were no deaths from scarlet fever, 1 (1) from enteric fever, 1 (1) from measles, 12 (0) from whooping-cough, 5 (0) from diphtheria, 44 (2) from diarrhœa and enteritis under two years, and 9 (3) from influenza. The figures in parentheses are those for London itself.

There were 4 fatal cases of whooping-cough at Manchester. Liverpool and Manchester each reported 6 deaths from diarrhœa and enteritis.

The number of stillbirths notified during the week was 258 (corresponding to a rate of 26 per thousand total births), including 35 in London.

1. Statistical Summary for 1945: King Edward's Hospital Fund for London, 10, Old Jewry, E.C.2. Pp. 62. 1s. (1s. 6d. post free).

MIDWIVES' PAY

EMPLOYING authorities have been advised by the Ministry of Health to adopt new recommendations by the Midwives Salaries Committee. These include a special service allowance of £20 at the end of each year's full-time employment for all (other than pupil) midwives. It is hoped that this grant may encourage more women who have the necessary qualifications to practise. The committee has now completed its review of all salaries. Under the revised scale a matron of a maternity hospital with 100–199 beds will receive a salary (inclusive of emoluments) ranging from £550 to £750, compared with the old range of £450 to £650; and a new inclusive salary ranging from £600 to £825 is recommended for matrons of institutions with 200 or more beds. Corresponding increases are recommended for matrons of the smaller hospitals and homes; and assistant matrons in institutions with 50 or more beds will now receive £410 to £485. Resident district midwives will now have a salary of £290 to £380, compared with the former £240 to £300. The committee has also recommended that part-time midwives should be given credit for years of previous service; and employing authorities are given discretion to increase the appropriate salaries by 10%.

In England Now

A Running Commentary by Peripatetic Correspondents

THE fact that hard-working G.P.s are given the task of allocating the nation's milk is certainly not an inducement to take up medicine. True, we are given a list of deserving cases entitled to extra milk, and on the face of it our task is easy. A pregnant woman gets her 1½ or 2 pints daily; so do sufferers from G.U. or T.B. That we can understand, but here comes the rub. Why does a man with a broken arm, being "an active worker on the panel," get his daily pint while our edentulous old dears in the 80's get nothing extra? Questions like this are unanswerable. Of course, we may stretch a point and give an occasional pint under the all-embracing 2c, but why do we have to wangle things? Our patients try to understand our difficulties, but they often make it worse. In my most oft-recurring nightmare I see myself surrounded by yellow cards with shadowy voices. There is the stiff upright card: "I don't want treatment, but I need my milk." There is the drooping bent card: "The milkman says he's got plenty; all he wants is a certificate." There is the crumpled and shabby old card: "I've had a glass of milk for supper all through the war; the other doctor gave it to me; I can't sleep without it." They draw near. They point accusing corners at me. In my dream I even see the often offered shilling. Mercifully the phone rings and the dream is gone, but the question remains. We were never taught about milk certificates at our medical schools. No examiner questioned us on this knotty point. We are simple people. We try to be fair to all and we please none. We are the scapegoats of the Ministry of Food and we don't like it.

* * *

Having bought a really new house I was determined not to lose it to the anarchists. (I feel sorry for them, but I am determined to assert myself too!) The house had recently been left empty, and pending the move from the present one into the new one I suggested that my wife should put up some curtains. "Curtains!" she scoffed. "They wouldn't keep me out if I were a squatter." While I was distempering the empty rooms between visits the idea arrived—I would get all our friends who could spare the time during the local rush hour to come in and look round and spend as long as they could offering suggestions.

One evening this was in full swing, with cars parked all over the place and a fearful hullabaloo going on, those in the garden calling to those in the bedrooms, when a young man walked in through the gate and produced a notebook. "This is it," I murmured to myself. He came towards me, as I was the tallest in sight, and asked, "Are the squatters in?" adding, "I'm from the *Bull Valley Tribune*, the local rag, y' know."

"Young man," I said, looking as unbalanced as I could, "are you in need of a home, a haven from the tortures and affliction of the world, where the upward-licking flames from the fiery furnace below cannot reach . . .?" He seemed to take in the situation in one terrified glance. "No," he said; "not at all, thank you sir," and he left hurriedly, without shutting the gate.

Two days later the professional plate which I had ordered months ago arrived, so I hurried down to the new house and put it up. Patients and friends alike (they have long ago forgiven me) agree that the plate has finally decided the issue between anarchy and order. "After all," they say, "when you have your *name* on it. . . ." Which is saying something, even in these days.

* * *

There ought to be a course of instruction in testimonial writing. Just now many of us are enjoying the exceedingly difficult experience of sitting in judgment on youthful aspirants to honorary staff appointments. So erudite, so distinguished do they all appear that they inspire in us a sense of shame at being accepted as competent arbiters and a sense of self-congratulation that in our day competition was less acute. What tests should we employ in a decision so momentous? How can we prepare ourselves to hold the scales in fairness to the claims of the applicant and to the interests of the hospital and, it may be, of the medical school?

I don't know. Errors in judgment are notorious. I recall a man who was selected on the most enthusiastic recommendation of a president of the R.C.P., a president whose integrity and wisdom were universally accepted and revered. For thirty years this paragon blocked the path of anxious, embittered juniors, and during that thirty years he was a useless encumbrance who taught nobody anything and made not the smallest contribution to medicine. Alternatively every school exhibits its inability to recognise exceptional potentiality and to deplore the loss which has proved a rival school's gain.

To assist us in our deliberations we have—testimonials. In many instances these comprehend no more than a bare recital of the applicant's appointments and other details of his career which we could learn for ourselves by consulting the *Medical Directory*. The majority of others consist of platitudinous assurances that "he is a sound physician," "has an extensive knowledge of medicine," "is hard-working and conscientious," "I think he would prove a very agreeable colleague," "he has read extensively," "is of stirling character" (yes, the misspelling has appeared on not a few occasions).

Of more value—indeed it ought to be of very great value—is the personal letter. Now this calls for considerable care in its composition unless it leads the recipient to read between the lines and conclude that it emanates as a formal response to a request rather than from a genuine desire to do all possible for the applicant. Look at these:

"A. B., who was my house-physician, is applying for the vacancy of assistant physician at your hospital. Unless you have somebody outstanding, you might do worse than select him."

"I have not worked with A. B. personally but I am told he is a very good physician."

"Although I can only speak from second-hand experience, I should say his work in the war was well above average."

"As far as I could judge, he was entirely trustworthy."

"He is an excellent teacher of the *list* type." (I suppose this interpreted means—you have been warned!)

Being damned with faint praise is bad enough, but there is a far graver danger to the seeker after testimonials. In my early days I encountered a sequence of failures until a real friend dropped a pretty broad hint that I would never be selected anywhere so long as I presented a testimonial from Dr. X. In my innocence I had congratulated myself on being sponsored by this prosperous and celebrated physician. How was I to know that this man whom I had thought to be famous and distinguished had a reputation among his colleagues which led them to substitute the adjectives infamous and notorious, a man whom the ladies called a duck and other doctors labelled quack? Presumably the converse holds good, although I find it difficult to visualise anyone with the confidence to utilise a testimonial of the opposite kind because it was written by one "of whom," in the words of Milton, "to be dispraised were no small praise."

* * *

Having just returned from a 1500-mile tour through Germany, I am happy to be able to announce the cause and cure of the "German problem." From time to time the Germans hear rumours that other nations possess beds in which it is possible to sleep, and, since conquest is the only means of acquisition known to the German mentality, they immediately start a war of aggression. The cure is therefore obvious. Compel the Germans to manufacture and make up their beds according to civilised specifications and they will remain in them tranquilly ever after. When I think of the tripartite boards that pose as mattresses, the absence of pillows, the untucked sheets, the . . . but far abler pens than mine have spent themselves in vain on that supreme example of Teutonic masochism.

* * *

Talking of the discretion of the British press, a woman starting a play group in London approached the advertisement manager of a national paper and unfortunately mentioned that the group was to be run on psychological lines. His response was immediate and final. "Psychology; no, we cannot touch this. We bar advertisements dealing with psychology, astrology, racing tips, and rubber goods."

Letters to the Editor

PSYCHONEUROSIS TREATED WITH ELECTRICAL CONVULSIONS

SIR,—Dr. Milligan's interesting paper raises many issues, but it is particularly towards the presentation of the material that criticism may be directed.

New treatments are judged by the careful selection of material, accurate diagnosis, criteria of recovery, adequate follow-up, and finally by acceptable presentation. In this paper all these points are open to criticism.

1. No criteria are given for the selection of cases, nor is there evidence of adequate examination preceding treatment.
2. The published case-histories leave room for doubt as to the correctness of the diagnosis; for example, case 7 could well be an involutional melancholia.
3. "Recovery" apparently depends on "stability," but we are given no hint of the method adopted in forming this judgment.
4. Only case 5 has an adequate follow-up. It is a pity that some of the cases followed for 5 years have not been included.

These points are a sufficient criticism of the presentation of results; but further information is required for general recognition of this new method of treatment. Scant consideration is given to the possibility that these patients have been "electrically leucotomised." Hypochondriacal features are most noteworthy in the histories; and the work of Freeman and others has indicated the effects of leucotomy on the chronic complaint habit. The question of deterioration is also most briefly considered; we are given a dogmatic denial of Brodie's findings, but no supporting evidence; and the absence of gross memory disturbance does not rule out deterioration, as Professor Golla has shown in leucotomy cases.

With the memory of other enthusiastic first reports on physical methods of treatment in psychiatry and their subsequent fate, I cannot feel that we are yet justified in recommending our neurotic patients to enter mental hospitals for this treatment. Even with electrical convulsions to "Music While You Work," the lay public will, I fear, continue to regard the mental hospital as a madhouse.

London, W.1. P. H. TOOLEY.

SIR,—Dr. Milligan's article is courageous and impressive. But, despite the recovery-rate, it contains features that give rise to concern.

He advocates this method for selected cases, but offers no criteria for selection, apart from chronicity—the duration apparently ranging from 2 to 20 years. Nor are the "general lines" of treatment in case 6 clear; surely the treatment prior to convulsive therapy might have been described.

Plausible as is the explanation by Brain and Strauss, is it a sound basis for giving up to four major convulsions daily, or for producing a condition in which the patient is reduced to the infantile level, with double incontinence? What proof is there that gross damage has not been done by the repeated severe neuronal disruption? Even if sequelæ are not immediately evident, they may still be forthcoming.

Dr. Milligan is indeed fortunate not to have seen protracted memory defects in these cases. I have under observation a woman of 25 with an anxiety state, who had previously been given 18 major convulsions in 6 weeks, and who now has a profound memory-defect for recent and remote events—a defect that impairs intellectual work. Though convulsive therapy may have a place in the treatment of psychoneuroses, its adoption as recorded by Dr. Milligan cannot be accepted with unreserved enthusiasm.

Todmorden. NORTHAGE J. DE V. MATHER.

SIR,—Of his 100 cases of psychoneurosis treated intensively by electrical convulsions Dr. Milligan classifies 52 as recovered on discharge, and he claims that a further 45 or 46 were much improved, most of them symptom-free. These results might appear to compare favourably with those of psychotherapy carried out under hospital conditions, while the amount of the physician's time occupied in the administration of treatment seems to have totalled rather less than five minutes apiece in the

7 cases quoted, as against the many hours required for psychotherapy. Even the doubtful acceptance of such results might encourage those who are planning our National Health Service to fob off the unfortunate sufferer from psychoneurosis with some more or less harmful form of physical treatment, under the pretext that it is the most modern and effective known to medical science.

I suspect that Dr. Beaton's treatment is in all essentials a regression to the therapy of the last century, fortified by modern apparatus.

Some 37 years ago, as a young man in general practice, I was called out very urgently to a woman said to be on the point of death. In a poor house in a mean street I found, in the centre of an excited crowd of neighbours, a married woman of about 35 lying apparently unconscious, but performing forced respiration with amazing energy. I could find no signs of physical disease, but my questions elicited no response of any kind from the patient. Being satisfied that I had to deal with an exhibition of hysteria, I turned everyone out of the room and sat down quietly with notebook and pen to observe the patient, whose breathing still continued violent and rapid. She probably noticed the sudden change from confused noise to complete silence, and after a minute or two opened her eyes and looked at me. I said: "Don't you think you might as well stop that performance? It must be very tiring." Her respiration became normal immediately, and she began to cry. After about five minutes of this I asked her whether she felt better; she said she did. I pointed out severely that she had caused much unnecessary alarm to her friends by her behaviour, and left after obtaining her promise not to do it again. I was quite pleased with my successful treatment, and so were the relatives and friends. Only the patient seemed to have no sense of relief or satisfaction, and I remember being struck by her attitude of quiet despair in contrast with her former excitement; but I was not interested in the case except as providing an opportunity for showing my skill in handling an hysterical outburst. I did not see her again, but I think I should have been called by the relatives if there had been any return of her symptom; the case was probably cured, by Dr. Milligan's standards.

Ten years later, having begun to learn something of the causes and treatment of this kind of illness, it occurred to me that if my understanding had been greater I should perhaps have encouraged this patient to tell me what was really troubling her, with the probable result that her display of emotion would have lasted very much longer while her relatives might have been called upon to improve their relationship with her. No doubt everyone except the patient would have regarded me as a very incompetent doctor; yet I might have performed a service of the greatest importance to the patient. As it was I had only intimidated her from further self-expression by a metaphorical bucket of cold water.

Is intensive electro-convulsive treatment really an advance upon the bucket of cold water which used to be the treatment for hysterical manifestations most favoured by bold therapists in the nineteenth century? In selected cases—and Dr. Milligan's cases were carefully selected—it commonly resulted in the complete disappearance of symptoms (sometimes, one gathers, for good), and results might have been still better if it had been applied intensively and unemotionally.

I do not deny that intensive convulsive therapy may be expected to produce more permanent results. It seems likely from Dr. Milligan's account that it is followed regularly by the commencement of a process of mental deterioration, and it may be that this, like leucotomy, damages the symptom-producing structures; but if this is so, such treatment should be reserved for the most desperate cases, after careful consideration by a responsible medical board.

Other questions present themselves. Does the theory, adopted by Dr. Milligan, that Dr. Beaton's method obliterates entirely the faulty electrical patterns of the brain mean that electro-encephalograms recorded before and after treatment showed the disappearance of abnormal rhythms? If not, does it mean anything? On what basis were these 100 cases selected for publication from the larger number of psychoneurotic patients treated by intensive electro-convulsive therapy? And does an average dose of "180 volts at 0·4 sec." mean anything but a large unmeasured dose?

These questions are minor matters, and it may well be that the intensive method described will prove valuable for the treatment of some severe cases which might otherwise be properly subjected to leucotomy. The large issue is between the view that the patient should be treated in the way that is best for him individually, and the opposed view that treatment should be adapted to the convenience of those who have to apply it and those who have to pay for it. I would suggest that the patient and his human environment should both receive full consideration. Each should be represented on a board which would consider on its merits every case in which it might be proposed to take action destructive of the integrity of human life; such actions would include the termination of pregnancy for reasons other than the preservation of the life of the mother, prefrontal leucotomy, and intensive convulsive treatment.

If the treatment described by Dr. Milligan is considered justifiable in the case of ordinary psychoneurotic patients, it seems to follow that it should be used also on habitual criminals, and then on the masses of ex-Nazis whose re-education is a yet unsolved problem. If Dr. Milligan is right, the "obliteration of psychologically unacceptable patterns of thought and conduct" can be effected in a few days, and then someone can carry out the resynthesis of their personalities along correct lines. One is glad Dr. Milligan sees that this is a task requiring much care and judgment.

London, W. J. NORMAN GLAISTER.

MORALE OF THE NATION

SIR,—I was glad to see that Dr. Kennedy, in the lecture on Health Education published in your issue of Sept. 21, emphasises the principle of holism in the doctrine of positive health. I was less glad to see that, while he notes the importance of "moral discipline," he is apparently prepared to leave this fundamental aspect of the matter to the individual conscience. In so far as moral discipline affects health, we should make an effort to provide some biological guidance for it.

I suggest that we use the term "morale" instead of moral discipline. Even if no more clearly defined, its various definitions are less likely to be coloured by the emotional prejudices of different sects. Without discussing the definition of the concept of morale (which would only recapitulate what Dr. Kennedy says of the definition of health), one can, for purposes of discussion, divide the factors which influence it into components which foster (*a*) a *sense of security*, and (*b*) a *sense of purpose*. The sense of security is essentially the feeling of "belonging" to a group, and has no implications about the actual physical conditions which might be held to make for security. Its antithesis is the sense of isolation, or "separation anxiety." The sense of purpose is essentially the feeling of "worthwhileness," and can exist apart from any explicitly stated aim or intention.

These two concepts are both aspects of a state of mind which is of course largely unconscious and little subject to deliberate control. Their formulation as separate entities allows us to estimate the value of any particular measure as an aid to morale. The sense of security relates to the individual's potential, while the sense of purpose relates to the direction in which the potential will be used. Needless to say, a particular morale factor will have effects on both aspects: thus a good leader will both provide an adequate motive for action and enhance his followers' sense of security, while the provision of excessive "welfare" facilities may enhance the feeling of security but confuse the sense of purpose.

In war-time, morale was tackled from both angles. The sense of purpose was fostered by repeated (and not always effective) efforts to render war aims explicit; and on a lower but more effective plane by the setting up of "targets"—for production, war savings, &c. The feeling of security was fostered in many ways, by no means all of them deliberate: "One spot of bombing makes the whole town kin," and people came into close contact with their neighbours in a way almost unattainable in peace-time. The necessities of the time caused the State to assume a paternal rôle which relieved many of the day-to-day anxieties of life for the ordinary man

and woman—for instance, work, food, housing, and clothes. It was not that these were provided, but that the individual need not worry about their provision, which enhanced the sense of security.

With the end of the war, morale inevitably worsened. The sudden disappearance of the overriding communal motive, together with the natural relaxation after a period of tension, would have sufficed to make a disruptive social picture even without the loss of the sense of security resulting from material shortages, the return of forgotten husbands to homes "otherwise occupied," the unconscious guilt of those who left their families, and the less unconscious (even if still unjustified) guilt of those who stayed at home.

To restore morale we have to restore both the sense of purpose and the sense of security. It might be possible to maintain morale, as the Russians seemed to be doing, by inventing new fears of war which would bind the people together against a common, even if so far a hypothetical, enemy; but to do this would require a further denial of democratic government which our people would fortunately not tolerate. It would in any event only delay the realisation of the individual's, as opposed to the State's, insecurity.

To return to the problem of health. The sense of security is to a much larger extent than is generally realised dependent on interpersonal contact between members of a community, and to a much smaller extent on the physical conditions of security. We may therefore aim at increasing social contact between people. There is ready to hand an adequate motive for health-giving activity in a war-weary country: *recreation*. A blueprint for action along these lines is, I think, to be found in the accounts of that admirable social experiment, the Pioneer Health Centre at Peckham. By laying emphasis on recreation, a motive is provided which is universally acceptable and which is persistent. By providing a focus for interpersonal exchange and communal integration, and by having the centre run under the guidance of properly trained biologists, every opportunity is given for the development of the sense of security. Morale is improved and a rich soil prepared for the seeds of health education.

Dr. Kennedy speaks of the need for more recreational facilities and for more biologists. It is important to emphasise that these two must be closely linked. Biology is the science of life; and inasmuch as "recreation" is a subject for science, it is the biologist's responsibility. In conclusion, we may remind ourselves that medical education—at least up to 1939—used a fragmentary rather than a holistic approach; and that our profession is primarily oriented toward the relief of illness, secondarily toward the maintenance of health, and only thirdly toward the enhancement of positive health. In the nature of medical work, as at present taught and organised, we see more and think more about disease than about health. A great deal of hard thinking and versatility will be required by our profession if we are to make a real contribution to this problem.

Narborough, Leicestershire. JAMES R. MATHERS.

PILONIDAL SINUS

SIR,—Mr. Patey and Professor Scarff (Oct. 5, p. 484) make two questionable assertions.

(1) They say there is a world of difference between sacrococcygeal cysts and tumours of undoubted developmental origin and pilonidal sinus. They claim that the pilonidal sinus is higher in the natal cleft, but those of us whose lot it is to see a disproportionate number of children's posteriors have seen many more than the 16 cysts and tumours of developmental origin which Raven collected in London museums. It is true that some of these are very near the anus but most are high up and all grades are seen from the massive dermoid to the short sinus and dimple.

(2) They stress the importance of hair in the ætiology. Surely this very fact emphasises the developmental origin of the pilonidal sinus. The body hair does not grow until stimulated by puberty hormone levels, and it is the young adult in whom the symptoms first develop most commonly. It is difficult to believe that the tough tissues of the sacrococcygeal region can be pierced by a human hair which has been sat on.

One of the reasons for so many failures in treatment during the war has been that the advent of powerful chemical bacteriostats has tempted the surgeon to "try his luck" and close primarily the gaping chasm of his wise and wide excision. Healing *of* the bottom *from* the bottom must still remain a fundamental rite.

London. D. F. ELLISON NASH.

TUBERCULOSIS FOLLOWING INJECTION

SIR,—Several interesting points emerge from Mr. Ebrill and Dr. Elek's account of a tuberculous abscess arising at the site of a previous intramuscular injection of penicillin (Sept. 14, p. 379). Although the authors do not use the term, it is clear that they regard the abscess as an example of *primary* tuberculosis (i.e., arising in a previously uninfected individual, who would have been tuberculin-negative had he been tested before the penicillin injection). One cannot, of course, be dogmatic, but the clinical details given are far more suggestive of a *post-primary* tuberculous abscess (i.e., arising in a previously infected allergic individual, whose Mantoux reaction would have been positive previously had it been tested). Such a post-primary abscess *could*, of course, have arisen as a result of introducing virulent tubercle bacilli during the penicillin injection, but this is extremely unlikely. Bacilli accidentally inoculated into tuberculo-allergic individuals in this way are usually effectively dealt with by the body's defence mechanism, as was first shown many years ago by Koch when he described what is now known as the Koch phenomenon. The most likely explanation is, I think, the one which Ebrill and Elek dismiss as a practical impossibility—namely, that the abscess arose as a blood-borne infection. Such disseminated tuberculous abscesses are by no means rare in sanatorium practice, particularly in the so-called hæmatogenous type of disease, and in the case described the hæmatoma appears to have acted as a *locus minoris resistantiæ*. The fact that clinical and radiological examination has revealed no other tuberculous focus is, of course, inconclusive; it is quite common not to find a primary tuberculous focus in persons undergoing Mantoux-conversion while under observation (e.g., in sanatorium staff). In such cases the site of infection may be in the alimentary tract.

Two clinical details would have been helpful. Firstly, no mention is made of the presence or absence of inguinal adenitis. With a large primary tuberculous abscess of the thigh, caseous adenitis of the regional lymph-nodes would almost certainly have occurred, while "drainage" glands of a post-primary abscess, if examined by biopsy, could have been distinguished histologically by the relative absence of caseation. Secondly, no mention is made of the type of bacillus recovered from the pus. The finding of bovine bacilli would have been a pointer, admittedly a weak one, to the presence of a bovine alimentary infection.

It might be of interest to note that by a curious coincidence two patients and a possible third have been admitted to this hospital during the last month, each with lupus verrucosus of the hand following an injury involving a breach of skin surface. It is tempting to picture the very natural reaction of sucking the injured member (and both patients have active pulmonary lesions), but it is far more probable that these are also examples of a hæmic infection of a *locus minoris resistantiæ*. The well-known association of injury with other tuberculous conditions, such as tuberculosis of joints, is also very much to the point.

Dr. Marsh's statement (Oct. 5, p. 508) that "tubercle bacilli are not uncommon in the dust of hospital wards" cannot be allowed to pass unchallenged, since it tends to perpetuate the erroneous belief that sanatoria and tuberculosis wards are dangerous places in which to work because of the risks of infection from dust. Since Cornet, in 1889, claimed to have found tubercle bacilli in 40 out of 140 specimens of dust from various German hospitals, public buildings, and tuberculosis wards,[1] belief in the rôle of dust as one of the chief infective agents in tuberculosis has been widely held, although few modern tuberculosis pathologists now subscribe to

1. Cornet, G. *Z. Hyg. InfektKr.* 1889, **5**, 191.

this view (e.g., Gloyne [2]; a good summary of the *dust* v. *droplet* controversy is given by Topley and Wilson,[3] who point out that the English climate militates very strongly against the formation of dust containing living virulent tubercle bacilli). Even if one accepts Cornet's work without question, few will deny that personal hygiene is now vastly improved since his day, largely as a result of public-health propaganda; our tuberculous patients no longer spit on the ward floor! Numerous investigators have failed to find living tubercle bacilli in the dust of modern hospitals and sanatoria.

An investigation was recently made at this hospital into the possible infectivity of occupational-therapy articles made by patients. One hundred articles of all types (plastic, wood, wool, felt, &c.) made by patients with all degrees of lung involvement (many producing large amounts of positive sputum daily) were examined carefully in the hospital laboratory, where the technique of cultural examination for tubercle bacilli has been brought to a high standard; not one positive result was obtained. I am sure that this is in large measure due to the careful instruction in the hygiene of cough which is given to all patients. The danger of infection from patients with open pulmonary tuberculosis is not from ward dust but from unrestrained cough. It is clear that this fact needs to be emphasised at a time when hospital and sanatorium domestics are at a premium.

A. G. HOUNSLOW.

County Sanatorium, Clare Hall, South Mimms, Barnet.

FOLIC ACID IN CŒLIAC DISEASE

SIR,—The course of cœliac disease in children is often so protracted, and the prognosis so uncertain, that we venture to draw attention to its treatment with folic acid, a procedure which in a particular case has so far proved dramatically successful.

A boy, aged 17 months, came under the care of one of us (L. G.) in May, 1946. There was a history of vomiting and diarrhœa with the passage of numerous pale bulky and foul-smelling stools during the previous 6 months. He had been under treatment by another doctor during this period, with no improvement.

He presented the typical appearance of cœliac disease—pale, apathetic, with a dry skin and distended abdomen and wasted buttocks, and with the stools as described above. His weight was 19 lb. Treatment with parenteral liver extract 2 c.cm. on alternate days, together with ascorbic acid and 'Benerva' Compound tablets by mouth and a fat-free diet was instituted. Improvement was rapid. The vomiting and diarrhœa ceased and he gained weight.

The child was taken away on holiday, but after a month he relapsed and became extremely ill with a return of his former symptoms. He was admitted to hospital weighing 21 lb., but after a fortnight's stay his condition had deteriorated considerably and he was taken home weighing only 14½ lb. He was then seen in consultation by one of us (H. P. B.) and admitted to hospital in a serious condition. The picture was typical of cœliac disease. He was grossly dehydrated and passing 15–16 stools a day. He could take only very small quantities of skimmed milk with water and glucose. The blood-count showed a secondary anæmia with 52% hæmoglobin and 4,200,000 red cells per c.mm. The total fat in the stools was 49%.

Treatment with parenteral liver extract and vitamin-B complex on alternate days, together with other vitamin supplements and iron by mouth, was begun, and during the next week there was no improvement although no deterioration in his condition and his weight remained stationary.

At this stage a supply of folic acid was obtained and 25 mg. per day was administered by mouth. There was immediate improvement. The following day only 2 stools were passed, the appetite returned, and he became much calmer and brighter. From then on he progressed rapidly. His appetite became ravenous and he took a good mixed diet, fat-modified, and passed one or two pale formed and non-offensive stools each day. At the end of a week he had gained 7 lb., and 9 days later he had gained a further 6 lb. At the moment improvement has been maintained but there is still considerable abdominal distension. The dosage of folic acid has been reduced gradually and he is now taking 10 mg. per day. All other treatment has been stopped since the institution of the folic acid.

It is impossible, of course, to draw any general conclusions from a single case, but we feel strongly that improvement in this case can be attributed solely to folic acid.

No doubt intensive trials in this direction are going on, but we have so far seen no recorded work on the treatment of cœliac disease in children with folic acid.

H. P. BRODY.
Sheffield. L. GORE.

2. Gloyne, S. R. Social Aspects of Tuberculosis, 1946, p. 23.
3. Topley, W. W. C., Wilson, G. S. Principles of Bacteriology and Immunity, 1936, pp. 1028–29.

PERFORATED PEPTIC ULCER TREATED WITHOUT OPERATION

SIR,—I am anxious to correct two impressions that Mr. Deitch's provocative and stimulating letter of Oct. 19 may give.

He mentions that for two years I have treated all cases of acute perforation conservatively and "with uniform success." This series was reported at a meeting of the Leeds Medico-Chirurgical Society in February, 1946. I did not invent the conservative method any more than Hermon Taylor did. Many surgeons practise conservative treatment in selected cases, and it was not until Bedford Turner reported 6 cases (*Brit. med. J.* 1935, i, 457) that I had the courage to treat all cases without selection. Further, I have lost 3 cases since the discussion in February, which makes the mortality 18% in my small series. I agree with your leader of Oct. 5 that since we have no means of determining which ulcer will close spontaneously, conservative treatment will inevitably cause the surgeon more anxiety than simple closure, which, in Mr. Deitch's hands, carries a mortality of only 4%. This remarkable record, extending over eight years, fully justifies his belief in spinal anæsthesia and no drainage-tube.

Our experience in York differs from Hermon Taylor's in two respects. We found considerable constitutional disturbance in several cases, the pulse-rate rising to 130 per min. and the temperature to 103° F, falling gradually to normal by the eighth day, and we had 2 patients who developed subphrenic abscess, a complication which I had never met after closure without drainage.

We have been more impressed by the results of prevention of perforation than with the conservative treatment after the catastrophe has occurred. By treating all cases of peptic ulcer with severe symptoms as requiring urgent admission, and by accepting for surgical treatment all cases who we think are unlikely to benefit permanently by medical treatment, we have reduced the incidence of acute perforation by 44% during the last three years. Acute perforation in the York area has now become a rarity; the majority of cases admitted are visitors to the district, transport drivers, or passengers in trains. The few locals who perforate "out of the blue" will always defeat our efforts to anticipate, rather than wait for, this dreaded complication.

York. A. HEDLEY VISICK.

PRICE OF POLYTHENE.—In his article of Sept. 14 (p. 380) Dr. Kent remarked that polythene costs about 1*s.* 2*d.* per lb. Imperial Chemical Industries Ltd. point out that the minimum price of 'Alkathene,' the British grade of polythene they manufacture, is 3*s.* 3*d.* per lb.

SODA-LIME.—Already a familiar laboratory reagent, soda-lime is now widely used in medical practice for the absorption of carbon dioxide. Apparatus for closed-circuit anæsthesia, oxygen therapy, and metabolism determination are a few examples of its uses. Messrs. Sofnol Ltd., Westcombe Hill, Greenwich, S.E.10, the makers of 'Sofnol Brand' soda-lime, claim that their product possesses advantages such as constancy of composition, high absorptive capacity, resistance to abrasion, and non-heating and non-deliquescent properties. Their catalogue, illustrated by easily understood graphs, describes in a simple way the experiments on which these claims are based. These tests will be of interest to those who are unfamiliar with the type of laboratory investigations to which a specimen of soda-lime must be submitted before its value as a CO_2-absorbent for medical purposes can be assessed.

Parliament

THE LORDS IN COMMITTEE

ON Oct. 17 the House of Lords resolved into committee under the chairmanship of the Earl of DROGHEDA to consider the National Health Service Bill.

POWERS OF THE CENTRAL COUNCIL

Lord MORAN moved an amendment to clause 2 with the purpose of strengthening the Central Health Services Council. The Bill was singularly free from the fault of trying to meet sectional interests at the expense of the community, but he thought it unfortunate that membership of the council had been allowed to grow to 41. This inevitably meant that there must be a number of advisory committees, which were to be appointed by the Minister and to report direct to him, though they would at the same time report to the council. The amendment empowered the council to appoint these committees and laid down that they should report to the Minister through the council. He thought this vital, for a Minister faced with a council of 41 and an alternative committee of 8 or 9 experts would naturally turn to the experts. Thus the committees would do the real work and the council would be largely robbed of its chief function. Did this matter? He thought it did, for at present those actively engaged in the practice of their profession played little part in administering the service, and it was hoped that the council would be a means whereby they could take an active part, not only once or twice a year but in every important thing that came before the Minister concerning health. Lord JOWITT, the Lord Chancellor, in reply, pointed out that the Minister before appointing a standing committee must consult with the Central Health Services Council. He agreed that it was important that the council should be really effective; but it was rather an unwieldy body, and for that reason and not because they wanted to belittle the authority of the council the Government felt unable to accept the amendment—which was by leave withdrawn.

ACCESS TO HOSPITALS

The Earl of MUNSTER moved an amendment to clause 4 to ensure that voluntary hospitals should not find after the passing of the Bill, on instructions from the Minister, that their small rooms must be abandoned and made into large wards. Lord JOWITT gave an assurance that these rooms would not be converted unless it was found really necessary in the interest of the whole service, and the amendment was withdrawn.

Lord LLEWELLIN moved an amendment to clause 5 allowing a doctor to follow his patient into a hospital even though he was not a specialist on the staff of that hospital. Lord HORDER supported the amendment, for he declared it was in the interests of the patient that continuity of treatment should be preserved.

The Earl of LISTOWEL pointed out that the effect of the amendment would be that a specialist or practitioner who chose to stay outside the public service would be able to use for his private work hospitals provided at the public expense. Viscount CRANBORNE suggested that as the patient had made his contribution to the scheme presumably he had the right to enter a State hospital. The clause as it stood allowed any doctor on the staff of a hospital to treat his private patients in that hospital, but the man outside the service could not even arrange for his patients to be treated by someone else at the State hospitals. He was in favour of a State service, but he did not believe that there should be this continual whittling down of private practice so that in effect it was really useless. Lord ADDISON pointed out that today medical practitioners who sent their patients into hospital did not follow them. The patients were treated by members of the hospital staff. The amendment was withdrawn.

The Earl of IDDESLEIGH moved an amendment incorporating the pledge which the Minister had given that the character of denominational hospitals would be respected, but withdrew it on Lord JOWITT promising to consider the matter before the report stage.

HOSPITAL ENDOWMENTS

Viscount MAUGHAM moved an amendment extending to the non-teaching hospital the proviso safeguarding the confiscated endowments of the teaching hospitals

> "Provided that the Board shall, so far as practicable, secure that the objects of any such endowment are not prejudiced by the provisions of this section."

In reply Lord JOWITT said there was no doubt that by Act of Parliament any trust could be disturbed. Whether it should be was another matter, and he agreed that it should not be done lightly. There was, he pointed out, a profound difference with regard to the endowments of the teaching and non-teaching hospitals. In the teaching hospitals no redistribution was contemplated. The existing funds remained with the hospital, though the board of governors was changed. But redistribution was the very essence of the scheme for the voluntary hospitals. The scheme would probably cost the public Exchequer something like £150 million a year. Approximately £30 million would come from the insurance contributions, some £10 million from local authorities, and the remaining £110 million from the Exchequer. Of the whole £150 million some £90 million would be expended on hospitals. The reaction of the Treasury officials to this enormous expenditure had been: "If you are going to call on us to find out of public funds this vast sum of money, at least you ought to let us have in return the various endowments to put against our obligations." The Chancellor of the Exchequer had been persuaded to forgo that claim, for the Government was anxious that the hospitals should have some cushion between themselves and the rigours of Treasury control. But it seemed only fair that this nest-egg should be redistributed so that all should have a share. The probable capital value of the endowments was something like £50 million which at 3% would give something like £1½ million a year, and even that figure probably contained a not inconsiderable element of the endowments of teaching hospitals. The effect of the amendment would be to smash up the scheme, for there was hardly an endowment which had not been given to some specific hospital. If the scheme became impossible, inevitably the Treasury would say to a hospital which was richly endowed, "You are so well off that you need not have a large amount of public funds," and the whole idea of this cushion would go.

Viscount SAMUEL suggested that a comforts fund would really fulfil the purpose of the ancient donors of these endowments, for their only desire was that the sick should be well cared for and happy, and they would not mind very much whether the hospital had the name of Saint So-and-so or was called the Manchester Central Hospital. Therefore it seemed to him that we were fully entitled to endorse a change of trusts which arose out of the different circumstances of our own times. But could not some words be inserted which would ensure that what was done was done without detriment to the general purposes of the endowment and with the intention to fulfil as far as possible the wishes of the donor? For example if it were merely a question of a hospital being named for all time "The 1914–18 War Memorial Hospital" obviously that sort of trust ought to be fulfilled. Lord JOWITT replied that he fully accepted Viscount Samuel's example, and that where a gift was attached to a condition—such as the upkeep of a garden—he was ready to consider an amendment provided it was limited to such special cases, and did not seek to say that any money merely because it was left to a particular hospital should therefore be exempted from pooling and redistribution.

REGIONAL BOARDS

Lord ADDINGTON and Viscount BRIDGEMAN moved amendments to ensure that the local health authorities should know what plans the regional boards were making and should have a chance of putting their views to the Minister before any regional plan was finally accepted. The Earl of LISTOWEL pointed out that the Minister must include members of local authorities among the people he appointed to the regional boards, and they would no doubt keep their colleagues informed of what was happening. Viscount SIMON suggested that the language of the Bill regarding these appointments might

be strengthened, and Lord LISTOWEL agreed, for, he declared, the intention was that representatives of the local authorities should be included. The amendment was withdrawn.

The Earl of MUNSTER pointed out that the Bill had now been before Parliament for six solid months and asked whether the Government could not now give some information as to the size of the regions. Lord JOWITT said he wished he could but to be frank he could not. There was a great deal of negotiation to be done, and it would be foolish to attempt anything in a hurry.

FUNCTIONS OF THE HOSPITAL MANAGEMENT COMMITTEES

Lord LUKE moved an amendment seeking to readjust the functions of the regional boards and the hospital management committees by omitting the subsection particularising the duties laid on the boards—to appoint staff, maintain premises, and acquire equipment and furniture. Why, he asked, could not the hospital management committees have powers from the boards similar to those enjoyed by the teaching hospitals from the Minister? The committees would be formed of trustworthy people appointed by the Minister and be left to manage the affairs of the hospitals. The boards would have enough on hand planning their regions and generally giving guidance. To take the appointment of staff from the committees would raise difficulties of divided loyalties and remote control, and put the non-teaching hospitals at a disadvantage compared with the teaching hospitals. To have a floating population within the region capable of being moved at a moment's notice might make it difficult for a hospital to get and keep a team together. If the Minister wanted suitable people to become members of the committees he must give them suitable responsibility.

Lord JOWITT agreed that if people were to work on the hospital committees they must be given a real job to do. The issue was how to achieve this. The Government intended to prescribe by regulations that the hospital management committee should do all things in regard to the running of their hospital, but that they should do them on behalf of the regional board. The appointment of officers—except perhaps senior servants—should be in the hands of the committee, as would be all expenditure, other than the building of a new wing or anything of that sort. The Government expected that the committees would have wide powers covering practically everything except questions of major policy. But they thought it better not to impinge upon the principle that the regional board was the authority and the hospital management committee the agent acting on behalf of the board. If there were any dispute between the two the legal position would then be plain.

Lord LLEWELLIN thought that all would agree that as much power as was proper should be left to the committees. But in the Bill he felt it was being done in the wrong way. To get good men to serve, these committees must be made a reality and not just a kind of camouflage. Their responsibilities must be placed in the forefront of the shop window and not prescribed afterwards by regulation. Viscount SIMON pointed out that in the future these things would be construed not according to what had been said in the House of Lords but according to the language of the Bill: while laying particular duties on the regional boards, Parliament had not given the hospital management committees any defined duty. Under this clause it would be lawful for a Minister to say, "Oh, I do not think much of this hospital committee. I think on the whole that any regulations it may make should be subject always to the ratification of the regional board." The Marquess of READING suggested that it might be some time before the regulations dealing with the functions of the committees could be passed. Yet surely to enlist support for local hospital committees people should know at the earliest possible moment, in the clearest possible terms, and by the best possible instrument—which was the Bill itself—what the functions of the committees were to be.

Lord JOWITT replied that as part of a coördinated scheme the committees were to act as the agents of the boards. He was anxious that there should be no demarcation disputes and that the boards should have unquestioned authority. But he was equally anxious that the boards should exercise their powers by leaving a wide discretion to the committees. He would discuss the clause further with his advisers; but to keep the legal position clear he thought it should stand, though he hoped there would be such a wide measure of devolution as would satisfy the noble Lords.

Lord LUKE withdrew his amendment.

MEDICAL STAFF COMMITTEE

Lord MORAN moved an amendment that a separate house committee should be set up in each hospital in every group, and that each hospital should have a medical staff committee with a right to nominate members to the hospital management committees. The medical staff committee which flourished in all our voluntary hospitals was a unique instrument for keeping the hospital up to date in practical matters. But in municipal hospitals its place was taken by a single medical superintendent. Lord HORDER thought that the principle was vital but that the exact relationship between the committee and the management committee was a domestic matter. "If it is not the intention of the Minister to disallow the formation of medical staff committees, I think an assurance to that effect would be satisfactory."

Lord JOWITT said it was obvious that a hospital board must be set up to run the individual hospitals under the jurisdiction of a hospital management committee; and save in rare cases, such as a fever hospital working with a general hospital, that would be done. It was also true that we must have medical staff committees, but he was reluctant to mention them in the Bill; for a good many committees would have to be set up—on nursing and dietetics, for instance—and if one were singled out it would look as if there were not to be any others.

In withdrawing the amendment Lord MORAN urged that it was important that in this matter municipal practice should be brought into accord with voluntary practice.

Lord MORAN moved a further amendment to provide that in teaching hospitals, facilities for medical teaching and research as required by the university or medical school should be supplied. A bed in a teaching hospital might well be more expensive than in another hospital, and a time might come when a hospital used for teaching might be accused of extravagance. Professors of medicine and surgery throughout the country had signed a memorial on this point, for they felt that if the functions of the teaching hospitals were not put down on paper it might weaken their case later when they came to argue about the necessary provisions for carrying out teaching and research. Lord JOWITT agreed that besides the care of the sick the teaching hospital had an added function which might be even more important. He thought the amendment went a little too far, but he undertook to consider the matter with a view to drafting suitable words, and the amendment was withdrawn.

LEGAL STATUS OF HOSPITAL MANAGEMENT COMMITTEES

Lord LLEWELLIN moved an amendment to allow hospital management committees to sue or be sued. This was something, he asserted, that had to be settled at once, for it could not be altered by regulation afterwards. Lord JOWITT recalled that the committees when acting as principals—in relation to research or in the administration of their own property—could be sued in the ordinary way. It was only when acting as the agents of the regional boards that they could not be sued. In a coördinated scheme there must be a chain of authority, and on this point he was not in a position to make a concession. The House accordingly divided, and the amendment was carried by 59 contents to 17 non-contents.

APPOINTMENT OF HOSPITAL OFFICERS

Lord LUKE moved an amendment enabling the Minister by regulation to empower the hospital management committees to employ officers other than specialists or consultants. The Earl of LISTOWEL stated that there already was power in the Bill to make a regulation of this kind. Lord MAUGHAM asked how the House could be expected to decide on this Bill when so much was left in the air to be determined by regulations. Why was there nothing in the Bill to show that the main management of the hospitals was confined to the management committee? The Marquess of READING asked whether

the regional boards were to be permitted or obliged to delegate their powers.

Lord JOWITT admitted that the regulations did not yet exist, but pointed out that there would be opportunity to discuss them in Parliament. Broadly, the regulations would lay down that certain matters fell within the province of the management committees—for instance, the engaging and dismissal of staff, with the exception of senior staff. He did not suppose there would be an appeal to the board if the committee dismissed some servant. That would be interfering with the discretion of the committee unduly. He suggested that the new system whereby a nurse became a servant of the regional board, though she could contract to serve at a particular place if she liked, might lessen the recruiting difficulties of today.

Lord INMAN, though he wished to see definite powers given to the management committee so far as this amendment was concerned, saw definite advantages in the Government's scheme. At his own hospital, to which several hospitals were affiliated, they had found that the nurses liked to move from one small hospital to another. Viscount CRANBORNE asked whether it would not be possible to distinguish between different types of staff. "Officer" was an all-embracing word. Could not the management committees control staff such as porters, who were unlikely to want to wander round the region?

The amendment was negatived.

LOCAL-AUTHORITY SERVICES

Lord ADDINGTON moved an amendment permitting a county council on application from a borough to delegate to it functions relating to the care of mothers, young children, employment of midwives, health visiting, home nursing, vaccination, and so forth. The amendment also gave the borough council the right of appeal to the Minister if its application was refused by the county council. Lord O'HAGAN moved further to extend the amendment to urban district councils. The amendment, Lord ADDINGTON declared, would provide a maximum of local control, attract voluntary effort, and permit the degree of delegation to vary according to circumstances. Lord JOWITT replied that in the past there had been a good deal of overlapping and confusion in the exercise of these functions, and their distribution was chaotic. Now that a new set of powers were being imposed on local health authorities, which it was hoped in the fullness of time would be performed at health centres, it was a matter of moment to entrust these duties only to major authorities, which meant the counties and county boroughs. The only exception was the care of children, which would follow the pattern imposed by the new Education Act. Lord HENLEY thought it would be unfair to the county councils to take away bits and pieces of their areas and spoil the continuity of their services. Viscount CRANBORNE thought that a proviso should be added to the amendment allowing delegation only subject to the approval of the Minister. To this suggestion the Earl of LISTOWEL promised to give consideration, though he feared that even so the amendment would undermine the scheme for coördinating the services. The amendments were withdrawn.

METROPOLITAN BOROUGHS

Lord BALFOUR of Burleigh moved an amendment providing that the London County Council should delegate the functions cited in the last amendment to the metropolitan boroughs. Local government in London, he pointed out, was different from anywhere else in the country, and the functions relating to maternity and child welfare had never been exercised by the L.C.C. Over the past 50 years they had been delegated to the metropolitan borough councils, and the L.C.C. was still on record as being in agreement with that position. The boroughs had a very good record, and he did not think that under the Bill the services could be maintained at the same level of efficiency. But for the fact that London local government was a thing by itself, these great boroughs would have been made county boroughs long ago.

Speaking as a Parliamentarian, Lord JOWITT was not too much moved by the plea of an agreement reached between the L.C.C. and the borough councils outside Parliament. At the time of the agreement the L.C.C. were going to keep their hospitals, and presumably as they did not want to have too much on their plate passed these functions to the boroughs. Now the position was different and the L.C.C. felt that they had time to conduct these services themselves.

Lord BALFOUR thought Lord Jowitt had made an astonishingly good case considering he had not a leg to stand on, but with 25 years' experience as a borough councillor behind him he assured the House that they would spoil a good service if these functions were transferred to the L.C.C. The amendment was carried by 35 contents to 15 non-contents.

FROM THE PRESS GALLERY

When is a Nurse Not a Nurse?

On Oct. 14 in the Commons Mr. ALFRED EDWARDS moved to annul the Nurses Amendment Regulation 1946. When the Nurses Act of 1943 was under discussion the Minister of Health, then Mr. Ernest Brown, in a letter, gave an assurance to the Christian Science movement that he would provide by regulation that nothing in the Act should prevent the using of the name or title of "Christian Science Nurse" by a member of the Church of Christ, Scientist, who was certified by the church to be qualified for employment as a nurse by members of the church. Had the movement not received this assurance they would certainly have moved an amendment to the Act. Nobody, Mr. Edwards declared, was entitled to claim a monopoly on a word or name. There were only 40–50 of these registered nurses in the country. No-one was allowed to practise as a Christian Science Nurse who had not completed 5 years' training and been recognised by the department. It would be impossible to engage a Christian Science Nurse in mistake for a medical nurse. Mr. G. COOPER, who seconded the motion, pointed out that the words "Christian Science Nurse" were used in the by-laws of the mother church in Boston, and even if the regulation went through it would be impossible to prohibit the use of the phrase in the literature issued by the movement.

Mr. WILSON HARRIS, though admitting he was no admirer of Mary Baker Eddy, supported the motion, for he was depressed by the high-handed action of those estimable people who wished to arrogate a common English word to their own purposes. He thought it reasonable to debar anyone from improperly using the term "registered nurse," but if in the phrase "Christian Science Nurse" the two Archbishops did not object to the use of the word "Christian," nor the Royal Society to the use of the word "science," why should anyone object to the use of the word "nurse"? Even the medical profession was less exacting, and the Chancellor of the Exchequer, though he could only pocket taxes and could not attack poxes, had the right to be termed "doctor." Mr. F. MESSER pointed out that those interested in the question had had no knowledge of the correspondence taking place between Mr. Brown and the Christian Scientists, and he refused to be bound by an undertaking given by a Minister without consultation. The nursing profession was in dire need of recruits who he thought would only be gained if it won the status of a real profession. If the door were opened to the Christian Scientists it would have to be opened to everyone else.

Mr. A. BEVAN explained that when he took office he was faced with a prayer to annul Mr. Brown's proposed regulation giving exemption to Christian Science Nurses. He therefore withdrew the regulation in the hope that a compromise could be reached. This had not proved possible so he had therefore introduced the present regulation. He admitted we were attempting to constrain the English language, but that happened whenever we made a charter and gave a specific meaning to a name. In the care of the sick, nursing, he ventured to suggest, was as important as any other branch of the medical profession. These women resented that after an arduous training they were known by a name which anyone could adopt. All the other exemptions to the Act were within the hierarchy of nursing itself. If he exempted the Christian Science Nurses where could he stop? He would have a stream of applications for exemptions and a great body of fine women would have been deeply and mortally offended. The motion was defeated by 245 votes to 43.

Obituary

CHARLES SAMUEL MYERS

C.B.E., M.A., M.D., SC.D. CAMB., LL.D., F.R.S.

Dr. Myers, one of the first psychologists elected to fellowship of the Royal Society, died at his home near Minehead on Oct. 13. A few days earlier he had attended the celebration of the 25th anniversary of the National Institute of Industrial Psychology, of which he was founder and principal.

Charles Samuel Myers was born on March 13, 1873. From the City of London School he went to St. Bartholomew's Hospital for a year and thence to Caius College, Cambridge, of which he was later to become an honorary fellow. He won Foundation and Shuttleworth scholarships, and took a double first in the natural sciences tripos, but still found time to exercise his keen interest in anthropology and in music; and he himself played the violin expertly. He returned to St. Bartholomew's Hospital to complete his medical training, and soon after qualifying in 1897 he joined McDougall, Seligmann, Ray, Wilkin, and Haddon on the Cambridge University expedition to the Torres Straits and Sarawak. Myers's part was ostensibly to study native music, but his experience at this time coloured his subsequent work in psychology. On returning to this country in 1899 he took a house-appointment at Barts, but he soon abandoned clinical medicine. He remained in London, first as lecturer, and, after 1906, as professor of psychology, until in 1909 he returned to Cambridge as lecturer in experimental psychology and director of the psychological laboratory. In 1911 he became first president of the British Psychological Society, whose journal he edited until 1924.

Sport & General Press Agency

The first world war found Myers slightly over age for the R.A.M.C., but he went to France as a civilian and became a hospital registrar at Le Touquet. Soon he worked his way into the Army; he became consulting psychologist to the B.E.F., and also took a guiding interest in the training centre set up at Maghull, where instruction was given in the application of psychological principles to the war psychoneuroses. The emergency attracted the energies not only of Myers but of W. H. R. Rivers, Elliot Smith, and William McDougall—a band of scientists whose work had previously borne little relation to clinical medicine. They had an important share in opening up what was then a new field, and Myers himself contributed five articles to our own columns during the war years. He also carried out spare-time research for the Admiralty on the selection of hydrophone listeners. The pioneer's path, however, was not easy, and his book *Shell-shock in France, 1914–18* reflects the sense of frustration he experienced and his relief when his task could be relinquished.

The end of his active participation in medical psychology was marked by a vigorously controversial letter in THE LANCET of Dec. 27, 1919, in which he condemned physical interference in the treatment of hysteria.

"It is high time that the medical profession should decide whether it is justifiable for a physician to tell lies to his patient with the object of effecting a cure by suggestion, and on the basis of such lies to perform a serious operation with that object. . . . During the war there were certain physicians who would explain to a patient suffering from functional hemiplegia that the cortical cells on one side of his brain were out of order. . . . And they would proceed to tone up the disordered cells by painful faradism. . . . I have always been convinced that such measures are not only needless, but also dangerous. If the patient is not cured by the electricity or the sham operation, his latter state is far worse than his previous one, because henceforth he firmly believes in an 'organic' basis of his condition. If, on the other hand, he is cured, he may at any future time fear or fancy a recurrence of his 'organic' malady."

He had gained the F.R.S. in 1915, and on his return to Cambridge had been eager to put his subject even more clearly on the map. In 1920 he was promoted to a readership; but he was denied the support he expected from scientists and philosophers, and on reflection he decided to give up his academic life and to join with a London business man, H. J. Welch, in the foundation of the National Institute of Industrial Psychology. Here he found scope for his abilities in his successful teaching that the humanising of industry by study of the worker's comfort, the adjustment of working conditions, and the fitting of the right man to the right job could be carried out only with the aid of psychology.

Mr. Alec Rodger writes: "The National Institute was Myers, and Myers was the National Institute; but it may be questioned whether he was altogether happy in his new life. In some ways he relished his constructive task, but now he had little time for teaching, and very little more for research. Moreover, the support he obtained from industry was scant. He became too preoccupied with financial problems and relationships with other bodies, public and private, to be able to give as much attention as he wished to science. Some consolation he undoubtedly gained from his editorship of the National Institute's journal, *Occupational Psychology*, but it seems likely that in London as in Cambridge he suffered disappointment. Nevertheless, he made his outstanding mark, and it gave him satisfaction to know that most of the personnel selection procedures adopted by the Navy and Army in the second world war, in the initial selection and allocation of recruits, were based directly on those developed by the institute for civilian purposes. He was a cultured, generous, kindly affectioned man, proud of his Jewish race. It is fitting that his last production should have been a report on Attitudes in Minority Groups, prepared for the Society of Jews and Christians; it is a fine, scholarly work which reflects his deep insight into anthropology."

Myers published an *Introduction to Experimental Psychology* and other books mostly concerned with the industrial aspect of psychology, but his influence was exerted rather through his teaching and organising than his writings. In later years he was honoured by several universities, receiving, honoris causa, the D.SC. at Manchester in 1927, the LL.D of Calcutta in 1938, and the D.SC. at Pennsylvania in 1940. He lived to see the successful application of principles established thirty years ago by him and his colleagues.

He was married and had two sons and three daughters, who, with his widow, attended a memorial service in London on Oct. 16.

SYDNEY ARTHUR OWEN

M.D. CAMB., F.R.C.P.

Dr. Sydney Owen had been at heart a children's doctor since the days when he served as resident medical officer at Shadwell, and though he did not drop his work among adults his appointments showed where his real interest lay. A pioneer in neonatal pædiatrics, he had been physician to the Queen's Hospital for Children, Hackney, since 1910. Physician to the Princess Louise Hospital for Children from the time of its opening, he was also on the staff of the City of London Maternity Hospital. From 1912 to 1937 he was in charge of the pædiatric department of the West London Hospital, where he died on Oct. 14.

An exhibitioner of Trinity College, Cambridge, he took a first class in the natural sciences tripos in 1901. At University College Hospital, where he qualified in 1904, taking his M.B. the following year, he was awarded an Atchison scholarship, a senior Fellowes medal, and a medal for midwifery. In 1910 he took his M.D. Camb., and in 1928 he was elected F.R.C.P.

Among the pieces of apparatus which he introduced and carefully tested was the "oxygen bell," a device for administering oxygen to small infants which is in regular use in hospitals. But it was characteristic of Sydney Owen that he himself never published anything about its use. An excellent teacher, he would have filled admirably a full-time clinical and academic appointment,

but in his day none existed. Years before the last war he anticipated its coming and its character better than most of us, and recommended the provision of hospital shelters. In 1939 he was due to retire, but instead he undertook full-time administrative work in the E.M.S., where his time-saving orderliness and thoroughness stood his many medical "clients" in good stead.

Generous to his juniors, gentle and courteous to his hospital mothers, a hard worker in spite of indifferent health, he would push for others but never for himself, and medical women owe him much for the doors he opened on their behalf.

"Those of us who worked with Owen," writes a colleague, "will always remember him for his keen insight into the problems which faced him, and his extraordinary sympathy and tact with little children. No trouble was too great when dealing with a patient, whether in hospital or in private, and the careful notes in his small, tidy but difficult handwriting, were a model of what case-taking should be. He had a valuable collection of clinical data, which the retiring nature of his character seemed to prevent him from publishing to any large extent."

His wife, who shared fully in all his interests, is left with a son and daughter.

IAN MACKENZIE DAVIDSON

M.D. GLASG., F.R.C.S.E.

Dr. Ian Davidson, who died at Carlisle on Oct. 14 at the age of 30, leaves a gap that might have been made by many an older man, for he had packed much into his short life. The son of Mr. Norman Davidson, F.R.C.S.E., of Glasgow, he entered Glasgow University from Rugby and graduated M.B. in 1938. After holding a house-appointment in the Glasgow Victoria Infirmary, he went as ship's surgeon to the Far East. At the outbreak of war, he volunteered for the R.A.M.C., and after his discharge on medical grounds served as house-physician and house-surgeon at the Cumberland Infirmary, Carlisle, during 1940. The following year, after an interval during which he wrote his thesis on parkinsonism which was accepted for the M.D. degree in 1942, he returned to the Cumberland Infirmary as surgical registrar. While holding this post he obtained his Edinburgh fellowship, and in 1943 he was appointed assistant surgeon to the Infirmary, later becoming surgeon to the E.M.S., consulting surgeon to the Victoria Cottage Hospital, Maryport, and surgeon to the City General Hospital, Carlisle.

He was blessed with unusual gifts of mind and body, and his engaging charm and genuineness won him many friends. A sound surgeon, he had a deftness of hand that reflected a quick and steady brain, and the maturity of his judgment belied his youth.

His widow, Dr. Josephine Cartwright, D.R.C.O.G., of Edinburgh, and their year-old daughter, survive him.

T. McL. G.

HENRY HANNA

M.A., M.B., B.SC. R.U.I.

Mr. Henry Hanna, who died in Belfast on Sept. 28, was widely known throughout the Province, for generations of medical students had passed under his keen scrutiny, and he had a large private practice in diseases of the eye, ear, nose, and throat. For close on 40 years he had worked at the City Hospital, where he held the appointment of visiting ophthalmic surgeon at the time of his death. He retired from the staff of the Royal Victoria Hospital in 1939.

Born in 1874, he received his early education at Belfast Royal Academy while his university career was spent between Queen's College, Belfast, and St. John's College, Cambridge. The old Royal University of Ireland conferred upon him a B.A. in 1894, and two years later he graduated M.A., B.SC. In the following years he worked at Cambridge but he returned to Ireland to begin his medical course, and he took his M.B. in 1903. After holding a resident appointment in the newly built Royal Victoria Hospital, Belfast, and a demonstratorship in the department of anatomy, he spent some time in the eye, ear, and throat clinics of Vienna before returning to practise in his chosen specialty at Belfast. He served as president of the Irish Ophthalmological Society, the Ulster Medical Society, and his special section at the British Medical Association meeting in Belfast in 1937. But though he had held these offices with distinction he preferred his own fireside or the company of his friends whom he delighted with his dry wit.

"Outside medicine," writes J. R. W., "Hanna's interests were varied. He was often to be seen on the golf links, but perhaps his greatest joy was fishing in a quiet stream. He had a genuine appreciation of art and his collection includes many valuable pictures as well as a beautiful selection of porcelain and old Irish glass."

His widow survives him with two daughters.

Appointments

BEATTIE, W. M., M.CHIR. Camb., F.R.C.S.: assistant surgeon, David Lewis Northern Hospital Branch, Royal Liverpool United Hospital.

FRIPP, A. T., B.M. Oxfd, F.R.C.S.: consultant orthopædic surgeon, public health department, London County Council.

GUTTMANN, E., M.D. Munich, L.R.F.P.S.: assistant clinical director, Maudsley Hospital, Denmark Hill.

LEYS, D. G., D.M. Oxfd, F.R.C.P.: consulting pædiatrician, County Hospital, Farnborough, and North-West Kent.

LUCAS, B. G. B., M.R.C.S., D.A.: research assistant in anæsthetics, University College Hospital medical school, London.

MENDL, K., M.D. Prague, D.M.R.: radiotherapist, Swansea General and Eye Hospital.

SMITH, A. G., M.D. Glasg., F.R.C.S.: medical referee for dermatological cases under the Workmen's Compensation Act, 1925, for county court districts in circuits 32 and 33.

THOMAS, R. C., F.R.C.S.E., M.R.C.O.G.: consulting obstetrician and gynæcologist, County Hospital, Farnborough, and North-West Kent.

Examining Factory Surgeons:

BOWER, C. E. W., M.B. Vict., D.P.H.: Stretton, Cheshire.
CAMPBELL, A. M., O.B.E., M.B. Glasg.: Cumnock, Ayr.
GREGSON, A. H., M.B. Manc.: Cromer, Norfolk.
GUTHRIE, G. A., M.B. Glasg.: Nairn.
MACLEAN, R., M.B. Aberd.: Ullapool, Ross.
MORRISON, D. N. B., M.B. Glasg.: Braemar, Aberdeen.
WATSON, K., M.D. Dubl., F.R.C.S.E.: Redhill, Surrey.

Empire Rheumatism Council:

NICHOLSON, D. P., M.B. Lond., M.R.C.P.: registrar at West London Hospital.
SHIERS, DUNCAN, B.SC., M.B. Wales, M.R.C.P.: registrar at Roya Mineral Water Hospital, Bath.

Silicosis Medical Board: New Members

FREEBAIRN, N. A., M.B. Glasg.
PIERCE, J. W., M.D. Lond., M.R.C.P.
ROGERS, ENID M., M.D. Wales.
TURNER, G. E. M., M.R.C.S.
WILLIAMS, WYNDHAM, M.B. Edin.

Births, Marriages, and Deaths

BIRTHS

EVANS.—On Oct. 17, in London, the wife of Dr. John Evans—a son.

GARROD.—On Oct. 10, in London, the wife of Dr. Oliver Garrod—a daughter.

GIBBS.—On Oct. 12, at Mackenzie, British Guiana, the wife of Dr. D. S. Gibbs, of Hove—a son.

GLASS.—On Oct. 21, in London, Dr. Norma MacLeod, the wife of Dr. R. M. Glass—a son.

KERSHAW.—On Oct. 5, at Mansfield, the wife of Dr. Robert Kershaw—a daughter.

LAZARUS.—On Oct. 1, the wife of Dr. Samuel Lazarus, of Glasgow—a daughter.

O'CONNOR.—On Oct. 12, at Abingdon, the wife of Dr. G. F. O'Connor—a son.

ROSENVINGE.—On Oct. 12, at Harrogate, the wife of Dr. Gerald Rosenvinge—a son.

SMYTH.—On Oct. 17, at Brighton, the wife of Captain Greville Smyth, R.A.M.C.—a son.

THOMAS.—On Oct. 11, at Northampton, the wife of Dr. S. F. Thomas, M.B.E.—a daughter.

WHEELDON.—On Oct. 15, in London, the wife of Dr. F. T. Wheeldon—a son.

WOOLLEY.—On Oct. 18, at Derby, the wife of Dr. E. J. S. Woolley—a daughter.

MARRIAGES

ABRAHAM—CLARK.—On Oct. 15, at Aughton, Everard Cecil Abraham, M.C., M.D., to Doris Irene Clark, J.P.

BEAL—READE.—On Oct. 19, John Hugh Bruce Beal, B.M. Oxfd, F.R.C.S., to Mary Bettina Reade.

HILL—AKRED.—On Oct. 19, in London, Major Francis E. Hill, of Loxwood, Sussex, to Alice Akred, M.B.

READ—BRODIE.—On Sept. 25, at Penang, Malaya, Marten Turner Read, M.C., M.R.C.S., to Alison Garland Brodie.

THOMAS—GIRVAN.—On Oct. 17, at Pinner, David Francis Thomas, F.R.C.S., to Jean Isobel Girvan.

DEATHS

DAVIDSON.—On Oct. 14, at Carlisle, Ian MacKenzie Davidson, M.D. Glasg., F.R.C.S.E., husband of Dr. J. A. Davidson (*née* Cartwright).

HARRIS.—On Oct. 18, Henry Arthur Clifton Harris, M.R.C.S., of Appledram, Ditchling, Sussex, aged 73.

HOWIE.—On Oct. 14, at Eastbourne, Robert Howie, M.B. Glasg., aged 75.

PHILP.—On Oct. 13, at Preston Hall, Maidstone, James Daniell Philp, M.R.C.S., aged 29.

TURNER.—On Oct. 15, at Shirlett Sanatorium, Shropshire, Frederick Thomas Turner, M.C., M.R.C.S., medical superintendent.

Notes and News

LIVERPOOL MEDICAL INSTITUTION

AT a large gathering of members of this institution, held last Saturday, with Dr. G. F. RAWDON SMITH, the president, in the chair, the honorary membership was conferred on Dr. A. E. Barclay, Sir Allen Daley, Dame Louise McIlroy, Prof. Charles McNeil, Dr. Ivan Magill, and Sir Alfred Webb-Johnson. The following are extracts from the introductory speeches delivered by Dr. ROBERT COOPE as orator:

DR. ALFRED ERNEST BARCLAY

In medicine's house there are many mansions. Alfred Ernest Barclay is one of the pioneers who has helped to build its well-fitted darkroom, in which men can usefully pursue "shadows, not substantial things." He has given us the work of a master in his book on the radiology of the digestive tract. With rare ingenuity he divides light from darkness, and emerges from obscurity to explain the mechanism of swallowing or to reveal the mysteries of the fœtal circulation, or to startle us with a new and revolutionary tale of the blood-flow through the kidneys. Thus he looks upon the forms of things unknown, turns them to shapes, and gives to airy nothing a local habitation.

To craftsmanship he adds a scholar's integrity. . . . As Socrates felt about words, so he feels about X-ray shadows: to use them in an improper sense is not only a bad thing in itself, but it also generates a bad habit in the soul.

SIR ALLEN DALEY

William Allen Daley—one of our own sons, a former councillor of this institution—has wandered into a far country, but today he comes back to us, full of honour and achievement.

There is no problem of preventive medicine on which the Government of the day does not turn to him for counsel. He sits almost by natural right on committees and commissions which consider matters of medical administration, education, or policy. Since 1939 he has directed the health services of the County of London—that awkward, more than ever ungainly Great Wen. But London has no terrors for this Merseysider. The man who was brought up in Bootle, who married a native of Liverpool, whose children were born in our midst, who thrived on the smoke and noise of Brownlow Hill, and who was tempered in the keen air of a provincial medical society could take London in his stride.

Throughout the war years, when London endured the long-drawn-out sufferings of bombs and fire and flying bombs and rockets, he virtually never left his post, day or night. The calm and sustained devotion to duty of this modest and homely man steadied and inspired his team. We welcome him home with pride.

DAME LOUISE McILROY

"England," wrote Bernard Shaw, "cannot do without its Irish and its Scots, because it cannot do without at least a little sanity." Anne Louise McIlroy made doubly sure that we should need her, first by being born in Antrim, and then by taking her medical course in Glasgow. It wanted only the finishing touch of Dublin to make her irresistible when the Royal Free Hospital looked for a professor of midwifery.

She might sweep through her ward like a whirlwind: might on occasion drive her staff almost to distraction by an inexorable insistence on detail: might never hesitate to say, forcibly and without respect of persons, what was in her mind; but however wild an Irishman may be, he has one eye always on things as they are. To many problems in her chosen field she brought abounding enthusiasm, but her final answers had the simplicity of hard common sense. Her old students have found that she has fixed enduringly in their minds fundamental principles. She has even dared to preach that the right place for a baby is with the mother. . . .

Now in the ripeness of her days, she can look back upon old, forgotten, far-off battles, and be satisfied: for by what she has done and by what she is, she has helped to make it natural for women to take their place in our profession.

PROF. CHARLES McNEIL

Early in his medical career Charles McNeil was hard-headed enough to realise that much may be made of a Scotsman if he be caught young. Certainly a lifetime's experience of techy and wayward infancies has made him a canny clinician and a very wise man, a senator among pædiatricians: nor has it taken the edge off a dry and palatable humour.

He has thrown light on many aspects of disease in children, notably on the respiratory infections of childhood; but as professor of child health he more than most men has given to pædiatrics a positive social content, championing the cause of the newborn baby, pleading earnestly for prophylactic child-care. To him this is no affair merely of instruction at medical clinics. He wants a practical and practisable gospel of child welfare carried right into the homes of the people.

We hope that it may be long before he needs an epitaph. When the time comes, however, he will have well earned that which was once given to another great man: "When he died, the little children cried in the streets."

DR. IVAN MAGILL

Ivan Whiteside Magill came across the water from Northern Ireland bringing with him a rich brogue and a spirit eager to blaze new trails. For a brief moment he broke his journey at our own Stanley Hospital to familiarise himself with a special brand of catarrhal upper respiratory tract; but he passed on to the metropolis, where he now puts even the most uneasy of crowned heads to sleep.

Modern anæsthesia owes him much, for he has improved its techniques and helped to make it safe. Without his skill and guidance the thoracic surgeon especially might still be unable to move delicately and with little hazard in a difficult field. Today the patient condemned to a chest operation is not even allowed to breathe; his respiratory centre is first poisoned and then ignored, and with rubber bag and strong right hand the anæsthetist breathes for him. Moreover, Magill has seen to it, by the provision of ingenious tubes, that the anæsthetising vapours are carried to the innermost shrine of his being.

SIR ALFRED WEBB-JOHNSON

The glory of a surgeon is a thing of a moment: he lives only so long as he is alive. The quick and ready motion of steadfast hands with experience creates his signature, which no man can copy; and though it may be read on the bodies of his patients, they too are mortal.

Some surgeons live on in their students, lighting a candle in their minds and hearts which can never be put out. Some are numbered among the few who in various ways help to push forward the advancing edge of their subject. Some are remembered for their leadership in wider issues of medicine and of medical policy.

Alfred Webb-Johnson qualifies on all three counts. What Manchester trained one day, London received a little breathlessly on the morrow. A born teacher, he never forgets a student, a houseman, a theatre sister, a nurse who has been one of his team; he even knoweth his sheep by name. Medical education and research have profited by the magic of this modern alchemist who has solved the mystery of distilling gold from baser metal. And now he is one of our most trusted medical statesmen, a man for the times, clear headed, robust in common sense, imperturbable.

After the new honorary members had been formally admitted by the president, each expressed appreciation and thanks to the members. In the evening the honorary members, together with the Lord Mayor of Liverpool and other official guests, were entertained to dinner at the Exchange Hotel.

COUNCIL FOR THE CARE OF SPASTICS

THE founding of St. Margaret's School at Croydon [1] has marked an entirely new phase in the care of children with cerebral palsy in this country. Their special needs are now recognised, and for some time various people and bodies interested in their care have felt that a council should be formed on a national basis to provide treatment and education for them. On Oct. 17 a meeting was held at the London School of Hygiene and Tropical Medicine, with Mr. G. R. Girdlestone, F.R.C.S., in the chair, to consider how such a council might best be founded. Both the Central Council for the Care of Cripples and the British Orthopædic Association, he said, have been studying the needs of these children. The Ministries of Health and of Education have included them in their plans in a general way, but there is much more to be done, he feels, in exact diagnosis of the damage done to the brain, and in the study of the psychological needs of spastic children. About a twentieth of them are deaf or have defective hearing. The exact numbers in the country have yet to be ascertained, but there are said to be about 7 children born with cerebral palsy in every 100,000 live births; 1 of these will die during infancy and 2 of the remaining 6 will be seriously defective mentally and thus fall outside the group for which the proposed council is to care. Each child needs the attention of an orthopædic surgeon, and Mr. Girdlestone estimated that there should be one physiotherapist and one occupational therapist for every 15, and a speech therapist for every 30 children. The parents need training in the care of their children; at St. Margaret's the mother is is to spend a day at the school once a week, helping to look after both her own child and others. The council, Mr. Girdlestone suggested, must help to develop training institutions, including residential and day schools, vocational training centres, and perhaps sheltered factories. In Danish hospitals, it seems, 30% of the secretarial staff are cases of cerebral palsy, a plan which does well, he said, as long as those they have to work with remain calm and serene. Since the only way to convince people that a thing needs doing is to do it, he suggested that the council, when formed, should select a small energetic committee to get the work going. A discussion on the name of the council followed, in which it was agreed that the work should not be limited to children, and that an appropriate name would be the "Council for the Care of Spastics (and those with allied conditions)."

Prof. J. M. Mackintosh was anxious to see the council formed forthwith, but since many of those present were unknown to each other it was finally agreed that the meeting should constitute itself an Association for the Care of Spastics (and persons suffering from kindred conditions), and should appoint a committee to draw up recommendations for the creation of a council. This committee, it was agreed, should have power to receive and expend money until they reported to the association in six or eight weeks' time, and their running expenses for that period, up to £400, were guaranteed by Mr. Paul Cadbury.

Members of the committee are: Mr. Stephen K. Quayle (chairman); Mr. H. P. Weston, M.A. (secretary); Mr. E. S. Evans, F.R.C.S.; Miss M. I. Dunsdon, M.A.; Mrs. W. Lionel Hitchens; and Mr. N. D. Bosworth Smith, M.A.

1 See *Lancet*, Sept. 7, 1946, p. 354.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

MONTHLY dinners to which fellows and members of the college and members of the associations linked with the college may bring guests have now been held for just over a year, and the attendance has ranged from 40 to 100. The dinners always take place at the college on a Wednesday, at 7 P.M., and the following are the dates chosen for the coming session:

1946: Nov. 13, Dec. 11.
1947: Jan. 8, Feb. 12, March 12, April 9, May 7, June 11, July 9.

Applications for tickets, accompanied by a remittance of one guinea a head, must reach the assistant secretary of the college, Lincoln's Inn Fields, London, W.C.2, at least one week before the date of the dinner.

ADDITIONS TO POISONS LIST

BY regulations which came into force on Oct. 15, pethidine and its salts, and dihydrodesoxymorphine are added to part I of the Poisons List, and zinc phosphide to part II. These substances are added to the first schedule of the Poisons Rules, but rat and mouse poisons containing zinc phosphide are exempted from first schedule requirements and may be sold by listed sellers of part II poisons.

University of Sheffield

Dr. D. H. Smyth has been appointed to the chair of physiology, in the place of Prof. G. A. Clark, who has resigned to take a post in the Ministry of Health.

Dr. Smyth, who is 38 years of age, graduated B.SC., with first-class honours, at Belfast in 1929, and M.B. in 1932. After being house-surgeon at the Royal Victoria Hospital, he was, in 1933, appointed senior demonstrator in physiology at Queen's University, where he worked under Prof. T. H. Milroy and Prof. Henry Barcroft. In 1934 he became a M.SC., and in 1935 M.D. With a Musgrave studentship he studied for a year under Prof. Hermann Rein at Göttingen, and on returning to this country in 1937 was appointed lecturer in physiology at University College, London. In 1939 Dr. Smyth went to Sheffield to which part of the London Faculty of Medical Sciences was evacuated, and in 1940 he helped to organise the department's work at Leatherhead; in 1944–45 he acted as head of the department in the absence of Prof. Lovatt Evans, F.R.S., on special war duties. In 1941 he gained the doctorate of philosophy of London University. Since 1943 he has been sub-dean and tutor to medical students at University College, and has made a special study of methods of selecting candidates for training. This year he became senior lecturer in physiology. His publications have dealt principally with respiration and metabolism.

As announced last week, Dr. R. S. Illingworth has been appointed professor in charge of the new department of child health in the university.

Dr. Illingworth studied medicine at the University of Leeds, qualifying in 1934. He held resident medical posts at Leeds, and obstetrical and ear, nose, and throat posts at Huddersfield, and spent a period in general practice before appointment as resident medical assistant and clinical pathologist at the Hospital for Sick Children, Great Ormond Street. He graduated M.D. and became M.R.C.P. in 1937, and in 1938 obtained the D.P.H., with distinction, and the D.C.H. In 1939 he won a Nuffield research studentship in medicine at the Radcliffe Infirmary, Oxford, and a Rockefeller research fellowship for travel in the United States. He was in the R.A.M.C. from 1941 to 1946, serving, with the rank of lieut.-colonel, as officer in charge of the medical division of military hospitals in the Middle East and Northern Ireland. He is at present assistant to the professor in the Institute of Child Health, London. Dr. Illingworth has published papers on nephritis, prematurity, infectious diseases, and other subjects. He is a fellow of the Royal Photographic Society.

University of Manchester

On Tuesday, Nov. 19, at 4.15 P.M., Prof. Michael Polanyi, M.D., PH.D., F.R.S., will deliver the Lloyd Roberts lecture in the physiology theatre of the university. Professor Polanyi, who holds the chair of physical chemistry at Manchester, will speak on the Foundations of Academic Freedom.

Royal College of Surgeons of England

On Oct. 15 Dr. Allen Oldfather Whipple, Valentine Mott professor of surgery at Columbia University, New York, was admitted to the fellowship, honoris causa, and was afterwards entertained to dinner by the council. In the course of his speech of presentation, Sir Heneage Ogilvie, senior vice-president, described him as "a great American surgeon, a pioneer in surgical research, a moving spirit in surgical education, a brilliant operator, an inspiring writer, a well-loved teacher." He went on:

"We honour him, not for his many distinctions but for the ability that earned those distinctions, not for the many important offices he holds or has held but for the outstanding qualities of mind and character that have earned him those appointments. Dr. Whipple's name is printed large on every page of surgical advance, and where other surgeons are breaking new ground and treading fearfully as they are today in the surgery of malignant diseases of the pancreas, there they see Allen Whipple before them saying 'Here I am. This is the way I have gone, and where I have trodden, you may follow safely.'"

Royal College of Surgeons of Edinburgh

At the annual meeting of the college on Oct. 16 the following office-bearers were elected for the ensuing year: president, Mr. J. M. Graham; vice-president, Prof. R. W. Johnstone; secretary and treasurer, Mr. K. Paterson Brown; members of the president's council, Sir John Fraser, Dr. G. Ewart Martin, Mr. F. E. Jardine, Mr. W. Quarry Wood, Mr. Walter Mercer, and Prof. J. R. Learmonth; representative on the General Medical Council, Sir Henry Wade; convener of museum committee, Mr. W. Quarry Wood; and librarian, Dr. Douglas Guthrie.

The following were admitted fellows:

Nicholas Alders, M.D. Vienna, M.R.C.S.; C. J. B. Anderson, M.B. Aberd.; W. G. Birks, M.B. Adelaide; S. K. Burcher, M.B. N.Z.; A. G. S. Calder, M.B. Edin.; E. A. Chisholm, M.B. Glasg.; L. M. David, M.B. Witwatersrand; F. W. T. Davies, M.R.C.S.; A. J. Freese, M.R.C.S.; G. L. Gale, M.B. Birm.; M. P. Goradia, M.B. Bombay; J. B. M. Green, M.R.C.S.; F. M. Hanna, M.B. Dubl.; E. L. John, M.B. Lond.; W. G. Kerr, M.B. Edin.; J. E. Laing, M.B. Edin.; W. H. S. Liebenberg, M.D. Amsterdam; Tobias Levitt, M.R.C.S.; A. A. MacGibbon, M.B. Edin.; J. M. McInroy, M.B. St. And.; T. B. McMurray, M.B. Lpool; J. M. Matheson, M.B. Edin.; K. N. Mitra, M.B. Patna; R. F. O'Driscoll, M.B. N.U.I.; G. V. Osborne, M.B. Lpool; A. P. R. Pinto, M.B. Bombay; E. C. Richardson, L.R.C.P.E.; G. K. Riddoch, M.B. Camb.; L. J. Roy, M.B. N.Z.; A. R. Taylor, M.B. Aberd.; D. J. Waterston, M.B. Edin.; Austen Young, M.B. Edin.

Royal College of Physicians of Ireland

Dr. Bethel Solomons has been elected president of the college.

Royal College of Obstetricians and Gynæcologists

The following course of lectures on recent advances affecting obstetrical and gynæcological practice will be given in the college house at 5 P.M. on each day: Nov. 1, Prof. J. C. Moir, Application of Radiology to the Diagnosis of Cephalo-pelvic Disproportion; Nov. 15, Dr. J. M. H. Campbell, Heart in Pregnancy; Nov. 29, Dr. J. F. Loutit, Rhesus Factor; Dec. 13, Mr. Victor Bonney, Myomectomy; and Jan. 10, Mr. F. J. Folley, D.SC., Lactation. Admission is by ticket only, for which early application should be made to the secretary.

Leeds and West Riding Medico-Chirurgical Society

Forthcoming lectures to this society include: Nov. 1, Prof. H. V. Dicks, Rôle of the Family Doctor in Mental Hygiene; Nov. 22, Dr. Macdonald Critchley on Sir William Gowers; Feb. 14, Dr. Peter Bishop, Use of Sex Hormones in Medicine; March 8, Prof. C. F. W. Illingworth, Recent Observations on Peptic Ulcer.

Association of Plastic Surgeons

A meeting of those interested in the establishment of an association of plastic surgeons will be held at the Royal College of Surgeons, Lincoln's Inn Fields, W.C.2, on Wednesday, Nov. 20, at 5 P.M. The President of the Royal College of Surgeons, welcoming the formation of such a body, has suggested that it should fall into line with similar associations already affiliated to the college.

Gifts from South Africa

General Smuts, prime minister of South Africa, on Oct. 18 handed to Mr. Attlee a bank draft for £196,000 as an offering to the people of Great Britain from the people of Durban and the province of Natal. Attached to the gift was a condition that the money should be spent on a hospital or similar utilitarian memorial. At the same time General Smuts presented a gold certificate for £985,000 as a nation-wide offering from all the people of South Africa and the British protectorates "to be used for the advantage of the British people."

Empire Rheumatism Council

Today, Friday, Oct. 25, Dr. C. W. Buckley will take the chair at a dinner, to be held at the Euston Hotel, London, N.W.1, at 7.15 P.M., to welcome the official Swedish delegates to the celebrations of the tenth anniversary of the foundation of the council. On Oct. 26, at 11, Chandos Street, W.1, at 11 A.M., Prof. J. A. Höjer, chief medical officer of the Royal Swedish health department, will give an address on Organisation of Treatment and Research into Rheumatism in Sweden. Lord Horder will be in the chair, supported by Mr. M. G. B. Prytz, the Swedish minister. On Monday, Oct. 28, at 4 P.M., Mr. Aneurin Bevan, the Minister of Health, will be present at a reception to be held at the Apothecaries' Hall, Black Friars Lane, E.C.4. On Oct. 29, H.M. Government will give a lunch at the Savoy Hotel at 1.15 P.M., when Mr. Bevan presides; and at 5.30 P.M., the British Council are to hold a reception at 74, Brook Street, W.1.

Medical Research Society

A lecture on the Artificial Kidney will be given by Dr. W. J. Kolff at University College Hospital medical school on Thursday, Nov. 7, at 5 P.M. Those interested are invited to attend.

Radiotherapy in Uterine Cancer

A joint meeting of the British Institute of Radiology, the Faculty of Radiologists, and the radiological section of the Royal Society of Medicine will be held today, Friday, Oct. 25, at 5 P.M., at the institute's house, 32, Welbeck Street, W., to hear Prof. J. Heyman (Stockholm) speak on Radiotherapy of Cancer of the Corpus Uteri.

Professional Nurses and Midwives Conference

At the opening of the conference in London last Monday, Colonel Walter Elliot, F.R.C.P., F.R.S., the deputy president, traced the history of British nursing since it had broken with the European tradition of association with religious foundations. Florence Nightingale, he said, though she achieved the miracle of a ready-made tradition, was herself a rebel. Even before the start of the late war there had been too few nurses; he blamed overwork and underpay, and the deadening effect of tradition. Registered nurses now numbered 138,000, and it was estimated that a further 30,000 nurses were required—i.e., three years' intake without allowing for the 50% wastage. Better conditions were needed, with a modernisation of the tradition, but the nurse's authority must be retained; the nursing profession must, above all, preserve its charity and discipline.

London Hospital Dinner

Presiding over the annual dinner on Oct. 17, Sir Henry Bashford pointed out that in the nine years since it was last held a whole generation of students had entered the hospital, qualified, held house-appointments, and gone its way. These years had seen the death of many members and former members of the staff—Mansell Moullin, Hurry Fenwick, Wilfred Hadley, Percy Kidd, Henry Head, Lord Dawson, Hugh Rigby, L. A. Smith, H. R. Andrews, Lambert Lack, E. W. Clapham, James Sherren, William Bulloch, Charles Miller, Russell Howard, S. G. Scott, F. F. Muecke, Charles Lindsay, Jack Harris, and Tudor Edwards—and of Sir William Goschen, the chairman. Of the many retirements he mentioned only two—those of Prof. Arthur Ellis to the regius chair of medicine at Oxford, and of Mr. E. J. Burdon, whom he had supposed to be part of the fabric but who had in fact been secretary to the medical school for only 37 years and was still young enough to embark on some entirely new occupation such as farming or holy orders. During the war 1206 Londoners (including nurses and lay staff) served in the Forces, winning 73 decorations and 83 mentions in despatches. Consultants in the three Services included Robert Milne, Alun Rowlands, Henry Tidy, James Walton, Hugh Cairns, J. R. Rees, George Riddoch, Ashley Daly, Charles Donald, Arthur Lister, R. R. Bomford, and W. J. O'Donovan. Baronetcies had been conferred on Robert Hutchison and Hugh Lett, who were simultaneously president of the Royal Colleges of Physicians and Surgeons. Dr. Dorothy Russell and Dr. Clifford Wilson were now professors, and the appointments to the hospital staff included those of Sir Reginald Watson-Jones, Mr. Osmond Clarke, Mr. Vaughan Jackson, Dr. Frank Ellis, Dr. Lloyd Rusby, Dr. Kenneth Perry, Mr. Vernon Thompson, Dr. Henry Wilson, and Mr. A. Bowen-Davies: the London had never believed in the closed shop. There were new departments for X-ray therapy, psychiatry, and the treatment of accidents: thanks to rehabilitation "a man coming in with a fractured femur can be discharged a fortnight later as a fully trained organ-grinder." Rebuilding plans would cost £3 million, and £100,000 was already being spent on repairs to the hospital, which had had eight direct hits. With 620 beds in use in London and 320 in the annexe at Brentwood, it was still (as throughout the war) the largest voluntary hospital in Britain.

In the medical school, said Sir Henry, women would appear in October, 1947; and he welcomed among the guests Colonel C. R. M. Green, I.M.S. retd., who became a student there in 1879 and had now entered his grand-daughter. To those still having trouble with examinations he offered the comfort of long experience: "either you go on and on and on—or you don't. And as one looks at time from the other end, how little it seems to matter." Looking at the men the hospital had produced he could not feel too pessimistic about the future of medicine. After all, in the golden age of Mead, Arbuthnot, Radcliffe, and Hans Sloane, physicians earned a considerable part of their income by selling remedies whose composition they often kept secret; and a hundred years hence some of the customs of our own time might equally be thought inappropriate. Medicine itself, as art and science, went too deep to be ever chained or bridled by chance enthusiasts of whatever persuasion. The same was true of the London Hospital, which represented something too big and too sane ever to disappear. In the future as in the past each new generation coming within its influence would absorb its tradition.

Dr. J. H. Thomas, proposing The Chairman, quoted some of his early poetry. While disputing a statement contained in one of his less good books Dr. Thomas felt bound to commend his steadfastness and his humanity.

Diary of the Week

OCT. 27 TO NOV. 2

Monday, 28th

UNIVERSITY OF LONDON
5.30 P.M. (London School of Hygiene, Keppel Street, W.C.1.) Prof. Major Greenwood, F.R.S.: British Pioneers in Social Medicine from Percival to Simon. (Heath Clark lecture.)

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
3.30 P.M. Prof. Alexander Lipschutz: Tumorigenic Action of Steroids and its Implication for the Problem of Cancer.
5 P.M. Mr. R. J. McNeill Love: Surgery of the Gall-bladder and Common Bile-duct.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
3 P.M. Field Marshal Montgomery: Morale—with Particular Reference to the British Soldier. (Lloyd Roberts lecture.)
5.30 P.M. *Odontology.* Prof. H. Stobie: Rôle of Dentistry in Medicine. (Presidential address.)

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1
8.30 P.M. Mr. Norman Dott, Sir Charles Symonds: Symptomatology and Treatment of Intervertebral Disks.

Tuesday, 29th

UNIVERSITY OF LONDON
5.30 P.M. (London School of Hygiene.) Prof. M. Greenwood: British Pioneers in Social Medicine.

ROYAL COLLEGE OF SURGEONS OF ENGLAND
3.30 P.M. Prof. Alexander Lipschutz: Antitumorigenic Action of Steroids.
5 P.M. Mr. G. A. G. Mitchell: Value of Penicillin in Surgery.

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle Street, W.C.2
5 P.M. Sir Archibald Gray: Sarcoidosis.

EDINBURGH POSTGRADUATE BOARD FOR MEDICINE
5 P.M. (Royal Infirmary.) Dr. A. C. P. Campbell: Cellular Defence.

Wednesday, 30th

UNIVERSITY OF LONDON
5.30 P.M. (London School of Hygiene.) Prof. M. Greenwood: British Pioneers in Social Medicine.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
3.30 P.M. Dr. W. H. Bradley: Methods Adopted in the Detection of the Carrier.

Thursday, 31st

UNIVERSITY OF LONDON
5 P.M. (University College, Gower Street, W.C.1.) Sir Joseph Barcroft, F.R.S.: Movements of the Human Fœtus.
5.30 P.M. (London School of Hygiene.) Prof. M. Greenwood: British Pioneers in Social Medicine.

ROYAL COLLEGE OF SURGEONS OF ENGLAND
5 P.M. Prof. Geoffrey Jefferson: Surgery of Intracranial Aneurysms.

LONDON SCHOOL OF DERMATOLOGY
5 P.M. Dr. J. L. Franklin: Lichen Planus and Lichenoid Eruptions.

Friday, 1st

UNIVERSITY OF LONDON
5.30 P.M. (London School of Hygiene.) Prof. M. Greenwood: British Pioneers in Social Medicine.

ROYAL COLLEGE OF SURGEONS OF ENGLAND
3.30 P.M. Prof. Alexander Lipschutz: Steroid Balance and the Antitumoral Autodefence.
5 P.M. Prof. C. A. Pannett: Pancreatic Surgery.

ROYAL COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS, 58, Queen Anne Street, W.1
5 P.M. Prof. J. C. Moir: Application of Radiology to the Diagnosis of Cephalo-pelvic Disproportion.

ROYAL SOCIETY OF MEDICINE
10.30 A.M. *Otology.* Mr. H. V. Forster: Otology in School-children and Child Welfare. (Presidential address.) Cases at 10 A.M.
2.30 P.M. *Laryngology.* Mr. Norman Patterson: Reminiscences and Reflections. (Presidential address.) Mr. Lionel Colledge: Laryngectomy. (Film.)
8.15 P.M. *Anæsthetics.* Dr. E. S. Rowbotham: Hundred Years of Anæsthesia. (Presidential address.)

LONDON CHEST HOSPITAL, Victoria Park, E.2
5 P.M. Dr. S. Roodhouse Gloyne: Industrial Diseases of the Lung.

LEEDS AND WEST RIDING MEDICO-CHIRURGICAL SOCIETY
8.30 P.M. Prof. H. V. Dicks: Rôle of the Family Doctor in Mental Hygiene.

Saturday, 2nd

BIOCHEMICAL SOCIETY
11.15 A.M. (London School of Hygiene.) Discussion: Quantitative Biochemical Analysis by Microbiological Response.

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