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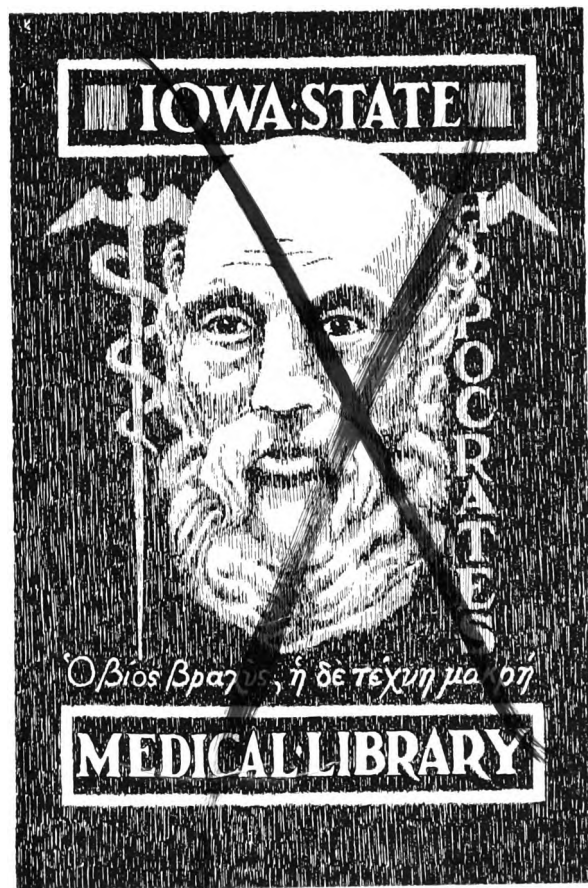
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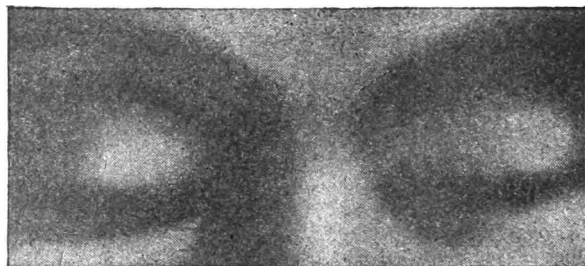
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THE MEANING OF NORMAL

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"No two individuals of the same race are quite alike. We may compare millions of faces, and each will be distinct. There is an equally great amount of diversity in the proportions and dimensions of the various parts of the body."

—DARWIN, *The Descent of Man*.

In medicine and the medical sciences the word "normal" is in constant use but, as a rule, without a proper clarification of its meaning. Whether in respect of the whole or parts of the body, it is commonly held to be synonymous with "healthy," but health too awaits a better definition and a closer study, in the course of which the establishment of more trustworthy standards would have value. It is, in fact, an old and just criticism of physicians that they have considered the symptoms, signs, causes, and measurements of disease without sufficient reference to the symptoms, signs, causes, and measurements of health; that they have refined their methods of detecting departures from the "normal" without first reviewing the idea of normal or discussing its limitations. In the Oxford English Dictionary normal is defined as the "average" or "mean" or "not deviating or differing from a type or standard"; but that the normal, in biological usage, is something other than a mean or fixed standard can scarcely be disputed. In man, as in all animals, variation is so constantly at work that no rigid pattern—whether anatomical, physiological, psychological, or immunological—is possible.

In consequence of the neglect of the study of "healthy" populations and of what may best be described as "normal variability," a number of physical findings due to clinical and associated methods have been accounted abnormal (in the sense of pathological) with quite inadequate justification and often for long periods. Inaccurate diagnoses, faulty treatments, and unnecessary invalidism have again and again been traced to this failure in essential discipline. Certain clinical signs wrongly regarded as having diagnostic value have long retained a place in the literature. Myotatic irritability of the pectoral muscles is one of these. It has been particularly (if not emphatically) associated with pulmonary tuberculosis, but Martin (1946) has recently shown that it is only another example of the familiar stretch-reflex, that it can be demonstrated in a variety of other conditions and in healthy persons, and that it is, as might be expected, more readily obtained in thin subjects.

The same author (personal communication) has shown that palpable epitrochlear glands, at times as large as a cherry-stone, are demonstrable in about 40% of all adult males and in the absence of syphilis and other generalised disease of the lymph-nodes. Unless additional features—e.g., consistence, mobility, tenderness—are taken into account, the finding cannot be regarded as pathological, much less as pathognomonic of syphilis, as it was sometimes reputed to be.

Many a new diagnostic instrument or technique capable of adding a greater precision to medicine has at first been abused in the same way and has added to the tale of clinical error. The stethoscope, through misinterpretations of natural sounds or of innocent murmurs, at one time created its thousands of cardiac invalids. With the introduction of chest radiography, the diagnosis of "bilar tuberculosis"—based on misinterpretations of the normal root shadows—was once dangerously fashionable. The barium meal led to diagnoses of "dropped stomach" and "dropped bowel" and to the prescription of expensive abdominal supports and unsound surgical procedures.

The gastroscope exaggerated the frequency and importance of gastritis, because gastroscopists at first failed to recognise that the gastric mucosa, like the face, varied much in appearance and could blush or become more corrugated under the stress of emotion. Blood-pressure readings within the normal range have been accounted as evidence or signals of arterial disease. In each instance there was initial failure to appreciate the importance of examining a large series of sound and symptomless individuals before extending the clinical uses of the method. Other findings due to laboratory methods have been similarly liable to misconstruction.

NORMAL VARIABILITY

Some twenty-five years ago I was investigating the possibilities of the fractional method of gastric analysis with the late T. Izod Bennett. We decided that the reading of test-meal charts obtained from dyspeptics would be of doubtful value unless we first studied the variations of acidity, emptying time, mucus secretion, and bile regurgitation in a series of healthy subjects. We therefore examined 100 fit medical students, all free from dyspepsia, and obtained the variations illustrated in fig. 1 (Bennett and Ryle 1921). The series was later extended by Campbell and Conybeare (1924), who also examined their students radiographically and found a measure of correlation between gastric conformation, emptying-rate, and acidity. Though the acidity curves of 86% (combined series) occupied a broad median position, 10% showed what would previously have been regarded as a pathological hyperchlorhydria, such as is particularly associated with duodenal ulcer, and 4% showed a complete achlorhydria—at that time thought to suggest chronic gastritis, carcinoma ventriculi, or pernicious anaemia.

A similar variability, sometimes of greater and sometimes of less degree, may be considered as obtaining in respect of all measurable physiological activities and of other immeasurable physical, mental, and emotional states or processes. Organs and structures also have their variations in size, shape, or position. The resting pulse-rate, the resting blood-pressure, haemoglobin, blood-sugar

TABLE I—VARIATIONS FOUND IN NORMAL YOUNG MEN AT HARVARD

Factor	No. of cases	Range	Mean	Standard deviation
Pulse-rate (recumbent) ..	259	40-96	66.1	10.0
Systolic blood-pressure (recumbent) ..	265	98-146	114.9	9.5
Hemoglobin % ..	255	85.4-107.8	97.4	4.6
Blood-sugar (resting) mg. per 100 c.cm. ..	147	84-125	100.0	7.7

level, and sugar tolerance, and the basal metabolic rate (apart from variations due to age and sex) all show this variation about a mean. Lyon (1942) has suggested that these variations may best be thought of in terms of the Gaussian curve (see fig. 2), and that for medical purposes the range of normality is best expressed by $M \pm 2 S.D.$ In the course of elaborate investigations of "normal young men" at Harvard, the Grant Study (Heath et al. 1945) found, among many others, the variations shown in table I.

We may demonstrate or assume the existence of similar variations among persons of like sex and age and accounted fit by history and physical examination in respect of their weight and height, body temperature, colouring, conformation of chest or pelvis, shape and position of stomach, speed of action, endurance, intelligence, and countless other characters. Those variations which can be measured are found to be numerous in their

lesser degrees and increasingly rare in their wider divergences from the mean. When a structural or functional variant is so pronounced as itself to occasion indisposition or inconvenience (as in the case of the bronchial spasm of asthma, the vascular spasm of Raynaud's disease, cutaneous hypersensitivity to light, or gigantism); or when (with or without symptoms) it can be shown to have been further increased or actually induced by disadvantageous stimuli or habit (as in the case of hyperpiesia and obesity); then it may be said to fall within the realm of the pathological. There can be no sharp

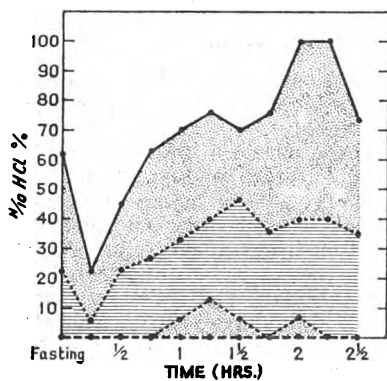


Fig. 1.—Range of gastric acidity in healthy young men. Central shaded area includes 80% of the acidity curves.

delineation between the inborn variations of health and the induced variations of disease where bodily function is concerned. It may well be, however, that a structure or function showing an extreme degree of variation from the mean in health can provide or contribute to certain predispositions to disease or injury. A tall man is more likely to sustain a head injury in low doorways. A man with a native hyperchlorhydria and rapidly emptying stomach may be more liable, in the presence of certain stresses, to develop or retain a duodenal ulcer than a man with a less active organ and a low gastric acidity.* A man with a native achlorhydria may well be more liable to pernicious anæmia. A man with particular physical and immunity endowments may be more liable to pulmonary tuberculosis than others differently endowed. Conversely certain variations may predispose to exceptional muscular vigour or a high immunity to infection. In the words of Jonathan Hutchinson (1884) we still "neglect unwisely the study of those differences between man and man of which, for the most part, physiology takes no cognisance, but which may yet prove of much importance in modifying the processes of disease."

In the more careful study of the normal we have (apart from its anthropological interest) four particular objectives. These are:

- (1) To provide anatomical and physiological standards by which we may better recognise or measure departures from it in our dealings with sick persons.
- (2) To provide standards to or towards which restoration may be directed in the case of sick or disabled persons by our immediate therapeutic measures and by rehabilitation, or to which it may be elevated by physical training and improved nutrition and education in the case of youthful and underprivileged members of society.
- (3) To provide a refinement of standards for certain types of health examination and personnel selection.
- (4) To provide examples and to discover the incidence of the more extreme normal variations which may lead us eventually to a better understanding of diathesis or predisposition to certain types of illness.

I have elsewhere suggested as a definition of diathesis that it should be regarded as "a variation in the structure

* In 1937 a postal follow-up of 120 of the students examined by Bennett and Ryle (1921) and Campbell and Conybeare (1924) was completed and put on record (Ryle and Bennett 1937). Of these men, now exposed to the stresses of practice or other responsible work, no less than 30 had developed a more than trivial and transitory dyspepsia, and of this group 15 had symptoms suggestive of a gastric or duodenal ulcer. Reinvestigation was not feasible, and with these small numbers, showing various combinations of acidity and motor activity at the original test, no valid conclusions in regard to physiological predispositions could be drawn.

or function of tissues which renders them peculiarly liable to react in a certain way to certain extrinsic stimuli" (Ryle 1936). Variation in the Darwinian sense is here implied.

TEMPORAL AND SPECIES VARIATIONS

When we speak of variability we must distinguish between variability in time and under differing conditions of activity in the individual and variability under set conditions of age, sex, and activity in the population or species, although even temporal variability must depend in part on native endowments. In the individual (apart from the slower changes of growth, maturity, and senescence) functional variations or fluctuations—in respect, for instance, of pulse-rate, blood-pressure, body temperature, and tissue chemistry—are occurring from minute to minute. In an ever-changing atmosphere and environment they serve to maintain the equilibrium which is a feature and necessity of healthy living. In the population or species we find those variations about a mean which we have thus far been discussing—variations which determine the "differences between man and man," even under standard conditions and in his healthiest moods and moments and in his most favoured communities; variations which both serve his communities and help to explain the differing resistances and susceptibilities to stress and strain and other harmful agencies in the individuals composing them. These, whether in their major or their minor degrees, are the true inborn variations, although we must allow that they can also be given a plus or minus bias by environmental experience.

A moment's thought will suggest that both types of variability are essential to survival. Without continuous and swift physicochemical variations in the individual there could be no adaptation to such constantly changing environmental conditions as heat and cold, or to the impositions of action and inaction, fasting and repletion, sleep and waking, or to the ebb and flow of emotional stimuli. Without species variations there could again be no communal equilibrium or adaptability; no maintenance of a stock by the emergence of types better fitted for survival in a changing and exacting world or submergence of those less fitted; no natural distribution of functions within the group; no slow adaptations to the environmental changes of climate, time, and place, and, in the case of man, no scope for adjustment to changing occupations and social systems. In brief—alike in the individual and the community—there could be no adaptability without variability. A complete standardisation would be incompatible with life. Physiological and biological constants are both unthinkable.

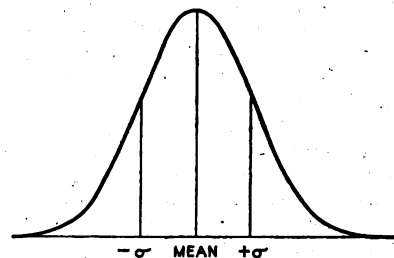


Fig. 2.—Gaussian curve: horizontal scale expresses magnitude of factor measured, vertical scale its frequency of occurrence. σ = standard deviation.

METHODS OF STUDY

As has been indicated, our chief difficulties in clinical medicine are encountered at the extremities of the range of natural variability. At what point, we may ask ourselves, does a pulse-rate (under standard conditions) cease to be a normal pulse-rate? Or—in the case of immeasurables such as the heart-sounds, the strength of the knee jerk, the size and other characters of the tonsils, the palpability of the different groups of superficial lymph-nodes, or the state of the thyroid gland—at what point is normality passed and should we account the organ, structure, or function as diseased? How is normality (local and constitutional) to be better assessed or measured in order to secure the answers to these and

other questions bearing on the practical discrimination between the healthy, the unhealthy, and the borderline state?

The practising physician is preoccupied with sick persons. He has no easy access to healthy controls nor, as a rule, spare time for their investigation. The pathology of the bedside is his primary concern. On the other hand, the physician responsible for groups or populations, for the health and health-examinations of large numbers of ostensibly fit persons—of men, women, and children not coming before him on account of sickness or disability—has special opportunities and other methods for improving clinical standards and advancing knowledge. He can help to develop the more intimate study of human health, of variability and adaptability in modern societies. The physician in charge of infant-welfare centres, the school medical officer, the Service medical officer, the physician with responsibility for student health in a university or medical school (where, incidentally, detailed periodic clinical examinations should have an educational value for the students themselves)—each of these has a contribution to make to human physiology and medicine. The academic student of social pathology and hygiene is more specifically concerned with the study of populations, large or small. In the samples selected for his surveys or experiments it is a part of his task to enumerate and compare the ostensibly healthy and the unhealthy and to consider them in relation to their social advantage or disadvantage—to their material and human environment, their nutrition, their work, or to other influences. Until extensive observations have been made on a great diversity of populations—whether determined by age, sex, or race, by occupation or geography—we shall, in fact, be lacking in information of a fundamental kind and calculated to implement physiological knowledge and to assist both individual and social medicine.

The methods used in the study of populations for these ends include somatometry, radiography, critical clinical assessments (using the familiar methods and instruments of the hospital ward), and parallel social and environmental studies, in conjunction with biostatistical planning and analyses. Recording systems must be carefully standardised on the basis of pilot surveys. Though no other periods of life need be excluded, the age-groups most worthy of study include the periods 0-5, 6-10, 11-15, and 16-20 years, since these cover the formative phase in which inborn variations may first be observed, reactions to infection and nutritional experience and to educational and emotional influences are first recognisable and often most pronounced, and induced local defects or disabilities begin to make their appearance. In English communities today no adults and very few adolescents will be found to be free from dental, ocular, cutaneous, postural, or other defects. In the protected period before the age of 5 years, provided maternal and infant nutrition have been good, defects are as yet relatively rare, although differences between child and child are manifest. In a current long-term study of the preschool child, undertaken by the Institute of Social Medicine at Oxford, Dr. F. H. Kemp and Miss Emrys-Roberts have revealed radiographically some early and unexpected variations in skeletal habit and development and in the appearance of the thoracic viscera. It is possible that some of the more pronounced of these may help to explain certain defects which only become apparent later.

The comparison of social class with social class in respect of height, weight, the routine clinical examination of systems, radiographic appearances, the common disabilities, and of mental and physical function tests in each of the four first quinquennia and in subsequent decades should have much to teach us. Had such group studies been undertaken in the past it is unlikely that we should have witnessed the frequent faults of interpretation

accompanying new diagnostic methods; the sorry manufacture of cardiac and "blood-pressure" invalids; the widespread craze for tonsillectomy and other "trial-and-error" operations; the anxieties dependent upon such diagnoses as hilar tuberculosis; the wrong attribution and delayed treatment of some postural defects; and the general neglect of comprehensive ætiological inquiry, which have together marked the last three or four decades of medicine and stayed its rational advance.

The development of ætiological science must now be based more and more upon socio-medical investigation—upon the examination, that is to say, of societies or populations in relation to their own environments, their work and upbringing, their food, and special hazards. The examination of individuals in the later stages of illness and in the remote and unnatural surroundings of the hospital ward can illuminate pathology and advance treatment, but they can make little contribution to studies in causation and prevention. Records of health and sickness experience and physical findings in adequate samples of various populations, together with the necessary familial histories and social correlations, will have a different story to tell. In the course of such inquiries we can scarcely fail to modify our ideas of what we mean when we apply the word "normal" to any particular structure, state, function, or coördinated performance in the individual.

ORGANISM AND ENVIRONMENT

This reference to ætiological and environmental studies should remind us that local and general health and adaptability, like disease, can never be fully considered in detachment from work and opportunity. Organism and environment are indivisible. A bank clerk may be free from signs of disease, and his physical, mental, and emotional equipment may fall within the range of our standards of normal variability. By his qualities he may be well adapted to the work of the city office. Move him, however, to the environment, work, and hazards entailed by polar exploration or by the duties and discipline of the paratrooper, and he may break down in a variety of ways and despite appropriate training. The small stocky Durham miner—poor though his general physique may appear to be from the combined effects of heredity, malnutrition in childhood, and occupational stress in adolescence—is probably better adapted to underground work and life than would be the more favoured and robust candidate for the Metropolitan police force. In respect of "normality" as an index of fitness or adaptability we must always therefore ask the further question: "Fitness or adaptability for what?"

THE THYROID GLAND

Let us conclude with a simple illustration of this problem of normal variability, selecting for consideration the state of a single organ in relation to a single environmental factor known to be necessary to it—a factor which varies quantitatively from one part of the world to another and from one part of our own country to another.

In 1943-45 the goitre subcommittee of the Medical Research Council (1944) undertook, as a part of its investigations, a survey of school-children aged 11-15 years in various parts of England and Scotland where adult goitre was known to be, or to have been, notably endemic or rare and the iodine content of the drinking-water had been for the first time accurately assessed. Surveys of developed goitre in adults would, for many reasons, have been impracticable. Surveys of thyroid size in school-children, on the other hand, can be readily organised. The general nutrition of the children had probably been better standardised by war-time rationing than at any previous time in our history. Sea fish, the other chief source of iodine (never easily obtainable in inland rural areas), was more scarce than usual in most of the regions visited. A standard method of examining

the neck, tested at a previous pilot survey, was used. The glands were recorded as invisible, visible, or visible "plus." They were also described as soft, smooth, and symmetrical, or as showing departures from one or more of these descriptions. Three observers (D. C. Wilson, M. Murray, and J. A. Ryle) were responsible for the examinations, and in most instances each child was examined by two of them, so that doubtful classifications could be discussed before approving a category. The results in four contrasted areas are shown in table II.

TABLE II—GOITRE SURVEY OF CHILDREN

Locality	No. of children	Mean percentage incidence of visible glands	Water-iodine (microgrammes per litre)
Okehampton (Devon)	298	26.0	1.1
N. Oxfordshire ..	451	17.5	1.9 (mean)
Windsor (Berkshire)	461	6.5	10.1
Maldon (Essex) ..	527	2.5	50.2

These correlations have definite statistical significance. In Maldon the children had also had sea fish with some regularity even during the war period. Where the percentage incidence of clinical thyroid hyperplasia was high (Okehampton and N. Oxfordshire) the boy-girl ratio was increased and a few cases of "firm" or "asymmetrical" glands were also seen. The total visible enlargements described also as soft, smooth, and symmetrical in the four groups numbered 167. There were 36 examples of visible "plus" enlargements or enlargements showing qualities suggesting more permanent structural change.

When, in communities such as those at Windsor and Maldon, the thyroid gland is invisible in upwards of 93% of cases, it seems reasonable to regard invisibility as "normal" and visibility as "abnormal." Having regard for the known high goitre endemicity in areas where visible glands were recorded in as many as 17.5% and 26% (N. Oxfordshire and Okehampton), it also seems reasonable to suggest that visibility of the gland in adolescence should be accepted as a true clinical sign of specific mineral deficiency. However, by no means all children with visible glands develop established goitres in later life—in fact in England only a minority do so. It might therefore be argued that clinical hyperplasia more usually represents a pronounced degree of adaptation—or physiological enlargement—rather than an early state of disease, or that it is a true example of a borderline condition which may either revert to "normality" or advance to "disease." We might further ask ourselves whether the thyroid glands or the iodine levels were abnormal in the two extreme examples of Maldon and Windsor; for, if the mean water-iodine level for the country as a whole were taken, it is probable that the figures for these places would diverge from it far more than those for N. Oxfordshire and Okehampton. We should then reach the conclusion that, where the environment in respect of its geological formations and water chemistry is most "abnormal," there the thyroid gland is most likely to be "normal." Extending the range of observation, we find from the anatomical studies of Sigurjónsson (1940) that in Iceland (as also in Japan), where the consumption of sea fish is high, thyroid size is notably smaller at all ages than in most European countries; whereas in parts of China up to 60% of the population are reputed to have goitres. If Sigurjónsson's careful studies were to be repeated, or if school surveys were conducted in other countries, national standards of "normality" would be found to differ widely. The argument serves at least to remind us that organism and environment can never be considered in dissociation, and that what we call normal or (better) normal variability in biology and medicine must always be related

to the work required of the organism or its parts and to the medium in which they have their being.

The practical conclusions in the case of the thyroid gland are sufficiently apparent:

- (1) The percentage incidence of visible glands in an adolescent population is a useful index of its iodine consumption and of the goitre hazard to which it is exposed in later life, whether we regard the clinical findings as an early sign of a specific deficiency—i.e., as pathological—or as expressing the more extreme limits of physiological variation or adaptation.
- (2) Thyroid size (as has been amply demonstrated by others) receives a plus or minus bias inversely proportionate to the availability of iodine; but it is also genetically and sexually determined. In this country most adolescent enlargements can be regarded as slow temporal variants. But, since among children of the same age, living in the same locality and drinking the same water, cases with and without hyperplasia occur, we must also assume the operation of innate predisposing influences or species variations. The occurrence in English low-iodine areas of families without goitre and of other families with cases of goitre running through several consecutive generations support this thesis.
- (3) Where the percentage incidence of clinical hyperplasia exceeds, say, 5–10%, there are good grounds for recommending the general use of iodised salt as a measure of social prophylaxis.

These conclusions—confirming in respect of the areas surveyed much previous work elsewhere—could not have been reached by the clinical study of established cases of goitre in hospital or clinic or by laboratory experiment but only by socio-medical studies; that is to say, by clinical surveys of ostensibly healthy populations determined by age and in particular relation to their environmental experience. In the process ideas concerning "normality," "abnormality," and "borderline" states and their insensible mergence with one another became subject to a more critical review. Similar considerations should govern the study of other nutritional measurements. Thus haemoglobin standards should strictly be related, not only to age and sex, but also to geography and the nutritional opportunity of the populations used for fixing the standards.

SUMMARY AND CONCLUSIONS

For every organ and tissue, and in respect both of its structure and its function, there is a natural range of variability in any population studied and in the species as a whole. Within this range efficient performance and adaptation to common stresses may be recognised. The "normal," in biology and medicine, is better expressed in terms of this variability than as a hypothetical mean or standard.

Temporal variations (perhaps better described as "variants") in the individual, to allow of necessary continuing adaptations, must be distinguished from the species variations which establish "differences between man and man." Both have essential survival value. Adaptability depends on variability.

The study of human variability within the normal range is important (1) as a fundamental biological study; (2) as supplying necessary standards in medicine for the recognition of health and sickness and borderline states; and (3) because the extremes within the normal range of variability in respect of certain functions may help to explain certain innate resistances and predispositions to disease and to place the study of diathesis on a firmer footing.

Preoccupation with sick persons has generally detached the mind of the physician from those investigations of ostensibly healthy populations upon which alone a better understanding of normal variability can be based. Without this better understanding diagnostic precision and therapeutic judgment must be hampered. It is among the functions of those concerned with the advancement of social pathology and hygiology to establish, by

their investigations of adequate population samples, acceptable standards of normal variability in man.

Studies of normal variations in the first four quintennia of life should have special value, for in this formative period the early contributions, for good or ill, of nutritional, educational, and other experience are discernible, and the manifold and complex stresses and hazards of adulthood have not yet affixed their mark. At this stage, too, the possibilities of improvement by a change of conditions are greater.

Observed variations must always be considered in relation to environment. Social environment has been shown to have striking effects on mortality and morbidity. It will also be shown to have its effects on physical, mental, and emotional equipment and the predispositions to disease (or health) dependent on this equipment. True—i.e., inherited—variations—e.g., in height, weight, and longevity—may be given a plus or minus bias by environmental opportunity.

Some variations are measurable. Of such are certain external somatic characters, the pulse-rate, the body temperature, the hæmoglobin, and the basal metabolic rate, all of which in the study of a group must be recorded under standard conditions and with respect to age and sex. Other variations are immeasurable. Of such are the size and functional state of the tonsils, the state of the thyroid gland, the palpability of the superficial lymph-nodes, and certain postural characters. Critical studies of these in appropriate population samples, with a view to determining the incidence of departures from the apparently healthy state, or the relative frequency of states assessed as "healthy," "unhealthy," and "borderline"—given that due attention is also paid to clinical history and the social and nutritional opportunity of the individuals composing the sample—should in time assist clinical judgment and throw much-needed light upon certain problems in aetiology. Correlated variations (such as the physical and mental associations of duodenal ulcer, eye colour and psoriasis, physical habitus and some mental disorders, and the physique and temperament which accompany vigour, large appetite, and freedom from infection and neurosis in early life but seem later to predispose to heaviness and hyperpiesia) have long had their interest for the physician. They await a more critical investigation.

Variations, increased as they probably are in kind and degree by the racial crossings and other chances of our social evolution, are a fitting subject of inquiry for all students of man, and not least for the physician. In their wider ranges, while consistent with "ordinary well-being," they may predispose to exceptional vigour or a high immunity to infections; they may also invite disease. In their more frequent forms and more moderate degrees, while setting no certain barrier to outstanding performance or to sickness (for these depend partly on the quantity of external influence), they are the essence of biological "normality" and the companions of adaptability and health.

The term health (= "wholeness"), as affecting the individual, should embrace (besides those of sensory well-being and structural integrity) ideas of balance and adaptability; these in turn reflect the coordinated activity of component parts each functioning within its normal range.

Health and disease know no sharp boundary. They could only do so if it were possible for biology to adopt the dictionary definition of normality. But variability, both in time and in the species, is one of the most distinctive and necessary attributes of life, which thus admits no constant and no norm.

For some additions to older experience which prompted this paper I am indebted to my colleagues in the Institute of Social Medicine and the Bureau of Health and Sickness Records, at present engaged on studies of disease and health in various

human groups and on the development of survey and recording methods.

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IMPENDING DEATH UNDER ANÆSTHESIA*

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THE expectation of death under an anæsthetic is 1 per 1000 when calculated on a very large number of cases from five teaching hospitals on three continents (Waters and Gillespie, 1944). Most emergency surgeons are removed from the facilities of a teaching hospital; their patients are often very ill and must be prepared for operation hastily. For these reasons an emergency surgeon comes face to face with impending death under anæsthesia relatively often.

My first introduction to this highly important subject was when, as an outpatient dresser, I was called on to help in an unavailing attempt to revive a girl who had collapsed under nitrous-oxide anæsthesia. Since that time I have often reflected how profitable it would be to have an organised drill to prepare us for these cases. Desirable as this would be, with a theatre staff constantly changing it is seldom practicable.

To take the trouble to procure a distinctive jar and place within it certain resuscitative agents (fig. 1), to seal it with adhesive tape, to label it *Anæsthetic Emergency Outfit*, and to know where it is kept in the operating-theatre is not asking much. It is worth while to overcome the inertia that alone prevents these agents from being at hand when they are required. To procrastinate will assuredly lead to regret.

Those who stop breathing and give rise to anxiety while under general anæsthesia can be segregated into two fundamental categories: blue asphyxia (primarily respiratory) and white asphyxia (primarily cardiac). It is to the far more serious condition of white asphyxia that I wish to direct special attention here.

White Asphyxia

Technique of Cardiac Massage.—With a sweep of the knife the upper abdomen is entered in the middle line immediately beneath the xiphisternum. The incision must be long enough to admit the hand. With counter-pressure exerted by the base of the left palm on the lower left costal margin, effective intermittent compression of the ventricles can be accomplished by the pulps of the fingers of the right hand beneath the diaphragm (fig. 2). For the first half-minute these movements should be quick and forcible. After half a minute, not to overtire the hand, the movements should become slower. Sometimes one cardiac contraction occurs, but the heart does not continue to beat. In nearly all such cases, with perseverance, the welcome response is not long delayed. In each of my successful cases subdiaphragmatic massage, just described, was used.

When the patient has a deformed thorax or a rigid costal margin (usually such patients are elderly), and as a consequence the operator is not satisfied that he is compressing the ventricles effectively, or when no response to the standard method has been obtained after

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a minute or a minute and a half, Nicholson's method should be adopted. Some surgeons use Nicholson's method from the start, and their argument for doing so is well founded.

Nicholson's Method.—A button-hole incision is made immediately behind the base of the xiphisternum between the attachment of the two sides of the diaphragm. The thumb of the right hand is thrust through the opening (Nicholson 1942). The heart (within its pericardium) can

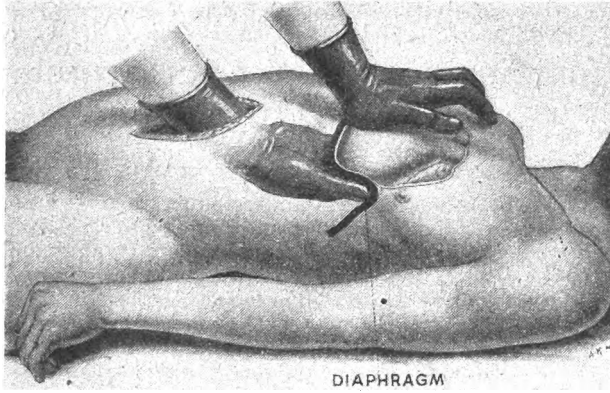


Fig. 2—Standard method of performing cardiac massage.

then be compressed between the thumb above and the fingers beneath the diaphragm (fig. 3).

PERSONAL EXPERIENCE

For more than twenty years I have tried to clarify what to do for the best in cases of cardiac arrest. In former editions of my *Emergency Surgery* I set out a table: a timekeeper, artificial respiration, hot precordial packs, and intracardiac injection of adrenaline were included in an orderly plan of action (now obsolete), in which cardiac massage might be described as the last card.

From time to time I have asked myself whether these instructions, which conformed to orthodox surgical teaching, were in the best interests of the patient. An analysis of published cases showed that cardiac massage had been relatively more successful when the catastrophe necessitating it had occurred during an abdominal

operation. It was reasonable to assume that, the abdomen being open, massage was resorted to sooner than otherwise would have been the case. In 1941 I recorded that I had performed cardiac massage about 40 times (Bailey 1941). In 13 cases the heart started beating in earnest, but too often, after giving hope for hours or days, disappointment was the outcome; only 5 patients survived. The following case caused me to revise the plan and to advocate earlier cardiac massage.

CASE 1.—I had completed an epididymectomy for tuberculosis on a boy aged 12 years. No anxiety had been experienced. I happened to look through the window of the changing-room and saw the anaesthetist performing artificial respiration. The child had white asphyxia, and we immediately put in operation the routine of having a timekeeper call out the passing minutes. At 3½ minutes I injected adrenaline into the heart. At 4½ minutes, after hastily scrubbing up, I opened the upper abdomen and performed cardiac massage. A full minute elapsed without any response. There was then one beat, a short interval, then three or four beats, and the boy began to breathe. By the time the abdomen had been closed with through-and-through sutures some colour had returned to the patient's blanched face, the pulse was full but very rapid, and oxygen was being administered. Next day the patient said he felt well.

On the third day the boy complained of dimness and double vision. On the fourth day he could only distinguish between light and darkness. There were other evidences of serious disturbance of the central nervous system, such as incoördination and some paresis. Obviously the vital centres had been left too long without a blood-supply, and during the period of blindness I wondered whether it would not have been better if the cardiac massage had failed. It was during this period that I became determined to advocate earlier cardiac massage.

By what I believe to be an unprecedented stroke of good fortune the patient's vision gradually returned and all other untoward signs disappeared. This patient was young, and it is reasonable to suppose that the unexpected restitution of function was attributable to his youth, for Swift Joly's patient, a man of 55, resuscitated under similar circumstances, never fully recovered (Vernon 1943).

I have now abandoned expending time in performing artificial respiration and injecting adrenaline into the ventricle. It seems obvious that, if the heart has stopped, the sooner it is massaged the better. As a consequence of following this simple dictum I can record 3 consecutive successful cases of cardiac massage, an experience vastly different from that when cardiac massage was longer delayed.

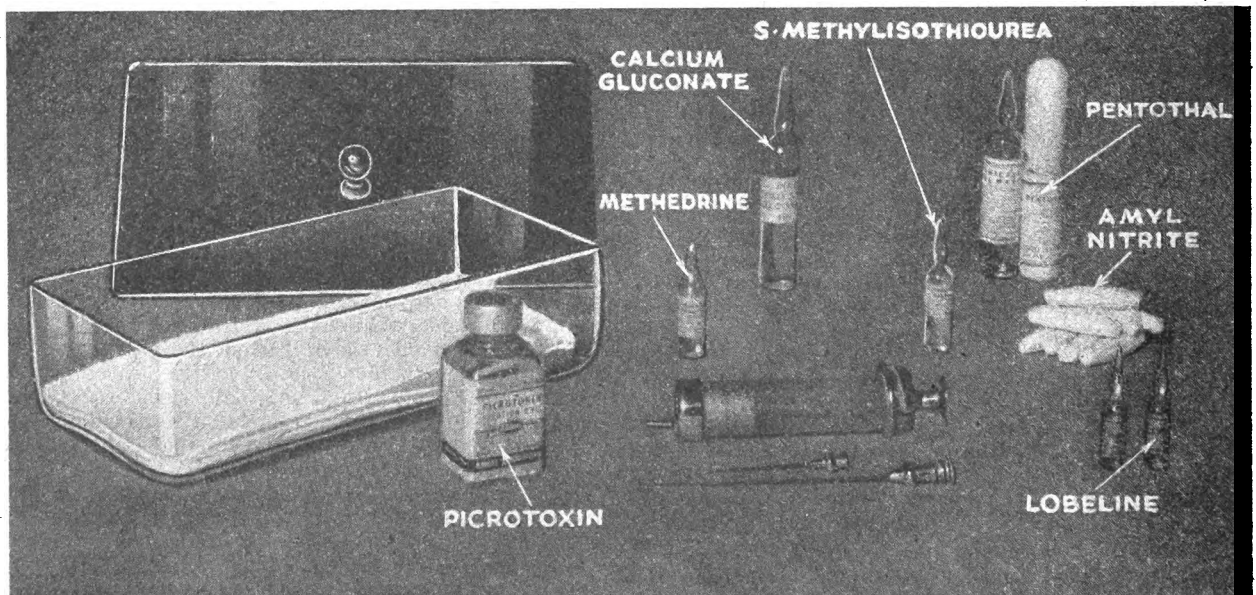


Fig. 1—Anesthetic emergency outfit: methedrine (general pressor substance); amyl nitrite (in case of cardiac arrest or cardiac depression); lobeline (respiratory-centre stimulant); calcium gluconate (in case of ether convulsions); pentothal (in case of anesthetic convulsions); picrotoxin (antidote to pentothal); and S-methylisothiurea (in case of collapse under spinal anaesthesia).

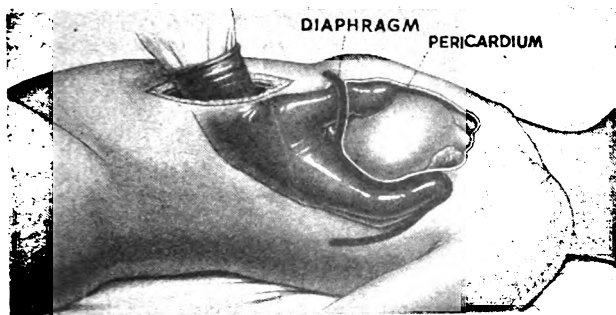


Fig. 3.—Nicholson's method of performing cardiac massage.

It appears that the early anxieties and later complications that follow temporary cardiac cessation are proportional to the length of time the organ is functionless—an observation in keeping with rudimentary physiological principles and common sense (Bailey 1946a). Now that prophylactic chemotherapy is available, one may say that, if the patient was in tolerably good condition before he was anaesthetised and the heart is allowed to stand still for not more than 1½ minutes, it is improbable that that patient will suffer harm or even any inconvenience over and above that occasioned by an upper abdominal incision.

CURRENT PLAN OF ACTION

The anaesthetist reports that he cannot feel the pulse. *Is the Heart Beating?*—When the surgeon has access to a large artery, such as the abdominal aorta or the common iliac, he can himself confirm or deny that the heart has ceased to beat.

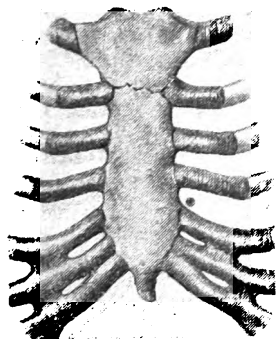


Fig. 4.—Showing where to prick the right ventricle.

When such an artery is not available, it is the anaesthetist who must settle this point by the means he thinks best; in my view the carotid pulse is the most reliable indicator. Three-quarters of a minute is available for this information to be forthcoming. During this period the anaesthetist verifies that the patient has an unobstructed airway (Elam 1944), and he breaks a capsule of amyl nitrite under the patient's nostrils. This, according to Primrose (1935), is the means of distinguishing between cardiac depression and cardiac arrest: the ordinary "faint" recovers immediately, whereas the arrested heart cannot respond at all.

During these 45 seconds the surgeon is not idle; he and the theatre sister are sterilising the precordial and epigastric areas and arranging towels.

Pricking the Ventricle.—As soon as the area has been prepared the ventricular wall should be pricked with a needle (Morley 1946). The needle need not be a hypodermic one; a long fine skin needle, or even better a fine lumbar-puncture needle, is admirable for this purpose. The needle is thrust into the fourth left interspace at the upper rim of the fifth rib, close to the sternal border (fig. 4). The needle should be directed backwards and slightly medially to penetrate the right ventricle, according to Bodon's method (Bodon 1923, Bailey 1927). This can be accomplished in the twinkling of an eye.

Cardiac Massage.—Unless the response to the above stimulus is obvious and immediate, cardiac massage must be undertaken forthwith.

Posture.—Get the head low by tilting the operating-table. "The cortex can be kept from death by the

merest trickle of blood" (Sir Leonard Hill). The anaesthetist can attend to this while cardiac massage is in progress.

Artificial Respiration.—Manifestly, artificial respiration is futile if the heart is not beating, but no harm is done in continuing automatic respiration with an anaesthetic machine if the anaesthetist has the facilities for doing this. On the contrary, it is highly desirable; for, should the heart's action be re-established, not a second is lost in oxygenating the erstwhile stagnant blood in the lungs. In some instances, almost as soon as the heart starts beating, the patient breathes spontaneously. In others artificial respiration must be carried out, sometimes for a long period.

Repairing the Incision.—It is inadvisable to close the midline incision until it is certain that the patient is breathing without artificial aid. If the surgeon has time on his hands he can insert through-and-through sutures without tying them. Sulphanilamide powder is poured into the wound, which is closed rapidly. It is sufficient to close the upper midline incision with strong interrupted through-and-through sutures traversing all layers. If the button-hole incision in the diaphragm has been made, suture of this opening is unnecessary.

Immediate Aftercare.—As soon as convenient the blood-pressure is taken; if it is under 100 mm. Hg, plasma infusion is given and a pressor drug administered intramuscularly (Dodd and Prescott 1943).

More Remote Aftercare.—An important consideration in the aftercare of the patient is that his lungs should be kept well ventilated by the intermittent administration of CO₂. Whenever possible penicillin therapy should be started within the first few hours. These measures are designed to prevent the pulmonary complications that are likely to develop after trauma of the diaphragm.

SOME ENCOURAGEMENTS

How long should we persevere with cardiac massage? This question has never been answered, but a lead is given from a case reported by Adams and Hand (1942)

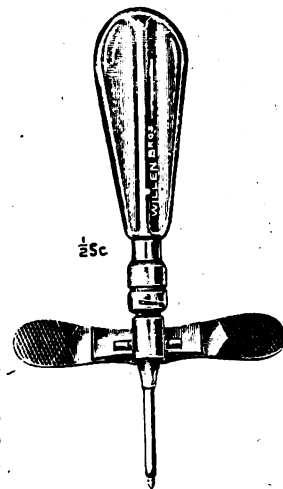


Fig. 5.—Sternal-puncture trocar and cannula devised by the author, in conjunction with Mr. T. W. Pearce and Dr. L. D. Miller.

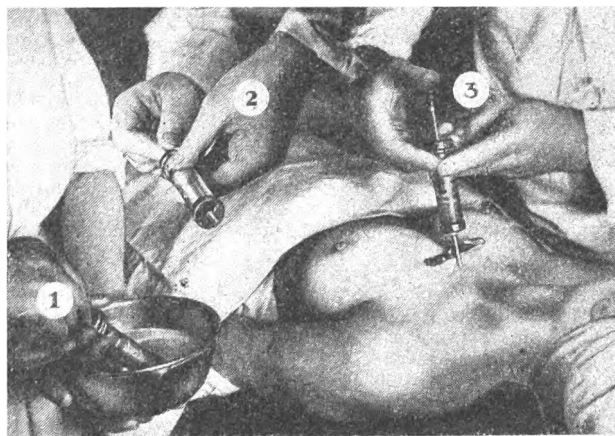


Fig. 6.—A pint of plasma or saline solution can be injected by the syringe method into the marrow of the sternum in 2 minutes: the composite photograph depicts the technique of this rapid transfer. When two syringes and an assistant are available, the movements 1 and 2 are carried out by the assistant; this speeds up the procedure still further.

where cardiac massage was continued for no less than 20 minutes before a response was obtained. The patient recovered.

Perhaps the most stimulating case is that recorded by Easton (1942), who courageously performed cardiac massage by Nicholson's method in circumstances which allowed only of using an unsterilised scalpel and with his hands unwashed. His patient was a woman of 25, whose heart stopped during chloroform anæsthesia for childbirth. Several hours after this ordeal the patient had recovered sufficiently for a general anæsthetic to be administered while her abdominal wall was sutured. She recovered uneventfully.

MacLeod's patient collapsed under spinal anæsthesia. Though the heart responded to cardiac massage after 2 minutes, it was 45 minutes before respiration became automatic. Throughout this period the surgeon and the assistant took turns in carrying out artificial respiration and keeping a hand beneath the diaphragm (MacLeod and Schnipelsky 1942).

Grimshaw's (1942) patient was a woman of 61, whose heart stopped during the administration of 'Pentothal.' Cardiac massage performed about 3 minutes later led to complete recovery.

These reports prove that cardiac massage can bring back to life those whose hearts have ceased to beat under any form of anæsthesia.

Blue Asphyxia

Little has been published on the possibilities of resuscitation in cases where the heart has ceased to beat after blue asphyxia. I have established in practice that the time-limit for successful cardiac massage is a great deal longer in blue asphyxia than in white, which is what we might expect from theoretical considerations. In blue asphyxia the cerebral mechanism is not deprived of blood—indeed, it is congested, and the cerebral cells therefore survive much longer.

CASE 2.—At 7.30 P.M. I was on my way to visit another patient when an agitated nurse ran out of a room saying, "He is very blue." I entered the room, and found a man of 28, from whom I had removed the left submaxillary salivary gland for calculus about three-quarters of an hour previously, lying quite still, with his face suffused and deeply cyanotic. I pulled his head and shoulders to the side of the bed, inserted a mouth gag which was on the table, put my right index finger down to the back of his throat, and attempted to perform artificial respiration by placing the base of my left hand over the xiphisternum. As soon as I had established an airway, I was surprised how effective was this method of getting some air in and out of the lungs. After about a dozen compressions he made one respiratory effort. This, the only sign of life, was not repeated.

I had sent the nurse to fetch sister and anyone else available. At last nurse returned with the news that sister was at dinner; she was accompanied by another nurse. I exhorted them to find someone. Possibly a minute later Dr. I. R. Marre, who was visiting another patient, appeared. He performed artificial respiration while I swabbed out the pharynx. After about 2 minutes we came to the conclusion that there were no signs of life, and I asked Dr. Marre to go to the theatre and fetch a scalpel. This he did, and returned after what seemed a very long time, but afterwards we estimated it was 5 minutes (the theatre was on another floor). During all this time I continued to perform artificial respiration.

The scalpel was in a bowl of spirit; and, having rinsed my hand, which was lacerated by the patient's teeth, in running water, I dipped my hands in the spirit and then poured some spirit on the patient's epigastrium. Having incised in the middle line, I started cardiac massage from beneath the diaphragm, and after about 1½ minutes there were, as I have experienced before, a few beats followed by further cardiac cessation. After further massage for some seconds the heart sprang into activity, and shortly afterwards the patient began to breathe naturally. Sulphanilamide powder and the instruments for sewing up the abdomen were sent for (by this time numerous helpers had arrived), and the abdomen was closed.

By 8.30 P.M. the patient was breathing well, the pulse-rate was about 120 per minute and steady, the pupils were widely dilated and fixed, and the conjunctival reflex was absent. The face was still very suffused, and the purple tongue, which had been torn by my endeavour to draw it forward, continued to bleed; consequently the pharynx had to be swabbed out periodically. By midnight the pupils were smaller, but the conjunctival reflexes were still absent. The patient became restless at 12.30 A.M., and attacks of restlessness recurred during the night. At 4.30 A.M. he showed signs of cerebral irritation and had to be held in bed. Morphine gr. ¼ was given. By 5 A.M. the pulse-rate was again down to 120 per minute, but at 8 A.M. extreme restlessness returned. Morphine gr. ⅓ was administered. At 10.30 A.M. there was generalised sweating. The blood-pressure was now 116/78 mm. Hg. The pupils were pin-point and equal, but there was no reaction to light.

The limbs were somewhat spastic; and, what was profoundly disappointing, there was no sign of return of consciousness. However, 13½ hours after the cardiac massage the patient began to swallow, and from this time hope of a successful issue was entertained. He spoke to a nurse 17 hours after resuscitation.

He then continued to improve until the seventh day, when suddenly he experienced very severe pain in the left side of the abdomen. This turned out to be diaphragmatic pleurisy. A left pleural effusion and later an empyema developed, but the patient recovered.

The period of cardiac arrest in this case was at least 12 minutes; in all probability it was longer.

Sudden Vasomotor Collapse

In sudden cases of collapse where the pulse becomes almost imperceptible—crises where, to be of value, a pint or more of fluid must be put into circulation in the matter of minutes—injection of fluid into the bone-marrow by means of a syringe or syringes (not by gravity) is a method that has yet to be bettered (Bailey 1946b). With a sternal-puncture trocar and cannula (fig. 5) the bone-marrow can be entered with a swiftness and certainty far greater than by cannulisation of a radicle of the venous system. I have used this expedient (fig. 6) with unbounded satisfaction on several desperate occasions, of which the following is an instructive example.

CASE 3.—A very difficult operation had just been concluded—the removal of a fibroneuromyxoma the size of a cricket ball from the posterior cord of the brachial plexus. (In passing, attention is called to the marvellous access obtained by Fiolle and Delmas's incision to that deep, dark, and dangerous recess behind the clavicle.) The gap in the posterior cord of the brachial plexus being about 6 in. and the ends of the cord having been sutured together, it was decided to put the arm in a shoulder spica plaster. While the plaster was being applied the patient suddenly collapsed. The pulse was imperceptible.

After an unfortunate delay in getting ready the apparatus for infusion, it was found that saline solution would not run into the left saphenous vein. The house-surgeon therefore cut down on to the right saphenous vein, but the saline solution only gravitated at the rate of about twenty drops a minute. So collapsed was the patient (a woman of 33) that it was useless to expect replenishment of the circulating fluid by this route. I therefore ordered a sternal-puncture trocar and cannula to be sterilised rapidly, and forthwith cannulised the manubrium sterni. By this time plasma was available and 1¼ pints were injected in less than 2 minutes.

After the patient, who appeared moribund, had received a pint of plasma, the anaesthetist reported that the pulse was perceptible. It was not until she had received 2 pints of plasma via the bone-marrow that the cannula tied into the saphenous vein began to function adequately. By this time the patient was out of immediate danger.

Envoi

Impending death under anæsthesia is a subject of cardinal importance to every surgeon. Experience has taught me that cardiac arrest can occur in any patient, with any anæsthetic agent, and with any anaesthetist. For obvious reasons a general emergency surgeon must expect to hear the beating of the wings of the angel of

death more often than do surgeons engaged in special branches of our art. Even so, let him who thinketh he standeth take heed lest he fall from unpreparedness. To prick the ventricle within three-quarters of a minute of ascertaining that the heart has ceased to beat, and, in the likely event of this simple procedure being ineffective, forthwith to massage the heart, will, I am sure, recall some of those whom Charon had started to ferry across the waters of the Styx.

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CLINICAL AND PHARMACOLOGICAL ASPECTS OF THE TOXICITY OF STREPTOMYCIN

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As pharmacological and clinical experience with streptomycin (Schatz et al. 1944) accumulates, the potential and actual toxicity of the antibiotic and its concentrates becomes apparent.

Already it is possible to indicate those intoxications due to the pure drug and those associated with known and unknown impurities. Thus, the fatty metamorphoses in the parenchymal cells of the liver, and to a lesser extent in the tubular epithelium of the kidneys, described by Molitor et al. (1946), are reversible changes produced in susceptible laboratory animals after the parenteral injection of pure streptomycin. We have observed these changes and the probably associated albuminuria in man.

On the other hand, the reactions reported by Hettig and Adcock (1946)—facial flushing, headache, and fall of blood-pressure, appearing promptly and lasting 10–60 min.—are attributed to histamine-like impurities by Molitor et al. (1946), who also reported the presence of an antidiuretic impurity. Most workers associate skin eruptions, rashes, and to some extent local pain with the presence of impurities. Whether the fever, invariably accompanied by myalgias and arthralgias in the temporomandibular joints and suboccipital region (Hettig and Adcock 1946), and the clinical evidence of toxic effects on the eighth nerve seen in 3 of 34 patients by Hinshaw and Feldman (1945), are due to streptomycin or its impurities is a subject for further inquiry.

We report here the results obtained from the examination in animals and man of the pharmacological effects of some seventeen batches of streptomycin. This material, though of varying purity, was free from histamine-like and other toxic substances, thus allowing large doses to be given intrathecally without incident. In well-marked contrast were the findings of Cairns et al. (1946), who recorded fatal reactions following injection of streptomycin of low dosage (Merck and Co. Inc., lots 200 and 213) in two out of seven infections.

It is evident that streptomycin concentrates, though of high purity, are persistently contaminated by histamine-like substances (Molitor et al. 1946); hence it is

desirable that streptomycin should be subjected to biological control.

PHARMACOLOGY

The potencies of the batches of streptomycin from one source (w.F.) are described in terms of weight of pure streptomycin base $C_{21}H_{37}N_7O_{12}$ (m.w.579) and have been derived from assay with a working standard of streptomycin sulphate, $1\frac{1}{2} H_2SO_4$ (m.w.726), of known potency. It follows that streptomycin sulphate contains 79.8% equivalence of base; in the accompanying graph this figure has been rounded off to 80%.

Assay.—Assessment in terms of the working standard by a dilution test, using a constant inoculum of a susceptible strain of *Bact. coli*, C.N.1360, where the interval of each increment is 20%, yields an answer of potency \pm s.d. 20%.

Chemotherapy.—The potency and therapeutic activity of the batches studied were controlled by assay, in terms of a working standard, in which three doses of test were compared with three doses of standard in groups of six mice infected with a number of lethal doses of a virulent strain of *Bact. coli*, C.N.348.

Acute Toxicity in Mice.—The acute toxicity of streptomycin concentrates was studied after the intravenous injection of two doses into two groups each of ten animals weighing 18–20 g. The onset of symptoms was immediate in the case of toxic doses, and took the form of irregular breathing, dyspnoea, and apnoea. Arrest of the heart and death followed in three or four minutes and was due to asphyxia. There were no late deaths.

The slopes of the line relating the probits corresponding to the per cent. mortalities and the logarithms of the two doses are all of the same order and reveal no artefact. The average lethal doses (L.D.50), derived graphically, range from 1.05 g. to 0.27 g. per kg. and are remarkable for the lack of toxicity which they reflect. This fact is illustrated on the accompanying graph, which shows the simple relation between acute toxicity and potency for the seventeen batches (w.F.) we have examined. The least-potent batch (w.F.11), of some 30% purity, is a fifth as toxic as pure streptomycin base, and the most potent batch, of some 80% purity, is two-thirds as toxic as pure streptomycin base.

For comparison the acute toxicities and potencies of twenty-eight lots of streptomycin from one source (Merck Research Laboratories) derived from the paper of Molitor et al. (1946) are included in the graph. Most of the batches, though varying in potency between a quarter and a third of the potency of pure streptomycin, are seen to be twice to four times as toxic. Molitor et al. attribute this toxicity mainly to the presence of a histamine-like impurity; an antidiuretic factor is also present. Included in the graph are the data on one sample of streptomycin sulphate from another source—Pfizer, lot 459.

Circulatory Effects.—When tested in cats anaesthetised with pentobarbitone sodium (30 mg. per kg. intraperitoneally), no significant effects on blood-pressure or respiration were recorded in any of the seventeen batches of streptomycin concentrates.

Antidiuretic Effects.—The acute effect of streptomycin concentrates on water diuresis was studied in groups of four rats. Food, but not water, was withdrawn on the previous night, and in the morning 5 ml. of tap water per 100 g. of body-weight was administered with a stomach-tube, and a dose of 250 mg. per kg. of streptomycin concentrate was given subcutaneously. Urine was measured at hourly intervals for six hours. With two exceptions, batches 20 and 15, the shape of the normal diuresis curve remained unaltered, except that the two-hour peak was a little flattened, but the total urinary excretion was not significantly different. In the case of batch 15 the shape of the curve was slightly modified, but the total excretion was not significantly different; with batch 20 there was retardation of diuresis for two hours, but thereafter it

was normal, and the total urinary excretion was not significantly altered.

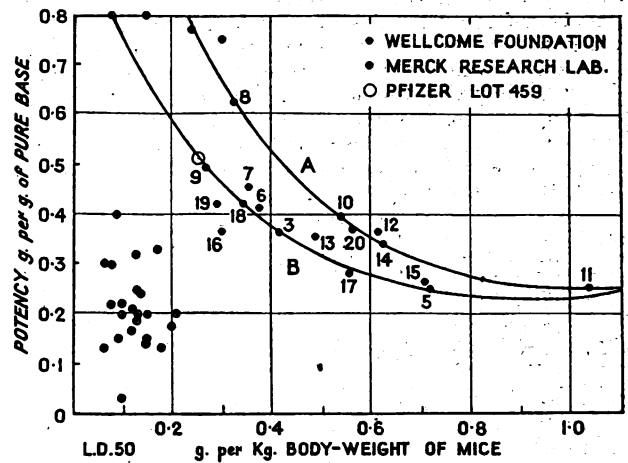
Intrathecal Injection in Rabbits.—Rabbits anaesthetised with pentobarbitone sodium (40 mg. per kg. i.p.) tolerate without detectable reaction 10 mg. per kg. equivalence of streptomycin base injected cisternally in 0.5 ml. of sterile distilled water following withdrawal of 0.5 ml. of cerebrospinal fluid. Under the same conditions two out of three rabbits did not survive the injection of 20 mg. per kg. equivalence of streptomycin base. Death followed in 10–15 min. from respiratory failure and was smooth and free from any other symptom.

STUDIES IN MAN

In the course of the evaluation of antituberculous chemotherapeutic drugs in this hospital the opportunity to evaluate the status of streptomycin in a side-by-side comparison with established sulphone chemotherapy presented itself in June, 1946. A limited supply was available from one source (w.f.) in the form of seventeen batches which had been subject to pharmacological control. The material was available, in sterile rubber-capped containers, in the form of a freeze-dried powder and contained the equivalent of 0.2 g. of pure streptomycin base, together with a supply of sterile pyrogen-free distilled water. The biological control of the material before it reached us included tests for sterility and freedom from pyrogens, freedom from histamine-like impurities, and, with one exception, from anti-diuretic substances. The average lethal doses in an acute experiment for mice of these batches were less than that of pure streptomycin. On the occasion of intrathecal injection an additional tonicity test was made on the batches used for this purpose. However, the figures obtained subsequently proved to be average values for all batches, an isotonic solution being obtained when one container (0.2 g.) was dissolved in 18 ml. of distilled water. In practice one container was mixed with 2 ml. of distilled water, but even with such a hypertonic solution no acute toxic effects were encountered. The usual precautions were taken of withdrawing at least an equal volume of cerebrospinal fluid; the use of a narrow-bore lumbar-puncture needle, very slow injection, and subsequently raising the foot of the bed.

In the course of this trial every attempt was made to evaluate the toxic manifestations of streptomycin both clinically and biochemically. Fourteen patients, aged 2–60 years, served as subjects. The total doses of streptomycin varied from 0.4 g. given in 9 hours to 108 g. given in 90 days. All of the fourteen patients received streptomycin by intermittent intramuscular injection at four-hour intervals; in addition four of the fourteen patients received a daily dose of 0.2 g. intrathecally by the lumbar route, or into the cisterna magna. Preliminary intramuscular injection in one of us (G. B.) proved the streptomycin to be painful; hence at the start of the trial, and subsequently in those patients who complained of pain, streptomycin was administered in the presence of 0.5% procaine hydrochloride. Animal protein enzymic hydrolysate and glucose, of each 1 g. per kg. of body-weight, were given by mouth to all patients on streptomycin to reduce liability to renal and hepatic damage.

Most patients were so seriously ill as to preclude systematic pathological investigations, but in most cases complete blood-counts (including differential leucocyte counts), hæmoglobin estimations, and urine analysis were done at short intervals before, during, and after the experimental trial. The quantity of streptomycin circulating in the blood at four hours after the intramuscular injection of 0.2 g. of streptomycin was estimated from time to time throughout the trial by the slide technique (Fleming 1943) with a strain of *Bact. coli*, c.n.1360. Mean blood concentrations of 8 µg. per ml. (minimum 4, maximum 16) were found. In cerebro-



Relation between potency and toxicity of batches of streptomycin from different sources. Wellcome Foundation batches fall on two curves, A and B.

spinal fluid twenty-four hours after intrathecal injection of 0.2 g. (two specimens), the concentration was 3.2 and 6.4 µg. per ml.; after intramuscular injection alone no streptomycin could be detected in the cerebrospinal fluid.

No evidence of toxic effects on the hæmatopoietic system was observed, and the total and differential blood-counts revealed no fluctuations outside the normal limits. The urines of five subjects showed the presence of leucocytes and epithelial cells during the experimental period; hæmaturias were not seen, but red corpuscles were found in two cases. Albuminuria was recorded in one case. Casts were not found on any occasion.

No facial flushing or headache or any other evidence of histamine-like reaction, such as described by Hettig and Adcock (1946), was seen.

One observation was made which seemed to us to be associated with the toxicity of pure streptomycin. This took the form of an increase of the normal diurnal excursion of the temperature range relative to the pyrexia. It was clearly demonstrated in three of the fourteen cases and showed no obvious relationship to any particular batch. It was not associated with myalgia or arthralgia; nor did any symptom appear with it.

In one case of advanced military tuberculosis with peritonitis and meningitis which came to necropsy, a diffuse fatty degeneration of the liver was found. This may have been due to the tuberculosis or to the streptomycin. No dermatoses were encountered, except a transient papulo-squamous lesion on the dorsum of the hands of a Thailand railway worker ex-prisoner-of-war. It is doubtful if this condition was due to streptomycin. No toxic effects on the auditory nerve appeared.

On two occasions swelling and pain round the site of injection, with regional adenitis, developed after intramuscular injection but settled down with conservative treatment in three or four days.

DISCUSSION

The pharmacological and clinical study of seventeen batches of streptomycin from one source reveals several interesting differences between this material and that described elsewhere. The major differences are freedom from acute toxicity of an order greater than that of pure streptomycin; an effect associated to some extent with freedom from histamine-like and anti-diuretic impurities. Clinically, ten patients, all seriously ill with tuberculosis, were treated with 1.2 g. daily for ninety days by intermittent intramuscular injection—a total of 108 g. of streptomycin drawn from several batches. Four patients were treated for shorter periods with 1.0 g. intramuscularly and 0.2 g. intrathecally daily. Our experiences were free from the hazards and perils.

which have characterised previously reported trials, and have convinced us that streptomycin, of the purity which we used, can be administered in safety at the dose levels which we adopted. Differences of this kind have come to be expected from concentrates of antibiotics of natural origin and are inherent in the method of preparation. The nature of the medium and the extraction procedure are only two of the many variables. Since it is clear that streptomycin of a purity closely approaching chemical purity may vary in its intravenous acute toxicity between one and four times (Molitor et al. 1946), it is evident that the control of individual batches by biological standardisation is a necessity.

It is desirable that streptomycin for parenteral use should be free from histamine-like substances and anti-diuretic factors. However, it seems that streptomycin may be contaminated by an additional hitherto unidentified substance of greater toxicity but whose toxic effects are similar to the effect of toxic doses of streptomycin itself. The additional safeguards required of streptomycin for intrathecal use is that it should be free from pyrogens and have an acute toxicity for mice not greater than the pure streptomycin of L.D.50, 220 mg. per kg. In this connexion it is of interest to refer to the graph relating potency and toxicity of the batches we have examined. Six batches may be considered to fall on a smooth curve (curve A) with a point of origin at the L.D.50 of pure streptomycin (220 mg. per kg.). Eleven batches may be considered to fall on a smooth curve (curve B) with a point of origin corresponding to L.D.50, 100 mg. Should this be so, these batches may be considered to be mixtures consisting of streptomycin of L.D.50, 200 mg. per kg., and a compound of toxicity greater than L.D.50, 100 mg. per kg. Alternatively the batches may be considered to be impure concentrates of a second pure streptomycin having an L.D.50 of some 100 mg. per kg.

SUMMARY

Seventeen batches of streptomycin from one source (w.F.) have been examined pharmacologically and found to be free from histamine-like impurities and, with one exception, antidiuretic substances; moreover, a simple relation has been found between potency and toxicity.

This is in contrast with the observations previously published, which difference may be attributed to the biological variations which exist in the preparation of natural antibiotics. Important among these are the choice of medium and the method of extraction.

A graph relating toxicity and potency reveals the presence of a hitherto uncharacterised substance more toxic than pure streptomycin, of acute toxicity to mice corresponding to L.D.50, 220 mg. per kg. This may be a very toxic material present in low concentration or a second streptomycin of acute toxicity to mice, corresponding to L.D.50, 100 mg. per kg. or thereby.

Fourteen patients have been treated systematically with these batches. Eleven received 1.2 g. daily by intermittent intramuscular injection for ninety days, a total of 108 g. Four patients received 1.0 g. daily intramuscularly and 0.2 g. daily intrathecally for shorter periods. The toxic manifestations were trivial.

We are indebted to the Wellcome Foundation Ltd. for the supply of seventeen batches of streptomycin.

We wish to thank Mr. P. A. Young, Mr. M. Woodbine, and Mr. M. Cheeseman, of the Wellcome Research Laboratories, for the estimates of potency and toxicity, and Dr. J. Fine, of the County Hospital, Farnborough, Kent, for invaluable help with the biochemical and pathological aspect. The animal experiments were made by Dr. G. Brownlee and Mr. M. Woodbine.

NOTE

After this paper was prepared for publication we had access to the report of the National Research Council (1946), whose committee on chemotherapeutics attribute hypersensitive reactions, such as skin eruptions and fever,

and neurological disturbances, such as vertigo, tinnitus, deafness, and paraesthesia, to the active substances and not to impurities. They further found that the incidence of reactions increased with the total daily dose. When the average daily dose was more than 1 g. there was a striking increase in reactions. Among patients receiving 3 g. a day 46% had reactions; and, when the daily dose was 4 g. or more, 60% had reactions. In our series of cases the average dose was 1.2 g. daily for ninety days, and such reactions, though diligently searched for, were not seen.

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CEREBRAL BERIBERI

(WERNICKE'S ENCEPHALOPATHY)

REVIEW OF 52 CASES IN A SINGAPORE PRISONER-OF-WAR HOSPITAL

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IN 1881 Wernicke described three fatal cases of ataxia, ophthalmoplegia, and clouding of consciousness, which he called acute superior hæmorrhagic polioencephalitis and believed to be inflammatory. Subsequent descriptions emphasised the association with alcohol. The necropsy findings of symmetrical vascular change and hæmorrhages, with glial proliferation and neuron degeneration in the paraventricular grey matter, usually best seen in the mammillary bodies, have often been described. From 1933 onwards a deficiency origin began to be suspected, and more recent clinical and experimental work has pointed to vitamin-B₁ deficiency as the principal factor. The disease in the past has been regarded as rare and chiefly diagnosed post mortem, and descriptions of the signs have been largely limited to those of the terminal stages with gross ocular and mental changes.

An opportunity for placing a large number of healthy adults simultaneously on a standardised deficient diet and observing the results over a period of years is one which the many workers on the vitamin-B complex must have coveted. To some extent the capitulation of Singapore supplied these conditions: some 32,000 troops (British alone are included) were within a very few days of Feb. 15, 1942; changed suddenly from normal British rations to a grossly unbalanced diet consisting mainly of polished rice. Largely owing to the efforts of Colonel J. Bennet, A.M.S., consulting physician, Malaya Command, the medical services were from the first alive to the opportunities of study likely to be presented. All severe cases were admitted to the Roberts Hospital, Changi. In spite of considerable departures from the strict standards of a formal deprivation experiment—e.g., the diet was not, especially at first, completely standardised, and a severe epidemic of bacillary dysentery complicated and intensified the picture—and in spite of manifold difficulties encountered—e.g., laboratory facilities were primitive, drugs for curative experiments in short supply or non-existent, paper for records almost unobtainable, and the medical officers concerned, who were themselves subjects of the experiment, never completely fit—many of the observations made may be worth recording.

A general account of the deficiency symptoms encountered in these men, with the biochemical findings, has already appeared (Burgess 1946, Cruickshank 1946); we present here a detailed description of 52 cases

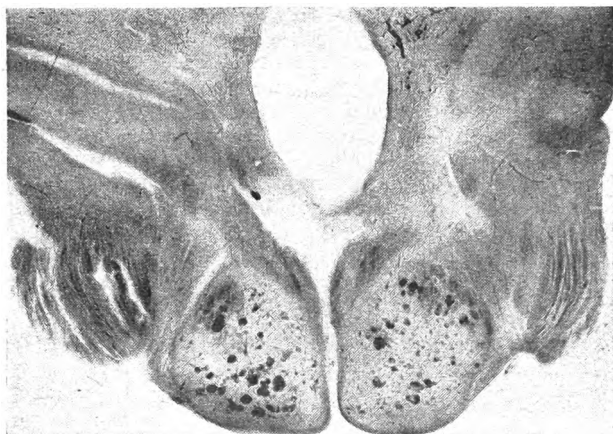


Fig. 1.—Frozen section through mammillary bodies showing dilated vessels and haemorrhages, and a smaller lesion in the wall of the 3rd ventricle. (Lepehne Pickworth, $\times 4\frac{1}{2}$.)

of Wernicke's encephalopathy, the largest series yet recorded. The fact that there were only 21 deaths should considerably change accepted ideas of the prognosis.

A few cases of neuritic beriberi occurred among alcoholics in the first weeks after the capitulation, but the main wave began in early April after the anticipated six weeks' interval. With this came cases of what was at first supposed to be some form of epidemic encephalitis, severe, often rapidly fatal, and of unfamiliar type. Sporadic cases of a virus encephalitis confused the picture, but clinical examination and the findings in the cerebrospinal fluid and at necropsy showed them to be distinct; and after a short period of doubt the diagnosis of Wernicke's encephalopathy was established by demonstration at necropsy of haemorrhages in the mammillary bodies. A more thorough scrutiny of the clinical findings then showed that there was no real resemblance to any known form of infective encephalitis, and that the symptoms agreed closely with available descriptions of Wernicke's disease.

The response of the condition to injections of thiamine at once aroused further interest; medical officers became alert for the earliest signs, and every patient with severe loss of appetite, vomiting, nystagmus, and mental change was at once thoroughly investigated. The description of these early cases and the features whereby they may be diagnosed and so treated long before the onset of the classical and often fatal stages is the principal object of this paper. We hope also to show that these cases were the effects of a pure thiamine deficiency. It is in expression of this belief that we use the term "cerebral beriberi." Economy does not usually survive the solid establishment of aetiology—no-one now calls neuritic beriberi Brontius's disease—and to us it seems that the case for regarding this encephalopathy as merely one of the four manifestations of beriberi is at least as strong as that for the inclusion of the oedematous type.

The 52 cases described are selected only on the basis of adequacy of records and certainty of diagnosis. We have not included any of the sporadic cases which developed later in captivity, of which we know at least 8; these occurred in times of acute dietary insufficiency, and were usually associated with a wasting disease. Several cases similar to those described here occurred in patients convalescent from cholera and dysentery on the Thai-Burma railway; the specimen illustrated in figs. 1 and 2 was from one of these.

PREDISPOSING CAUSES

Cerebral beriberi was to be looked for in three main types of case:

(1) *Dysentery and Diarrhoea* (45 cases).—A protracted attack of dysentery, with three weeks or more of fluid diet (mainly

tea and plain water), was the most common history. A few other fatal cases of dysentery lasting up to a week showed signs of Wernicke's encephalopathy as a terminal event.

(2) *Failure of Adaptation* (3 cases).—Owing to an individual exaggeration of the widespread difficulty of adaptation to rice, 3 men developed the disease after a period of semi-starvation, with no history of diarrhoea or other disease since becoming prisoners-of-war; 2 of these had difficulty in eating rice from the first day of their captivity, and the third ate well at first but subsequently developed anorexia, followed by cerebral beriberi.

(3) *Febrile Conditions* (4 cases).—The febrile group consisted of 3 cases of gunshot wounds with chronic sepsis and 1 case of long-standing undiagnosed malignant tertian malaria.

Every case with diarrhoea and one of the other above predisposing causes has been placed in the dysentery and diarrhoea group.

CLINICAL PICTURE

Symptoms.—The first symptom in many cases was persistent anorexia after an attack of dysentery. A week or so later came vomiting and nystagmus; and one would note a progressive mental detachment from the environment, the early loss of interest in food being followed by loss of interest in the immediate past and finally in all surrounding events. The full picture was one of miserable inactivity, the patient being sleepless, disoriented, and uncoöperative, with terminally, if untreated, the classical semi-coma and severe oculomotor palsies. There were considerable variations both in onset and in rate of progress, but the following analysis shows that the basic picture remains.

	No. of cases
Loss of appetite	46 (88%)
Eye symptoms:	33 (63%)
Wavering of fields of vision on looking to the side	24 (46%)
Diplopia	23 (44%)
Photophobia	3 (6%)
Nausea and vomiting	31 (57%)
Insomnia	20 (38%)
Giddiness	11 (21%)

Loss of appetite was the first symptom and was present in all cases in which a history could be taken. The patients blamed the food and demanded sweet things. Nausea would follow, and then vomiting. Vomiting was not necessarily associated with meals, sometimes occurring regularly on waking, and was seldom violent, unless associated with giddiness. The frequency of vomits ranged from two a day to short bouts of vomiting every half-hour; from four to five times a day was the average. In severe cases vomiting became less frequent in the terminal stages. After a varying time patients complained that everything wavered when they looked to the side, others found difficulty in reading, and some described frank diplopia in any direction but straight ahead. Diplopia was first noticed for distant objects. All these eye symptoms were more pronounced in the evening, and some patients claimed that they had no trouble until midday. In one case photophobia preceded all other symptoms by two weeks.

As the disease progressed, sleeplessness with anxiety became another common feature and accentuated the dream-like world into which the patients gradually lapsed. They described their surroundings as somehow different, the brightness and acuteness of life seemed lost, and human voices appeared toneless. They complained of difficulty in concentration, loss of memory for the immediate past, and, in one case, of having no conception of the time of day. Restless snatches of dreams when trying to sleep became part of reality, and a fear of the dark was not uncommon. In the early stages of mental symptoms the patients had great insight into their condition and, though worried about their mental abnormalities, were reluctant to mention them unless closely questioned.

Signs.—The following is an analysis of the signs.

(ii) Glossitis :	No. of cases
Mild midline superficial atrophy ..	12
Severe glazed raw ,, ,, ..	5
	—
	Total 17 (23%)
(iii) Purpura never proved to be scorbutic ; all patients severely ill, and 5 died ..	7 (13%)

Neuritic beriberi included all varieties, from loss of reflexes to a complete generalised asthenia, associated with aphonia, dysphagia, dyspnoea, and incontinence. This form was seen in advanced cases of Wernicke's encephalopathy and was followed by profound wasting and a long convalescence. Cardiac beriberi was the fatal termination of 4 cases.

PATHOLOGY

The cerebrospinal fluid was examined in 8 cases and was uniformly normal by all the available procedures (pressure, cytology, and rough estimations of globulin and sugar).

There are many excellent descriptions of the pathology —e.g., Bender and Schilder (1933), Campbell and Biggart (1939). Since no histological examination was possible, the morbid anatomical findings were important only for diagnosis. In 2 cases there was no necropsy, and in 3 cases the fixed brains (which had used up all the available formalin) were removed for examination by a Japanese doctor whose claim to being a pathologist appeared to rest on the possession of a magnificent set of necropsy instruments looted from the Singapore General Hospital, and who did not divulge the results of his examination. There remain 16 brains, all of which were cut fresh.

Of these, 8 showed unmistakable naked-eye hæmorrhages in the corpora mammillaria and left no doubt of the diagnosis. The establishment of the diagnosis on anything less than this in the fresh brain, without the possibility of histological confirmation, must always be difficult ; but the degree of congestion in the mammillary bodies or in the periaqueductal grey matter was enough to render 3 more cases highly suggestive. No macroscopical signs were found in 5 brains, but it is believed that close serial section of fixed brains would have reduced this number, and it is not unusual for brains which are negative to the naked eye to show microscopic lesions (Campbell and Biggart 1939). Of 73 brains examined during the first six months after the capitulation, including various traumatic, infective, vascular, and nutritional lesions, no cases which showed any other lesion showed the syndrome of Wernicke's encephalopathy, and no case which showed the lesion had not had diagnostic symptoms during life.

Several pieces of brain were preserved in formalin for post-war histological examination but were lost in a railway accident in Siam. The specimen (figs. 1 and 2) which illustrates the typical naked-eye and histological findings comes from a cholera convalescent in 1943 in Siam. The specimen spent the last two years of the war, together with the records on which this paper is based, buried in a Siamese cemetery.

ILLUSTRATIVE CASE-RECORDS

Since cerebral beriberi is divisible into chronological phases, these can be used as a basis for classifying the cases into four groups :

- (1) Mild—up to and including the stage of eye changes.
- (2) Moderate—up to and including the stage of loss of memory for recent events.
- (3) Severe—up to and including the stage of disorientation and coma.
- (4) Terminal—as a terminal event in an acute toxic condition.

CASE 1 (mild type).—Admitted on June 1, 1942, with a history of anorexia for rice since being captured, and bacillary dysentery six weeks before admission, though he had been doing heavy work for the past three weeks. Had dizziness and blurring of vision for a week. He looked well but thin, and had horizontal nystagmus with a rotatory element initiated half-way from the midline. He was given yeast tablets, but four days later complained of diplopia unless he concentrated. He was then treated with vitamin B₁ by injection on June 8 and recovered.

CASE 2 (moderate type).—Admitted on March 24, 1942, with three weeks' history of dysentery ; after four weeks in hospital was up and on normal diet, though he had no return of appetite after recovery from dysentery. On April 16 he developed nausea, followed by vomiting two days later, and on the 20th he complained of "trouble with his memory" and sleeplessness.

His general condition was fair ; he was coöperative but apprehensive, with early loss of memory for recent events. He had a bilateral horizontal nystagmus which appeared instantly on deviation from the midline, and a bilateral external rectus paresis accentuated by fatigue. The ankle jerks were absent. There was a midline superficial atrophy of the tongue. In the next two-days vomiting increased up to 8 times a day, and the nystagmus acquired a vertical component. He lost his gold watch one night and reported the loss next morning ; by midday he complained that, though he recalled losing his watch, he had forgotten how long ago, and when questioned in the evening he denied the whole incident. At this stage he was treated with vitamin B₁ by injection and recovered.

CASE 3 (severe type).—Admitted on March 25, 1942, with bacillary dysentery ; within a week his diarrhoea had ceased, but his appetite did not return. On April 4 he complained of nausea, vomiting, tinnitus, headache, and giddiness while he was up assisting in the ward. On the 9th the tinnitus was more severe, and he vomited 4 times. His pulse-rate was 100 per min. There was a bilateral peripheral loss of visual acuity with nystagmus in all directions appearing instantly on deviation, and slight right-sided external rectus weakness. Power of the limbs was fair, but all deep tendon reflexes were absent.

Next day he complained of paræsthesiæ of both feet, violent giddiness, and that "everything was jumping up and down." Tinnitus was even more severe, and there was associated deafness. Pulse-rate 110 per min. No loss of memory or apprehension. Continuous fine vertical nystagmus on looking straight ahead.

On the 11th headaches and tinnitus were still increasing, and he complained that he "could not think" and that "everything was going round" in his mind. He also had

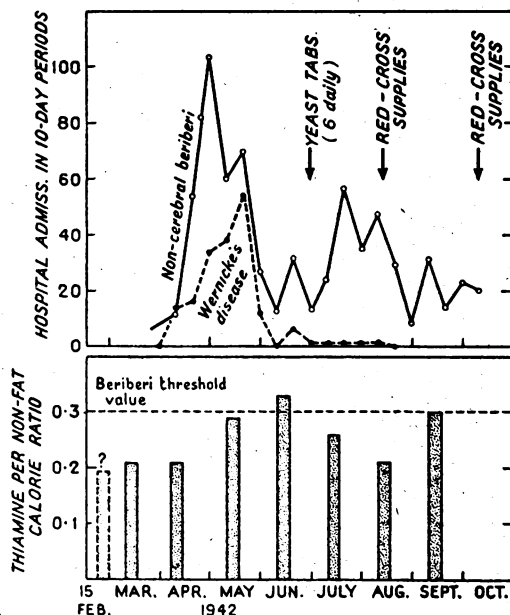


Fig. 3—Hospital admissions of non-cerebral beriberi and Wernicke's encephalopathy, in ten-day periods, compared with thiamine/non-fat-calorie ratio of diet (mg. of thiamine per 1000 n.-f. calories).

difficulty in swallowing, and numbness of all limbs and the face. He lay flat on his back with eyes half closed; he was apathetic, confused, and tearful about his condition. He kept asking for sweet things, which he assured the orderlies were in his trousers pockets, and he was not sure of the time of day though he knew where he was. There was a restless side to side movement of his head. The continuous vertical nystagmus was more severe, and he now showed early papilloedema of both optic disks, with blurring of the nasal edges and engorgement of veins. Pupils still reacted to light and accommodation, but seemed smaller than before. There was a slight left-sided facial weakness, with ptosis of the left eyelid, and tenting of the soft palate to the right. He could only swallow by pushing his larynx up with his hand. Sensation to pinprick was blunted over all limbs and face, and he had much weakness of all limbs.

He received no vitamin treatment, and his condition deteriorated steadily, with an onset of coma on the 13th and death on the 15th. Before death he had complete paralysis of the external recti, with disconjugate wandering, more severe papilloedema, and almost complete flaccid paralysis of all limbs. There was some dyspnoea just before death, with laboured respiratory movement. The cerebrospinal fluid showed no abnormality of cell-count, protein, or glucose content.

Necropsy showed almost healed bacillary dysentery; the brain was fixed in formalin but removed by the Japanese before it had been sectioned.

CASE 4 (terminal type).—Admitted on April 16, 1942, with right-sided pleural effusion, and developed bacillary dysentery next day. He quickly lost weight, and after two weeks' diarrhoea his condition was critical. He vomited twice on May 3, and though he appeared worried he was always rational until the onset of coma an hour before death. On the 5th he had bilateral nystagmus, absence of knee jerks and ankle jerks, and multiple petechial hæmorrhages. He died two days later.

At necropsy there was an empyema of his right pleural cavity, a carcinoma of his right lung, and bacillary type dysentery, with sloughing of most of the sigmoid mucosa. In the brain the mammillary bodies each contained about a dozen punctate hæmorrhages.

ETIOLOGY

The only article on Wernicke's encephalopathy available at the time of the outbreak was one by Campbell and Russell (1941), who suggested vitamin B₁ as the main aetiological factor and cited a case of Prof. D. M. Dunlop's, with cardiac and neuritic beriberi and encephalopathy up to the stage of loss of memory, in which treatment with thiamine led to quick and complete recovery.

The following evidence led us to believe that thiamine deficiency was responsible for our cases:

(1) The disease occurred in men in whom a vitamin deficiency was most likely. Three main categories developed the disease—i.e., those with (a) a deficient intake due to failure of adaptation; (b) a decreased absorption, with increased demand (dysentery); and (c) increased utilisation (febrile conditions).

(2) Owing to the diet a general outbreak of deficiency disease was expected, and the deprivation period for beriberi had just then elapsed. Williams and Spies (1938), using a reanalysis of Cowgill's (1934) figures for beriberi-producing and beriberi-preventing diets, found that a diet with a thiamine/non-fat-calorie ratio below 0.3 mg. per 1000 produced beriberi. They also say that 1–2 mg. (300–600 units) daily of vitamin B₁ is necessary for health in the normal subject, and that the incubation period for beriberi on beriberi-producing diets varies from a few weeks to several months. The estimated food value of foodstuffs in Changi for the whole period (March, 1941–August, 1945) has been given in elaborate detail by Burgess (1946). These figures show that the thiamine/non-fat-calorie ratio for the first seven months was below 0.3, and that at no time was the minimum of 1 mg. of thiamine a day attained. They also show that the most acute deprivation was in the first two months of this period. The first case of Wernicke's disease occurred after six weeks of captivity. Fig. 3

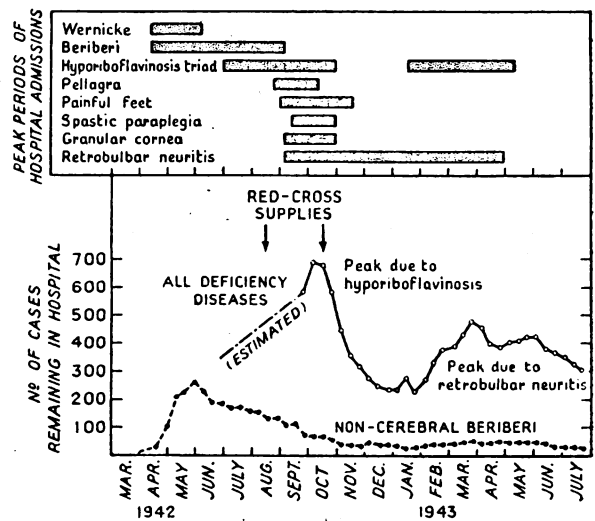


Fig. 4.—Peak periods of hospital admissions for principal deficiency diseases.

shows the thiamine/non-fat-calorie ratio in relation to the incidence of all forms of beriberi.

(3) The time-incidence of the classical forms of beriberi (cardiac, neuritic, and oedematous) coincided with the time-incidence of Wernicke's encephalopathy. Fig. 3 shows that many more cases were notified than the 52 included in this paper. Most of the cases not included were notified from the dysentery wing, where eventually the earliest flicker of nystagmus was notified as a case of Wernicke's disease and treated with vitamin-B₁ preparations. No such early case has been included in this paper unless it showed well-marked nystagmus.

(4) In individual as well as general incidence there was a high correlation between the Wernicke's disease and classical beriberi. The close association (79%) with classical beriberi was not paralleled by a similar association with any other deficiency syndrome, though 17 (33%) of our patients had a smooth tongue.

(5) The effects of thiamine treatment, summarised below, provided the best evidence of all.

TREATMENT

The following preparations containing vitamin B₁ were available:

- (1) Preparations for parenteral injection.
- (2) Japanese tablets of compressed yeast of unknown potency (dosage recommended, 24 tablets a day).
- (3) 'Marmite' in doses from 3 drachms to 3 oz. a day. (Old marmite contains thiamine 1 mg. per oz., nicotinic acid 16.5 mg. per oz., riboflavine 1.5 mg. per oz.)

The amount of thiamine for injection was lamentably small and varied from week to week, this explaining the variations in dosage: 9 mg. was the largest single dose given, and 2 mg. the average. Some patients recovered sufficiently on two doses and continued treatment with one or both of the other two preparations, which were always given concurrently with the injections. This necessity for minimal injections led to a few relapses which, however, cleared on further administration of thiamine.

Treatment in Non-fatal Cases.—Of the 31 non-fatal cases 29 were treated and the patients recovered. One mild case recovered without any specific treatment. Another patient, after receiving 4 mg. of vitamin B₁ by injection, followed by a continuous supply of tablets, retained confabulation, and when last seen seven months later showed no mental improvement, though his physical deterioration had been checked by the injections.

Since both yeast tablets and marmite contain the whole B-complex, and since these were always given concurrently with the injections of vitamin B₁, the case for thiamine rests on the immediate effects produced on injection, which

effects, apart from one mild case, were never produced so early with yeast and/or marmite alone. Of the 29 cases which were treated and recovered completely, 25 received intramuscular thiamine and the remainder recovered on marmite or tablets alone. Of the 25 men who received injections, 20 are known to have improved dramatically within forty-eight hours, and 1 improved only slightly. Notes on the immediate effects in the other 4 cases were inadequate. Of these 25 patients, 11 had been receiving marmite or tablets before injection, and their condition had nevertheless deteriorated (presumably because of inadequate absorption, the patients usually having diarrhoea) until intramuscular vitamin B₁ produced a reversal of symptoms, leading to recovery.

An injection of thiamine produced recovery from the clinical picture in the same order as that in which it had appeared. Within twelve to twenty-four hours vomiting would cease, and the appetite would return, followed by a relief from diplopia. At the same time the patient would experience a sense of well-being and become cheerful, coöperative, and voluble. Sleep returned, and objective recovery of the eye abnormalities followed within forty-eight hours. Gross bilateral paresis of the external recti, if present, would improve to reveal the underlying nystagmus. This, in its turn, would improve until it was initiated only on lateral movement beyond 45°; this stage commonly remained for two to four months. Loss of memory for recent events returned within two days to a week, if the patient had developed no further phase of mental change before injection. However, a patient with a well-established confusional state, though he would exhibit all the above-mentioned rapid changes in anorexia, vomiting, eye changes, and emotion, was likely to take up to three months to return to normal mentality, losing successively confabulation, disorientation, and lastly loss of memory for recent events. In these patients there was apt to be a permanent amnesia for the time during which they were most confused. It must be emphasised again, however, that after the initial improvement with vitamin-B₁ injections no more were given owing to the limited supply, and treatment was continued with marmite and tablets. During recovery it was noted that large rice meals would often bring about a temporary postprandial relapse of symptoms.

It can therefore be seen that, up to the stage of early loss of memory, quick recovery could be expected after treatment by injection, and it is reasonable to suppose that thiamine was the responsible factor. All the severer cases except one eventually recovered completely from the other mental changes, but only after prolonged administration of the whole vitamin-B complex, so our evidence that no vitamin other than thiamine is concerned in the profounder mental manifestations cannot be said to be complete.

Treatment in Fatal Cases.—Of the 21 fatal cases, 4 patients died without having had any vitamin treatment, and 6 died after having marmite and/or tablets but no injections of vitamin B₁. In 5 of these deaths, though hastened, was not due primarily to Wernicke's encephalopathy; the encephalopathic state in 1 case was actually improving before death. Of the 11 patients who died after receiving injections of vitamin B₁ before death, only 2 died of Wernicke's encephalopathy uncomplicated by any associated acute toxic condition just before death.

Results of treatment were as follows:

Vitamin treatment	Died	Survived but not cured	Cured	Total
Untreated	4	..	1	5
Treated: no injection ..	6	..	4	10
Treated with injection ..	11	1	25	37
Total	21	1	30	52

ILLUSTRATIVE CASE-RECORDS

CASE 5.—This patient was examined on April 16, 1942. He was convalescent from five weeks' bacillary dysentery and

was then passing two solid motions a day. Since the onset of dysentery he had had no return of appetite, and for the past two weeks had complained of nausea and vomiting, wavering of fields of vision, and insomnia. He had had loss of memory for recent events since the 11th, and complete disorientation since the 13th. For twenty-four hours he had had incontinence, dyspnoea, and aphonia.

On examination he was lying flat on his back, with eyes closed, and difficult to question. He was extremely anxious and tearful, especially when any attempt was made to feed him, and he was completely confused. There was also dyspnoea on attempted phonation or movement, and nystagmus on minimal deviation in all directions, and all limbs were so weak that they were unable to flex against gravity. All deep tendon jerks were absent, except right biceps jerk. Pulse-rate 120, blood-pressure 110/80, with a widespread upper abdominal pulsation and abnormally loud heart sounds.

He was given 6 mg. of vitamin B₁ by injection and next day showed a remarkable change after a full night's sleep. He was smiling, cheerful, and responsive, but thought he was in Cornwall. He had stopped vomiting and had eaten the whole of the full diet for one meal six hours after the first injection. The vertical component of the nystagmus was now gone, and the horizontal only initiated half-way from the midline. Pulse-rate 110. Marmite and yeast tablets were given from this day onwards.

Convalescence was slow, and 16 mg. of vitamin B₁ was given by injection during the first week. Confabulation on close questioning became evident for three or four days in the first week after treatment but had disappeared by the 25th. There was a gradual return to normal mentality in the following order of recovery: loss of memory for remote events after a week; disorientation, a month; and loss of memory for recent events, two months.

On discharge in November there remained a period of amnesia for the month following his admission to hospital. Nystagmus disappeared after a week's treatment, but reappeared three weeks later for a few days, when it again responded to injection of vitamin B₁. The cardiac condition cleared in a week, but the peripheral nerve lesions took six months before recovery. A month after the first injection of vitamin B₁ he developed a smooth glazed tongue, which became repapillated within four weeks.

CASE 6.—On April 29, 1942, after two weeks' bacillary dysentery, and while he was still passing from eight to ten motions a day with blood and mucus, this patient had a history of twenty days' anorexia, ten days' nausea and vomiting, and progressive loss of power of both legs, seven days' insomnia, two days' diplopia, and a day's dyspnoea.

On examination he was apprehensive about himself and showed early loss of memory—e.g., he could not remember having had marmite, though he had been having it three times a day for the past two days and had vomited each time, the last occasion being an hour before this examination. There was bilateral nystagmus, bilateral foot-drop and wrist-drop, and oedema of ankles. Pulse-rate 110, blood-pressure 95/45.

He was given 4 mg. of vitamin B₁ and yeast tablets. Next day there was no vomiting or diplopia, he said he felt more comfortable, and the nystagmus was only present to the left. Pulse-rate 100, blood-pressure 105/55. On May 2 he was eating large quantities of rice and felt contented and that "life was good." He was sleeping well, his memory showed no abnormality, and there was no nystagmus. Dyspnoea was reduced to half an hour after meals and when using the bedpan.

He made an uninterrupted recovery after receiving 16 mg. of vitamin B₁ during the first two weeks' treatment. The cardiac condition cleared within a week, when severe pain began in his calves and he had a hypertrophic condition of his gums (both of which cleared within ten days). The gross peripheral neuropathy improved only gradually, and on his discharge on July 20 (three months after initial treatment with vitamin B₁) he was still walking with a high-stepping gait.

DISCUSSION

Thiamine deficiency appears to be solely responsible for the cases we have described. Jolliffe et al. (1941) and Wortis et al. (1942) believe that thiamine deficiency cannot be the sole cause of Wernicke's encephalopathy because it is so often associated with other deficiencies, and the more profound mental changes do not respond

completely and at once to thiamine. Pure deficiency of any one vitamin is so rare in practice that the first objection is hardly insurmountable, and slowness of response of some part of a syndrome to exhibition of a deficient factor is no bar to its acceptance as causal—e.g., neuritic beriberi, rickets, and the megalocytic anæmias. Black (1941) and Campbell and Biggart (1939) express a doubt about thiamine as an ætiological factor, based on a lack of any account of the association of Wernicke's disease with beriberi—a hiatus only partially bridged by Tanaka's (1934) account of the condition in infants breast-fed by mothers with beriberi. The previous lack of any recorded association may be due to the difficulty of diagnosing the condition, especially in Asiatics, and to the rarity of a deprivation as acute as that seen in Changi.

The series at Changi was seen during the height of the beriberi incidence, and 79% of the cases showed neuritic beriberi. Further, the main waves of other deficiencies of the vitamin-B complex (hyporiboflavinosis, pellagra, retrobulbar neuritis, "painful feet," and spastic paraplegia) developed after the cases of Wernicke's encephalopathy had ceased to occur and when there were only sporadic cases of other forms of beriberi (see fig. 4). If other deficiencies were concerned in the ætiology it is reasonable to suppose some overlap of Wernicke's encephalopathy with the better-known manifestations of these deficiencies, especially as the accepted basic deficiency of vitamin B₁ was present to some extent, as shown by sporadic cases of beriberi which continued to occur throughout the period.

Wernicke's encephalopathy appears to be produced only by an acute deficiency of thiamine, whereas the other forms of beriberi may be produced either by such an acute or, more commonly, by a less severe deficiency. This is evident from the fact that, while living on a beriberi-producing diet, only 1 patient in the whole Changi population developed encephalopathy without some additional factor, such as diarrhœa, aggravating the existing deficiency. This isolated case was the one which ate well at first but developed cerebral beriberi later without any associated disease.

Jolliffe et al. (1940), discussing encephalopathy due to deficiency of nicotinic acid, suggest that it is due to an acute deprivation of nicotinic acid, and classical pellagra to a more long-standing incomplete deprivation. They quote a parallel in the work of Street and Cowgill (1939) and others in dogs, in which complete and incomplete deficiencies of riboflavine produced distinct syndromes. We suggest a similar mechanism for thiamine. Williams et al. (1939, 1940) gave healthy subjects a diet grossly deficient in thiamine (T./N.F.C. ratio below 0.12) and found no signs of neuritic beriberi, but well-marked signs of what was obviously Wernicke's encephalopathy terminated the experiment. The authors, however, do not seem to have realised that they were dealing with this condition.

In general we agree with the theory of Alexander et al. (1938) that the difference in incidence of Wernicke's disease and neuritic beriberi is due to the fact that smaller amounts of thiamine are necessary for its anti-angiodegenerative than for its antineuritic action, but it is difficult to reconcile this entirely with the occasional onset of cerebral signs before neuritic in our cases and the findings of Williams et al. (1939, 1940).

The very large proportion of dysenteries in our series appears to confirm recent work—e.g., Najjar and Holt (1943), Benesch (1945)—on the importance of a normal intestinal flora as a source of vitamins.

Anorexia and vomiting are an integral part of the syndrome and once established produce a vicious circle which is probably largely responsible for the uniform fatality in untreated cases. This was well shown by Williams et al. (1939, 1940) in their excellent description of cases of induced thiamine deficiency. However, so

many cases have been reported—e.g., Gill and McCall (1943), Wagener and Weir (1937), Wernicke (1881)—in which vomiting was part of the associated condition and was, in the first place, the cause rather than the result of Wernicke's encephalopathy, that its occurrence in many cases (Ecker and Woltman 1939, Wagener and Weir 1937, &c.) in which there appears to have been nothing to explain it except the actual lesion seems to have been overlooked.

Nystagmus was a constant finding and was by far the most valuable single sign in diagnosis. It disappeared in the later stages with the onset of ophthalmoplegia, which, together with the ease with which it may be overlooked, as suggested by Campbell and Russell (1941), perhaps explains the fact that many cases have been recorded as having had no nystagmus—e.g., Riggs and Boles (1944).

In the few cases in which the fundi were examined retinal hæmorrhages were noted in 1 case. Retinal hæmorrhages appear to be common only in cerebral beriberi associated with severe vomiting of pregnancy (Black 1941, Sheehan 1939, and many others). We suggest that prolonged vomiting may damage retinal vessels already affected by the angiodegenerative changes; but we can find no description of the histology of the retina in Wernicke's encephalopathy.

Pupil abnormalities were seen in only 2 cases; the proportion has been much higher in other series (Jolliffe et al. 1941, Campbell and Russell 1941).

Alcohol may be completely excluded from the ætiology of our cases. Only 2 patients gave a history of previous alcoholism, and no alcohol was obtainable in Changi.

SUMMARY

There were 52 cases of Wernicke's encephalopathy in a Japanese prisoner-of-war camp; 30 of the patients recovered.

The early diagnosis, based on anorexia, vomiting, nystagmus, and emotional changes, before the onset of gross mental and eye changes, is emphasised.

Early treatment with thiamine injections cured rapidly and completely.

Acute thiamine deficiency appears to be the sole cause of the syndrome.

The name cerebral beriberi is suggested.

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LOW BLOOD-PRESSURE PHASES FOLLOWING HÆMORRHAGE

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ARTERIAL blood-pressure depends on cardiac output and total peripheral resistance (skin, muscle, and splanchnic resistance, and other factors—e.g., viscosity). Cardiac output depends on two factors at least: the venous filling pressure of the heart and the heart-rate. The venous filling pressure of the heart may be considered as depending on the amount of blood in the veins and the tone or tension of the veins.

When normal volunteers are bled rapidly up to 1500 c.cm., the following changes have been demonstrated:

(1) The right auricular pressure, reflecting venous filling pressure, falls (McMichael and Sharpey-Schafer 1944, Warren et al. 1945). Restoration of blood-volume after such bleedings is slow in man (Wallace and Sharpey-Schafer 1941, Ebert et al. 1941); and since there is a steady decrease in right auricular pressure with bleeding, it appears that there is no immediate conspicuous increase in venous tone.

(2) The fall in right auricular pressure leads usually to a decrease in cardiac output (McMichael and Sharpey-Schafer 1944) in spite of some acceleration of the heart. Warren et al. (1945) found variable changes in cardiac output by similar methods, but their results may possibly have been affected by the use of young subjects with particularly labile heart-rates.

(3) The arterial blood-pressure is maintained in each subject up to a point when it falls suddenly and the heart-rate slows. There is now much evidence that this vasovagal reaction can be produced in all subjects, provided the amount bled is sufficiently great. It has been shown that the sudden fall of blood-pressure cannot be explained by a further fall of cardiac output and is due to vasodilatation in muscle arterioles (Barcroft et al. 1944), which is mediated through the sympathetic nervous system (Barcroft and Edholm 1945).

Another change in the circulation, the hyperkinetic phase, has been demonstrated after hæmorrhage, the intervening period varying from hours to days, and identical circulatory changes have been found in severe anæmia (Sharpey-Schafer 1944); the right auricular

and reduction of blood-volume in about 150 volunteers; yet patients with low blood-pressure and high normal or increased heart-rates after hæmorrhage are often seen in clinical practice.

We report here some findings in such cases by the methods described in previous papers (McMichael and Sharpey-Schafer 1944, Sharpey-Schafer 1944), cardiac output and right auricular pressure being measured by cardiac catheterisation with the patients supine.

RESULTS

The cases observed fall into two groups and may conveniently be labelled "low blood-pressure, phases 2 and 3," phase 1 being the immediate vasovagal reaction with muscle vasodilatation.

Phase 2 is characterised by low right auricular pressure, low cardiac output, and increased heart-rate. The appearance of the patient is that often described by the term "shocked." The skin is pale and cold, sweating and air hunger may be present, and the venous pressure is too low to be assessed by observation of the neck veins. The general appearance of the patient is, however, often not so alarming as that observed in phase 1. Two examples are presented.

CASE 1 (fig. 1).—A man, aged 37, had had a hæmatemesis, amounting to about 2 litres, from a carcinoma of the stomach, starting five and a half hours before the observations were made. He had fainted. An hour and a half before the observations the blood-pressure was 90/60 mm. Hg. The skin was pale, cold, and sweating. Hb 67%. Right auricular pressure was low (5 cm. below the average normal). Cardiac output was low for a heart-rate of 120 per min.

Transfusion of 3000 c.cm. of blood, plasma, and saline raised right auricular pressure and cardiac output, while the blood-pressure rose and the heart-rate slowed. Right auricular pressure was raised considerably above the normal resting level by the transfusion, and the heart-rate began to increase again, possibly a Bainbridge reflex. Cardiac output, which showed an increase to over 9 litres/min. during the early part of transfusion, was maintained at that level in spite of a further rise in right auricular pressure and acceleration of rate, suggesting that the maximal output on Starling's venous filling pressure-cardiac output curve may have been reached. There was no clinical evidence of overloading, such as acute dyspnoea. The maintained high blood-pressure, in spite of a falling output after stopping transfusion, suggests that arterial vasoconstriction may have developed at this stage.

CASE 2 (fig. 2).—A man, aged 52, gave a history suggesting melæna for two months. Three days before the observations he fainted, and later had melæna. A day before the observations his blood-pressure was 100/65 mm. Hg, heart-rate 90, Hb 39%. The extremities were warm, and the venous

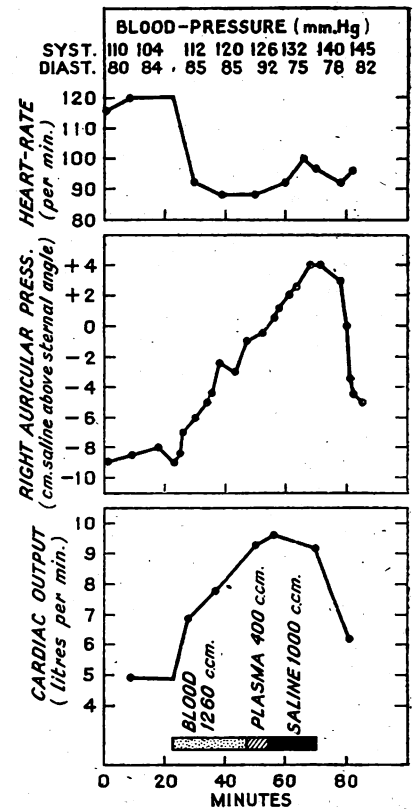


Fig. 1.—Case 1: initial Hb (Haden) 67%; final Hb 57%.

OBSERVATIONS IN CASE 3

	Blood-pressure (mm. Hg)	Pulse-rate (per min.)	Right auricular pressure (cm. saline above sternal angle)	Cardiac output (l./min.)	Hb %
Observation 1 (4th day)	72/40	100	-6	4.0	59
	92/72	104	-3.5	5.6	..
Observation 2 (11th day)	86/48	114	-2.5	8.5	40
	..	..	0	8.6	..
Observation 3 (23rd day)	72/50	128	+12	7.9	32
	90/60	120	+7	8.7	..

pressure is normal or increased, and the cardiac output is increased. Since the blood-volume may be reduced to low levels, it is probable that the high filling pressure of the heart is maintained by an increase in venous tone. The systolic blood-pressure is within normal limits in this phase, but the pulse-pressure is increased.

Neither the hyperkinetic phase nor a phase with low blood-pressure and increased heart-rate has been observed to follow immediately the loss of a litre or more of blood

* Working on behalf of the Medical Research Council.

pressure was not raised. Two and a half hours before the observation he vomited about 500 c.cm. of blood, blood-pressure was 84/44 mm. Hg, the heart-rate increased, and blood-urea was 96 mg. per 100 c.cm. His appearance was that of severe "shock," with cold, pale, and sweating skin and air hunger. Right auricular pressure was low, 5.5 cm. below the average normal figure, and cardiac output was unexpectedly low for a heart-rate of 150 per min. Blood, plasma, and saline amounting to 3380 c.cm. was needed to raise auricular pressure, cardiac output, and blood-pressure. The heart-rate decreased.

Phase 3 is characterised by high right auricular pressure, high cardiac output, and increased heart-rate. These patients look ill and pale, but the skin is warm. They may be moderately dyspnoic. Two examples are presented; case 3 illustrates the progression from phase 2 to phase 3.

CASE 3.—A woman, aged 50, had been admitted on three previous occasions for hæmatemesis in fifteen years. She vomited 500 c.cm. of blood on the day of admission, when the blood-urea was 70 mg. per 100 c.cm., and again vomited blood on the fourth day, when observation 1 was made (see table). The circulatory state was that of phase 2: right auricular pressure and cardiac output were low and increased after transfusion, and blood-pressure rose.

On the eleventh day (see table) blood-urea was 55 mg. per 100 c.cm., right auricular pressure slightly above normal, and cardiac output increased, but blood-pressure was still low. From the eleventh to the twenty-third day blood-pressure remained low, and there were several small hæmorrhages.

On the twenty-third day (see table) the patient looked very ill. She was dyspnoic, and the venous pressure in the neck was raised to the level of the angle of the jaw. The blood-urea was 38 mg. per 100 c.cm. Right auricular pressure was considerably increased, but blood-pressure was low in spite of a high cardiac output.

Digitalis was given to lower right auricular pressure before transfusion. The slight rise of cardiac output following digoxin indicates that the status of the heart in this patient was on the overloaded or falling part of Starling's curve (Howarth et al. 1946). Thereafter 500 c.cm. of concentrated corpuscles was successfully given at a very slow rate. Blood-pressure remained low until the fifty-sixth day, when it was 118/80 mm. Hg, and Hb was 75%. The patient eventually made a complete recovery.

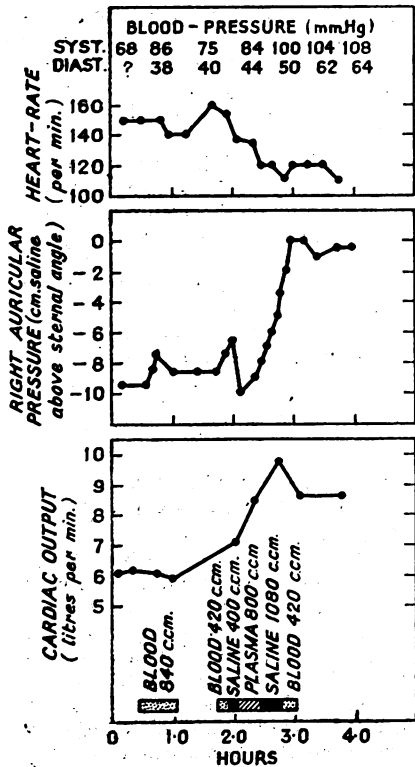


Fig. 2—Case 2: Initial Hb 32%; final Hb 44%.

semicomatose. Right auricular pressure was 4.5 cm. above the sternal angle; cardiac output 10 litres/min.; Hb 67%. A rise in right auricular pressure produced a further increase in cardiac output, and a fall in auricular pressure produced by digoxin led to a fall in cardiac output, indicating that the status of the heart in this case was on the normal or the rising part of Starling's curve. Thereafter blood-pressure remained low; transfusions of about 100 c.cm. of packed cells were given. The patient died, on the thirteenth day after admission, of pulmonary œdema, which was confirmed at necropsy.

DISCUSSION

The normal resting cardiac output in the supine position is about 5 litres per min. when the heart-rate is less than 80 per min. When the heart accelerates, the output increases, provided the venous filling pressure remains constant (McMichael & Sharpey-Schafer 1944). The cardiac outputs of about 5 and 6 litres per min. of the cases in phase 2, though within normal limits, are low in relation to the fast heart-rates. Some degree of vasodilatation also appears to be present in case 2. Cournand et al. (1943) and Warren et al. (1945) found low cardiac outputs in a similar phase after hæmorrhage, but in some cases output was not so low as might have been expected. In phase 3 considerable vasodilatation must be present, since blood-pressure is low in spite of increased cardiac output. The site of peripheral changes has not yet been determined in phases 2 and 3. The normal blood-urea level in phase 3 suggests that renal blood-flow is not seriously impaired in spite of the long-continued low blood-pressure.

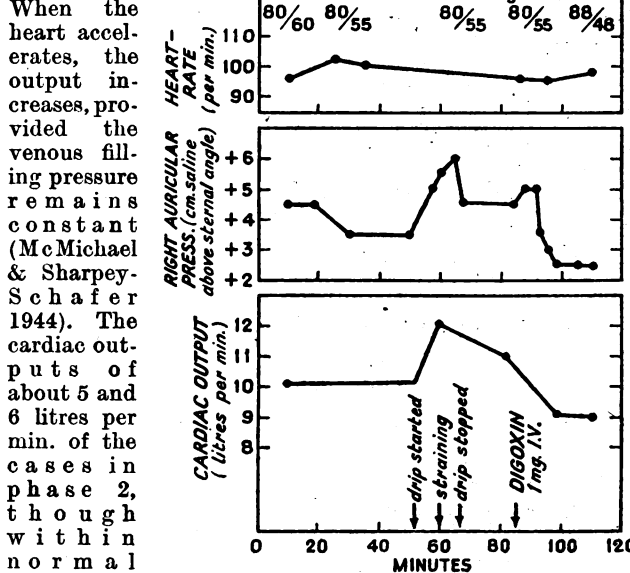


Fig. 3—Case 4: total transfusion was about 100 c.cm.

CASE 4 (fig. 3).—A woman, aged 60, had had melæna from a chronic gastric ulcer for two weeks when admitted to hospital. She was then very pale; the jugular venous pressure was raised 5 cm. above the sternal angle. Blood-pressure 112/70 mm. Hg, heart-rate 110 per min., Hb 21%. Over the first four days blood-pressure slowly fell in spite of three slow transfusions totalling 4 litres of blood.

On the fifth day, when the observations were made, the patient was

low in relation to the fast heart-rates. Some degree of vasodilatation also appears to be present in case 2. Cournand et al. (1943) and Warren et al. (1945) found low cardiac outputs in a similar phase after hæmorrhage, but in some cases output was not so low as might have been expected. In phase 3 considerable vasodilatation must be present, since blood-pressure is low in spite of increased cardiac output. The site of peripheral changes has not yet been determined in phases 2 and 3. The normal blood-urea level in phase 3 suggests that renal blood-flow is not seriously impaired in spite of the long-continued low blood-pressure.

The clinical differentiation of these two low blood-pressure phases after hæmorrhage is necessary, since the treatment differs. The venous pressure is raised in phase 3, and clinical observation of the neck veins gives all the required information. Further, observation of venous pressure is the best clinical method, in conjunction with blood-pressure measurements, of judging the effects of transfusion. In phase 2 large rapid transfusions are needed, and we suggest that enough blood should be given to raise the venous pressure to the level of the sternal angle. The heart in phase 3 behaves similarly to the heart in severe anæmia, and raising the filling pressure by transfusion may lead to a falling output and pulmonary œdema (Sharpey-Schafer 1945). A rising blood-pressure on transfusion in this phase may indicate not improvement but left heart-failure, with possibly serious consequences (Howarth and Sharpey-Schafer). Small transfusions with concentrated corpuscles given very slowly are needed if transfusions have to be given at all.

SUMMARY

Three low blood-pressure phases after hæmorrhage have been investigated.

Phase 1, as previously described, is the sudden vasovagal reaction with bradycardia and muscle vasodilatation which develops suddenly during or after bleeding.

Phase 2 is associated with increased heart-rate, low right auricular pressure, and low cardiac output. Large transfusions raise right auricular pressure, cardiac output, and blood-pressure.

Phase 3 takes time to develop and may persist over long periods. Severe anæmia may be a causal factor in this phase. Right auricular pressure and cardiac output are increased. Large transfusions may be dangerous from overloading.

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AGGLUTINATION OF LEPTOSPIRÆ

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THE combination of an antigen with its specific antibody under optimal conditions is a reaction of high velocity (Eisenberg and Volk 1902, Dreyer and Douglas 1910), which begins immediately the reagents are mixed and proceeds to about 90% completion in a few minutes at room temperature or below; and, though the combination of the ever-diminishing free residues may take several hours to reach final equilibrium, the reaction is so far advanced in some five minutes that an estimation of titre, not substantially differing from that obtainable by any macroscopic or microscopic technique, may be made at once, provided that a method is available for observing the very earliest effects of the combination.

In the familiar agglutination techniques for bacteria of various genera, observation is made exclusively of large clumps or aggregates, which take a considerable time to form; and it is this, and only this, that necessitates periods of two, four, or even twenty-four hours of incubation, during which the convection currents in the fluid accelerate the necessary contacts between the sensitised bacteria.

Now it happens that in a living rich culture of leptospira we have a reagent that will give an immediate visible response to its combination with the specific antibody. When one examines by dark-ground illumination a rich normal living culture, the leptospiræ can be seen to make frequent contacts with each other, and sometimes become longitudinally intertwined; but by their vigorous vibratory and undulating motions they move up and down each other and soon separate. Moreover, in actively multiplying cultures there are many long individuals, bent at the centre, which are about to divide; and these, by their lashing movements, tend to tie themselves up into temporary loops or knots which quickly untie themselves again. Occasional loose clumps of from five to ten cells, if watched for 5-10 sec., can be seen rapidly to resolve into free separate individuals. Nothing like a permanent or progressive aggregation takes place.

But in the presence of an adequate concentration of specific agglutinating antibody the picture is strikingly different. In the half-minute or thereabouts required for setting up a dark-ground preparation many of the contacts and intertwings of two or more leptospiræ have already taken place, and more and more can be seen every moment. Moreover, these associations, when watched for 15-30 sec., show little or no sign of reversibility. Whorls, balls, and leashes of interwoven leptospiræ are progressively formed, and in a few minutes aggregates may be seen of such size as to convince even the unpractised eye that agglutination is taking place. These appearances are shown semi-diagrammatically in the accompanying figure.

In preparations made with decreasing quantities of antibody fewer and fewer aggregates are formed, and more and more cells remain free. Contacts between the free cells lead with decreasing frequency to permanent aggregations, till a dilution is reached that shows no definite effect. The estimation of the end-point of the reaction is no more difficult than it is with other techniques. Of three successive twofold dilutions near the level of full titre the first will generally show an undoubted reaction, the second a trace or doubtful agglutination, and the third no observable effect.

In the agglutination of a leptospira by the antibody of a different but antigenically related type the phenomena show some modification. At all effective dilutions (the highest being generally much lower than the full homologous titre of the serum) the clumping is imperfect, loose and partially reversible aggregates being formed, and a much larger proportion of cells remain free or escape from the clumps. The appearance is like the incomplete reaction in the higher dilutions of a homologous serum, and suggests that the cells are only weakly or partly sensitised. The formation of clumps is slower than with strong specific antibody, but 5-10 min. is enough to allow a reliable reading.

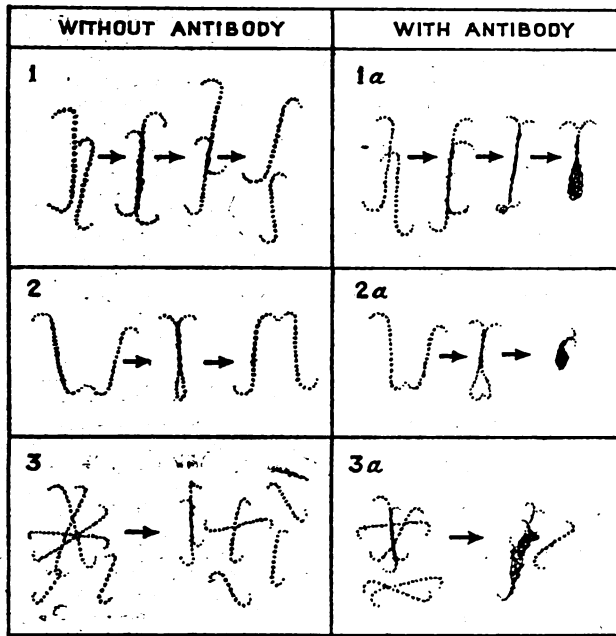
TECHNIQUE

Apparatus.—Nothing special is needed except the thin microscope slides and no. 0 coverslips required for dark-ground microscopy and two wire loops; one of the wire loops should be about 3 mm. in diameter, and the other, made of thinner wire, should be roughly 1 mm. in diameter and should deliver a volume about a tenth of that delivered by the larger loop.

The agglutinable suspension is a living culture of a suitable leptospira 4-7 days old in 12% rabbit-serum water or some other standard fluid culture-medium. It should be rich enough to show at least 10 leptospiræ per $1/12$ dark-ground oil-immersion field in a wet film made as described below. If it shows more than 20 per field it should be suitably diluted with sterile culture-medium before use. For routine work a culture should be selected in which the organisms are of at least average length. Some strains produce mostly short cells which, for purely physical reasons, show the early phenomena of agglutination less rapidly and obviously than do the longer ones.

Serum.—For routine diagnosis the serum is used (1) undiluted, (2) diluted 1 in 10 with saline solution, and (3) diluted 1 in 100.

Procedure.—With the 3 mm. loop a loopful of the suspension is placed on a slide, and a 1 mm. loopful of the 1 in 10 dilution of serum is added, making a final serum dilution of about 1 in 100. A coverslip is placed over the fluid, and the preparation is examined by dark-ground illumination, first with a low-power lens, to find a suitable luminous object, such as the edge of an air bubble, on which to focus with the $1/12$ oil-immersion lens. If the result is negative, a similar preparation is made with the undiluted serum, giving a final dilution of about



Movements of living leptospiræ in fluid culture-medium: 1, two leptospiræ entwining and disengaging; 1a, two leptospiræ entwining and becoming agglutinated; 2, a dividing leptospira twining and untwining itself; 2a, a dividing leptospira twining and tying itself into a ball; 3, a fortuitous aggregate of leptospiræ dispersing; 3a, a fortuitous aggregate of leptospiræ becoming agglutinated.

1 in 10; but, if it is positive at 1 in 100, a final dilution of about 1 in 1000 is examined.

Controls.—If on a given day all sera examined give negative results at 1 in 100 and over, the culture used must be proved to be agglutinable by testing it with a suitable dilution of a known positive serum. If all preparations give positive results the culture must be examined for auto-agglutination, though this is very rarely seen.

Microscopical Examination.—This has already been sufficiently described. The reaction may be considered as strongly positive when half or more of the leptospiral objects are aggregates of two or more cells, and half or less are free single leptospiræ. Though in occasional preparations streaming or oscillating movements may give a little trouble, they are very seldom enough to confuse the observer. But if they should do so, and for special examinations when immobility of the fluid is essential, the coverslip may be sealed along its edges with melted soft paraffin.

Titre.—For routine diagnosis agglutination at 1 in 100 or over is to be considered significant. If a serum reacts only at 1 in 10, it is well to put up a 1 in 30 dilution, because a good proportion of normal sera react at 1 in 10, which is therefore insignificant, whereas a titre of 1 in 30 is suggestive and indicates a repetition of the test. In the same way, if 1 in 100 is positive and 1 in 1000 negative, an intermediate test at 1 in 300 is desirable. In both cases the intermediate dilutions will provide a titration precise enough for a subsequent determination of a rise or fall of titre, should this be desired.

DISCUSSION

Disadvantages of Other Methods.—The method previously used in this laboratory (Gardner 1943) involved the use of killed formolised suspensions, the preparation of which, though rather difficult and uncertain, was for a considerable time successful; and a sufficient bulk was made to suffice for two or three years of tests for Weil's disease, done on behalf of the Emergency Public

Health Laboratory Service. But, when the time came to replenish the stock, attempt after attempt to make satisfactorily stable formolised suspensions was unsuccessful, and it became necessary, at least temporarily, to use a technique suitable for living cultures.

In the State Serum Institute in Copenhagen, where expert work on leptospirosis is done, investigators have had similar difficulties with formolised serum-water cultures and have abandoned them in favour of living suspensions (Borg Petersen, private communication). On the other hand Hampson (1946) appears to have had some success with formolised serum-water cultures. Owing, therefore, to uncontrolled variable factors the method advocated by me in 1943 can no longer be confidently recommended in routine laboratories. Several workers have reported reliable results with modifications in which the killed leptospiræ are separated by centrifugalisation and resuspended in a fluid free from serum-protein (Pot 1936, Brown 1939). Lederle's suspensions, obtainable in England before the war, were presumably made in this way and seemed to be of good quality. Further work on these lines is desirable.

The method of Schüffner (1934) involves living suspensions, twenty-four hours' incubation at room temperature, and low-power dark-ground observation of clumping. It is therefore slow, and the end-point of the reaction is, in my opinion, difficult to determine, though it (and its modifications) can undoubtedly give reliable results in skilled hands.

Advantages and Disadvantages of Present Method.—In its favour is its unique rapidity and simplicity, and the extremely small quantities of serum and suspensions required.

Against it are the disadvantages and potential danger of using live cultures, contrasted with the convenience and safety of killed ones. The danger, however, is slight, since most stock strains are of greatly reduced virulence. Living cultures also suffer from the theoretical risk of changes in agglutinability, though no evidence of their occurrence is available; and the maintenance of cultures rich enough, but not overgrown and degenerating, needs some care. On the other side of the picture the difficulties of making satisfactory and durable killed suspensions are great enough to act as a considerable deterrent to their use.

Experience with Rapid Micromethod.—After it had been ascertained that the full titre of a human specific serum was substantially the same with the new micromethod as with the macroscopic killed-culture technique, the new method was put into routine use, and over 300 specimens of human serum from patients suspected of Weil's disease were tested with it. The ratio of positive to negative results is very similar to that given by over 1000 previous macroscopic tests (Gardner and Wylie 1946), and there is no reason to believe that the method does not give equally reliable results. It has also given satisfaction in various pieces of experimental work.

SUMMARY

A description is given of a very simple and extremely rapid microscopic technique for leptospiral agglutination, in which the earliest and smallest visible effects of the antibody are observed.

The relative advantages and disadvantages of this and other methods are discussed.

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PENICILLIN IN PROTEUS SEPTICÆMIA

REPORT OF A CASE

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ORGANISMS of the proteus group are not generally considered to be very pathogenic. In routine examinations of nose and throat swabs or of faecal specimens, proteus bacilli are often isolated as saprophytes.

During the last two years in a Kent orthopaedic unit, 31 out of 67 cases of compound fracture were found to be infected with proteus. In spite of manipulations, bone-grafting, &c., these organisms did not interfere with the healing of the wounds, nor did they cause any general infection.

Occasionally outbreaks of food-poisoning have been reported (Wichels and Barner 1925, Plähn 1937, Cooper et al. 1941) in which these organisms are believed to have been responsible. The urinary tract, however, is a common site of infection by proteus. Kretschmer and Mason (1929), reviewing 305 cases, describe 20 in which proteus was isolated.

Workers in India (Harley et al. 1946) have noted the enhanced pathogenicity in that country of the gram-negative bacilli, especially when occurring in compound fractures. They list the proteus group among these and suggest that tropical conditions may be responsible for the increased virulence of organisms which in England are regarded as mainly saprophytic.

A careful search of the literature has revealed 43 cases of generalised blood-stream infection by proteus.

MacKenzie and Hawthorne (1933) reviewed 18 cases where the urinary tract was the primary source.

McKee (1944) collected 23 cases of septicæmia due to proteus from causes other than infection of the urinary tract. Otitis media was the most common, the course of the disease being short and termination fatal in most cases. He himself reported a case which was cured by sulphphonamide therapy.

Poirier (1942) described a case in a North African following a war wound infected with this organism.

With the control of staphylococcal and streptococcal organisms by penicillin, infection by gram-negative bacilli may assume an increasing frequency and importance.

The present case is of interest because (1) septicæmia was secondary to osteomyelitis of the foot, which was the seat of a primary malignant tumour; and (2) the patient was treated with penicillin.

CASE-RECORD

A woman, aged 29, had had six weeks' pain and swelling in the foot, with a vague history of injury. Radiography showed some rarefaction of the bones in the mid-tarsal region, with swelling of overlying soft tissues.

Tuberculosis of the tarsus was diagnosed, but despite immobilisation the patient continued to complain of pain and have pyrexia. Pyogenic osteitis was now diagnosed, and the swelling was incised. A course of sulphadiazine and of penicillin (100,000 units daily) was given with only slight temporary improvement.

On re-exploration ten days later a large abscess cavity was found, lined by gelatinous necrotic faintly smelling granulation tissue with no true pus. The infection extended to the periosteum but did not apparently involve bone or joint. Cultures yielded a pure growth of proteus bacilli. The white-cell count was 10,200 per c.mm.

In spite of sulphadiazine the temperature climbed to 105° F after a week, and the white-cell count to 14,600 (polymorphs 80%). There was now much swelling and free bleeding.

On exploration the infection was found to have spread to the bones and joints of the mid-tarsal region; the cuneiforms, the scaphoid, and the head of the astragalus were friable and necrotic, and many loose fragments were removed. Cultures yielded a heavy growth of proteus bacilli.

Two days later amputation was performed above the ankle-joint, because the temperature had continued to swing violently, and a heavy growth of proteus bacilli had been isolated from the blood. Patient's serum now agglutinated a proteus suspension to a titre of 1 in 40. A further blood-culture was positive next day; so intramuscular penicillin (125,000 units three-hourly) was begun.

Two days later the general condition had improved, the wound appeared clean, and the temperature was only 100° F. Blood-culture was sterile. Penicillin 4,000,000 units was given in three days but had to be discontinued as it was not available.

On April 21, six days after amputation, the temperature rose to 104° F, and the hæmoglobin had fallen to 48%, with a white-cell count of 11,000 per c.mm. The condition steadily deteriorated, the temperature rising from 102° F to 104° F daily.

On April 28 further rigors occurred, and a blood-culture next day yielded proteus bacilli. The serum now agglutinated a suspension of the organism to 1 in 320; this rising titre from 1/40 to 1/320 in ten days indicated an active infection with this bacillus. The serum also agglutinated the standard Oxford proteus XK O to 1/320 and X2 O to 1/40, but did not agglutinate the X19 strain. The patient soon became comatose, developed deep jaundice, and died on May 1.

Necropsy.—The body was that of a jaundiced woman with a healthy amputation stump. All viscera jaundiced and showing much post-mortem staining. Numerous petechial hæmorrhages over pericardium. Cardiovascular system otherwise normal. Spleen enlarged (250 g.) and soft. Some œdema of lungs.

Between 8th and 9th ribs posteriorly was a swelling 3 cm. in diameter, containing necrotic yellowish material, which had begun to erode both ribs. Cultures from this yielded proteus bacilli. Hepatic, alimentary, genito-urinary, and central nervous systems normal.

Histologically the intercostal swelling was an anaplastic round-celled tumour, and sections of the foot showed a round-celled sarcoma of similar cytology causing necrosis of bone and some osteitis.

Bacteriology.—The bacillus was gram-negative and motile and grew rapidly on blood-agar and agar plates. It gave the biochemical reactions of *Proteus vulgaris* and, injected intraperitoneally, killed mice in twenty-four hours, the bacilli being recovered from the blood. Guinea-pigs and rabbits were not affected. The bacillus was sensitive to penicillin only in a concentration of 1000 units per c.cm. A suspension was agglutinated by a polyvalent proteus serum to a titre of 1/1280 (the full titre).

A culture injected near the sacro-iliac joint of a rabbit produced in 14 days an abscess containing 1½ oz. of thick creamy pus; the muscles, tendons, and ligaments were destroyed. The femur was loose in its socket but intact. Sterile pieces of bone were inoculated with the bacillus; the marrow was rapidly destroyed, but the bone remained unharmed. Growth was profuse in media containing 0.01 g. of calcium chloride per c.cm. but was inhibited by 0.1 g./c.cm.

DISCUSSION

There are three interesting points about this case:

(1) The local rapid and peculiar destruction of bone and tissue accompanied by all the signs and symptoms of a pyogenic infection.

(2) The persistent blood invasion by an organism which is not generally considered to be very pathogenic.

(3) The apparent improvement under penicillin therapy when the infection was due to a gram-negative bacillus.

Local destruction of tissues, similar to that in the patient's foot, was reproduced to some extent in an experimental animal. Here the soft tissues were obviously destroyed by the proteolytic enzymes of the bacillus, and it is reasonable to conclude that the same process took place in the patient. It seems that the rapid destruction of soft tissues was due to a combination of sarcoma and proteolytic bacilli; but that of the bone was due to the neoplasm alone, as we were unable to obtain experimentally any true destruction with the proteus organisms.

Blood-culture was positive for proteus on numerous occasions. The fall of temperature, patient's general improvement, and sterility of the blood after heavy doses with penicillin suggest that the penicillin destroyed

the organisms in the blood. Their reappearance was probably due to the infected focus in the rib. It is unfortunate that the dosage of penicillin could not be continued, as the infection might then have been completely overcome.

For a full discussion of septicæmia due to proteus from origins other than the urinary tract, reference should be made to McKee (1944).

In very few of the cases in the literature is there mention of the patient's serum showing a rise in agglutinin titre to the specific organism. This evidence substantiates the belief that active infection by that organism is present. As proteus bacilli are often found as contaminants in cultures, it is very important that this evidence should be obtained.

It is suggested that cases should be treated with at least 1,000,000 units of penicillin daily, immediately blood infection is proved.

SUMMARY

The published work on proteus septicæmia is reviewed.

A case is described where the infection was secondary to an osteitis of the foot.

A tumour in the foot was thought to be a primary round-celled sarcoma, and a nodule in the chest wall an infected metastatic deposit. Presumably, this tumour provided a portal of entry for the proteus bacilli.

Improvement followed amputation and penicillin therapy; but, as the heavy dosage could not be maintained, fatal reinfection of the blood took place.

Our thanks are due to Mr. J. S. Batchelor, F.R.C.S., for permission to describe this case and for help with the clinical details; and to Mr. P. R. G. Browne and Mrs. R. Udall, technicians at the Public Health Laboratory.

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Medical Societies

ROYAL SOCIETY OF MEDICINE

At a meeting of the section of neurology on Dec. 12, with Dr. DOUGLAS MCALPINE, the president, in the chair, a discussion on the

Treatment and Prognosis of Traumatic Paraplegia

was opened by Dr. L. GUTTMANN, who gave an account of 177 patients treated for spinal conditions at the Stoke Mandeville centre. The patients had been received at varying intervals after injury, and the condition of some had been serious, and complicated by contractures, sepsis, or demoralisation.

Food, said Dr. Guttman, is an important therapeutic weapon. On admission patients were often undernourished, and a high protein intake was essential to replace that lost through pressure sores or urinary infection. Sores are caused both by intrinsic factors, such as the lowering of tissue vitality from peripheral vascular changes, and by extrinsic causes, such as pressure and laceration. The stages are (1) reddening of the skin, disappearing with relief of pressure; (2) persistent reddening and congestion, and induration; (3) excoriation of the skin, sometimes with a blister; (4) damage to the deeper layers, with necrosis and ulcer formation; and (5) penetrating necrosis with involvement of muscle and bone, ending in gangrene. Often the deeper tissues are more widely affected than the superficial.

The most important measure in the prevention of sores is continual change of posture by day and by night, regardless of whether the patient is sleeping. Infection is controlled by the various chemotherapeutic agents, and the necrotic portions are excised. Dressings must

be changed once or twice a day. Plastic operations are sometimes successful, but should never be contemplated unless the general condition is satisfactory. Even when the sores are fully healed the patient and his attendants must remain sore-conscious; when he is fit enough to sit he must still change his posture often. Plastic beds are to be deprecated; they may even cause sores.

In the management of the bladder neither urethral catheterisation nor suprapubic cystostomy has proved wholly satisfactory. Every patient admitted with a cystostomy had an infected urine, often with severe ascending infection. Where a cystostomy is undertaken with cord lesions the bladder becomes contracted; the procedure does not prevent action of the detrusor of the bladder. There are certainly indications for cystostomy, such as urethral stricture, but there is no case for its adoption as a routine. Tidal drainage is a valuable auxiliary method, but the tube tends to get blocked. Where suprapubic cystostomy is adopted it should be discontinued as soon as possible and replaced by intermittent washouts through a catheter or an indwelling catheter to reduce infection.

Distension of a painless bladder below the level of the lesion sets up a widespread reflex, with flushing, sweating of the head and neck, nasal occlusion, raised blood-pressure, slow pulse, and respiratory discomfort. This is due to an autonomic disturbance. Recognition of the reflex has proved a valuable guide to distension; and its observation has reduced the call for aspirin to relieve headache.

Mental changes may be due to infection; an early sign is querulous or rude behaviour. Reactive mental disturbance also occurs, from the psychological shock of crippling, and from feelings of hopelessness or economic insecurity, or fear of impotence. It is essential that the patient's coöperation should be secured, and that he should be surrounded by a cheerful and optimistic atmosphere; but at the same time the spoiled-child mentality must be avoided.

The aim is to shorten the period of recumbency and to restore the patient's independence as soon as possible. Contractures and atrophy must be guarded against by keeping the paralysed limbs in the proper position; the worst contractures are seen in patients who have been in plaster beds. Passive movements once or twice a day are begun immediately. The intramedullary injection of 1 c.cm. of 90% alcohol effectively controls flexor spasm for 3-4 weeks.

Mr. E. W. RICHES said that in spinal shock the bladder becomes inert. After 24-36 hours there is overflow from retention, and after an interval which is prolonged by infection or general injuries the bladder eventually reacts automatically to stretch. Initial treatment is all-important. Former teaching that distension of the bladder must, from the start, be prevented is harmful. The bladder can be safely left to distend for 24-36 hours until the patient reaches suitable surgical surroundings. Infection is almost inevitable where intermittent catheterisation is continued for more than two days. Pain from a distended bladder may be relieved by morphine or the expedient of withdrawing the urine through a serum needle introduced suprapubically.

The suprapubic route is to be advocated for general use. Urethral catheterisation and tidal drainage are sometimes successful, but these methods call for constant attention. The system of drainage must allow of no leakage and no infection; it must prevent contraction and dilatation; and it must be understandable to nurses. A method which answers these criteria is that of introducing a small (size 16 French) suprapubic catheter at the top of the bladder. The incision is made at the highest point of bladder dullness, or midway between the symphysis pubis and the umbilicus—whichever is higher—and the catheter is inserted downwards and backwards with a trocar-pointed introducer. The catheter is changed after 10-14 days, and thereafter weekly. A slightly larger catheter (size 20 French) later replaces the smaller one.

Drainage, once established, must be continuous, and tidal drainage is the best method. Some favour sulphoamides in the prevention of infection, but their use cannot be continued long. Infection is more likely with drainage through the urethra because of the inevitable urethritis

and the chance of consequent direct lymphatic spread to the kidneys.

Dr. DAVID WHITTERIDGE, from a study of changes in the upper limbs, confirmed Dr. Guttman's clinical observation of a reflex with distension of the bladder. The change, he said, is much more marked with lesions above the level of the 5th cervical vertebra. The entire vasomotor apparatus below the level of the lesion comes into activity.

Dr. P. H. A. JONASON showed that with cord lesions there is increased sensitivity to change of posture, most pronounced in those with high thoracic or cervical lesions.

Dr. W. RITCHEY RUSSELL supported Dr. Guttman's contention that patients with paraplegia should be admitted to a spinal centre. In civilian cases, he said, there is a sharp conflict of interests between the wishes of the orthopaedist and those of the physician; it is only in special centres that a balance can be reached.

Dr. P. W. NATHAN was opposed to long-continued suprapubic cystotomy. He suggested early closure of the suprapubic wound, urethral catheterisation, manual compression, and the sustained use of sulphadiazine in small doses.

Reviews of Books

A Textbook of Bacteriology and Immunology

J. M. DOUGHERTY, PH.D., professor of bacteriology, Villanova College; A. J. LAMBERT, M.S., instructor in bacteriology, Temple University. London: H. Kimpton. Pp. 360. 22s. 6d.

CURRICULA in medical and dental schools are already crowded, and a case can be made for teaching students the essentials of some medical subjects before they reach the university. The present book is designed for such premedical study in America, and it describes simply the main pathogenic organisms and the reactions of the body to invasion. There are useful chapters on the history of bacteriology, and on simple methods for culture and staining, and a full description of the technique for quantitative titration. With the rickettsias, the viruses, and the parasitic protozoa also included, the general scope of the book does not differ greatly from standard texts. Only the elementary facts about serology are included, and some groups of organisms are dealt with very briefly, but certain modern techniques, such as fluorescence microscopy, get considerable attention. Each chapter carries a quota of valuable references, but the authors are too ready to accept some of the statements of early workers. The tradition in this country is to teach the premedical student more about the general principles of biology than about more specialised aspects of medical knowledge, but there is no harm, and probably much good, in relating one to the other as opportunity arises. This book, which does explain clearly the main facts about pathogenic organisms, may well serve to keep an early enthusiasm burning.

Criminal Justice and Social Reconstruction

HERMANN MANNHEIM, Dr. Jur., lecturer in criminology in the University of London. London: Kegan Paul, Trench, Trubner. Pp. 290. 15s.

WE have travelled far in penal reform since men were hanged for stealing five shillings' worth of goods, and King Edward VII was able to say with some truth, in opening the Central Criminal Court at the Old Bailey in 1907, that "the barbarous penal code which was deemed necessary a hundred years ago has gradually been replaced in the progress towards a higher civilisation by laws breathing a more humane spirit and aiming at a nobler purpose." In the four decades that have elapsed since that speech progress towards an enlightened penal code has been even more rapid, largely owing to the replacement of retribution by reform as the aim of punishment. Notable examples are seen in the field of juvenile delinquency, in the probation system, and in the widening of judicial discretion. But, substantial as these reforms are, they concern only or mainly punishment, while the content of the Criminal Law itself remains unaltered. "To a greater or smaller extent in every country," says Professor Mannheim, "the Criminal Law has in essential parts become out of date. Instead of being a living

organism supported by the confidence of all sections of the community and developing according to the practical and ideological needs of the time, it presents itself as a petrified body unable to cope with the ever-changing world and kept alive mainly by tradition, habit, and inertia." His plea is for a complete rethinking of the system of values upon which the criminal code is based. He reviews some of the basic values in present-day society and considers how far their treatment by the Criminal Law is in harmony with the functions these values have to fulfil especially in relation to problems of human life, the protection of sexual and family life, and the protection of property. Much of the book is concerned with the replanning of criminal justice. He describes not only our own criminal code but refers also to the codes of many other countries, of particular interest being the references to the Soviet code.

Euthanasia, he thinks, should—with suitable safeguards—be legalised, and voluntary sterilisation permitted in a narrowly defined category of cases. Birth control should be given its proper place in the educational system and social and health services. Abortion should be legalised on clearly defined therapeutic, eugenic, ethical, socio-economic, or personal grounds, but only under strict control; otherwise it should still remain a criminal offence.

His final plea is for more international coöperation and comparative study in the field of Criminal Law, for more planning in the law itself and its administration, and for the prevention of crime.

Squint and Convergence

N. A. STUTTERHEIM, M.D. Rand, formerly surgeon to the eye clinic, University of Leyden. London: H. K. Lewis. Pp. 95. 15s.

"THIS monograph," says the author, "is written to place a new conception of squint before the medical profession." This is an interesting start, and after relating some of his early successes he goes on to state his conception of squint. Concomitant squint, like eye-strain, is, in his opinion, a disorder of the visual brain due to insufficient action of the centre for convergence in the mid-brain: squint and eye-strain are different grades on a scale, and the scale is insufficiency or lack of effective power of involuntary or reflex convergence, which is the basic movement of the di-opthalmos (or bi-unial eye). The profession must make what they can of this; and certainly any man has a right to his own pet theory of the cause of squint, since all theories remain at present without proof. Dr. Stutterheim's treatment, which lasts about a year, is at first with a battery of prisms to encourage the simultaneous use of the two eyes and later with the synoptophore or some similar apparatus. This treatment differs in no essential from the orthoptic training of squints as now practised almost universally. Dr. Stutterheim admits that "surgical adjustment" is necessary in a number of cases. "These adjustments," he says, "are not squint operations, but intended merely to overcome an anatomical impediment for physiological treatment. . . . No muscles or tendons should be severed by advancement or tenotomy." He then goes on to describe his adjustments, and the reader may well be surprised to learn that he takes a tuck in the external rectus and then divides the lateral expansions and three-quarters of the width of the internal rectus tendon in two different places. If this is not a squint operation, and not a tenotomy, the terms must be differently interpreted in Johannesburg.

The *British Encyclopædia of Medical Practice for 1946* contains its usual critical surveys of advances in medicine by experts in the various subjects, a section on drugs—written this year by Prof. Noah Morris—and a long section of abstracts on subjects ranging from abdominal pain and acute abdominal emergencies at one end of the alphabet, to yellow fever at the other. Lord Horder succeeds the late Sir Humphry Rolleston as chief editor, and notes in his foreword what able collaboration his contributors have given. The surveys, he suggests, "should be read and valued as non-committal epitomes of what authors who are in the van of medical progress are saying." The usual cumulative supplement, in a separate binding, accompanies the "Medical Progress" volume.

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The Distributors

RATHER shabby, rather tired, and rather poor, we have come to think too meanly of ourselves, our country, and our profession. We award medals to FLEMING and FLOREY, but we forget that medicine stands on the threshold of a golden age. We no longer suppose that foreigners look to Britain; and it seldom occurs to us that they may be interested in the painful rearrangement of our medical services. No doubt the egocentric depression of convalescence is excusable after so long and dangerous a war; but it may be salutary to begin the New Year by looking at ourselves through other people's eyes. Provided we care to do so, said an expert from America recently, we can now raise medicine to a higher level in this country than in any other. Three things, he holds, are needful to fulfil its modern promise. The first is removal of the money barrier between doctor and patient. The second is technical achievement. The third is distribution of the fruits of knowledge wherever they are needed. The National Health Service Act takes away the money barrier; the medical schools of Britain are capable of attaining and maintaining the highest technical standards. Only on the third requirement—the efficient distribution of medicine to the consumer—does this friendly observer fear that we may fail ourselves and the watching world.

The distribution of medicine is primarily the function of the general practitioner; and, at its best, general practice in these islands is as good as anywhere, or better. But its best is exceptional; the standard on the whole is none too high; and some aver that the new legislation will make it lower. "Taking a long view," it has been argued,¹ "the general public will get an ever-improving service from the consultant and the hospital but a continuously deteriorating service from the general practitioner." Already for a generation the rôle of the G.P. has been contracting. New methods of investigation have placed the diagnosis of all but the simplest disorders in the hands of the specialist, while many forms of treatment have passed beyond the family doctor. The dearth of private nurses and domestic help drives people to hospital for illnesses formerly treated at home. In establishing clinics to do work which was not being done sufficiently by private doctors, local authorities have reduced the practitioner's interest in maternity, child welfare, school-children, and the treatment of tuberculosis and venereal disease. We must face the fact that the G.P. has lost much of his authority—partly because medicine has become more complex, partly because manpower has been redistributed, and not least because the system by which he earns his living has made him unable to give much attention to unremunerative tasks. At the same time general practice remains as arduous as ever, and it is scarcely surprising that so many of the younger men should now be seeking to specialise in order to avoid it. In the National Health Service the number of specialists is likely to rise, while general practitioners may have to bear an even heavier

load, owing to the calls of those who for the first time are offered medical care without payment. The natural impulse to transfer responsibility by sending the patient on to a specialist will always be strong when time and energy are limited, and both personal interest and clinical alertness grow dull as soon as personal responsibility is lost. There would be something radically wrong with any service in which the practitioner ceased to be a real doctor and became a mere channel through which the patient could reach one.

To be a first-class G.P. is harder than to be a competent specialist; and this will remain true when the emphasis of the family doctor's work has shifted, as it must, towards preventive and functional medicine. If men and women of high calibre are to be attracted into general practice, the incomes within their reach there should not be substantially lower than those of their coevals who decide to specialise. At least equally important, however, is the opportunity to do satisfying work, with freedom from irrelevant duties and claims; and it is here that some of us see in the National Health Service a chance of regenerating (rather than degrading) general practice, through the health centres which it will develop. We hope that these will be found to save the practitioner's time, improve his equipment, and above all give him regular association with other doctors. Where the specialist has hitherto had most advantage has been in his attachment to a hospital, which not only is an object of loyalty but also polishes him continually with the friction of professional contacts. The health centre will do a great deal for the general practitioner if it gives him too an object of loyalty and a mental atmosphere in which his work will be known to and appraised by his fellows—practitioners and specialists alike.

The suggestion that health centres would improve the quality of general practice came from the medical profession, not from governments. The difficulties of practising singly have led more and more doctors to form partnerships, and professional bodies such as the B.M.A.'s Medical Planning Commission have commended the health centre as a further evolutionary stage deserving full trial. Hostility to the idea was indeed seldom vocal until the Coalition Government suggested that health-centre practice was incompatible with competition between the participating doctors, who must therefore be paid by "salary or similar alternative." (In the light of subsequent opposition it is strange to recall that the Medical Planning Commission had itself proposed a basic salary.) From then onwards B.M.A. spokesmen began to stress the need for experiment rather than the need for centres, pointing to the danger of committing the profession to a mode of practice which has not yet been tried. As late as May, 1945, the B.M.A. representative body voted for experiment "on the widest possible basis," but since that time the tendency has been more and more to regard the health centre as a Government device for regimenting doctor and patient. Even those who would gladly remove their surgeries from their own homes have acquired an exaggerated idea of the changes intended. As the Coalition white-paper said:

"There has often been misconception as to the precise implications of Health Centre practice. It has been assumed that a doctor would be on duty only for stated periods and that, outside those periods,

1. Matthews, E. R. *Brit. med. J.* 1946, ii, 306.

his patients would always be attended by some other doctor. That need not be so. Normally, a doctor will attend his own patients as necessary, either at the Centre or at the home. He will have his consulting hours and visit his patients as at present. But the grouping of practices at a Centre will make possible a greater fluidity of arrangements; for example, as arrangements will be made for continuous staffing, a patient will, in emergency, get immediate attention even though his own doctor does not happen to be available. The grouping of practices will, moreover, make it easier for doctors to obtain reasonable holidays and to attend refresher courses. The internal organisation of the Centre so as to facilitate reasonable absences consistent with the doctor's responsibilities will be a matter for the doctors themselves."

The misconceptions have arisen partly because nobody quite knows what a health centre would be like. Some see it as little more than the central surgery which some large medical firms have already found convenient, while others have in mind a temple of Hygeia that would dwarf the Edinburgh Royal Infirmary. In a way this latitude of opinion is healthy, and we hope it will find expression in experiments of widely different kinds. Nevertheless there are certain common purposes that all health centres in the National Health Service would have to fulfil; so, in the hope of clearing our own minds if nobody else's, we have prepared a short series of articles on what seems to us necessary and feasible. Having already published descriptions of some existing Health Centres of Today,² we turn this week to the Health Centres of Tomorrow; and though our sketch will be tentative and incomplete it may arouse some of the discussion now badly needed. The time has come for getting down to brass tacks.

Which brings us back to the visitor from America. "You English," he said, "are disappointing. You produce remarkable and far-seeing plans, like the report of the Royal Commission on University Education in 1913, the Dawson report of 1920, and the recent reports of your College of Physicians; and then you go on exactly as before. Is that what you are going to do now?" The fateful answer lies in this new year.

Death Under Anæsthesia

DEATHS during surgical operations do not seem to become any less common with advance in anæsthetic technique. To a great extent this can be explained by the increasing boldness of surgery, where the dangers of the operation must be set against the certainty of early death from disease. Many tragedies, however, must be attributed to the tendency to serve the convenience of the patient at some added risk. Basal hypnosis has not made anæsthesia safer though it has removed many of its terrors and discomforts. Though an accurate estimate is impracticable, it is likely that thiopentone, except in expert hands, carries a mortality far higher than the 1 in 4000 commonly attributed to chloroform. There is much to be said for the establishment of a committee of experienced anæsthetists to investigate (but not to criticise) all deaths under anæsthesia, few of which reach the medical journals, though many get more space than they deserve in the lay press.

The dangerous emergencies of anæsthesia are better prevented than treated—prevented, for example, by reasonable caution in the use of preoperative hypnotics and discretion in the use of thiopentone.

There is, with the last, a band of laryngeal irritability between very light anæsthesia (which is, after all, the limit of one's aim before proceeding to the main anæsthetic agent), where stimuli may produce stridor but not the dangerous and persistent laryngeal spasm that is the usual cause of death, and relatively deep anæsthesia, where the larynx is insensitive except to severe stimuli. When thiopentone is the main agent, the risk may be reduced by maintaining an anæsthesia sufficiently deep for the degree of surgical stimulation, and by avoiding direct stimuli such as the introduction of an oral airway or a laryngoscope; tracheal intubation is only for the expert. When a potentially dangerous laryngeal spasm does occur, the intravenous injection of as little as 5 mg. of *d*-tubocurarine chloride will relieve the situation; if this is not obtainable the anæsthetist or surgeon should surely perform an emergency tracheotomy. It may be embarrassing to explain an unexpected wound to the patient (and occasionally an unnecessary wound, for who can tell the exact moment when the heart will fail?), but no-one should be allowed to die from laryngeal obstruction—now the commonest fatal accident during anæsthesia—when an effective remedy is always to hand.

Heart-failure under anæsthesia may conveniently be classified as primary and secondary, though some anæsthetists who read his article on another page may think Mr. HAMILTON BAILEY's subtitles—"white" and "blue" asphyxia—inappropriate. Primary cardiac failure applies to ventricular fibrillation and to cardiac asystole excited reflexly. Ventricular fibrillation can be diagnosed only by direct palpation of the heart when cardiac massage is attempted. Where fibrillation is present, the intracardiac injection of 10 ml. of 2% procaine may restore a normal rhythm.¹ Failing this, it may still not be too late for the heart to be stimulated into activity by cardiac massage after fibrillation has ceased from coronary anoxæmia. The first need is to restore the cerebral circulation of oxygenated blood, and, as BAILEY rightly insists, the need is urgent. Recovery of consciousness has taken place after heart-failure lasting more than 10 minutes but it would be wiser to regard 4 minutes as the outside limit of time available, and this is considerably reduced where heart-failure is due to anoxæmia. The first stimulus to be applied, without delay, is auricular puncture through the third right intercostal space close to the border of the sternum, the needle being directed backwards and medially (the auricle is more sensitive than the ventricle to mechanical stimuli²). If this fails, subdiaphragmatic cardiac massage should follow at once, though it is questionable whether "quick and forcible" movements may not sometimes do damage. As OGLIVIE³ says, direct cardiac massage with the right hand inserted through an incision in the diaphragm can maintain an artificial circulation which, with artificial respiration, will suffice to oxygenate the vital centres. It is doubtful whether this can be equally effective through the button-hole incision of Nicholson. In one of OGLIVIE's cases there was no spontaneous heart-beat for 75 minutes,

1. Burstein, C. L., Marangoni, B. A., De Graff, A. C., Rovenstine, E. A. *Anesthesiology*, 1940, 1, 167.
2. Hyman, A. S. *Arch. intern. Med.* 1930, 46, 553.
3. Oglivie, W. H. *Recent Advances in Surgery*, London, 1929, p. 147.

though the patient remained a good colour and was breathing, groaning, and moving spontaneously. In another case an artificial circulation of oxygenated blood (judged by skin colour) was maintained for over 3 hours until it was decided that the medullary centres had been damaged beyond recovery and resuscitation was abandoned. It has been suggested that early injection of adrenaline may convert cardiac asystole into ventricular fibrillation,⁴ but adrenaline should certainly be tried when cardiac massage has failed to produce a response. Few anaesthetists will agree that artificial respiration is less important than cardiac massage, especially in a case where heart-failure is secondary to asphyxia. Surely the first step in resuscitation must be the establishment of a clear airway, including bronchial suction where this is appropriate, though preparation for cardiac massage need not wait on this. Cardiac stimulation must otherwise be a waste of time.

With sufficient foresight in the early institution of intravenous fluid therapy death during operation from shock and hæmorrhage can nearly always be prevented. The treatment of sudden hæmorrhage should be the copious and rapid transfusion of blood. Where a cannula is already in a vein, the pressure from a sterile Higginson's syringe, which should be included in every transfusion outfit, will force blood through in spite of venospasm. If the apparatus is to hand, sternal puncture is more rapid and more certain. When the heart fails in spite of intravenous fluids there seems little more that can be done; though one patient, apparently dead at the end of a severe operation, was restored to normal within 10 minutes by the rapid injection, under pressure, of 500 ml. of plasma and 750 ml. of blood. Though heart-failure in the operating-theatre will not be encountered often, so urgent is the need for effective treatment that, besides an *anæsthetic emergency outfit* such as BAILEY illustrates and tracheotomy instruments, blood-transfusion apparatus and a supply of plasma must be kept ready for immediate use.

During an operation the anaesthetist's responsibility is seldom lighter than the surgeon's; with minor operations it is heavier. Is the anaesthetist always equipped to carry such a responsibility? Operative mortality will be reduced to a minimum only when every anaesthetic is given or supervised by an experienced administrator who is also a good physician well versed in the practice of intravenous fluid therapy. The administrator will then be in charge of the patient, from his angle, from the time an anaesthetic is decided on until the end of the immediate post-operative period. With the recognition that such a wide range of duties falls within the province of the anaesthetist who has made himself competent to undertake them there will be no lack of recruits of suitable quality.

Reorganisation in Cancer Research

In the coming year the British Empire Cancer Campaign¹ is to widen its activities and provide facilities in fields of research previously somewhat neglected in this country. All research-workers will welcome the Campaign's new official organ, the quarterly *British Journal of Cancer*, the first number

of which will appear in the spring. Articles on cancer investigations have hitherto appeared in a multitude of journals, every issue of which must be consulted lest some new contribution to the subject be missed. The gathering together of sources of information will save time and effort. The editors of the more general journals will no doubt be grateful, even when paper becomes plentiful, to be relieved of the hoped-for *embarras de richesses* from the field of cancer research.

Another innovation now revealed in the Campaign's annual report is the enlargement of the scientific advisory committee by the inclusion of separate biochemical, biological, and physical subcommittees, each made up of experts in their own branches but subject to coördination from the parent committee. Of these, the one intending the greatest expansion of opportunity is the biological. The grand council has been asked by the scientific advisory committee to provide £25,000 for investigations on the relation of viruses to cancer. It is no longer denied that some viruses cause cell proliferation and even malignant proliferation, yet the discoverer of the virus origin of tumours, Dr. PEYTON ROUS, questions whether this cause is universal. In his lectures in July at the Royal College of Surgeons² and at the Microbiological Society meeting in Leeds, and in his Ludwig Kast lecture to the New York Academy of Medicine reported in this issue, he refers to his own recent experimental work as speaking against the assumption that most tumours are caused by agents of this sort. It cannot be denied that this is one of the most important of the theoretical—and ultimately of the practical—aspects of cancer research. Acceptance or rejection of the virus theory must be aimed at; "our senses must inform us, not our reason—ocular inspection, not any process of the mind."³ Here we cannot do better than be guided by one of the greatest of explorers, who argued that "no kind of science can possibly flow, save from some pre-existing knowledge of more obvious things."⁴ Of virus-induced tumours there is pre-existing knowledge, and we would be well advised to follow the example of others in proceeding from the known to the unknown. Extension of knowledge of those minute particles which are able to cause cell proliferations of varying degree appears to wait upon more subtle and refined methods of investigation. These are too expensive for any one institution to supply. The British Empire Cancer Campaign will be doing a great service if ultra-centrifuges, an electron microscope, and other costly pieces of apparatus are supplied for the use of the whole country. In providing for the production of synthetic chemical carcinogens the Campaign will be performing a similar service. Hitherto research-workers have been dependent on commercial firms which have since ceased to supply these substances, and also, to an extent which is rarely appreciated, on the generosity of Prof. E. L. KENNAWAY, F.R.S., and Prof. J. W. COOK, F.R.S. These chemicals are indispensable to cancer research.

Another notable announcement in this report is the assurance that the Government research committee on the medical and biological applications

4. Organe, G. *Proc. R. Soc. Med.* 1942, 35, 439.

1. British Empire Cancer Campaign. Twenty-third annual report, 1946.

2. *Lancet*, 1946, ii, 98.

3. The Works of W. Harvey, M.D. Sydenham Society, p. 132.

4. *Ibid.*, p. 133.

of nuclear physics will include consideration of all the objects that the Campaign would otherwise have undertaken in respect of recent discoveries. This fortunate conjunction of biologists and physicists leads to the hope that one fascinating and unexplored field of investigation may sometime be tackled—that is, the quantitative and qualitative effects on and the time relationships in the response of vascular endothelium and other components to various wavelengths of all the rays and to all the particles we know. The physicists can direct and assess the stimuli and the biologists have an exquisite technique for observation—the Sandison-Clark transparent chamber. The importance of such observations to radiotherapy and the study of injury can no longer be contested; they might provide a delicate biological measure of various rays with one yardstick.

A central consultant panel in morbid histology, with a service available throughout the country, has been formed by the Campaign, together with the Pathological Society of Great Britain and Ireland and the National Radium Commission, to assist in the diagnosis of obscure pathological material. Other new departures include a scholarships and fellowships committee and a Hospital Physicists Association. The first may enable the Campaign to recruit new blood; the second will serve as a kind of library of physical data which is ordinarily too extensive for full reproduction in journals. Two catalogues (A, December, 1944; and B, June, 1946) have already appeared. These promise to have a world-wide circulation.

Annotations

PLACE FOR THE CHRONIC PATIENT

THE plight of the chronic sick and of the old and infirm is rightly causing more and more anxiety. In the United States, as here, these patients are often segregated in isolated county hospitals, almshouses, poor-farms, homes for the aged, and mental hospitals, where, according to Dr. E. M. Bluestone,¹ they "vegetate their lives away under a sentence of life imprisonment or death." Yet they cannot be allowed to occupy indefinitely beds intended for acute cases. Dr. Bluestone suggests that hospital beds should be reserved for those who need intensive scientific care, without regard to the probable length of their illness. Poverty, or the convenience of the doctor or relatives, is an insufficient reason for admitting patients to such beds: those who do not require the special equipment of a hospital must be cared for in their own homes, if necessary being subsidised financially. "Elevation of the economic status of the patient," he says, "or, in lieu of this, better government support in all of its levels, more group-insurance, and more philanthropy if necessary, will do much to free hospital beds and promote a home-care program." If the disease is stationary, not capable of further relief by hospital treatment, and if the patient cannot afford to live at home, he must be supported in an appropriate institution, but not in the general hospital. Convalescents, too, must be transferred from the hospital to their own homes or convalescent centres.

This means that long-term patients who can benefit by treatment will be retained in the hospital; as Dr. Bluestone points out, "the doctor, working with scientific problems in the hospital, is entitled to a well balanced diet of clinical material." Moreover if both the long-term and the short-term patient are under the same roof,

the doctor is less likely to lavish most of his interest on the short-term case: "never place an obstacle between patient and physician, and remember that distance is an obstacle." In England, not only distance but the whole pattern of our health services have, until now, prevented the doctor in the acute hospital from sharing in the care of the chronic sick, many of whom could benefit by the "intensive scientific care" of which Dr. Bluestone speaks; and here, too, opinion is beginning to favour the inclusion of chronic wards in our general hospitals. Moreover, as he remarks, chronic disease and old age are not recognisable entities: "there is no such thing as a specialist in chronic disease or a specialist in all the diseases of old age. Every medical speciality is represented in geriatrics." The aged sick, he says, belong in a general hospital more often than we are willing to concede.

CYTOCHROME C IN TISSUE ANOXIA

It is now known that the greater part of the respiration of mammalian tissues takes place through the cytochrome system. The hydrogen transported from the foodstuffs or metabolites brings about the reduction of cytochrome, and this is in turn reoxidised by the specific cytochrome oxidase which can react directly with oxygen from the atmosphere. There is evidence that the tissues sometimes contain more cytochrome oxidase than there is cytochrome for it to act on; so added cytochrome might increase the respiration of these tissues. Proger, Dekaneas, and their co-workers¹ have therefore studied the effect of parenteral injections of cytochrome C on various conditions associated with tissue anoxia. They found that cytochrome C would increase the oxygen consumption of well-oxygenated tissues above the normal level, and, in cases where the oxygen tension in the blood was low, would prevent a falling off in tissue respiration. Some of the secondary deleterious effects of low oxygen tension could also be avoided by the administration of cytochrome.

Cytochrome C, as prepared from ox heart by the method of Keilin and Hartree,² is a conjugated protein containing an iron-porphyrin group; but in spite of its protein nature it appears to be non-antigenic and non-toxic, doses of 50–350 mg. of the purified substance, passed through a Seitz filter, having been given intravenously to dogs and man without any apparent harmful effect.³ After the injection the blood-serum assumes a pinkish colour, thus providing a useful indication of adequate dosage. The excess cytochrome C gradually disappears from the blood-stream but cannot be recovered in the urine; it is presumably broken down in the body but the products have not yet been detected. The effect of inducing anoxia in a subject thus saturated with cytochrome C is to cause a sharp decline in the amount of circulating cytochrome and a simultaneous increase in the cytochrome content of the tissues. Discontinuance of the anoxia leads to a reversal of this relationship, cytochrome now leaving the tissues and passing into the blood-stream.

These observations clearly provided a basis for the clinical trial of cytochrome injections, and beneficial results have been claimed. The heart, studied by the electrocardiograph, showed the effects of moderately severe anoxia when the oxygen in the inspired air was reduced to 10%; but these effects, and the subjects' distress, were regularly averted¹ by the previous intravenous injection of cytochrome C. Patients with angina pectoris benefited moderately from the injections, but there was no improvement in acute myocardial infarction, presumably because occlusion of the coronary vessels

1. Proger, S., Dekaneas, D. *Science*, 1946, **104**, 389; Proger, S., Aisner, M., Squires, R. B. *J. clin. Invest.* 1942, **21**, 630; Proger, S., Dekaneas, D., Schmidt, G. *J. biol. Chem.* 1946, **160**, 233.
2. Keilin, D., Hartree, E. F. *Proc. Roy. Soc. B*, 1937, **122**, 298; *Biochem. J.* 1945, **39**, 289.
3. Proger, S., Dekaneas, D., Schmidt, G. *J. clin. Invest.* 1944, **23**, 249; 1945, **24**, 864.

1. *Bull. Amer. Coll. Surg.* 1946, **31**, 104.

prevented the cytochrome reaching the affected region. The effects of anoxia on the brain, manifested by electroencephalographic changes, impairment of visual discrimination, and reduced performance of decoding tests, were definitely lessened by cytochrome. Tissue anoxia is thought to be a major factor in hæmorrhagic shock, and dogs injected with cytochrome C a few hours after severe hæmorrhage survived, whereas without this additional respiratory carrier other dogs almost invariably died from similar bleeding. On the other hand, traumatic shock produced in rabbits by the application of a tourniquet was not favourably affected.¹

These findings are important, for tissue anoxia is suspected to play a part in many varied conditions. The American workers have already produced evidence which justifies a more extensive investigation, and this they intend to carry out. It is a pity that cytochrome C is not readily obtainable (from one to three ox hearts would be needed for the preparation of a single dose of purified material); but if the more detailed results justify it steps will no doubt be taken to overcome this difficulty.

PENICILLIN CHEWING-GUM

THE advent of penicillin brought many suggestions as to its incorporation in everyday materials such as tooth-pastes and cosmetics. Its use in chewing-gum seems likely to be of practical value since MacGregor and Long¹ have shown that local application is effective in the control of acute ulcerative gingivo-stomatitis, sepsis accompanying oral and dental operations, and some types of tonsillitis, when incorporated in a slowly dissolving base such as gelatin. Work has been done in the United States with penicillin in a chewing-gum base and the results are said to have been good. Now McIntosh and Perryman,² of Tunbridge Wells, have described a method of incorporating the penicillin in ordinary commercial chewing-gum. Using a pellet of gum containing 10,000 units of the calcium salt they have shown that a considerable amount of penicillin still remains in the gum even after it has been chewed for seven hours. There was a difference between the findings with sodium and with calcium penicillin, probably because of the lower solubility of the calcium salt. After four hours' chewing the residual penicillin in the gum was only half as active in the gum containing sodium penicillin as in that containing the calcium salt, each pellet having started with 10,000 units. After seven hours no penicillin could be detected in the gum containing the sodium salt, whereas the calcium gum was still active. When a control tablet of calcium penicillin not contained in gum was dissolved in the mouth the saliva showed no penicillin activity after two hours; so absorption and re-excretion can be ruled out as an explanation of the continued activity of the gum preparations. For comparative work it would perhaps have been preferable to have estimated the amount of penicillin in the saliva at intervals while the gum was being chewed, since this would have indicated the amount of penicillin being liberated rather than the amount still retained in the gum.

As could be expected, successful results have been reported in the treatment of Vincent's infection. The chewing-gum has also been used instead of pastilles or lozenges in streptococcal tonsillitis, subacute laryngitis, pharyngitis, and post-tonsillectomy cases. In pharyngitis this vehicle is not likely to be of great value, since the salivary flow will not carry effective amounts of the drug to the pharynx.³ If it can be shown that with chewing-gum the backward flow of saliva to the tonsillar area and the rate of liberation of penicillin are satisfactory this should prove a valuable method of therapy, especially in children. It might also be worth while to investigate

the use of chewing-gum containing 60,000 to 90,000 units of sodium penicillin as a method of administering the drug by mouth, for Dolkart and others⁴ have shown that tablets containing this amount, placed under the tongue, will produce effective blood-levels for 2-5 hours.

WHY NO NURSES?

A THOROUGH, knowledgeable, and epigrammatic account of the reasons for our lack of nurses makes absorbing reading, even though the reasons themselves are not new. Mr. James Barclay¹ has studied the many reports on this theme, that of THE LANCET Commission among them, and concludes that, since we now know the reasons why we are short of nurses, it remains to act. Nevertheless he believes that action could be hastened by a new committee of inquiry, to be appointed by the Ministry of Health, to examine proposals already made for the increase of nursing recruitment and to encourage progressive improvement in conditions. This committee should continue until terminated by the Minister of Health, but after that a nucleus with its secretary would remain to review conditions periodically and make five-yearly reports to the Minister. Employing authorities, too, should reconsider nursing and domestic conditions in their hospitals every five years, with a view to improving them. A body should be set up by the Ministry to study domestic service in institutions, to find ways of reducing crude domestic work, and to introduce a training structure into this part of hospital work. The Minister should ask all nursing employment authorities to concentrate on improving conditions; and those authorities which have already made improvements should ascertain that these have not been allowed to lapse—especially those dealing with lectures and duty-times. Mr. Barclay suggests that money allowances to student nurses should be reviewed in relation to their special expenses in textbooks and examination fees. The student's contract should be renewable year by year, and there should be no penalties for breach of contract—a condition now fulfilled in many hospitals. Hostels should replace nurses' homes wherever possible, and should not be under the matron but under a warden responsible to the employing authority. Methods of looking after the sick nurse should be revised so as to remove undue supervision and control by her hospital seniors. He recommends the formation of nurses' councils which can report not through the matron or other officer but directly to the employing authority.

With these and many others of his suggestions we can heartily agree, for (as he is good enough to point out) most of them appeared in THE LANCET Commission's report, though some are still waiting to be put into action. But training and experience in nursing skills and techniques—that delicate and elusive art of making the patient comfortable—are scarcely mentioned among the attractions to be offered, though it is precisely for these things that the good candidate takes up nursing. No amount of good living conditions or good catering can make up to her for inadequate nursing training; but since the curriculum needs revising and the ward sisters are too pressed to teach training cannot be truly adequate.

Mr. Barclay also shares our belief that a well-conducted experimental school of nursing could do much to revive and raise standards. Himself the officer of a public-health authority, he would like to see this experiment made in a municipal hospital by an authority controlling a large group of institutions. It could be done, he thinks, with chosen staff released for the purpose from the other hospitals under the authority, and would be devised to test how far conditions of service are the

1. MacGregor, A. B., Long, D. A. *Brit. dent. J.* 1945, 78, 33.
2. McIntosh, C. F., Perryman, P. W. *Pharm. J.* 1946, 157, 354.
3. MacGregor, A. B., Long, D. A. *Lancet*, 1945, ii, 299.

4. Dolkart, R. E., Halpern, B., Larkin, M. *Quart. Bull. Nihwest. Univ.* 1946, 20, 413.

1. Why No Nurses? By James Barclay. With a foreword by Dr. D. Stark Murray. London: Faber & Faber. Pp. 176. 6s.

dominating factor in recruitment, and to establish a new tradition in hospital life and management. This is not quite our conception. Instead of acquiring a picked staff, who might be expected to do well anywhere, we should like an experimental school to take a cross-section of current types of nursing candidates, and establish by research how good a nurse can be made not only of the best but of the average type of girl now entering training; for that is the urgent problem of the small training schools at present.

The parts of Mr. Barclay's book which come freshly to the student of nursing problems are those dealing with publicity. He is on sure ground when he suggests that nursing has never been well advertised, judged by advertiser's standards; and he shows a sensible appreciation of what will appeal to the young girl. "... the case for entry to the nursing profession," he says, "is being made to the same audience to whom commercial publicity is addressed." The vocational appeal, as hitherto understood, has failed, and should rather be made he thinks on the basis of co-operation in a worthwhile national task. Statistics of promotion would show that there is a real chance of rapid advance; statistics might also get rid of the idea that nursing interferes with marriage. Much could be done by personal interviews, in schools or better in hospitals, between nurses and possible candidates.

He may be right in his belief that better publicity would bring a better yield of recruits, but he himself asserts that "increasing publicity and decreasing recruitment have gone together." This statement is, not, in fact, quite accurate: recruitment has steadily risen, but increasing publicity and increasing wastage have gone together. Mr. Barclay's clear mind seems here to miss its focus. He is, of course, right in saying that it is the young girl, with her notions (however foolish), who must be won as a recruit; and this girl has a clear opinion of the demands which her job can fairly make on her life. Whether her standards agree with nursing traditions or not we must respect them as the genuine standards of her generation and not play the part of a huckster by beating them down. That has been tried, and has robbed nursing of its appeal for the more enterprising leavers of public and secondary schools. If we want the standards, apart from the numbers, of recruits to rise we must make nursing acceptable not only to the untried girl but to her sisters, one, two, or three years older, who have already crossed the hospital threshold. This, in the short as well as the long run, will prove the best publicity for nursing.

TUBERCULOUS CATTLE

THE attested-herds scheme, begun in 1935, can be regarded as the first real attempt to reduce the incidence of bovine tuberculosis in this country; and it was certainly the first to be based on systematic use of the tuberculin test. The progress of the scheme and the various methods that may be used to get rid of tuberculosis in cattle were recently described by Francis,¹ and elsewhere in this issue a veterinary correspondent summarises some interesting new developments in tuberculin testing.

From the standpoint both of public health and of human nutrition the eradication of bovine tuberculosis is probably the most important measure which can be taken by the milk-producer. It is therefore surprising that under the Milk Industry Act, 1939, a farmer who raises calves instead of selling milk receives no reward for establishing a tubercle-free herd, and the farmer who sells milk receives no reward unless his buildings are of such a standard that they can be licensed for the production of tuberculin-tested milk, for which he receives 2½d. per gallon more than for milk of the "accredited"

standard of cleanliness. Since the removal of the old capitation bonus there has been little incentive, where milk is not sold, to maintain or create tubercle-free herds, and many dairy herds which a few years ago could readily have been freed from tuberculosis are now heavily infected because of the purchase of heifers from infected sources. Of the farmers who sell milk, many are now in a stronger financial position than before the war, and would face the expense of eradication if they could get the tuberculin-tested milk bonus; but they may be unable to obtain the necessary licence without expensive alterations to buildings, which the landlord often cannot afford and for which in any event labour and material are lacking. The insistence by local medical authorities on certain building standards for cow-houses, though in itself desirable, is thus retarding the establishment of tubercle-free herds.

The position could perhaps be remedied by reintroducing the capitation payment for all tubercle-free herds, so as to compensate for the expense of eradication in herds whose milk is not sold. With proper grading there could be an additional benefit for tuberculin-tested milk, but instead of the licence depending partly on a somewhat arbitrary building standard it might depend on the quality of the milk as determined by laboratory tests over, say, a six-month period. In some parts of America milk-grading is based entirely on laboratory tests, irrespective of conditions on the farm.² While it may seem retrograde to abandon definite building standards, the fact remains that if a farmer has the ability and enthusiasm to produce clean milk under difficult conditions, and in addition desires to eradicate tuberculosis, he ought not to be prevented by factors outside his control. The veterinary profession and the farming community seem ready to begin a campaign against tuberculosis, and it may be wise to make some temporary sacrifice in building standards so as to let them go ahead.

PROFIT FROM WAR

ALL too often official reports convey a sense of cold aloofness, as if the authors were above all human folly. Not so the report for 1945 by the Chief Inspector of Factories.¹ Here is a document on a subject without intrinsic appeal to many readers, which nevertheless grips the attention by its warm, sometimes anecdotal, style. Signed by Mr. H. E. Chastaney, who succeeded Sir Wilfrid Garrett as chief inspector at the end of 1945, it is largely concerned with the balance of profit and loss from the war years. On the debit side are serious deterioration in standards of cleanliness and upkeep, and a swollen legacy of antiquated buildings. But these setbacks are offset by notable achievements: the number of power-machine accidents has continued to fall; factories constructed during the war have set a new high standard; employers have become more attentive to the physical and mental welfare of their workers; canteens and other amenities are increasingly commonplace; and, through the agency of works' committees, there is growing understanding between employer and employed.

Many concerns, particularly those with small "slum" or "backyard" factories, though within the law, are still very badly housed; eventually perhaps these may get the chance of renting space in modern "flatted" factories. Some of the new buildings constructed during the war have revealed how good conditions can be; to get the best labour employers will have to keep a watchful eye on the conditions they offer. But good wages are still a powerful inducement: "As an ex-company-sergeant-major working in an insalubrious back-street joinery expressed it, 'Well, it's not exactly smashing, but it's Friday that counts.'"

2. Agriculture Overseas. Report no. 1. Milk in North America. H.M. Stationery Office. 1946. See *Lancet*, 1946, ii, 127.

1. Annual Report of the Chief Inspector of Factories for the Year 1945. Cmd. 6992. H.M. Stationery Office. Pp. 104, 2a.

1. Francis, J. *J. R. sanit. Inst.* 1946, 66, 355.

MECHANISM OF HEADACHE IN FEVER

RECENT work has shown that some headaches are due to dilatation of intra- and extra-cranial arteries and increased tension on the vessel wall and perivascular structures; this mechanism has been demonstrated by Pickering¹ for the headache caused by intravenous injection of histamine, for migraine, and for cases of hypertension by Sutherland and Wolff,² who also demonstrated dilatation of intracranial arteries in animals after induction of fever by protein shock.

Bodley Scott and Warin³ have studied the mechanism of headache in 100 patients in M.E.F. who were suffering from acute fevers of various types without evidence of meningeal involvement. The headaches occurred in three constant situations, much the commonest being frontal and temporal; these were usually bilateral but they were predominantly unilateral in 8 patients, including a sufferer from migraine who could not distinguish his febrile headache from his accustomed hemiplegia. The other two situations were at the back of the head above the occipital protuberance and in the upper cervical and lower occipital region, but pain in these areas was always accompanied by fronto-temporal headache. The character of the headache was throbbing, increasing to a constant severe pain exacerbated by each heart-beat and waning as the fever subsided; it was accompanied by peripheral vasodilatation, prominent and vigorous pulsation of temporal arteries, and a raised pulse-pressure. In 93 of the patients with headache there was also a constant boring ache behind the eyes, which often continued for one to two days after the headache had stopped.

The headaches were abolished on one side of the head when the common carotid artery was compressed, and returned on release of the artery; and actions such as straining, which raise the blood-pressure, accentuated the pain, while a fall of pressure due to inhalation of amyl nitrite temporarily relieved it. These findings suggested that the headache of fever is also due to tension on the walls of arteries, and from further tests Bodley Scott and Warin concluded that in some cases the pain is due to dilatation of extracranial arteries, in some of intracranial ones, and in a larger number of both.

They based this conclusion on the difference of response to unilateral occlusion of the temporal artery and to bilateral compression of the jugular vein in three groups of cases. In one group unilateral obliteration of the temporal pulse did not alter the headache, whereas jugular compression lessened it, and in 10 of these patients lumbar puncture was done which showed a normal initial pressure. In these patients the headache was thought to originate from increased tension in the intracranial arteries, jugular compression relieving the pain because its effect is to raise first the intracranial venous pressure and secondarily the C.S.F. pressure, so lessening the difference of pressure inside and outside the arteries and reducing the distending force on the arterial walls. In a second group the headache on one side was effectively relieved by occluding the temporal artery, showing that the cause of the pain was in the extracranial vessels, and this view was supported by the finding in these cases that jugular compression increased rather than alleviated the headache, since the cushioning action of a rise in C.S.F. pressure would not affect the temporal arteries. The third group showed features common to both the other groups, and in these presumably both sets of arteries were involved.

Investigations into the source of the pain behind the eyes were inconclusive. They were relieved by compression of the common carotid artery, increased by

jugular compression, and unaffected by compression of the temporal artery. A raised ocular tension was sometimes found in these cases, and eserine partly or completely relieved the ache in 9 out of 16 cases in which it was tried. It seemed probable that the eyeache arose from some vascular disturbance in the orbit, but its nature remains doubtful.

THE DENTISTS AND THE MINISTER

THERE is no sign of agreement between the Minister of National Insurance and the dentists on the scale of payment for insured persons. The negotiations with the Minister are in the hands of the Joint Advisory Dental Council (J.A.D.C.), which represents the British Dental Association, the Incorporated Dental Society, and the Public Dental Services Association, and in November the J.A.D.C. advised the profession to accept a scale of fees proposed by the Minister. Since then, however, the British Dental Association has met and rejected this scale. The Public Dental Services Association has accepted it, and the Incorporated Dental Society is meeting shortly; but since the B.D.A. has a membership of 7500, against a total of 4500 for the other two bodies, it is unlikely that the Advisory Council will continue to support the Minister's scale in face of B.D.A. opposition. Meanwhile most dentists are refusing to accept dental letters but are doing urgent work for panel patients on a private basis.

NEW YEAR HONOURS

THE New Year honours include three knighthoods for medical men. Mr. Eardley Holland recently concluded a notable presidency of the Royal College of Obstetricians and Gynaecologists, whose position in the counsels of the nation he has done much to assure. Major-General H. C. Buckley, I.M.S., is the former principal of the Medical College, Agra, and Dr. C. E. Hercus, professor of bacteriology and preventive medicine at Otago, was a welcome visitor to this country last summer. Other honours conferred include:

C.B.

Surgeon Rear Admiral H. R. B. HULL, M.R.C.S.
Major-General E. A. SUTTON, C.B.E., M.C., M.R.C.S.

C.M.G.

Prof. P. A. BUXTON, M.R.C.S., F.R.S.
MELVILLE MACKENZIE, M.D. Lond.
ALBERT R. SOUTHWOOD, M.D., M.S. Adelaide.

C.I.E.

Major F. A. B. SHEPPARD, O.B.E., M.B. Melb., F.R.C.S.E., I.M.S.
Lieut.-Colonel W. J. WEBSTER, M.C., M.D. Aberd., I.M.S.

C.V.O.

DANIEL T. DAVIES, M.D. Wales, F.R.C.P.
F. ANDERSON JULER, M.B. Camb., F.R.C.S.

C.B.E.

ELDRED CURWEN BRAITHWAITE, O.B.E., M.S. Durh., F.R.C.S.E.
Air Commodore H. OSMOND CLARKE, M.B. Dubl., F.R.C.S.
JAMES HARDIE-NEIL, D.S.O., M.B., of Auckland.

O.B.E.

F. A. L'ESTRANGE BURGESS, M.B.E., M.R.C.S.
PERCIVAL P. COLE, M.B. Birm., F.R.C.S.
P. F. J. L. R. DU VERGÉ, of Mauritius.
Lieut.-Colonel E. F. EDSON, M.B. Sheff., R.A.M.C.
JOHN W. H. GRICE, M.R.C.S.
C. D. JOHNSTON, M.D.
Squadron-Leader R. A. MOOREHEAD, M.B. Belf., R.A.F.V.R.
PATRICK W. R. PETRIE, M.B. Edin.
Major E. SOYSA, Ceylon Medical Corps.
JAMES GRAHAM WILLMORE, M.D. McGill, M.R.C.P.

M.B.E.

LEON GILLIS, F.R.C.S.
CHARLES STUART OGILVIE, L.R.C.P.F.

1. Pickering, G. W. *Clin. Sci.* 1933, 1, 77.
2. Sutherland, A. M., Wolff, H. G. *Arch. Neur. Psychiat.* 1940, 44, 929.
3. Bodley Scott, R., Warin, R. P. *Clin. Sci.* 1946, 5, 51.

THE Society of Apothecaries of London has decided to admit medical women to its yeomanry and livery.

Health Centres of Tomorrow

I—SCOPE

"In the last two years there has been such a clamour from sectional interests in the field of national health that we are in danger of forgetting why these proposals are being brought forward at all." This remark by Mr. Aneurin Bevan applies very well to health centres. In controversy on whether, how, where, and by whom these centres shall be built, we have lost sight of why they are needed at all.

WHY ARE HEALTH CENTRES WANTED ?

In 1942 the Medical Planning Commission, after long and detailed discussion by representatives of all branches of medical practice, issued an interim report which said :

"The days when a doctor armed only with his stethoscope and his drugs could offer a fairly complete medical service are gone. He cannot now be all-sufficient. For efficient work he must have at his disposal modern facilities for diagnosis and treatment, and often these cannot be provided by a private individual or installed in a private surgery. He must also have easy and convenient access to consultant and specialist opinion, whether at hospital or elsewhere, and he must have opportunities of real collaboration with consultants. There must also be close collaboration amongst local general practitioners themselves, for their different interests and experience can be of value to each other.

"Greater efficiency and economy would be secured and less expense incurred if groups of practitioners would coöperate to conduct a single centre at which all of them would see their own patients and share equipment and the services of secretarial, domestic, and dispensing staff. The value of the practitioner to his patients would gain immeasurably from his close and constant contact with his colleagues. . . .

"A convenient term for the focal point of coöperation is 'health centre.' . . .

"The health centre must on the one hand preserve the professional independence of the coöperating general practitioners, it must on the other hand be capable of becoming an organised unit in an integrated medical service."

The main purpose of the centre, as the Medical Planning Commission saw it, is to create better conditions for general practice by allowing the more general use of modern methods of diagnosis and treatment, by encouraging practitioners to work with one another and with dentists, nurses, and midwives, and by making fuller use of secretarial and other ancillary staff so as to prevent waste of medical time and effort.

WHAT KIND OF CENTRE ?

Most of this has long been common ground, but opinions differ over the emphasis, and consequent priority, to be given to the several aims. Of the two main schools of thought the first holds that what the general practitioner needs most of all is access to special diagnostic methods carried out on his behalf by experts. The other school chiefly seeks better facilities for the practitioner's own use ; it wants to increase his usefulness by sparing him non-medical tasks and by promoting more coöperation with his fellow practitioners and other health workers.

From the arguments of these two different schools we have different conceptions of the type of health centre needed.

The first would be an elaborately equipped building staffed by consultants and technicians and devoted entirely to the examination of patients already seen elsewhere by the general practitioner. The kind of work done at such a centre would mostly resemble that done in a hospital outpatient department : indeed some of the investigations demanded would almost certainly involve

keeping the patient under observation overnight or even for several days, and thus make it necessary to provide inpatient or hostel accommodation, with nursing and catering staff.

But if the work is to be that of a hospital outpatient department, why should it not be done at the hospital rather than at some special new centre ? True, there are areas without hospitals, where a diagnostic centre staffed by specialists would be invaluable ; but really this is an argument for seeing that every area has a hospital accessible to it. In a genuinely comprehensive service there should be no gaps in hospital provision ; and with modern methods of transport there need be none.

If then the object of the first type of health centre is best fulfilled by the hospital, we can concentrate our attention on the second type—the centre in which general practitioners undertake all work ordinarily coming within their scope, and, where they assist each other, with ample aid from technicians. But before we come to details of the structure, layout, and equipment there are still one or two matters of general policy to be considered.

GENERAL AND SPECIAL WORK

Firstly, what duties should in fact come within the scope of the practitioners who will work in the centre ? Obviously all ordinary methods of examination and treatment now undertaken in the doctor's private consulting-rooms would be included. So also would minor surgical techniques which do not necessitate inpatient nursing. At almost every centre, moreover, there will be one or more practitioners particularly interested in one of the specialties, who could be of considerable help to their colleagues, especially if they could enlarge their knowledge by special courses or experience. Provision should therefore be made in the centre for carrying out the simpler techniques of (for example) dermatology, ophthalmology, and otorhinolaryngology.

What about radiology and pathology ? Is it better to put radiographic and pathological equipment in the health centre, for the use of the practitioner himself (assisted by appropriate technicians), or to put it in the local hospital under full specialist supervision ?

Where a centre accommodates six or more general practitioners there seems to be a strong case for giving it a pathological laboratory with a full-time technician. Such a laboratory could undertake all routine biochemical, many hæmatological, and some bacteriological examinations. It would need to be linked with the main district laboratory, both for the performance of investigations which it could not undertake and for regular supervision by the hospital pathologist, who would have to be responsible for the work of all the health-centre laboratories in his charge. To such a laboratory the practitioner would himself take specimens or (better still) patients ; and whether or not he made his own investigations he would generally get early information. The difficulty, the delay, and the expense of obtaining laboratory help have often prevented or postponed proper investigation of the patient, and have depressed the practitioner—especially the younger man fresh from hospital, where he has been accustomed to such aids. Undoubtedly a very wide undisclosed demand would be revealed wherever a service of this type was established in a health centre, and there need be little fear that a full-time technician would not soon be fully occupied. Laboratory technicians are of course not nearly numerous enough for the establishment of laboratories on this wide scale ; but, as it will probably be several years before the health centres can be built in any number, there is time to recruit and train more of these people if the need to do so is recognised now.

The case of radiology is rather different, and there are good arguments both for and against having radiographic equipment in the health centre. Those who

think it undesirable say that X-ray examination requires complicated and expensive apparatus, which has to be replaced regularly because it is always obsolescent. Its most efficient use demands the services of experts both for taking and for interpreting X-ray pictures. If every health centre were to be given radiographic apparatus, this would have to be comparatively cheap, and would be infrequently renewed or replaced. The tendency would be to use it for tasks beyond its proper capacity, and to entrust difficult radiographic problems to general practitioners who could not justly claim the necessary training and experience. All this would be uneconomical if it meant that the expensive apparatus and skilled ancillary staff of the larger radiological departments were not to be used to the full. And it would be unnecessary if every health centre were linked, as it should be, with a nearby hospital to which the practitioner had easy access, and from which he would receive the fullest possible assistance from an expert team working with the best equipment.

Those who favour wide provision of radiological facilities argue, on the other hand, that times are changing and that we are planning for a future in which we can have standardised and simplified apparatus which will not be costly and which will serve its purpose for many years. We are planning, too, for a generation of doctors who are being brought up to regard radiography as necessary for accurate diagnosis and for any exact estimate of progress and prognosis—who are being taught themselves to interpret X-ray films and are encouraged to be present whenever their patients are examined under the X-ray screen. The health centre will be properly equipped only if it enables them to use the knowledge acquired in their training.

But if, in due course, it proves both desirable and possible to have X-ray apparatus at all centres, this must not be used in isolation: the health centre must be linked with the district hospital in such a way that the radiologist there can keep an eye on the work done at the centre by the practitioners and their radiographer. The radiologist should indeed have regular and frequent meetings with the centre staff so as to be able to offer his expert advice and aid on any radiological problem which may arise, and all examinations outside the scope of the centre and its staff should be referred to the parent hospital.

Such is probably the ideal arrangement for the future; but until there is suitable apparatus, and enough radiographers, the doctors at health centres will have to rely on the hospitals for most of the radiography required. Access to this and other hospital specialist services must be made as simple as possible, or we shall miss most of the improvement of general practice which health centres are meant to promote.

WORK FOR THE LOCAL AUTHORITY

Among the special activities which certainly could and should be undertaken at the health centre are antenatal and postnatal examinations and child welfare. And these bring us to the question of the relation between the general practitioner, working in the centre, and the public-health authorities.

The white-paper on the National Health Service Bill sets out the position thus:

"The Bill makes it the duty of the county and county borough councils to provide, equip, staff, and maintain the new health centres to the satisfaction of the Minister. The local authorities will directly administer such of their own local clinic facilities as they may provide in the centres. Doctors and dentists, however, who use the new centres while participating in the general personal practitioner service will be in contract only with the new Executive Councils, and it will be for those Councils to arrange with the local authorities for the use of the centres' facilities by those doctors and dentists."

The local-authority services which we may expect to be partly or wholly provided at or from the health centre include "antenatal clinics for the care of expectant mothers, postnatal and child clinics, the provision of such things as cod-liver oil, fruit juices, and other dietary supplements, and in particular a priority dental service for expectant and nursing mothers and young children." In addition, the Education Act, 1944, requires the local authority to provide a service both of medical inspection and of treatment for all children attending State-provided or State-aided schools; and while the function of inspection will still be performed most conveniently at the schools, the health centre seems a far more appropriate place for treatment. The local authority has also to arrange a domiciliary midwifery service, and services of health visiting and home nursing; and though in a compact area such as a county borough it may be possible to conduct all nursing services from a central health department in the municipal administrative offices, the more widely spread responsibilities of the county M.O.H. will often oblige him to depute the day-to-day supervision of these services to divisional officers, who may well find that the health centres are their most suitable headquarters.

It will often be necessary, therefore, to establish in the health centres some form of condominium between the general practitioners and the local-authority doctors.

HEALTH

The work of the centre should thus associate the techniques of *curative medicine* and *preventive medicine*, and we may hope that practitioners will increasingly look on the latter as part of their affair. But both cure and prevention are concerned with disease, and an organisation designed solely to promote them would scarcely be entitled to the name of health centre. A health centre ought also to serve the third and newer branch which one might call *functional medicine*, the purpose of which is to help people to make the best use of their capacities—to have life more abundantly.

"Positive health" is a state of well-being above the average, while "negative health" is a state of ill-being below the average. The medical profession has hitherto had to give most of its attention to the negative departures from ordinary health which we call disease; but as curative and preventive medicine grow more successful doctors should have more chance to practise functional medicine—the promotion of positive health. Though the technique of this branch is in its infancy, it is obvious at least that the health centre is a convenient base for what is called health education, applied both to individuals and to groups. Lectures, films, classes, and demonstrations are among the means by which this work can be done, and if there is no more suitable meeting-point for them the public might be invited to the health centre for instruction.

The most attractive place for it would of course be a community centre with some of the characteristics of Peckham, including swimming-bath, gymnasium, restaurant, and equipment for amateur entertainment and hobbies. In some towns it might indeed be possible quite soon to bring the medical work and these social activities under a single roof; but for a long time to come this will be exceptional. Meanwhile, however, the ideal of a true health centre should be kept always in mind, so that our emphasis is increasingly placed on positive health. This is not so much a matter of planning and building as of mental attitude—particularly the attitude of the practitioner.

The term "health centre," like the term "National Health Service," represents an aspiration rather than an immediate probability; though it is none the worse for that. It raises problems of medical education to which we shall return in our concluding article.

Special Articles

CANCER RESEARCH

REVIEW BY DR. PEYTON ROUS

IN his Ludwig Kast lecture at the New York Academy of Medicine on Oct. 8, Dr. F. PEYTON ROUS, of the Rockefeller Institute for Medical Research, outlined recent progress in cancer research.

NATURE OF CANCER

In the last few years, he said, it has been gradually appreciated that cancer is not a separate neoplastic entity but merely one among the immense group of true neoplasms which, however much they differ in cellular composition, all obey the same general principles. A single chemical carcinogen may elicit any of the entire gamut of tumours, the precise type depending upon the kind of cells on which it is brought to bear; and the most widely different carcinogens may cause tumours of identical type. Carcinogens also give rise to the leukæmias, which are now acknowledged as within the neoplastic fold; indeed, every now and then leukæmic cells in animals, if injected into the connective tissue instead of into the blood, give rise to local tumours. (In this lecture the words "cancer" and "tumour" are often used interchangeably.)

Physicians have long been aware that there are agents in the human environment which are capable of causing neoplasms. These agents have now been identified in bewildering numbers, and more must be expected as new physical and chemical processes are pressed into industrial service. The very sunlight is carcinogenic, and the only reason anyone goes free from cancer is because the action of most carcinogens is episodic or weak.

It has now been established that extracts of some diseased human tissues produce tumours in animals; and for some time it has been known that certain normal substances—namely, hormones—may also give rise to tumours. Hormones are not themselves carcinogenic, but they bring the tissues upon which they act into such a disordered and excited state that neoplastic changes take place.

Study of "spontaneous" tumours shows that often they are the outcome of many influences working together or consecutively, often for years. Even the smallest details in the previous history of cancer patients may prove vital for other human beings, by giving hints as to where the chain of determining factors can be broken. In every cancer hospital there may eventually be specialists whose main aim will be to learn precisely how each patient's tumour has come about.

For nearly seventy-five years doctors have known that cancers often start at sites of chronic disturbance, yet chronic inflammation alone is not enough to cause them. Some special influence precipitates the neoplastic change. Some workers, and notably Haddow, have concluded that the cells become neoplastic while they are faring badly, and that the chemical carcinogens act through their depression of cellular activities; and injection of some of these substances causes transplanted tumours to grow more slowly than in control animals. Just before the late war a German surgeon actually painted human cancers of the skin with a powerful carcinogenic hydrocarbon, heedless of whether it induced other growths later on; he reported that the tumours disappeared.

Haddow himself has synthesised numerous hydrocarbons nearly related chemically to those with carcinogenic properties, in an effort to find some which would check established tumours while giving rise to none on their own account; his results so far are encouraging. Laboratory observations in the United States on the effects of the nitrogen mustards in retarding

cellular activity have led to their use in the treatment of lymphoid tumours and leukæmia in human beings.

TRANSMISSION OF GROWTHS

The fact that tumour cells are not ordinary cells which have seized an opportunity to go on the loose is the basis for the present-day search for a chemical trait distinguishing the neoplastic cell; already remarkable differences have been discovered.

Some of the agents which are highly effective in producing tumours—the röntgen ray and bilharzia ova, for example—cannot possibly be the real causes of these growths; their part is played when they have produced neoplastic change. The fact that certain hydrocarbons are capable of inducing tumours has led workers to ask whether substances having similar effects may not be continually elaborated within neoplastic cells, thus maintaining them in their pathological state.

Strains of animals have been procured with striking liabilities to spontaneous tumours, while other strains are remarkably free from these growths. What are the reasons? At first it was assumed that the tumour tendencies were passed through the chromosomes. Then workers in Holland and in the United States, studying hybrids between mice of strains having marked and slight liabilities respectively to mammary cancer, simultaneously found that the tendency to such tumours is handed down through the mother. There followed a startling discovery by Bittner, working at Bar Harbor, Maine. Taking newborn mice away from mother-mice of strains liable to mammary cancer, he had them suckled by females devoid of this liability, and found that he had thus rescued them from the disease in later life. By reversing the experiment, the tendency to mammary cancer could be conferred upon mice of strains not ordinarily having it.

This milk factor reaches the mammary tissue from the gut, and increases in amount as the glands develop, one or more adenocarcinomata appearing in the breasts as the mice grow old. All the evidence suggests that the factor is a virus, except that it does not induce disease directly. The most reasonable explanation is that it is a harmless virus, liable to variation so that it becomes tumour-producing when its cellular environment undergoes pathological alteration, as in the breast of ageing mice.

The discovery of the milk factor has given new weight to the hypothesis that tumours in general may be due to viruses, but recent experimental evidence speaks against the assumption that most tumours are caused by agents of this sort. However, decisive evidence may soon be available; with the electron microscope Claude and Porter have already obtained pictures of chicken-tumour viruses within the cells of the sarcomas that they cause.

TUMOUR CELLS NOT ANARCHIC

A tumour has long been defined as an autonomous new growth. But Huggins's demonstration that many prostatic cancers which have metastasised stand still or disappear after removal of the testicles shows that even the cells of malignant growths may not be truly independent in their behaviour. The meaning of this discovery far transcends its practical application; for it denotes that endeavour in cancer research has been led astray by the idea that tumour cells are anarchic.

The experience with prostatic cancer justified the expectation that many mammary cancers would regress when the influence of the female sex hormones was lessened by removal of the ovaries or by injections of testosterone. The results with women have so far not been very promising, but the fact that cancers of the male breast yield to orchidectomy or to stilbœstrol provides encouragement.

Scarcely a month goes by without some discovery. For example, certain transplantable testicular tumours

in mice will grow only if the new hosts are given oestrogen. Lipschutz, working in Chile and following up Nelson's observation that uterine myomas appear in guineapigs repeatedly injected with oestrogen, has now demonstrated that testosterone will prevent them from developing.

The dependence of some tumours on hormonal influences for success justifies the inference that the change of a normal cell to a tumour cell does not necessarily mean that a growth will ensue. If the caloric intake of mice is cut down so slightly that they are only 5% under weight, carcinogenic agents induce no tumours on their skin. This is not because these agents have failed to bring about neoplastic changes; for if the animals are again fully fed, tumours appear. The "spontaneous" tumours to which mice of some strains are liable can also be prevented by cutting down the food. At the moment much work is under way to learn whether modifications of the diet which involve no caloric reduction will hinder tumour growth.

How shall the presence of incipient cancers be perceived? Recently Kidd has demonstrated a distinctive antigenic substance in the Brown-Pearce rabbit carcinoma. Though this finding may raise hopes of multiple diagnostic blood-tests, it does not foster faith in the chance of a single general test. Even the possibility of multiple special tests is still problematical, since in rabbits with the tumour just mentioned the production of antibodies necessary for serological tests is inconstant despite the fact that every one of the growths contains the specific antigen.

SPECIALIST STATUS IN CANADA

FROM OUR CANADIAN CORRESPONDENT

Lord Moran is reported as saying recently that in Britain anyone on the Medical Register can call himself a specialist and none can say him nay. Until lately this was so in Canada too. Some years ago the province of Alberta entrusted the nomination of specialists to the faculty of medicine in the provincial university; but the other provinces accepted laissez-faire as the rule until the federal government announced preparations for a Bill to provide health services throughout the Dominion. Such matters as education and social legislation are the prerogatives of the provincial legislatures, so this Bill was to be designed as a model; and each province that agreed to enact legislation conforming to the model was to be assisted by grants from the federal treasury.

The model Bill is still unpassed, and the provinces have various schemes of their own in force; but these schemes may be modified when the federal Bill becomes law. Every scheme provides for service by specialists, and the licensing bodies of the provinces are asked to make official lists of specialists who are to be recognised and entitled to fees higher than those paid to general practitioners. Registers have been opened by the provincial licensing bodies, known as the College of Physicians and Surgeons in each province.

About ten years ago the Canadian Medical Association asked the Royal College of Physicians and Surgeons of Canada to study the question of certifying specialists. This college grants fellowships in three departments—surgery, medicine, and obstetrics and gynaecology. It decided to issue certificates to specialists who had qualified in a variety of ways other than by becoming fellows of the college. The profession throughout Canada was circularised, and applications for recognition were received and acted upon. For two years these certificates without examination were issued to applicants who presented evidence of qualification, provided that they had qualified not later than 1935 or, in the case of those with superior training, not later than 1939. All others were to qualify by examination; and the first examination was held in September. The specialties so far approved are anaesthesia, dermatology and syphilology, general surgery, internal medicine, neurology and/or psychiatry, neurosurgery, obstetrics and/or gynaecology, ophthalmology and/or otolaryngology, orthopaedic surgery, pathology and/or bacteriology, physical medicine, paediatrics, diagnostic and/or therapeutic radiology, and urology.

The provincial colleges adopted the certificate from the royal college as the qualification for registration as a specialist. Appointment to hospital staffs and clinics throughout the country is becoming more and more contingent upon the holding of a certificate of qualification as a specialist. The next step will be to provide more opportunity for postgraduate study in Canada.

The College of Physicians and Surgeons of Ontario has appointed a committee to work out a scheme of reciprocity in licensure with the General Medical Council of Great Britain. Alberta and Nova Scotia have had reciprocity for many years; and the other provinces made special arrangements during the war. The stumbling-block for Ontario is the foreign list of the General Medical Council. The present regulations require graduates from European universities to attend final-year classes at a Canadian school of medicine. Except for British subjects, Canadian citizenship is also required; naturalisation is granted only after five years' residence in Canada.

TUBERCULIN AND THE CONTROL OF BOVINE TUBERCULOSIS

FROM A VETERINARY CORRESPONDENT

THE production of "Weybridge" tuberculin, which is used in all official veterinary testing, has lately been described by Green.¹ Tubercle bacilli are grown on a synthetic medium and precipitated with trichloroacetic acid. From this precipitate a purified protein derivative (P.P.D.) tuberculin is produced, which is standardised by chemical and biological methods. The mammalian tuberculin used for testing cattle contains 1.5 mg. P.P.D. per ml.—i.e., it has about three-quarters the activity of undiluted "O.T." tuberculin. Avian tuberculin used in the official comparative test contains 0.4 mg. P.P.D. per ml. The ratio of 1.4 to 0.5 is about that in natural mammalian and avian tuberculins. Weybridge P.P.D. probably contains complexes with molecular weights varying from 8000 to 64,000, most of them being about 16,000. This size of tuberculin molecule does not provoke tuberculin sensitivity in injected animals.

The "specificity factor" of tuberculins produced from the different types of tubercle bacilli has been studied in detail, and during 1943-44 J. L. McGirr attempted to increase the specificity of various tuberculins by chemical treatment.

Treatment of mammalian P.P.D. (either human or bovine) with ninhydrin or chloramine-T, or by exposure of dilute solutions to strong light, or by gentle oxidation, damages the non-specific grouping much more than the specific groupings and therefore yields a protein derivative more specific than the P.P.D. from which it was derived. The same type of treatment applied to an avian or johnin P.P.D. damages the specific groupings more than the non-specific ones, and yields a protein derivative less specific than the mother protein. Human-strain P.P.D. treated with chloramine-T gives much the same reactions as the mother substance in guineapigs sensitised with *Mycobacterium tuberculosis* of human strain, but in guineapigs sensitised with avian strain the reactions are very different. The "specificity factor" is increased fourfold, without significant reduction in "potency" so far as human-strain sensitisation of guineapigs is concerned. When, however, the method is used on tuberculous cattle in the field, erratic results are encountered, and practical applications therefore await further research. Apparently there is a pronounced difference in the reaction of different species of animals—an interesting finding which may dethrone the guineapig from its proud position in tuberculin research.

During 1947 some 10 million doses of mammalian and avian tuberculin are likely to be issued for veterinary work. Because the dose of P.P.D. used in man is usually only one-thousandth of that in cattle, it will be seen that a very small diversion of this material would supply all the needs of human medicine.

Kerr, Lamont, and McGirr,² following observations on hypersensitivity and immune reaction in cattle infected with *Trichomonas fetus*, studied the behaviour

1. Green, H. H. *Vet. J.* 1946, 102, 267.

2. Kerr, W. R., Lamont, H. G., McGirr, J. L. *Vet. Rec.* 1946, 58, 443, 451.

of tuberculous cattle. They showed that after parturition there was a loss of skin sensitivity in tuberculous cows, and they concluded that the simplest explanation of this phenomenon is that the formation of colostrum, with its considerable antibody content, creates a state in which fixed-cell antibodies are abstracted into the general circulation and then drained into the colostrum. Many difficulties, of course, arise in accepting such a hypothesis, but more precise information must await the results of further investigations. Of 13 colostrum-fed calves from mammalian infected cows, 3 showed definite evidence of passive skin sensitisation.

The same workers also demonstrated that under various conditions the injection of tuberculin resulted in a loss of skin sensitivity. During the experiments on desensitisation it became evident that, after a single intradermal injection of tuberculin in an infected bovine, the site of the original injection had an enhanced specific sensitivity. This could be detected 6-9 days after the original tuberculin injection; and though the optimum time for its development has not yet been fully explored, a test known as the Stormont test has been developed in which a second injection of tuberculin is given 7 days after the first and the reaction is read 24 hours later. In experiments on 300 animals the Stormont test had an error of 1.66%, as against 15.33% (plus 9% doubtful) for the single intradermal test, and 12.33% (plus 9% doubtful) for the single intradermal comparative test.

A disadvantage of the Stormont test was that it gave strong reactions in animals with skin tuberculosis, but Kerr, Lamont, and McGirr conclude that its merits and possible modifications demand attention.

INTELLIGENCE AND FERTILITY

SIR CYRIL BURT'S FINDINGS

THE first attempt to study the inheritance of mental characteristics by formal tests was made by Sir Cyril Burt, in collaboration with J. C. Flugel, at Oxford in 1907. His latest survey, undertaken for the Royal Commission on Population and lately published by the Eugenics Society,¹ confirms his early observation "that the dull and defective are multiplying more rapidly than the bright."

He finds that during the past generation the decline in the intelligence quotient (I.Q.) has amounted in urban areas to about 1.5 points (equivalent to about 3 mental months for adults), and in rural areas to about 2.0 points (equivalent to about 4 mental months for adults). If prolonged, this decline, of which these are regarded as conservative estimates, would have grave effects. For example, if the rate were to remain constant until the end of the century, the number of youths of scholarship ability would be approximately halved and the number of feeble-minded almost doubled—an outcome even graver than the lowering of the general average by about 5 I.Q. points.

The survey was undertaken on school-children in a London borough. At the poorest school the average number of children in the family was 5.2, and at the best only 2.9; the average intelligence quotients were 98 and 113 respectively. Thus the children from the poorest social classes not only had an intelligence nearly two years below that of the children from the better social classes but were drawn from families nearly twice as large. The suggestion that the inverse correlation between size of family and intelligence may be simply due to differences in reproductivity between the different social classes is refuted on the score that the correlations are still significant (ranging from -0.11 to -0.18) among pupils of a fairly homogeneous social and occupational class. The important conclusion is not that the smaller, well-to-do, classes are producing few children but that among the more numerous working classes it is still the most intelligent families that contribute fewest to the next generation. With the rise in the standard of living throughout the whole community, the class correlation will grow smaller; and the partial correlation with intelligence will soon outweigh the partial correlation with occupational category or economic group.

1. Intelligence and Fertility: the Effect of the Differential Birth-rate on Inborn Mental Characteristics. By Sir Cyril Burt, M.A., D.Sc. Oxf., hon. LL.D. Aberd., Professor of Psychology, University College, London. London: Eugenics Society and Hamish Hamilton. Pp. 43. 2s.

Reconstruction

HOSPITAL ADMINISTRATION

LAY OR MEDICAL?

FROM A CORRESPONDENT

RECOMMENDATIONS made by the Medical Superintendents Society and endorsed by the British Medical Association some months ago urged that "the administrative head of a large hospital or group of small hospitals should ordinarily be a medical practitioner, designated medical superintendent." The *Hospital* has been championing the cause of the layman. It is a controversy which has been smouldering for years. And now there seems to be a danger that if the rival parties continue to express their views in a self-interested manner we may find ourselves confronted with a first-class source of friction which could gravely handicap the new service.

The controversy as thus conducted is apt to turn on the question of the efficiency of the medical man as an administrator. His supporters claim that "other things being equal"—a favourite phrase in this context—the doctor possesses by virtue of his training and outlook certain advantages over his lay opposite number. He can, it is said, more easily speak the same language as the medical staff, he can cope better with the matron and nursing staff, and so on. The laymen claim on the contrary that the doctor cannot be expected to have that background of knowledge of administration which they regard as essential.

It is true that the need for knowledge of many technical aspects of hospital work has increased rapidly in recent years; but this fact is an insufficient basis for the lay case. If a layman with relatively little experience, but with a flair for administration, can get it up relatively quickly and become sometimes an exceptionally good administrator there is no reason why a medical man with a similar flair should not do the same.

The controversy, when waged on these lines, is apt to result in the tame conclusion that provided you get the right man it does not very much matter whether he is a doctor or a layman. But this is surely to miss the significance of the issues raised. Discussion on the relative "efficiency" of medical man and layman implies a lack of grasp of the principle on which the medical profession in this country conducts its affairs and influences the life of the country.

THE DOCTOR'S RÔLE

The status of the medical profession is bound up with its function of giving advice. The doctor at the bedside may on occasion adopt a tone of command, but he does not forget that in the last resort he is but offering advice. So now, under this new Act, the Central Health Services Council and the advisory committees will stand in an advisory relation to the Minister. The medical officers of the Ministry in turn stand in an advisory relation to their lay colleagues, on whom rests the responsibility for giving effect to decisions of policy.

It is of vital importance to the proper status of medicine and of the profession under the new régime that this distinction should be preserved right through the organisation. If, and in so far as, we depart from it, we shall find the profession entangled in policy: and policy means, in the last resort, politics. It is a piece of good fortune that in the typical organisation of our great voluntary hospitals we have a pattern, a form of machinery, which preserves the distinction intact—an organisation which fits easily and without embarrassment into the general framework which has to be preserved. The lay board lines up with the lay side of the Ministerial organisation: the medical staff retains its clear advisory status in relation to the policy of the institution.

Seen in this light, there is little room for doubt that the lay board is best served by a lay executive officer; who, by very reason of the fact that he does not possess medical qualifications, is free from the temptation to lose sight of the all-important distinction between his own sphere and that of the profession. Talk of the relative "efficiency" of the layman and of the medical chief executive slides into the background as the mere irrelevant issue that it really is.

MEDICAL SUPERINTENDENTS

The medical superintendent of a progressive local-authority hospital, proud of the efficiency of his unit, will find this doctrine hard to accept. It is only natural that this should be so.

The medical superintendent first appeared in the old "institutions" as a direct result of *The Lancet's* inquiry of 1865, which exposed the neglect arising from reliance on occasional visits by outside practitioners. He and his salaried whole-time staff have ever since been a feature of the public hospital provision in this country. But he has in fact carried only partial responsibility for the group of lay functions that together comprise policy and administration. This responsibility rested first on the guardians, and since 1929 has lain with the committee of the local authority. The effect of grouping the hospitals under local authorities has often meant the exercise of administrative and financial functions by people whose contact with, and knowledge of, the hospital was inadequate—*hinc illæ lacrimæ!* The achievements of the more capable medical superintendent are properly seen, therefore, not as a natural result of an excellent system but as a tour-de-force of personality, and a triumph over adverse circumstances for which all credit is due to him.

But we must not forget that there is another side to the picture: in the medical world of our generation none are more to be pitied than the hospital medical superintendents who find themselves "in charge" of institutions which they are powerless to improve and of whose deficiencies they are acutely aware. It is not their fault: it is the fault of a system which has used the medical man as an instrument, as an executive, and has ignored his proper professional status. His administrative appointment has destroyed his power to protest with a voice that can be heard: he is a servant, he must not speak out. His presence has been used as a screen to hide the inadequacies of a system which failed to place the administrative responsibility squarely on the shoulders of those who hold the purse-strings.

Happily this phase is now about to pass. It is one of the fundamental intentions of the present Act, by means of the hospital management committees, to break up remote control where it now exists; and to ensure that, subject to the necessary degree of regional supervision, the affairs of each unit shall be managed by its own management committee. Of special importance is the fact that each such committee is to have its own budget, to be responsible for the allocation of resources as between one department and another. The management committee will thus have far greater financial (and ipso facto administrative) freedom than does the typical municipal hospital today. This is as it should be. But it carries the implication that the management committee will require the twin machinery of a predominantly lay body on the one hand, bearing ultimate responsibility for policy, and a medical advisory committee on the other, safeguarding professional interests and keeping the lay body up to scratch. In this scheme of things the executive officer is best unencumbered by medical qualifications. He will not be tempted to go outside his own proper sphere.

A DIFFERENT ARRANGEMENT

Does this mean that there is no place for a medical superintendent? If the question means "should the

executive officer of the hospital management committee be a doctor?" the answer must be that to thrust the medical man in here is to place him in a false position vis-à-vis his medical colleagues. If on the other hand the question means "is there in a large hospital no room for a senior man resident in the hospital discharging other functions?" a different answer can be given. Here we are on less certain ground, but a suggestion may perhaps be hazarded.

It is often a defect in the voluntary hospitals that there is no resident (or at least whole-time) senior medical man supervising the junior staff and available in the absence of his consultant colleagues to give advice in emergencies. Here we have surely a group of functions (which might well be combined sometimes with the secretaryship of the medical committee) the importance of which needs no emphasis. One great hospital in London, and others in Scotland and the North of England, have experience of the value of appointments approximating to that we have sketched out.

It is doubtful, however, whether the title of medical superintendent is the right one for the future, or indeed quite appropriate. The words have come to have a connotation which, unless corrected by a strong tradition at the hospital in question, may lead to friction and difficulty. There is a word which carries the right note of dignity and authority tempered with fatherly care for the younger members of the community—"dean." If the medical schools and the universities are not too jealous of an extension of a good old English usage, the hospital management committees could well find a place for a medical dean of the hospital. He should not find it difficult to work in harness with a lay house-governor, and indeed there are often times when the house-governor and the matron would welcome someone upon whom to unload difficulties which fall more appropriately to his sphere than to their own.

There is not, or rather there should not be, a question here of relative "status." Status flows from function: the two functions are distinct, and each carries an importance quite sufficient in its own right to ensure the necessary status. Such a plan surely offers the means whereby the advisory relationship of the profession vis-à-vis the administrative side of the hospital services may be safeguarded, and the profession freed from the temptation to share directly an administrative responsibility which must ultimately rest upon the Minister in Parliament and not upon his professional advisers.

THE REGIONAL AREAS

As we have already recorded, the Minister of Health has laid before Parliament an order defining the areas for which regional hospital boards will be responsible under the National Health Service Act.

On Nov. 15 he sent to more than 200 bodies his provisional proposals for the boundaries of these areas,¹ and asked for their views and advice. Among those from which he has received observations are the universities and medical schools, the British Hospitals Association and its area committees, the three Royal Colleges, King Edward's Hospital Fund for London, the Nuffield Provincial Hospitals Trust, and the local health authorities (county and county-borough councils). In the light of their views he has made a number of modifications, which are shown in the map overleaf.

The following are the more important amendments:

Goole and neighbourhood are associated with Leeds instead of Sheffield.

Burton-on-Trent and neighbourhood are associated with Birmingham instead of Sheffield.

Hinckley is associated with Sheffield instead of Birmingham.

The whole of Bedfordshire is associated with London instead of the northern part being associated with Cambridge.

1. *Lancet*, 1946, ii, 804, 842, 876.

High Wycombe and district are associated with Oxford instead of London.

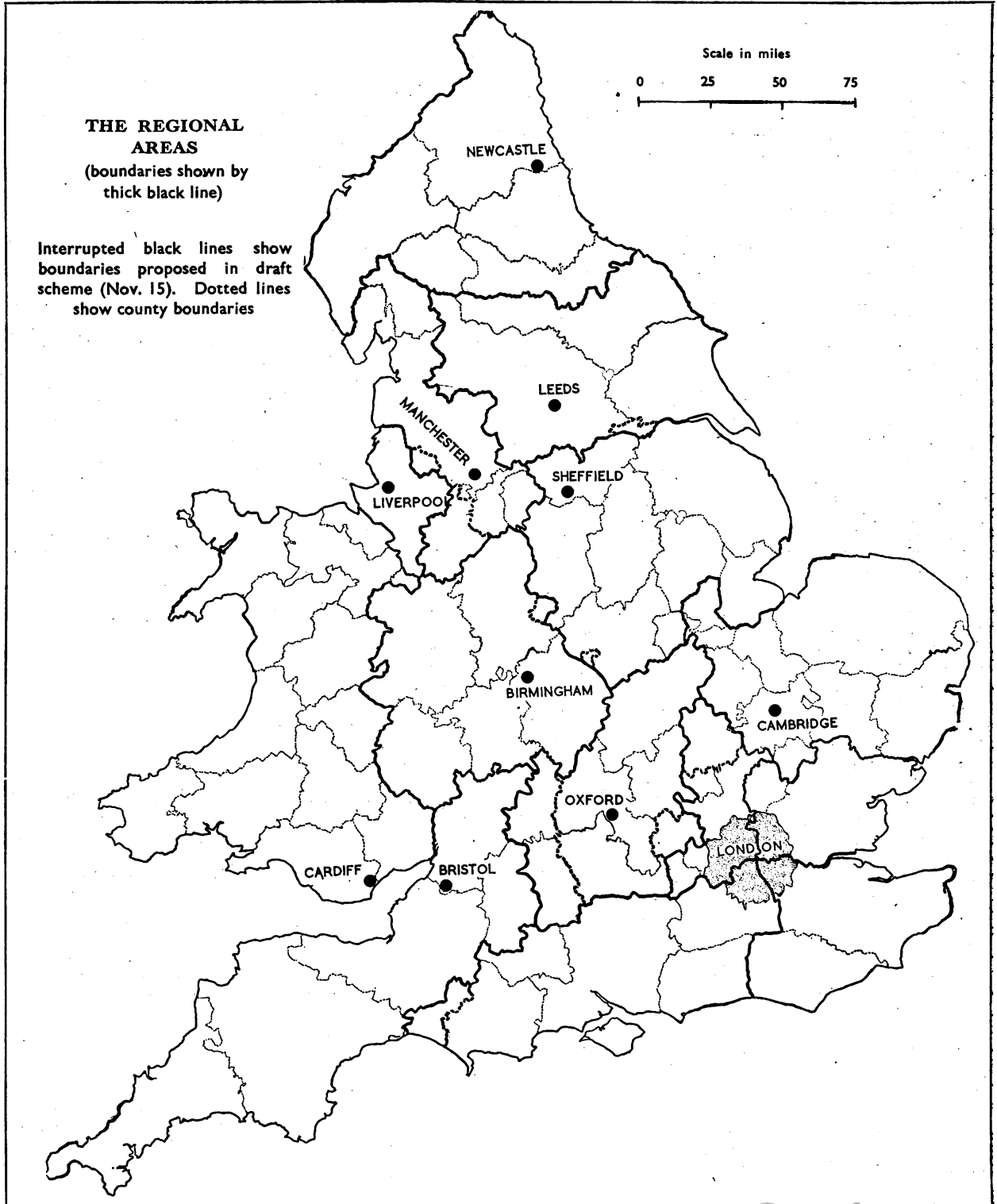
West Dorset (except Lyme Regis) is associated with the South-west London region instead of Bristol.

North-east Gloucestershire and North-east Wiltshire (including Marlborough and Swindon) are associated with Oxford instead of Bristol.

Wigan and district and Crewe and district are associated with Manchester instead of Liverpool.

Representations have been made that the area of the Liverpool region is inadequate to meet the needs of a large medical school and modern teaching hospital. The

Minister realises the force of this contention and he has kept in mind the needs of the Liverpool region. He feels, however, that they can best be met by administrative arrangements rather than by varying the regional boundaries, which would create other difficulties. There has long been a close link between the Liverpool hospitals and North Wales and this will be preserved by providing representation for Liverpool representatives on the Welsh regional board. Similarly there are links between Liverpool and North Lancashire which will be maintained by appointing for that area a subcommittee of the Manchester regional board on which Liverpool representatives will sit.



Medicine and the Law

Drugging the Truth out of Witnesses

OVERSEA tribunals and criminologists have sometimes played with the idea of using drugs in order to detect the falsity of evidence or at any rate to elicit the truth. Some such application of drugs was mentioned in the High Court in London lately during a case of a non-criminal nature. Mr. Justice Denning was hearing an appeal in respect of an ex-Serviceman's pension. Counsel for the appellant said the man was invalided from the Army by reason of psychoneurosis which the Pensions Appeal Tribunal held not to be attributable to war service. While still serving, said counsel, the man went sick. A psychiatrist was said to have obtained the truth about his condition under the influence of 'Amytal'; the man had then confessed that he was afraid of going overseas.

After argument as to the admissibility of this evidence, the judge said he would have thought it admissible; whether it was reliable was another question. He thought the evidence similar to evidence of blood-group tests in cases of disputed paternity. It would be a question how much weight should be attached to it. The court apparently was not troubled further with this problem; the judge, finding that there was no previous history of mental trouble, was satisfied that the disablement was attributable to war service. The man's appeal was therefore allowed.

If an attempt were made to use a "truth drug" against an accused person in an English criminal court, the judge would reject its results as an involuntary confession. Even where an accused person happens to make a voluntary statement, he is not to be cross-examined in custody; the police must put no question to him thereon except for the purpose of removing elementary and obvious ambiguity. This prohibition was laid down in the "Judges' Rules" in 1918, which did no more than restate the principles of judicial practice on which courts act when deciding whether evidence is admissible. The whole subject was examined by the Royal Commission on Police Powers, presided over by Lord Lee in 1929. The commission's report (Cmd. 3297) paid THE LANCET the compliment of reprinting from its columns a note on the use of hyoscine in a police investigation in Hawaii (1928, ii, 990). The Lee Commission cited this incident with obvious disapproval as an illustration of the lengths to which third-degree methods might be carried in countries where there were no restrictions on police action. The note referred to an earlier article (1922, ii, 1082, 1190) on a paper read before the State Medical Association of Texas, which suggested that experience of the use of scopolamine in obstetric practice might perhaps be applied for the detection of guilt in criminal cases. British justice insists on giving an accused person a fair run. To use a lie-detecting machine on him would be as unsportsmanlike as shooting a fox. But even if the machine were vouched for by eminent scientific authorities and if its testimony were admitted, our judges and juries would still find difficulty in overcoming their natural repugnance to expert evidence.

Death after Gold Salt

On Dec. 21 we drew attention to an inquest held by the Manchester city coroner on a woman who was found to have died as the result of gold injections for rheumatoid arthritis. Within a few days the Manchester county coroner held an inquest at Ashton-under-Lyme on a very similar case. This inquest was on a woman who two years ago, at the age of 36, developed rheumatoid arthritis, for which she was twice treated in hospital. According to the *Ashton-under-Lyme Reporter* (Nov. 22), her own doctor began gold treatment ten months ago; after ten injections her condition was improved and the treatment was stopped. Three months later she was given

a further five injections, at the end of which she became listless and her condition deteriorated. On readmission to hospital she received six large blood-transfusions, but hæmorrhage continued and she died from aplastic anæmia. The coroner said he was satisfied that the gold had not been given in excessive doses, and suggested that there might be hypersensitivity to the drug. A verdict of death from misadventure was recorded.

Public Health

The Third Quarter

FIGURES of births and deaths in the third quarter of the year appeared in our issue of Nov. 9 (p. 695). The Registrar-General's report for the quarter¹ shows that the infant-mortality rate—35 per 1000 related live births—was the lowest ever recorded for England and Wales, being 7 per 1000 below the average rate for the third quarter of the ten preceding years, and 2 per 1000 below that for the September quarter, 1945, which was the previous lowest. The diarrhoea death-rate for children under two years of age was 3.2 per 1000 live births, compared with 6.2, 5.5, 5.6, and 4.2 in the four preceding quarters.

Marriages totalled 109,047, which was 10,400 fewer than the number registered in the September quarter, 1945, but 9663 more than the average for the five years 1940-44.

Infectious Disease in England and Wales

WEEK ENDED DEC. 14

Notifications.—Smallpox, 0; scarlet fever, 1392; whooping-cough, 1664; diphtheria, 328; paratyphoid, 5; typhoid, 7; measles (excluding rubella), 6957; pneumonia (primary or influenzal), 693; cerebrospinal fever, 31; poliomyelitis, 14; polioencephalitis, 0; encephalitis lethargica, 0; dysentery, 68; puerperal pyrexia, 148; ophthalmia neonatorum, 43. 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, 3 (0) from diphtheria, 6 (0) from measles, 7 (1) from whooping-cough, 63 (7) from diarrhoea and enteritis under two years, and 22 (2) from influenza. The figures in parentheses are those for London itself.

Sheffield reported the death from an enteric fever. There were 10 fatal cases of diarrhoea and enteritis at Leicester, 8 at Manchester, and 6 at Liverpool.

The number of stillbirths notified during the week was 296 (corresponding to a rate of 31 per thousand total births), including 42 in London.

WEEK ENDED DEC. 21

Notifications.—Smallpox, 0; scarlet fever, 1201; whooping-cough, 1586; diphtheria, 242; paratyphoid, 6; typhoid, 4; measles (excluding rubella), 7728; pneumonia (primary or influenzal), 741; cerebrospinal fever, 29; poliomyelitis, 13; polioencephalitis, 2; encephalitis lethargica, 0; dysentery, 62; puerperal pyrexia, 133; ophthalmia neonatorum, 79. No case of cholera, plague, or typhus was notified during the week.

Deaths.—In 126 great towns there were no deaths from scarlet fever or enteric fever, 3 (1) from diphtheria, 4 (0) from measles, 18 (1) from whooping-cough, 91 (5) from diarrhoea and enteritis under two years, and 26 (5) from influenza. The figures in parentheses are those for London itself.

Liverpool reported 11 deaths from diarrhoea and enteritis, Manchester and Birmingham each reported 10, and Leicester 7.

The number of stillbirths notified during the week was 269 (corresponding to a rate of 29 per thousand total births), including 29 in London.

1. Registrar-General's Return of Births, Deaths and Marriages for the September Quarter, 1946. H.M. Stationery Office. 6d.

ANY nursing-home, even if not licensed as an institution by the Ministry of Food, may now have four additional rations of soap on behalf of each expectant mother whose confinement takes place in the home. Application should be made by matrons to the local food office, and must be accompanied by the expectant mother's ration book R.B.2 (EM).

In England Now

A Running Commentary by Peripatetic Correspondents

IN these days of atom bombs and other monstrous follies of man, it is a relief and joy to find places where human happiness on a simple scale reigns. The other day I went to see some children suffering from bronchiectasis, which is a miserable affliction for a child. But they were all as happy as could be doing gym—or I suppose I should call it physiotherapeutic exercise. The young woman taking the class was overflowing with energy and enthusiasm, so that what might have been dull exercises were one long game, and the children were in turn engines, windmills, and crocodiles trying to bite her toes. From time to time a child would need to bring up sputum, and without a trace of self-consciousness would run to his mug at the side of the classroom, spit it out, and immediately return to the game. Later, at tea with the matron, there were endless happy anecdotes of the children, ending with bringing in little Harry, who sang a song about a train going to the sea, and "would it please take me." Unfortunately, little Harry could not remember how to stop, so the train went round and round until Harry's dilemma was solved by the matron who brought it to a standstill with a chocolate biscuit. By the time I left I could almost feel that the children were lucky to have an illness which took them to such a place.

As a contrast I visited a home for chronics, who would normally have been either a miserable burden on their families or the flotsam and jetsam of life swept into the backwaters of an institution. But far from it. They lived in a hostel looked after by a woman who so enjoyed her work that all the old ladies—average age about 80—were as merry as could be. Introduced to each one punctiliously by name as a friend and neighbour, the afternoon went rapidly by in a stream of lively chat, ending with an old lady who, having to sleep sitting up leaning against a cushion, said, "I'm luckier than the others—I sleep with my old man," giving the cushion an affectionate squeeze. Those old women, well past medical aid so far as returning to a useful life was concerned, still had some years of happiness to enjoy, free from troubles, neglect, or the reproach of wearing down their younger relatives. Here the term "chronic sick" implied not misery, weariness, or even incarceration, but just a happy old age.

I have always been interested in soup since as a boy it formed a staple part of my diet. Kale, Scotch broth, cockie leekie, hare soup, salmon cream, game, white and brown onion soups, pot-au-feu (the Borderers have many affinities with the French) were all standard dishes. This was not peculiar to our household but common throughout the town. The nutritive and economical values of soup were well appreciated. It is said that one worthy possessor of a large family used to encourage his brood with the adjuration: "Them that sups the maist soup gets the maist meat." But my interest was clinched at my oral in medicine when one examiner was touting me sorely over biochemistry. The other, his senior and a kindly soul, interrupted him blandly with a question about nephritis in a girl of twelve. Turning to him gratefully I launched out on the specific and general treatment—I knew his method—and in detailing a diet mentioned broth. "And how do you make broth?" he asked. "You cannot just say broth to an ignorant mother. You must tell her how to make it. Give me a recipe." The junior examiner nursed his wrath while I went into culinary minutiae, silently thanking my chief who used to import his sister into the infirmary to lecture his clinic on invalid cookery. The five minutes spent on this took me safely to the bell and a pass.

I maintain my interest in soup these days by making it myself; my wife heartily approves of this hobby and I find it satisfies the experimental urge as well as the wame. It is marvellous what can be done with the produce of a small garden which includes a goodly variety of herbs, even without meat stock. Still, there is little difficulty about the latter even today. In the southern

English town where we now dwell my wife has never any trouble in getting soup bones from the butcher. There is no demand among the local people, I keep on recommending soups to my patients for various reasons, not least to improve their nutrition and give them mineral salts that they would otherwise lack. I fear however I am merely gathering a reputation for eccentricity, because making soup is far too much trouble for the average housewife with whom I have to deal. It is a pity, for much valuable nutriment is thereby wasted.

Before the war Professor Mayer, of the Collège de France, used to say that one could divide France geographically into two parts. In the one it was customary to throw away water in which vegetables were boiled. In the other the vegetable water was always used for soups and sauces, and the state of nutrition was demonstrably better than in the former area.

I could expand this subject almost to book length. Perhaps some day I shall.

If, as Dr. Moody (Dec. 28) suggests, a psychiatrist can dig such unpleasant experiences out of the subconscious that actual physical signs appear, surely he can dig out some pleasant experiences and thereby produce desirable physical effects? I am going to set up an Abreaction Holiday Clinic. Under a little 'Pentothal' my patients will be made to recall that prewar week at Torquay or Hastings—the heat of the August sun on their backs, the chill of the water as they took their first plunge, the soreness of their feet from unaccustomed climbing on the rocks, the mighty blow-out at the hotel afterwards. They will cram the health-giving properties of a week at the seaside into 30 short minutes. And if when they come round and are handed my account they doubt my word for what has taken place, there will be the stigmata of a mahogany face and two stone on their weight to convince them. There will be no more need to queue for emergency ration books, to hoard petrol for the journey, or to write endless letters pleading for non-existent reservations. People will come in hoards (I'd almost said queues), and in a couple of months I ought to take enough to take self and family to the sea this summer.

I think it was Chesterton who dismissed a whole epoch with the damning phrase: "They have no songs." And that, I believe, is what is wrong with our profession today. I am not disposed to think that I can remedy the whole defect myself, though the post of song- and slogan-writer to the new health service might be an attractive one if adequately remunerated on a per-*item* basis and if a right of appeal to the Poet Laureate were assured. It is rather in the hope of encouraging other readers to try their hand that I offer the following small lyric as an example of what I mean.

"Oh Dr. Dain! Oh Dr. Dain!
Are you coming round to meet me, Dr. Dain?
Everybody seems confused
By your ballot—or amused,
Don't you think that you had better try again?
Oh Dr. Dain! Oh Dr. Dain!
My advances you will surely not disdain?
What a service there might be,
If we only could agree!
Absolutely, Mr. Minister! Completely, Dr. Dain!"

In choirs and places (like local meetings of the B.M.A.) where they sing, this lyric may be rendered effectively to the tune of *Mr. Gallacher and Mr. Shean*, provided a sufficient number of members are familiar with the tune of *Mr. Gallacher and Mr. Shean*. A concerted tutti-frutti from the whole council of the B.M.A., led by the booming bass of the Radio Doctor, would without doubt be quite overpowering in its effect, and irresistible to any Welshman. You will see, therefore, that my simple scheme has unexpected and incalculable possibilities, and it only remains for the more imaginative members of the profession—readers of THE LANCET, that is—to start the ball rolling by applying themselves to the composition of suitable lyrics.

* I think line seven rather pithy myself, but the contrapuntist may substitute "entertain" for "not disdain."

Letters to the Editor

THE B.M.A.'S DECISION

SIR,—I have read Mr. Layton's letter very carefully but am still not sure what he complains of, except that he does not like the result of the plebiscite. But why blame the B.M.A.? There was no other body ready and competent to take the lead in ascertaining the opinion of the profession. It invited and obtained the coöperation of all the bodies representing the specialist groups. To say that they have "become absorbed by the B.M.A." is no compliment to men who are quite able to hold their own. They put their ideas into the common pool and produced a set of requirements which they regarded as fundamental to a good medical service, and these have been endorsed over and over again by representative meetings. If Mr. Layton has any other organised body in mind which was or is capable of doing this I should like to know what and where it is. To speak of "the herded will of the medical profession" comes with an ill grace from one who presumably calls himself a democrat. But evidently the old slogan still persists as it did all the time I was in office: "When in doubt, blame the B.M.A."

Mr. Layton has a curious notion about the meaning of the word "strike." I have always thought a strike was an organised refusal to *continue* to work in conditions previously accepted. Mr. Layton apparently proposes to apply it to an organised refusal to accept entirely new conditions never previously proposed. And his B.M.A. history is not correct: the "failure in 1922-23 or thereabouts" was not a strike. It was an organised proposal that insurance doctors should give legal notice to resign from the service unless the Government would arbitrate on the capitation fee. The Government did go to arbitration, with considerable advantage to the doctors concerned.

What the Negotiating Committee will do now I cannot prophesy. But as it has never abjured the principles it declared to be fundamental; as these have not been accepted; as it agreed to the plebiscite; and as it clearly has no mandate to negotiate with a Minister who in any case declines to negotiate (in strong contrast to his Welsh predecessor, Mr. Lloyd George) it seems to me that the next move is up to the Minister if he still wishes to provide that free and comprehensive service he has promised to the public who will shortly be paying for it.

London, S.W.7.

ALFRED COX.

SIR,—Since the collective unconscious of the B.M.A. executive has got down to the level of making arithmetical errors, the ordinary citizen may be left in some doubt as to whether there really is a majority of doctors so opposed to the wishes of the country as a whole as to decline even to negotiate on the new Act. Three considerations seem to me to be of some importance in justifying such doubts.

(1) As your leader of Dec. 21 so well expresses it, "the leaders of the British Medical Association have presented a partial picture of the National Health Service scheme, continually emphasising its risks and imperfections rather than its opportunities." Even among doctors there are many who will vote very largely as they are told; but votes cast under such persuasion scarcely correspond to a resolved determination not to help in working the new service.

(2) Voting in the younger age-groups was in favour of negotiating. Quantitatively, in terms of years of useful service to be expected, such favourable votes average more than the adverse opinion of long-established practitioners, who are naturally more conservative in their outlook.

(3) In the Services there was a majority of Yes's. Although the difficulties of communicating with doctors in uniform are recognised by allowing a longer period for their votes to be returned, this means that the votes of one important section of the profession have not yet been considered in full, and the absence of a "mandate to negotiate" at this stage of the analysis may well be removed by the two-thirds of Service doctors whose votes have still to come in.

In view of these things, the refusal of the B.M.A. council to accept the opportunities offered by negotiation will certainly appear to the general public as arbitrary

and unjustifiable action. Is it too late to reverse this decision?

Manchester.

DOUGLAS A. K. BLACK.

SIR,—I think your leading article of Dec. 21 underestimates the strength of the B.M.A. position. All who voted No on the plebiscite are definitely pledged to support it; but the Yes-men (of whom I am one) are by no means to be reckoned as necessarily its opponents. I voted Yes, partly in a sort of Munich spirit, and partly because I did not wish to be committed to blind obedience to some future decision of the B.M.A. (of which I am a member). But I shall certainly not apply for leave to join the National Service unless I am satisfied that—

1. The relation of the basic salary (if any) to the capitation fee cannot be substantially altered by unilateral action of a politician or politicians.

2. Only professional considerations shall be allowed to influence the appointment of hospital staffs.

3. Every reputable doctor at present established in practice shall have the right to join the service without being required to uproot himself and start afresh elsewhere.

It should be clearly understood that under the Act no doctor has a right to enter the service; he has only the option of asking leave to enter it, and this will only be granted on conditions. Many who would have been willing to negotiate will refuse to exercise this option so long as conditions which they believe to be detrimental to the efficiency of the service are retained.

Paignton.

ATHELSTANE HILL.

SIR,—As a reader of *The Lancet* for over forty years I have always looked upon it as a scientific and not a political journal; but your editorial on Dec. 21, ignoring the majority of general practitioners against negotiation *now*, and your criticism of the British Medical Association for acting on that vote, seems to me to be biased propaganda.

You do not criticise the Minister of Health for refusing to negotiate before the Bill was presented to Parliament, nor for cutting out much that would have been beneficial in the Bill proposed by his predecessor, and the amendments proposed by the House of Lords.

At the time when the National Health Insurance Act was passed I resigned from the B.M.A. on account of their then feeble attempts to improve it, but I am now applying for membership as I see that the association has learned to stand up and not allow a profession to be dictated to and treated like a flock of sheep as Hitler (*Mein Kampf*) described the German people.

The B.M.A. has taken great pains to give both sides of the question a very fair hearing in accordance with their truly democratic principles (vide the *British Medical Journal* of the last two years). They do not allow politics to enter into their discussions, and they have refused to discuss monetary matters in connexion with the new Health Service Act.

Swindon, Wilts.

R. P. BEATTY.

SIR,—May I suggest a "way out" for the B.M.A.? The future medical service concerns mainly the young people. Let a new vote be taken, therefore, restricted to those practitioners who are under fifty years of age. We over-fifties have had our day; let us leave it to the young people to decide how the future service shall be worked. While standing aside and leaving the decision to them, we can yet assure the young people that we will stand by them and support them in whatever decision they may make.

Barnet.

JOHN ELAM.

SIR,—64% of the voting general practitioners of Great Britain voted No. This is a higher percentage than that of the electorate whose votes returned the present Government to power. If votes mean anything this 64%—the men most directly affected—must therefore be accepted as decisive.

Those of your readers who have neither party nor emotional bias can see that your conscientiously propagated gospel has now been found imperfect, and your first reaction is that of the well-known animal which refuses to recognise the existence of that which it fears. I submit that it is you, Sir, and others like you, whose

unwillingness to recognise what 64% of us believe is helping to delay a solution.

Nothing could be further from the truth than your assertion that this 64% was persuaded by emotional propaganda to vote as they did. The fact is rather that their virile determination to remain free obliged the B.M.A. to carry out their policy.

A. B. C.

SIR,—The analyses of the B.M.A. plebiscite conceal the main issue. That issue is "the divergence between the principles of the profession and the provisions of the National Health Service Act."

On a matter of principle surely the opinion of one medical man is as good as another. Every medical man who registers his name becomes subject to a code of professional morality, whatever branch of the profession he pursues. Whatever his work, he may be called to serve on an ethical committee of the B.M.A. or on the G.M.C. It is the distinguishing feature of principles that they apply under all conditions: to test them, they must be tried under every kind of condition, or in this case in every branch of medical activity. Only when the sum of experience and judgment in every such branch is combined in a grand total can the validity of the principles be assessed.

To compare principles in one group with principles in another is undesirable and fallacious. It suffices to say that when the principles put forward by the council of the B.M.A. were viewed in the light of every kind of medical experience, 54% had voted for them and 46% against (by Dec. 16). To allow the judgment of 33% of the profession (the general practitioners) to weigh heavily in a judgment of principle is regrettable. To allow them to plead hardship is understandable; but it is doubtful whether their verdict outweighs that of all the remaining civilian practitioners (11,247 for negotiation, 9784 against), when it is claimed as a determinant of principle. When such a verdict may bring the profession as a whole into conflict with the principles of the British constitution it is most certainly one which needs confirming on appeal.

Hove, Sussex.

WILLIAM BOURNE.

REGIONAL AREAS

SIR,—Your issue of Dec. 14 contained a number of comments, mainly favourable, from various individuals with regard to the proposed regional areas under the National Health Service Act 1946. I have been rather surprised not to find in later issues some attempt to draw attention to difficulties and disadvantages which must arise.

Hitherto it has generally been considered sound policy to integrate as closely as possible the practice of preventive medicine and the treatment of disease. The Local Government Act 1929 made a most valuable contribution towards the attainment of this ideal by bringing together, under the control of the county councils and county boroughs, the public-health and public hospital services of the areas over which they had jurisdiction. During my term of office at the London County Council we had considerable practical experience of the benefits to the inhabitants of the Administrative County of London which arose from this close integration under unit control.

Between the years 1930 and 1939 a first-class public service was gradually built up, which included all aspects of public-health and hospital work, the school medical service, maternity and child welfare, tuberculosis, and venereal diseases. Had it not been for the outbreak of war in 1939 we should have had by 1946 not only a first-class public-health and hospital service for the county of London but also harmonious co-operation with the metropolitan borough health services, the voluntary hospitals of London, and the health and hospital services of all the home counties.

Instead of that most desirable co-operation in the densely populated area of Greater London, without any interference with the autonomy of either the local-government authorities or the voluntary hospitals within the area, we are now faced with a scheme of regional areas which completely breaks up the highly efficient organisations which have been built up after many years of devoted work and after gaining a mass of invaluable practical knowledge and experience.

It is abundantly clear that this tragic disruption of the public-health and hospital work of local-government authorities has been brought about by men whose ideas and ideals have been completely dominated by clinical experience and who have no knowledge or practical experience of the health work, preventive and curative, of local authorities. It would be easy to illustrate in a hundred different ways how the division of the county of London, for example, into four regional areas must inevitably lead to confusion, chaos, and inefficiency. Adverse comment can be made with complete confidence with regard to the regional area for Wales, which is quite obviously designed not on practical day-to-day experience and knowledge but on purely political and nationalistic considerations.

I mention these two very different regional areas for the simple reason that I happen to know them intimately from personal experience; but I shall not be surprised to learn later that similar criticisms can justly be made with regard to most, if not all, of the other regional areas. Unless I am very much mistaken the years of 1948 and 1949 will reveal in a most unpleasant fashion the folly of breaking up well-established public-health and hospital organisations based upon equally well-established local-government areas, and replacing the latter by new regional areas based mainly (except in the case of Wales) upon clinical considerations.

London, W.8.

FREDERICK MENZIES.

PENICILLIN FOR GONORRHOEA IN THE FEMALE

SIR,—Dr. Mascal's account of his failure with penicillin in female cases of gonorrhoea (Nov. 16) raises many interesting points. One is the number of films in which gram-negative extracellular diplococci are reported and are apparently assumed to be gonococci. I think it should be emphasised that gram-negative diplococci, whether intra- or extra-cellular, from the cervix, urethra, or anywhere else are not necessarily gonococci; and that all circumstances have to be considered carefully if the organism has not been cultured and identified. In other words, the microscopic examination of films warrants only a provisional diagnosis. Two cases will illustrate how easily mistakes can be made.

Some time ago I saw a child who had a slight vulvitis. The doctor took a slide, and the laboratory reported gonococci present. The vulvitis was very mild, amounting to little more than an irritation. I repeated the tests, with the addition of cultures: the slides showed gram-negative intra- and extracellular diplococci which were proved by culture to be of the catarrhalis type.

The second case was more important. I was asked by a doctor to see a woman whose husband, in the Services, reported a slight urethritis, which he was told was gonococcal. I gather that there was some doubt about the diagnosis on the first examination, as a second test was taken. He communicated with his wife, from whom he assumed he had contracted the condition, since there had been no extramarital intercourse. If his wife was the source of the infection, the incubation period was long—three weeks. I saw his wife, and on the first occasion could find no abnormality clinically and no gonococci. On a second examination there was slight patchiness about the cervix: films showed a few gram-negative extracellular diplococci; but the cultural appearances of these cocci were not those of gonococci, they did not ferment glucose, and in fact they were not gonococci. Incidentally, this organism was sensitive to penicillin.

I suggest that neither of these persons had gonorrhoea; but had the cultures failed to grow (which, I fear, happens too often) gonorrhoea would have been diagnosed in both husband and wife, with very serious consequences. I do not believe such cases are very rare.

Miss Sandes (Nov. 30) stresses the importance of gynaecological experience for V.D. officers. I would go further and suggest that all gynaecologists should take a short course of 130 hours or so in a V.D. department.

In conclusion, I think that we have been too optimistic in hoping for a cure of gonorrhoea from a single day's treatment with penicillin. I am having far greater success with a single injection of 300,000 units of penicillin in oil and wax, followed by a week's treatment with sulphonamide.

Birmingham, 3.

E. W. ASSINDER.

A MORAL PROBLEM

SIR,—Your annotation of Nov. 30 has stimulated discussion both in the medical profession and in the lay press; and responsibility devolves on the profession for deciding on a matter likely to arouse increasing public concern. The decision should rest on a dispassionate view of the issues, and should so far as possible be unbiased by sentimentality.

There is, of course, no question of attempting to justify the experiments carried out by the Nazis. Examination, and even subsequent utilisation, of the results of those experiments in no way condones the cruelty which was a characteristic feature of Nazi pseudoscientific technique, nor entitles the perpetrators of crimes to expect any remission of punishment. However, precisely because of our determination that such experiments should never again be undertaken, it becomes crucial to discover whether facts are today at our disposal which may never again become available. Refusal to publish the results of these experiments may deprive medical science of information unobtainable in any other way.

Of all the arguments used against publication, that which commands most respect is the danger of establishing a precedent for future crimes against humanity in the name of medical science. Surely the reply to this argument is that to those so perverted as to contemplate resurrecting the concentration camp, with its attendant horrors, no precedent is required, and the absence of precedent would be no restraining force on the execution of their plans. The only possible safeguards against a recrudescence of cruelty on the scale of Nazi Germany lie in the establishment of a peaceful international order based on mutual trust and in the consequent raising of the moral standards of life throughout the world.

Valuable information has already been obtained by observation of victims systematically starved by their Nazi oppressors; yet no objection has been raised on moral, ethical, or political grounds. The published results have given us illuminating information about the clinical picture of starvation, the vitamin deficiencies, and disorders of the blood, and about the treatment of starvation; and the data will find application in many facets of medical practice. Here then is an unequivocal example of mankind benefiting from study of the effects of the inhuman treatment meted out to the victims of Nazi tyranny.

In conclusion may I suggest a practical approach to the problem? Since many of the German "experiments" appear to have been quite senseless, would it not be wise to commission a panel of experts to examine the material and to discard what is clearly valueless? This would, in addition, provide a further safeguard against the ventilation of ill-informed opinion offending the sensibilities of the public and vitiating the purpose of the investigation.

We cannot undo the damage done to human lives nor quicken the dead; but do we not owe it to those who themselves suffered so horribly to do all that we can to reduce the sum total of human suffering?

Preston Hall Hospital, Maidstone. SIDNEY M. HILTON.

CURARE AND POSTOPERATIVE CHESTS

SIR,—As you say in your leader of Dec. 21, when each new anaesthetic is introduced we are assured that here at last is an agent which will not "cause" postoperative emesis and pulmonary complications. Curare is no exception to this rule. In many quarters it seems to be regarded as proved that curare possesses these virtues, but no figures have been offered in support of the thesis. The results summarised in the table below have a special claim to significance as the series ran concurrently; consequently epidemiological factors need not be considered in their interpretation. The curare group contained more women than the other group. "A" chest complications were those associated with a temperature over 101° F or a respiratory rate faster than 24 per minute; they included cases of pneumonia and atelectasis. The remaining patients classed as having chest complications were those in whom a cough with expectoration appeared for the first time after an operation or who had an exacerbation of a pre-existing bronchitis. Only patients undergoing intra-abdominal operations were considered. With a single exception, the curare patients were anaesthetised with intratracheal nitrous oxide and

oxygen after an 'Evipan' or 'Pentothal' induction; a few received a little ether in addition. All had fully recovered their reflexes and many could answer questions in a drunken fashion by the time they left the theatre.

Anaesthetic	Cases	Total chest complications	"A" chest complications
Curare	14	7	2
Other agents	19	8	3

This brief series offers no ground for hoping that curare will, more than any other agent, prevent postoperative pulmonary complications. This finding is far from unexpected, since it has now been shown, times without number, that the primary aetiological factors in these conditions are the operation and the condition for which it is performed.¹ The only other factor of any importance is pre-existing respiratory infection,² and it is against this that prophylaxis should be directed. Apart from the importance of having skilled anaesthetists for difficult cases,³ modifications of the anaesthetic technique are unlikely to be of value.

Cheadle Hulme, Cheshire.

A. R. HUNTER.

PART-TIME NURSES

SIR,—Your annotation of Dec. 14 stating that "Gloucestershire has solved the problem" of the infirmary care of the chronic sick is indeed tidings of great joy for the Christmas season. Honour to those who have been at work to get so great and yet so simple a scheme into being in the short space of time recorded.

While the profession and the press argue heatedly and long over the arrangement of medical services, it is well to be reminded that honest workers doing their daily job with intelligence and sympathy can find solutions ready to hand.

"For forms of Government let fools contest
Whate'er is best administered, is best."

Moor Park, Middlesex.

ESTHER CARLING.

LIVER-FUNCTION TESTS IN JAUNDICE

SIR,—With reference to your second leader of Dec. 28, I should like to support your views as to the value of the flocculation tests in differentiating obstructive from infective jaundice, and to pay a tribute to a clinician to the usefulness of these tests in practice.

A test not apparently investigated along with the study of liver biopsies—namely, the serum colloidal gold reaction (Maclagan's modification)—has been of great value to me in the diagnosis of infective hepatitis even in the pre-icteric stage. I find that my last 50 cases of this condition have given strongly positive results, both in the colloidal gold and the thymol turbidity reaction.

I should like to stress the value of combining the results of a number of tests rather than relying on the result of any one. Very few experienced clinicians would change their diagnosis on one biochemical test, but I can recall two occasions on which I have recommended laparotomy for a jaundiced patient whose symptoms and signs suggested subacute hepatic necrosis but whose biochemical tests pointed to obstruction: both these patients had stones in the common duct. I have found the most useful and reliable combination to be the thymol turbidity, serum colloidal gold, serum bilirubin, direct and indirect, and serum alkaline phosphatase. In obstructive jaundice the flocculation tests have been negative, the direct serum bilirubin raised, and the serum phosphatase above 35 units, and this type of combination of results has appeared in a consecutive series of 20 proved cases. In the more difficult case of an infective jaundice with an obstructive element I have found the positive flocculation tests of value, as these tend to remain constantly positive while the bilirubin and phosphatase sometimes vary even from day to day.

There seems to be a healthy scepticism in the minds of physicians as to the clinical value of liver-function tests, and I think the time has come to suggest that the "empirical" flocculation tests mentioned here and in your leader be no longer called tests of liver function, especially as recent experience has shown that they are

1. King, D. S. *Surg. Gynec. Obstet.* 1933, 56, 43. Brock, R. C. *Guy's Hosp. Rep.* 1936, 86, 191. Bird, H. M., Kilner, S. D., Martin, D. J. *Brit. med. J.* 1943, 1, 754.
2. Campbell, S. M., Gordon, R. A. *Canad. med. Ass. J.* 1942, 46, 347.
3. Dripps, R. D., Deming, M., Van N. *Ann. Surg.* 1946, 124, 94.

often positive in diseases not apparently involving the liver. In spite of this, their place in the diagnosis of a jaundiced patient presenting a difficult clinical picture is, I believe, assured.

Ashford County Hospital,
Middlesex.

A. BARHAM CARTER.

DANGERS OF CALCIFEROL

SIR,—May I correct a small error in your leading article of Dec. 14? You say that Dowling and Prosser Thomas think that there will be no great risk of serious sequelæ with the maximal dosage they employ in lupus—150,000 I.U., or 3·75 mg., daily. In the article from which this expression of opinion is quoted (*Lancet*, 1946, i, 919) the actual words are: "With adequate precautions, and assuming that the patient is under regular observation, it seems unlikely that the administration of calciferol for limited periods in the dosage used by us, which has never exceeded 150,000 I.U. daily, would entail any great risk of causing calcification or other serious sequelæ. There is little doubt, though, that there is considerable individual variation in the toxic threshold."

In fact the dose of 150,000 I.U. daily for an indefinite period is by no means safe, though most patients will tolerate it for two or three months, and some for a longer period, without developing either an important rise in blood calcium or toxic symptoms. Unfortunately it would appear that the effective dose in lupus is often near the limit of tolerance.

I am sure that all dermatologists will agree that heavy dosage of vitamin D is not suitable for the treatment of such trivial complaints as chilblains; some might even go so far as to assert that it is useless.

London, W.1.

G. B. DOWLING.

LEPTOSPIROSIS CANICOLA

SIR,—In connexion with the interesting paper by Dr. Baber and Dr. Stuart (Oct. 26) I would recall that it was my teacher, Prof. Jan Lukes, who identified the *Leptospira canicola*; this was in 1923 at Brno, Moravia, during an extensive epidemic among dogs. He did not succeed in cultivating the organism, but he did transmit Stuttgart disease in animals.

Professor Uhlenhuth¹ has acknowledged the value of Lukes's work, which has been the basis for all subsequent investigations of the subject.

Institute of Morbid Anatomy, Slovak
University, Bratislava.

F. KLEIN
Acting Director.

ETHER ANÆSTHESIA IN 1846

SIR,—Dr. Douglas Guthrie's account (Dec. 21) of the administration of ether as an anæsthetic in 1817 is of great interest. For a long time it was thought that Liston's amputation on Dec. 21, 1846, was the first operation to be performed in Europe under ether. A recent paper by Dr. Ashworth Underwood claimed priority for an amputation in Dumfries a few weeks earlier.

I should like to place on record the details of a hitherto unpublished case which occurred in London, possibly before the Dumfries one. While engaged in some research on the ether centenary, I came across a letter in the collection of documents compiled by Dr. F. W. Cock in 1910, in which Dr. Henry Montague Duncan (1822–1915) gives a personal account of the inhalation of ether in November, 1846. The relevant portion of this letter, dated Oct. 23, 1910, reads as follows:

"Your letter in the B.M. Journal of this date carries me back to the time of Robert Liston, my idolised teacher of surgery. Liston, who was celebrated for his remarkably quick and sure operations, was in 1846 a strong opponent of anæsthesia. As the first in Great Britain to inhale ether vapour, I, now in my 88th year, entered Univ. Coll. in 1846. By the friendship of Mr. Holme Coutts, late surgeon of St. Bart's, in the autumn of 1846 I gained admission to the meeting of the Medico-Chirurg. Soc. to hear George Johnson's lecture on the kidney. After the lecture, the assistant of Dr. Morton of Boston, U.S.A., exhibited his inhaling apparatus. A patient from Univ. Coll. Hosp. who had promised to appear, failed to do so. And as no one else wanted to submit to the trial, I offered myself. For during the enforced five years' apprenticeship of that time, I had studied the effects of nitrous oxide after the method of Sir

H. Davy, and practised its effects on my young acquaintances so safely that I boldly and fully inspired the ether vapour, became unconscious, and awoke in full health and in presence of many anxious faces, the only inconvenience being an itching or stinging of my wrists, which showed that needles had been inserted (without my feeling their punctures at the time) and produced a little bleeding. The Boston visitor thanked me heartily and Mr. Liston was so convinced of the value of anæsthesia that he a few days later engaged the services of Mr. P. Squire, chemist, of Oxford Street, in the construction of an apparatus for administration of ether vapour."

Dr. Duncan thus becomes the first person to be anæsthetised in this country, although it was not for the purpose of an operation. He qualified M.R.C.S. and L.S.A. in 1849, and gained the M.D. Lond. in 1861. He was assistant surgeon to the North London Eye Infirmary. The *Transactions of the Medico-Chirurg. Society* show that the meeting which Dr. Duncan attended took place on Nov. 11, 1846.

London, W.1.

MASSEY DAWKINS.

MEDICAL ADMINISTRATION

SIR,—Your correspondent "F.R.C.S.," writing on Dec. 14 under the heading of Regional Boards, makes a very serious criticism in regard to medical administration of hospitals.

It should be remembered that medical superintendents have been forced to take a position of authority in certain hospitals owing to the backwardness of their own local authority in applying a democratic system of medical government in the hospital. It is such conditions which have caused the Medical Superintendents Society to press for reforms in hospital administration; and in the Manchester area, for example, the local authority, at the request of the medical superintendents, has improved its system of hospital management. The visiting staff form a medical staffs committee and minutes of the local-authority committee are forwarded to the secretary of the medical committee before the meeting of the local-authority committee at the hospital. A member of the medical staffs committee, other than the medical superintendent, can attend meetings of the local-authority committee.

The criticism of "F.R.C.S." against medical superintendents in the latter part of his remarks imputes to medical men a moral sense lower than that possessed by laymen. Surely if a medical superintendent can cancel out the medical committee's advice by a judicious word to the chairman of the local-authority committee such a course could also be followed by a lay superintendent. There is poor hope for medical progress unless members of the staff of a hospital are prepared to work in coöperation for the good of the hospital as a whole, and not to further the interests of one particular person, be he medical superintendent or member of the full-time or part-time specialist staff.

Manchester.

J. M. GREENWOOD.

AMPHETAMINE IN PULMONARY TUBERCULOSIS

SIR,—The article by Dr. Houghton and Dr. Corrigan (Dec. 14) is a valuable one; but I should like to comment on the sentence "Doses much larger than those which we have used can be given, and no ill effects have been found when amphetamine has been administered continually for two years or more."

About a decade ago I had a patient who was going through a period of great mental strain, based on a well-founded fear of professional ruin and social obloquy, and in order to continue with his work for as long as possible took amphetamine 15 mg. daily. After 18 months a rash appeared on the chest, and then he started what seemed to be an exfoliative dermatitis. Eventually the whole of his skin became severely fissured, and he was a prey alternately to intense irritation and to severe pain. No part of his skin escaped, except the scalp which shed epithelium so that when he brushed his hair he, in his own words, stood in a pile of snow.

Withdrawal of the drug and the application of active treatment led to a complete cure although the fear-complex persisted because the conditions causing it were still operative. Presumably therefore the skin condition was due to a toxic element and was not primarily

1. Uhlenhuth, P., Fromme, W. *Handbuch der pathogenen Mikroorganismen*, Jena, 1930, vol. 7, p. 1568.

psychogenic. One knows, of course, that individual idiosyncrasies to drugs are continually observed, but in my opinion this applies to amphetamine far more than to others.

London, W.1.

CHRISTOPHER HOWARD.

RELAPSING BENIGN TERTIAN MALARIA

SIR,—Dr. Johnstone (Dec. 7) in his interesting report on the treatment of relapsing benign tertian (B.T.) malaria, showed that relapses are less frequent with quinine-pamaquin (15.6%) than with 'Paludrine' (43%). It is especially noteworthy that with paludrine the relapse-rate was the same whether 0.05 g. or the tenfold dose, 0.5 g., was given each day.

Your annotation of Dec. 14 says: "Against this achievement must be set the facts that quinine in the dosage advocated has unpleasant side-effects..." You are right: gr. 30 (2 g.) of quinine—corresponding to 1460 mg. (sulphate) or 1640 mg. (hydrochloride) of quinine base—often causes unpleasant side-effects.

However, I believe the dosage of quinine advocated by Dr. Johnstone is unnecessarily high. I know that many British malariologists, especially in the tropical countries of your Empire, prescribe 2 g. daily. But with B.T. malaria (not with subtertian) a smaller dose suffices. Not only in Holland but also in Java B.T. malaria responds as quickly to gr. 12–15 of quinine sulphate as to gr. 20 or even gr. 30. Our malaria patients, including those from the endemic districts of Holland and the many thousands of repatriated military and civil internees from Java and Sumatra, are at present successfully treated as a routine with 0.75–1 g. (gr. 12–15) of quinine sulphate, combined with pamaquin naphthoate 50 mg. daily, without admission to hospital.

Amsterdam.

C. W. F. WINCKEL.

AIDS TO THE DIAGNOSIS AND TREATMENT OF VENEREAL DISEASES

SIR,—I am most grateful to your reviewer (Dec. 14) for the kind things he says about my little book, but he is in error when he says I omitted to mention post-arsphenamine jaundice resulting from faulty sterilisation of syringes; if he will refer to page 115 he will see that I did not omit it. Of course it was not possible in the space at my disposal to go into details, but in view of the fact that I was the person most concerned about the high incidence of post-arsenical jaundice in the Army it was very unlikely that I should forget to mention it.

Ashford, Middlesex.

T. E. OSMOND.

SOLUBLE SULPHONAMIDE COMPOUNDS

SIR,—The soluble sodium salts of sulphapyridine, sulphathiazole, sulphadiazine, &c., introduced first in 1939, have been exceedingly useful preparations for intravenous injection, especially in the unconscious patient. Their great disadvantage, as is now well known, is their high alkalinity and consequent liability to cause irritation and even necrosis in the tissues unless they are highly diluted. This property is occasionally dangerous, as when, by some inadvertence, these preparations are injected undiluted into the theca, the brachial artery (in mistake for a vein), or the subcutaneous tissues (in mistake for a muscle). From these respective causes I have seen permanent sciatic palsy, loss of an arm, and deep sloughing ulcers of subcutaneous tissue and skin. It would seem therefore that these preparations would by general agreement be superseded as soon as a neutral preparation, proved to be harmless and equally efficient, could be obtained. This I consider has been done.

My colleagues and I have injected the preparation known as 'Soluthiazole' (May & Baker) intravenously or intramuscularly whenever a sulphonamide injection was indicated in this hospital for over two years. We are quite satisfied that this preparation is harmless intravenously, intramuscularly, and even when injected, as sometimes happens, deeply into the subcutaneous tissue. The pH value is around 7. The solution is not, however, isotonic; it is hypertonic. Accordingly, we have not used it, nor indeed have had occasion to use it, in contact with mucous or serous membranes. The first preparation which we tried had a tendency to crystallise out in some of the ampoules, but I understand that the preparation now in use has been slightly modified to

obviate this defect, and we have seen no trace of crystallisation in any of our ampoules for more than a year. The ampoules of 5 c.cm., each containing 1 g. of sulphathiazole, should be kept at room temperature, not in the cold.

In teaching students and postgraduates I have been struck by the almost universal ignorance of the existence of a soluble neutral sulphonamide preparation in concentrated form and completely satisfactory for intravenous and intramuscular injection. Hence this letter.

Park Hospital, London, S.E.13.

H. STANLEY BANKS.

CORONARY DISEASE

SIR,—I too have considered the alternative and "generally accepted" view, which Dr. M. Symons (Dec. 28) puts forward, that the leucocytosis and increased erythrocyte-sedimentation rate (E.S.R.) in coronary occlusion are due to the myocardial infarction and resulting destruction of tissue, and not to a septic process. It would be interesting to know if Dr. Symons has records of cases in which it has been proved that the infarct in any site was simple and aseptic, and in which leucocytosis and an increased E.S.R. also occurred.

London, W.1.

G. E. BEAUMONT.

Obituary

RICHARD ROBERT CRUISE

G.C.V.O., F.R.C.S.

Sir Richard Cruise, surgeon oculist to Queen Mary and surgeon to the Royal Westminster Ophthalmic Hospital, died in St. Mary's Hospital on Christmas Eve, after a short illness. Born at Purneah, in India, the son of the late Francis Cruise, he was educated at Harrow and at St. Mary's Hospital, whence he qualified in 1900. After holding a house-appointment at Bristol Eye Hospital he took his F.R.C.S. in 1903 and returned to London to obtain further experience in the specialty on which he was now decided. During the next five years he held clinical assistantships at the Royal Eye Hospital, Southwark, the Royal London Ophthalmic Hospital, and the Westminster Ophthalmic Hospital, where in 1909 he was appointed to the staff. During the 1914–18 war Cruise served with the R.A.M.C. in France and with the 3rd London General Hospital. He invented a visor of light chain mail to protect the eyes against injury, recommended by the Ophthalmological Society for universal use among the troops and adopted by the authorities in 1918. At the meeting of the society in 1919 he also described his plastic operation to prepare contracted sockets for the fitting of artificial eyes.

"Cruise," writes A. S. P., "will be remembered by generations of house-surgeons, by whom he was greatly loved, as the man who gave them their first cataract to do, and then stood by and gave them the confidence with which to do it. He never tired of teaching them, and they could have had no better master, for his confidence was unbounded and he inspired a like feeling in pupils and patients. His beautiful cataract results were achieved by cultivating the relationship between surgeon and patient, making the patient into his "assistant," and doing without most of the modern sutures and safeguards. Cruise taught simplicity and gentleness in operating, and when he did a cataract extraction things never looked like going wrong—'I do a simple extraction,* my boy, and don't forget the word *simple*,' he would say. And again of cataract surgery—'There are no sticky lenses, only sticky surgeons.'

"A courageous and lovable man, he was daunted by nothing, and made himself master of everything to which he set his hand. Never ruffled, he showed the same coolness at steeplechasing and golf, at both of which he excelled, as he did in his surgical work. He set himself a standard of achievement and never allowed himself to fall below it. To the last he maintained this fine standard of work and it was best that he should die in harness. He would not have liked to grow old."

Sir Richard, who was surgeon oculist to King George V, was appointed C.V.O. in 1917 and promoted K.C.V.O. in 1922 and G.C.V.O. in 1936.

* i.e., a cataract extraction with iridectomy.

SIR WILLIAM COLLINS

IN an appreciation of Sir William Collins, Z. L. P. writes: To those who knew him intimately in his home it was always a surprise to hear him described as "stiff" by those who knew him only officially. In the charming house on Beachy Head, which Lady Collins with her unerring instinct of a Scottish hostess had made perfect in every respect—not least in its cuisine—high thinking was combined with the most comfortable living. Though a spartan himself, Sir William found nothing too good for his wife. From the time they met at the London Temperance Hospital, where he was a surgeon and she a sister, their devotion was something unique in my experience. During his time at the House of Commons she was his never-failing helper; but arthritis tried her even then, and this was what prevented him from standing for re-election. Though he carried on innumerable public and benevolent activities the best of his energies were given to saving her in every conceivable way, and he nursed her single-handed almost to the end.

Sir William's ethical standards were immensely high. In his political and public life he was always the uncompromising Victorian liberal, and neither hope of office nor fear of censure would make him swerve an inch where principles were concerned. An admirer of Emerson, a friend of Stopford Brooke, he would read aloud after breakfast on Sunday morning something from Martineau or another of the great Unitarians.

When I saw him a few weeks ago, he knew that at last the time had come for him to give up his various tasks. He had finished the course and kept the faith and he died "nursing an unconquerable hope."

Mr. C. E. A. Bedwell, chairman of the Federation of Associations in Metropolitan Area, writes: "Sir William Collins assisted in the promotion of the Central Council for District Nursing for London. The common omission of the two last words, as in your obituary (Dec. 28, p. 963), is unfortunate in causing confusion with the council of the Queen's Institute, which is the representative body for the service of district nursing throughout the country."

On Active Service

AWARDS

THE following have been mentioned in despatches in recognition of gallant and distinguished services in Malaya in 1942:

I.A.M.C.

Colonel.—J. M. MITCHELL, O.B.E.

Lieut.-Colonels.—E. G. HURDWOOD, W. G. KENNEDY, W. J. L. NEAL, O.B.E., M.C., L. T. PEARSON.

Majors.—K. F. ALFORD, L. FEINHOLS, S. G. NARDELL.

Captains.—ARORA, O. F. CAMPBELL, A. K. MARWAT, A. ROY.

Appointments

MARKHAM, WINIFRED M., B.S.C. Birm., M.R.C.S.: resident aural registrar, Hospital for Sick Children, Great Ormond Street, London.

OWEN, G. A., M.R.C.S.: M.O., Gold Coast, Colonial Service.

Middlesex Hospital, London:

HADLEY, G. D., M.D. Camb., M.R.C.P.: asst. physician.

KEKWICK, ALAN, M.B. Camb., M.R.C.P.: asst. physician.

KREMER, MICHAEL, B.S.C., M.D. Lond., F.R.C.P.: asst. physician for diseases of nervous system.

SELICK, B. A., M.B. Lond., D.A.: anaesthetist.

King's College Hospital, London:

GALLEY, A. H., M.B. Lond., D.A.: asst. anaesthetist.

HERIOT, A. J., M.S. Lond., F.R.C.S.: asst. surgeon.

LEWIS, R. S., M.B. Camb., F.R.C.S.: asst. surgeon in ear, nose, and throat department.

ORAM, SAMUEL, M.D. Lond., M.R.C.P.: asst. physician.

Royal Free Hospital, London:

MOORE, J. ADELAIDE M., M.B. Lond., F.R.C.S.: asst. obstetrician and gynaecologist.

ROBINSON, KATHLEEN M., M.D. Lond., F.R.C.S., M.R.C.O.G.: asst. obstetrician and gynaecologist.

Birmingham Accident Hospital:

CARTER, D. J., M.R.C.S.: asst. anaesthetist.

CLARKE, A. R., M.S. Lond., F.R.C.S.: surgeon.

ESSEX-LOPRESTI, P. G. L., F.R.C.S., D.A.: asst. surgeon.

EVANS, E. M., M.B. Camb., F.R.C.S.: surgeon.

HARRISON, S. H., F.R.C.S.E.: surgeon.

HOULT, E. ANNE, M.B. Birm., asst. anaesthetist.

JEFFERY, C. C., F.R.C.S.: asst. surgeon.

KANAAR, A. C., M.D. Lond., F.R.C.S.E.: asst. surgeon.

Notes and News

THE ETHER CENTENARY AT U.C.H.

A LECTURE to commemorate the first public administration of ether in Europe was given on Dec. 21 in the lecture theatre of the medical school of University College Hospital, by Dr. Massey Dawkins, honorary anaesthetist to the hospital and lecturer in anaesthetics to the medical school. In the absence (through illness) of Dr. A. D. Marston, president of the Association of Anaesthetists, the chair was taken by Dr. Stanley Rowbotham. The lecturer traced the progress of the practice of anaesthetics in the hospital through the days of John Snow, Clover, Barker, with his spinal injections, and Felix Rood, and he alluded to the work of Elliotson. Referring to preanaesthetic days he quoted the patient's view on the shock after operation—that "had he known what to expect he'd rather have died." The wooden operating-table, on which the patient lay while Liston performed the first operation in England carried out under ether, was exhibited. Dr. E. A. Barton, whose father had been present at operations of Liston's, recalled the paternal recollections of the "shrieks and screams which accompanied operation before the use of anaesthetics."

THE ACT AND THE FUTURE

IN *Now for Health*,¹ written during the penultimate stages of the passage of the National Health Service Act through Parliament, Dr. Stark Murray, vice-president of the Socialist Medical Association, assumes a little prematurely that all argument about the early establishment of a National Health Service is over, and that attention will now be concentrated instead on finding the best ways in which to implement the Act. For himself, he seems to believe that the departures that the Minister has made from Socialist doctrine are wise ones, and that the Act is the best the country could be given at present. The one concession which he does still regret is the retention of the right of the doctor inside the service to practise privately as well.

For the rest he believes that we should turn from our debates on the dangers of this or that section, and concentrate on the opportunities the Act offers, and how these can be translated into practice to the best advantage of profession and public. We can but agree that this is now a very necessary stage, and hope that the present medico-political impasse will not long prevent attention to it. Particularly in such spheres as regional hospital planning, the establishment of a specialist service, and the provision of health centres no clear or generally acceptable picture has yet emerged, and it must soon do so if we are not to waste time and effort over impracticable schemes.

For illustration we need look no further than Dr. Murray's own book, to the chapter he devotes to health centres; for few would agree that the enormous, elaborate, all-purpose centre that he favours really represents for the patient the best type.

Although Dr. Murray's book is intended to make its main appeal to the lay public, it will also repay examination by the doctors; and if it stimulates constructive argument it will serve a very useful purpose.

THE SOCIAL MISFIT

CHILD-GUIDANCE clinics can do much for children with behaviour problems if they see them early; but, as Dr. John Bowlby pointed out at the recent conference on mental health,¹ clinics today are often flooded with children already in serious difficulties—children whose school work is years behind their mental age, children with phobias, persistent truants, unmanageable and destructive children, delinquents, and children who are chronically too good. Often their emotional difficulties are so serious that they will respond only to skilled treatment over a long period—which is hard to get and very expensive.

In the United States, according to Dr. D. M. Levy,² the picture is slightly different: there the child-guidance clinics have done well with behaviour problems, but in treating delinquency, he considers, psychiatry has not made notable progress. The psychiatrists are not necessarily to blame; there, as here, they can advise, but must rely for success on the abilities of the court, of the available professional staff,

1. *Now for Health*. By Dr. Stark Murray and L. C. J. McNaë. London: St. Botolph Publishing Co. Ltd. Pp. 78. 4s. 6d.

2. Arranged by the Provisional National Council for Mental Welfare, and held in London on Nov. 14.

2. The Salmon Lecture, New York Academy of Medicine, Nov. 13.

and of the institutions for delinquents. Like us, they are short of trained staff for this work; many times the present numbers are needed. But Dr. Levy sees prospects of development. Group psychotherapy in informal social gatherings promises good results; and a few examples of a new type of institute are beginning to appear in New York State. In these, every member of the staff, "from elevator man to director," has an understanding non-authoritarian attitude. Delinquent children who have previously been treated with pure discipline are confounded at first by the change; they look for the weak spots, suspect a trap, run amok, or run away. But once they have discovered that no-one is trying to get the better of them they settle down and respond to it. Such institutions are likely to be few for many years to come, because staff of this quality is harder to find than any other. Levy thinks that in England we have developed the care of the delinquent relatively well, bringing in courts, probation officers, directors of institutions, teachers, social workers, and all prison personnel. We have succeeded better than Americans, he considers, in gaining freedom from politics in the selection of personnel and the co-operation of legal, administrative, and professional workers; but Americans have developed more thoroughly the psychiatric study and treatment of delinquency.

When it comes to the adult criminal, he suspects that it would hardly do to give the psychiatrist a free hand: "on the whole, if a psychiatrist were in charge," he says, "I believe that a number of prisoners now released after a few years would remain in prison for life."

LOUIS PASTEUR

"ONE of the great splendours of his genius is to be found in the enthusiasm with which, all his life, he hurried off to those who made any call upon his knowledge. This laboratory worker, whose discoveries were to turn men's beliefs upside down, sought passionately for immediate and practical results from studies on the fermentation of beer, the making of vinegar, the diseases of silkworms. He worked in breweries, in silkworm nurseries, among distillers, mulberry growers, and the shepherds of the plains. Then see him in the hospitals: for the wise man the distress of the sick is an appeal. Pasteur responded."

Prof. Robert Debré, member of the Académie de Médecine, thus celebrates the 50th anniversary of Pasteur's death.¹ His splendid curiosity, his accuracy and logic, and his fine simplicity of character, set Pasteur forever among the great examples to students of science. When, in 1856, he was asked about the fermentation of beetroots he set about studying the question with characteristic ability and thoroughness. He made a medium capable of fermenting, sterilised it by heat, and sealed it; naturally it remained unchanged indefinitely. Then he inoculated part of it with a trace of pure yeast, and as the yeast grew the medium fermented. Here, in one simple experiment, he laid down a fundamental principle of technique. Between 1857 and 1865 he carried out the series of researches which wholly changed scientific ideas on fermentation and established firmly the bacterial theory which was to revolutionise surgery, medicine, and public health.

But hard as he worked at research, he found it easier to discover a great truth than to get it accepted. Professor Debré tells how in the course of that long battle for belief a speaker at one scientific discussion declared that the organism of puerperal fever could never be found. Pasteur flung himself towards the blackboard and drew the organism "en chapelet de grains," crying: "Tenez, voici sa figure." He won his battle and lived to be honoured as he deserved, but that made little difference to a man whose interest was in doing things rather than in what others thought of his doings. Prof. Henri Mondor² tells how, when he came to die, he said—as a sort of sublime excuse—"I can do no more." It can be said of Pasteur, as of few others, that he had done enough.

HOSPITAL FOR ETHIOPIA

Miss Sylvia Pankhurst, hon. secretary of the Princess Tsehai Memorial Hospital Fund, informs us that more than £80,000 has been raised towards the £100,000 required for the new hospital at Addis Ababa. Of this, £40,000 has been collected in Ethiopia itself. The building, with the addition of the outpatient, theatre, and kitchen blocks generously designed by Mr. Lionel Pearson, F.R.I.B.A., is nearing completion. The interior equipment is being purchased in this

country and some of it is now ready for shipment. Applications for positions on the medical and nursing staff will shortly be considered by the medical committee.

Correspondence should be addressed to Miss Pankhurst at 3, Charteris Road, Woodford, Essex.

University of London

The title of professor emeritus in the university has been conferred on Mr. G. Grey Turner on his retirement from the chair of surgery at the British Postgraduate Medical School.

Mr. J. E. Roberts, D.Sc., has been appointed to the Joel chair of physics tenable at the Middlesex Hospital medical school, as from Oct. 1. He succeeds Prof. Sydney Russ, D.Sc., on whom the title of professor emeritus has been conferred.

Miss Meave Kenny has been appointed to the university readership in obstetrics and gynaecology tenable at the British Postgraduate Medical School, as from Oct. 1.

Miss Kenny studied medicine at the Lady Hardinge Medical College, New Delhi, and the London School of Medicine for Women, qualifying M.B. Punjab in 1931 and M.R.C.S. in 1934. She became M.R.C.O.G. in 1935, and held appointments as obstetrical and gynaecological house-surgeon at the Royal Northern Hospital, and as resident medical officer at the isolation block, Queen Charlotte's Maternity Hospital, London. In 1937 she was appointed first assistant in the department of obstetrics and gynaecology at the British Postgraduate Medical School. She was elected F.R.C.O.G. in 1945. Miss Kenny was associated with Dr. Leonard Colebrook, F.R.S., in pioneer work on the treatment with sulphonamides of puerperal sepsis and urinary-tract infections, and has also reported on the radiology of contracted pelvis. She is the author of a novel, *I'll Change the Colour*, published in 1935, and of books of poems in Spanish.

The title of reader in physiology in the university has been conferred on Dr. C. C. N. Vass, in respect of the post held by him at St. Thomas's Hospital medical school.

University of Durham

On Dec. 20 the following degrees were conferred:

M.B., B.S.—Irene O. Blankley, Alan Ross; Diana I. Priest, Peter Wise (in absentia).

Prof. R. C. Browne, first holder of the Nuffield chair of industrial health, will deliver his inaugural lecture in King's Hall, King's College, Newcastle-on-Tyne, on Friday, Jan. 24, at 5.30 P.M. Tickets are obtainable from the registrar of the college.

Royal College of Surgeons of England

The following Hunterian lectures will be delivered at the college at 5 P.M. on Thursdays in January: 9th, Mr. J. B. Macalpine, Growths of the Renal Pelvis and Ureter; 16th, Mr. R. H. Franklin, Congenital Atresia of the Oesophagus; 23rd, Mr. H. A. Haxton, Regeneration after Sympathectomy, and its Effects in Raynaud's Disease; and 30th, Mr. John Howkins, Movement of the Diaphragm after Operation. A course of lectures in ophthalmology will be held at the college from Jan. 20 to 27.

Royal College of Surgeons of Edinburgh

At a meeting of the college on Dec. 20, with Mr. James Graham, president, in the chair, the following were admitted to the fellowship:

L. W. Aldridge, M.B. Birm.; D. R. Beaton, M.B. Edin.; E. N. Brockway, M.B. Lond.; J. T. Brown, M.B. Glasg.; J. E. Buck, M.B. Edin.; D. R. Cairns, M.B. Belf.; A. M. Gilchrist, M.B. Glasg.; William Girdwood, M.B. Witw'rsrand; S. C. Gupta, M.B. Calcutta; A. E. Khan, M.B. Sydney; Louis Kobrinsky, M.D. Manitoba; M. M. Kriseman, M.B. Witw'rsrand; V. P. McAllister, M.B. Dubl.; H. C. McLaren, M.B. Glasg.; M. A. Margo, M.R.C.S.; Elizabeth T. Mess, M.B. Lond.; R. F. Moody, M.B. N.Z.; H. D. Moore, M.B. Sydney; J. C. Morris, M.B. Manc.; J. D. Muir, M.B. L'pool; K. G. Pascall, M.B. Lond.; W. I. Paterson, M.B. Edin.; H. E. Pearse, M.D. Brist.; Richard Percy-Lancaster, M.B. Edin.; C. J. T. Pinto, M.B. Bombay; Bernard Polonsky, M.B. L'pool; C. I. Raeburn, M.B. St. And.; G. J. Ralston, M.B. Edin.; William Reid, M.B. Glasg.; A. St. C. Robertson, M.B. Edin.; T. B. Russell, M.B. Edin.; A. W. B. Strahan, M.B. Edin.; E. J. Tamblin, M.B. Adelaide; Pieter Theron, M.B. Aberd.; C. K. Warrick, M.B. Lond.; C. D. Weir, M.B. Edin.; George Winchester, M.B. Edin.

Joint Tuberculosis Council

At its last meeting the council adopted a report dealing with the National Health Service Act and ordered it to be forwarded to the Minister of Health's Standing Advisory Committee on Tuberculosis. The report, which is not being published now, emphasises the council's view that tuberculosis is a disease requiring a special organisation. The committee on nutrition reported that they had studied the effect of bread-rationing on tuberculous persons and had also considered whether dietaries for the tuberculous should be reinvestigated; they had decided that no action was at present required in either case.

1. "Extintor," no. 1818, a leaflet from the French Minister of Information.

2. *Ibid.*, no. 1817.

Society of Apothecaries of London

The court of assistants recently met under the chairmanship of Dr. C. T. Parsons, master of the society. Dr. J. P. Hedley was reappointed as the society's representative on the General Medical Council.

Common hall discussed lately the proposal to admit medical women to the yeomanry and livery of the society. The result of the vote was reported to the court, who have decided that medical women shall be admitted.

D. C. Norris was clothed with the livery of the society. The following were admitted to the freedom of the society: by gift, the Rev. M. F. Foxell; by redemption, H. A. Byworth, R. J. Willan, A. J. Wrigley, H. J. B. Atkins, and B. Hamilton Hogben; and by servitude, G. P. West, S. P. Berkeley Way, E. W. R. Clark.

The following were sworn in as examiners: anatomy, John Kirk; pathology, R. W. Scarff.

The following diplomas were granted upon examination:

Master of Midwifery.—J. G. Hunt.

Industrial Health.—F. H. Tyrer, J. B. Lynch.

L.M.S.S.A.—I. J. R. Mussion, H. F. Goldman, H. M. Price, J. G. Kelsey, G. A. May, A. H. J. Whitehouse, H. Freeman, Sodiho, R. M. Holmes, T. C. McC. Gilmore, S. L. O. Jackson.

London Council of Social Service

A conference on Special Forms of Catering for the Aged, Invalids, and Infirm will be held at the Bonnington Hotel, Southampton Row, W.C.1, on Saturday, Jan. 18, at 10.30 A.M.

Streptomycin Used against Bubonic Plague

Streptomycin is reported to have been used successfully in a recent outbreak of bubonic plague at Buenos Aires. The first two cases to be treated, says B.U.P., recovered completely with streptomycin after hope of their surviving had been abandoned.

Hospital for Tropical Diseases, London

This hospital, which was closed during the war, has now been reopened at 23, Devonshire Street, W.1 (Tel.: Welbeck 8371). The hospital is open to all patients suffering from tropical diseases. There is an outpatient department, for which appointments should be made by telephone or letter.

Serviceable Books

The National Council of Social Service have compiled a list of the 208 books which they consider best describe the British social services. The books are divided into three groups: general books; books about services which cater for special sections of the community, such as the handicapped, mothers, and children; and books about special types of service which are available for the whole community, such as communal feeding, education, and the health services. Copies of the list may be obtained (post free 8d.) from the National Book League, 7, Albemarle Street, London, W.1.

Empire Rheumatism Council

As announced last week, the council's annual general meeting was held in London on Dec. 18, when Lord Horder, the chairman, announced a plan to investigate factors in the causation of rheumatoid arthritis. Sir George Elliston, proposing a vote of thanks to the chairman, said it would be hard to over-emphasise the importance of the announcement by Sir Wilson Jameson, at the council's tenth anniversary reception in October, that the rheumatism service would in future provide employment for all young doctors who wished to enter it. Sir George was concerned that this remark had not been given enough publicity; the many hundreds of demobilised young doctors who had not yet decided on their future would be welcome and valuable recruits in the campaign against rheumatism. These men, he concluded, should be secured for a service whose importance is steadily growing.

Presentation to Sir George Elliston

On Dec. 19 at a luncheon held at the Guildhall a presentation was made to Sir George Elliston, formerly secretary of the Society of Medical Officers of Health, on the completion of his third term of office as chairman of the health committee of the corporation of the City of London. The toast of the Lord Mayor and Corporation was proposed by Sir Allen Daley. In his reply, Sir George Aylwen, a sheriff of the City and treasurer of St. Bartholomew's Hospital, declared that the hospital's relation with the corporation had been an object lesson to local authorities and voluntary hospitals alike. Among the services which the hospital willingly rendered to the City he mentioned the provision of clinics for the treatment of tuberculosis and venereal diseases, and a welfare clinic for mothers and babies. He hoped that under the National Health Service there would be opportunity to continue this successful partnership.

Glaucoma Prize

The American National Society for the Prevention of Blindness is offering a prize of \$500 for the best original paper adding to existing knowledge about the diagnosis of early glaucoma or the medical treatment of non-congestive glaucoma. The criteria may be obtained from the society, 1790 Broadway, New York 19, N.Y.; entries must be submitted by next December.

Diary of the Week

JAN. 5 TO 11

Tuesday, 7th

LONDON ASSOCIATION OF THE MEDICAL WOMEN'S FEDERATION
8.30 P.M. (B.M.A. House, Tavistock Square, W.C.1.) Dr. Innes Pearce: Peckham Health Centre.

Wednesday, 8th

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
2.30 P.M. *History of Medicine*. Dr. A. P. Cawadias: Clinical Science in the Light of History.
4.30 P.M. *Physical Medicine*. Mr. T. Holmes Sellors: Rehabilitation of Patients following Chest Surgery.
BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck Street, W.1
5 P.M. Prof. W. V. Mayneord: Applications of Atomic Physics in Medicine. (Second of six lectures.)
MEDICAL SOCIETY OF THE L.C.C. SERVICE
4.30 P.M. (County Hall, Westminster Bridge, S.E.1.) Mr. G. F. Stebbing: Organisation of Cancer Treatment.

Thursday, 9th

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
5 P.M. Mr. J. B. Macalpine: Growths of the Renal Pelvis and Ureter. (Hunterian lecture.)

Friday, 10th

ROYAL COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS, 58, Queen Anne Street, W.1
5 P.M. Mr. S. J. Folley, D.S.C.: Lactation.
LONDON CHEST HOSPITAL, Victoria Park, E.2
5 P.M. Dr. R. A. Beaver: Anesthesia in Thoracic Surgery.
ROYAL MEDICAL SOCIETY, 7, Melbourn Place, Edinburgh
8 P.M. Prof. Charles Cameron: Tuberculosis as a Problem in Diagnosis.

Births, Marriages, and Deaths**BIRTHS**

ARCHER.—On Dec. 23, at Eastbourne, the wife of Captain R. M. Archer, R.A.M.C.—a daughter.
DOCKRAY.—On Dec. 24, the wife of Dr. J. V. Dockray, O.B.E.—a daughter.
FRANKLIN.—On Dec. 19, at Glasgow, the wife of Mr. V. M. Franklin, F.R.C.S.—a daughter.
GOTTLIEB.—On Dec. 27, at Sheffield, the wife of Dr. I. Gottlieb—a son.
HARKINS.—On Dec. 22, in London, the wife of Dr. Denis Harkins—a son.
MARTIN.—On Dec. 20, the wife of Dr. A. J. Martin—a son.
RICHARDS.—On Dec. 15, the wife of Dr. E. Ailwyn Richards—a daughter.
RITCHIE.—On Dec. 23, at Sanderstead, Surrey, the wife of Dr. T. H. W. Ritchie—a son.
WOOD.—On Dec. 21, at Oxford, the wife of Dr. D. R. Wood—a son.
WOOD.—On Dec. 14, at Poughurst, Kent, the wife of Dr. L. A. C. Wood—a daughter.

MARRIAGES

CRUICKSHANK—LEDINGHAM.—On Dec. 20, in London, James Durno Cruickshank, lieutenant-colonel R.A.M.C., to Isabel Catherine Ledingham.
PORRITT—PECK.—On Dec. 20, in London, Arthur E. Porritt, C.B.E., F.R.C.S., to Kathleen Mary Peck.

DEATHS

BISHOPP.—On Dec. 26, at Tunbridge Wells, Francis Robert Bryant Bishopp, M.A., M.D. Camb., M.R.C.P., aged 87.
BURKITT.—On Dec. 22, in Dublin, Roland Wilks Burkitt, F.R.C.S.I. late of Nairobi, Kenya, aged 74.
CRUISE.—On Dec. 24, in London, Sir Richard Cruise, G.C.V.O., F.R.C.S.
HASKINS.—On Dec. 21, at Worthing, Nicholas Hopkins Henry Haskins, M.C., M.B. Dubl., late lieutenant-colonel R.A.M.C.
LANDER.—On Dec. 25, at Gillingham, Dorset, Charles Llewellyn Lander, D.S.O., M.C., B.S.C., M.B. Lond.
MCKENZIE.—On Dec. 22, in London, Harry Valentine McKenzie, M.D. Edin., aged 79.
MANSELL.—On Dec. 19, at Farnborough, Hants, Arthur Rodney Mansell, L.R.C.P.E.
MATHEW.—On Dec. 21, Frederick Crichton Mathew, M.D. Edin., F.R.C.S.E.
PUGH.—On Dec. 19, Charles Grant Pugh, B.S.C., M.D. Lond., D.P.H.
SCOTT.—On Dec. 9, at Sydney, Australia, David Jobson Scott, O.B.E., M.C., M.D. Edin., D.P.H., barrister-at-law.
SMITH.—On Dec. 18, at Dunfermline, Harry Emslie Smith, M.D. Aberd., D.P.H., D.T.M. & H., lieutenant-colonel I.M.S.
WATERS.—On Dec. 19, at Stroud, Sir Harry Waters, M.R.C.S., D.P.H., D.T.M. & H., aged 78.
WEST.—On Dec. 25, John Hardstaff West, M.R.C.S., D.A.
WHITE.—On Dec. 29, at Hindhead, William Harold White, M.R.C.S.
WOODS.—On Dec. 17, at Taunton, Somerset, Alfred Annesley Woods, L.R.C.P.I., D.P.H.

REST VERSUS ACTIVITY IN THE TREATMENT OF A FRACTURE*

GEORGE PERKINS

M.C., M.Ch. Oxfd, F.R.C.S.

On the therapeutic side, one problem confronts the orthopaedic surgeon throughout his professional life—whether to rest or not to rest. The answer depends on the cause of the lesion, the effects of the lesion on the tissues, and the reaction of the tissues to the lesion. One or more of these may be in doubt; but, even when all three factors are known, it is not always easy to decide between rest and activity.

In the case of injury, the cause is definite and non-continuing, the effect is obvious, and nature's method of repair is, we think, known to us. Even so, the problem looms large—so large that I shall not have time to deal with injuries to ligaments, injuries to muscles, or even with bone injuries involving joints. I shall confine myself to fractures not involving joints.

When considering rest and activity in the treatment of a fracture of a shaft, we have to decide (1) whether to encourage or to forbid normal use of the limb; (2) whether to move the joints; (3) whether to allow weight-bearing—i.e., the transmission of force through the broken bone; (4) whether to keep the bone ends immobile or to let them move on one another; and (5) whether to activate the muscles or to let them lie dormant.

MOVEMENT OF THE LIMB

Nowadays everyone agrees, I think, that normal function is to be encouraged. The patient with a Colles' fracture is no longer allowed to mope about with her arm in a sling but is kept under the eye of a masseuse until she is using her hand. Nevertheless I do not believe the enormous advantages to be derived from activity of the limb are sufficiently realised. One still sees the hand immobilised for a fracture of the scaphoid, with the thumb abducted in the plane of the palm instead of at right angles to the palm. This faulty position renders it impossible for the patient to oppose thumb and fingers and seriously curtails use of the hand. And one still sees—all too frequently—a foot immobilised in slight equinovarus instead of in the plantigrade position. With a foot in equinovarus a patient has great difficulty in walking.

The advantages of encouraging activity of the limb are that rehabilitation can proceed hand in hand with bone repair, and that the harmful effects of splintage are minimised. Who nowadays finds it necessary to apply an Unna's paste bandage after the removal of a plaster for a fractured tibia and fibula? Post-plaster swelling has disappeared from the practice of those who make their patients walk normally while wearing a plaster cast. We saw it in the old days when a patient pivoted along on a Böhrer iron, for then he only used his hip muscles, the remainder of the leg being in a state of physiological rest—in other words, growing rusty.

MOVEMENT OF THE JOINTS

On this again, I believe, there is general agreement. All joints not immobilised by splintage should be moved actively by the patient. Since movement is so desirable, the splint should be shortened to its minimum so as to free as many joints as possible. This is not a popular recommendation, for a surgeon rises in the estimation of his patients according to the multiplicity and complexity of his apparatus. I have on more than one occasion lost a patient for not having applied a splint to a fracture.

* Presidential address delivered to the British Orthopaedic Association on Oct. 19, 1946.

WEIGHT-BEARING

Anyone who believes, as I do, that longitudinal compression of the bone ends is the essential stimulus for repair by bone (as opposed to fibrous tissue) will favour early weight-bearing. Indeed, I think most surgeons would advocate early weight-bearing were it not for fear of overriding of the fragments. In my experience overriding is little to be feared. I grant, however, that weight-bearing is a potential danger in a transverse fracture when the two fragments are not parallel; for a force which is not perpendicular to the line of fracture tends to angulate the fragments. Angulation distracts the raw bony surfaces from one another, and distraction is the stimulus par excellence for the production of fibrous tissue.

The stimulus to callus formation by weight-bearing on a fracture that is not angulated is demonstrated in figs. 1-4.

Fig. 1a shows a fracture of the shaft of the femur, eight months old. Note the absence of callus. I removed the Thomas splint and applied a plaster cast reaching from behind the heads of the metatarsals to the groin, and got the patient first to lift his leg off the bed and then to walk.

Fig. 1b shows the amount of union four months later, when he discarded his plaster. Note the amount of callus, the preservation of alignment, and the fact that the lower fragment has not ridden up.

Fig. 2a shows a fracture of the tibia, sustained seven months previously. There was a painless hinge at the site of the fracture. The painlessness indicated that union had taken place; the hinge that the union was fibrous and not bony. Bony repair could not be expected until the fibrous tissue between the fragments had been removed.

Accordingly I cut down on the fracture, removed the fragment lying athwart, and inserted the cortex of the lower fragment into the medulla of the upper fragment. At the end of ten days the patient was got up in the original plaster, for the first time since his injury.

Fig. 2b shows the state of affairs five weeks after the operation. Note the amount of external callus, the absence of overriding, and the preservation of alignment.

The radiogram shown in fig. 2c was taken five months after the operation, when all splintage was discarded. Removal of the intervening fragment added to his shortening, but he had an amputation of the thigh on the other side, so I could make the fractured leg what length I liked. There was no doubt about his taking weight on the broken leg, for it was the only leg he had to stand on.

Fig. 3a shows a fracture of the tibia after the taking of a graft. The leg was put into plaster and the man made to walk.

Fig. 3b shows the fracture ten weeks later, when the plaster was discarded. Note again the amount of callus, the preservation of alignment, and the absence of overriding.

Fig. 4a shows a fracture of the shaft of the femur with delayed union and slight angulation. Under an anaesthetic I straightened the leg and applied a plaster from behind the heads of the metatarsals to the groin.

Fig. 4b shows the position obtained. Note that the plaster extends only to the groin, and is well moulded on the outer side to counteract the tendency to outward angulation.

Fig. 4c was taken three months after the manipulation, when the plaster was discarded. Note the preservation of alignment and the massive amount of organised external callus.

All these radiograms show early and massive external callus, and I believe the rapidity of repair was due to making the patient take weight through the fracture.

It is not enough to make the patient walk; he must be made to walk as naturally as possible, so that he uses the muscles of the leg in the same manner as he would in ordinary walking. To obtain a natural gait, the plastered foot must be at right angles to the leg and plantigrade, and the loss of ankle movement must be compensated for by rockering the sole of the plaster over-boot.

MOVEMENT OF THE BONE ENDS

Splintage is not always necessary for the repair of a fracture. When a dog breaks a bone he treats himself

without a splint. There are no orthopædic surgeons in the dog world; which is perhaps just as well, for otherwise the poor animal might have to go to a rehabilitation centre to recover from its treatment.

The dog hops along on three legs for a while and then gingerly resumes weight-bearing. On the other hand, an adduction type of transcervical fracture of the neck of the femur will not unite without splintage. Can we explain this contradiction?

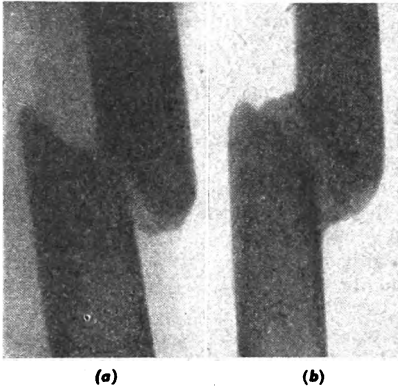


Fig. 1.—Fracture of shaft of femur: (a) 8 months old, treated with Thomas splint, showing absence of callus; (b) 4 months after substitution of ambulant plaster (from metatarsals to groin) for Thomas splint, showing callus, good alignment, and no overriding.

visible) and the neck of the femur does unite (though not with bone). Let us consider the two statements.

In the case of the dog's bone, the muscles that have their origin on one fragment and their insertion on the other form an internal splint which not only holds the bone ends immobile but also forces the bone ends against one another and so supplies the requisite stimulus for repair by bone. I grant this is only supposition, for one cannot prove that it is the activity of the muscles that promotes osseous, as opposed to fibrous, union. The evidence in its favour is that, whenever there is an absence of muscle splintage, fibrous union is the usual outcome. Three examples come quickly to mind: a fracture of the neck of the femur, a fracture of the internal malleolus, and a fracture of the scaphoid. In a transcervical fracture of the neck of the femur there are no muscles attached to the central fragment; in a fractured internal malleolus none to the distal fragment; and in a fractured scaphoid no muscles are attached to either

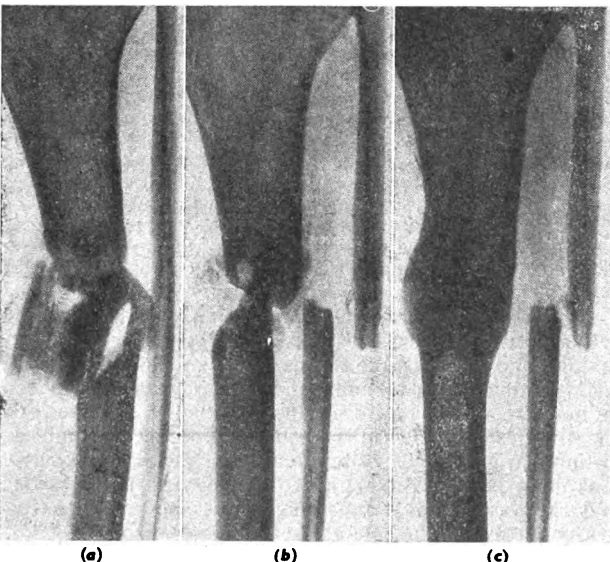


Fig. 2.—Fracture of tibia: (a) 7 months old, showing fibrous union; (b) 5 weeks after removal of fibrous union, and insertion of cortex of lower fragment into medulla of upper fragment, showing callus, good alignment, and no overriding; (c) 5 months after operation.

fragment. In these three fractures natural internal fixation by muscle splintage is absent, and fibrous union is certain unless the bone ends can be immobilised by external splintage or by surgical internal splintage.

I am not advocating dispensing with external splintage whenever there is natural internal fixation by the muscles; for external splintage has another function to perform—the preservation of correct alignment. Splintage may be unnecessary to secure bony union, yet may be essential to secure union in a good position. When we are using a splint for a fracture we should be quite clear in our minds why we are using it: is it to preserve alignment, or is it to immobilise the bone ends, or is it for both purposes? If splintage is required to immobilise the bone ends, then indeed it must be PURE: P for protracted, U for uninterrupted, R for rigid, and E for extensive. I maintain, however, that splintage is rarely required for this purpose. (Incidentally, when it is required for this purpose it is often inadequate—witness the poor results from plaster splintage for a transcervical fracture of the neck of the femur.) If splintage is only required to preserve alignment it need not be protracted, uninterrupted, rigid, or extensive.

Fig. 5a shows a transverse fracture of the shaft of the humerus. Such a fracture joins without difficulty, provided the muscles are free to act and are encouraged to act. Alignment, however, is not so easy to maintain.

The surgeon decided that the alignment could best be secured in this case by rigid internal fixation. Accordingly he plated the fracture and did not use any external splint. The arm was supported in a sling and, before the stitches were out, the patient was sent to the physiotherapy department for exercises.



Fig. 3.—(a) Fracture of tibia on taking a graft; (b) 10 weeks later, after treatment with ambulant plaster, showing callus, good alignment, and no overriding.

In the department the patient was made to flex and extend his elbow, and to abduct his shoulder by his own voluntary effort. Twenty days after the operation, when lifting his arm vigorously, he heard a snap, and the arm became painful.

The radiogram (fig. 5b) shows that the plate had broken. Whereupon the surgeon argued thus: "I did not use the plate to keep the bone ends immobile, for the muscles can be relied on to do that. I used the plate only to secure alignment. Alignment has been secured, and there is now no danger of the fragments becoming displaced. The plate therefore has done its work, and I need not worry about its breaking."

Accordingly he disregarded the incident of the broken plate and made the patient continue his active exercises. Five weeks after the original accident the patient had to all outward appearances a normal arm (fig. 5c). Note the amount of external callus.

At this stage many might ask: "Why bother about whether splintage is being used for alignment or for immobilisation? Why not always play for safety and always use PURE splintage?" Because PURE splintage is an evil, a necessary evil at times, but nevertheless an evil, and therefore to be shunned whenever possible.

Consider the four attributes of PURE splintage:

(P) Protracted splintage conduces to a permanent loss of joint range. We recognise this in joints where move-

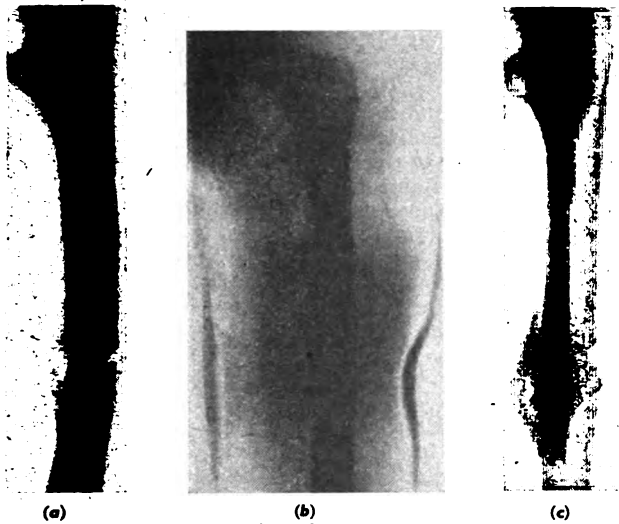


Fig. 4—Fracture of femur: (a) before manipulation, showing delayed union and slight angulation; (b) after correction of alignment and application of plaster, well moulded on outer side to overcome tendency to outward angulation; (c) 3 months after manipulation, showing good alignment and callus.

ment is vital for function, but tend to overlook it in joints where stiffness is not so obviously disabling. In the case of the knuckle-joints, for example, movement is so important, and the range of stiffness from splintage so great, that one book on fractures declares it to be criminal to splint these joints for longer than ten days. The corresponding joints in the foot suffer equally from splintage, but loss of function from stiffness of the toes is not so obvious, and many surgeons do not mind immobilising them in plaster for months on end.

(U) *Uninterrupted*.—I have no objection to uninterrupted splintage. If splintage is required, by all means let it be uninterrupted.

(R) *Rigid*.—Many surgeons believe that non-union, by which they mean fibrous union, is commoner today, now that we use plaster casts, than it was in the olden days, when we padded wooden splints. This may be true. But, if so, we must beware that we are truly linking cause and effect and comparing like with like. Possibly the greater length of time required for bony union nowadays is explained by a change in the nature of the fracturing force; road accidents and industrial accidents are responsible for many more fractures than in the past. I can see no advantage in loose splintage over rigid splintage, provided that the latter is comfortable. An unpadded plaster, so long as the circulation is unimpeded, is never so tight that it prevents the muscles underneath from acting. I do, however, deprecate not using stockinet under a plaster. Plaster applied direct to the skin enmeshes the hairs and so fixes the skin, and the patient may be inhibited from using his muscles because muscular action pulls on the hair-fixed skin and causes pain.

(E) *Extensive*.—The last requisite for PURE splintage is that it should be extensive. The word needs definition. Our forefathers have instructed us, in the treatment of a fracture, to splint the joints above and below. Now, tradition is a mighty fine thing. After many generations have declared the earth to be flat, one hesitates to venture the opinion that it may be round. The wisdom of the ages is not to be lightly discarded. However, there is no harm in investigating the matter, for the world might turn out to be round after all. In like manner our surgical forebears may be right—probably are right—about the necessity for including in the splint the joint above and the joint below the fracture; but there is no harm in appraising the instruction.

Consider a fracture of the forearm, and imagine the limb has been put into a plaster cast with the elbow

extended and the wrist straight. We have obeyed the instructions by including in the splint the joints above and below the fracture. But we have not immobilised the fractured ends, since they are free to rotate on one another. To prevent rotation the elbow must be flexed and the wrist dorsiflexed. Our forefathers' instruction to splint the joints above and below needs altering therefore to "extend the splint until it can be angulated above and below the fracture." This is the definition of "extensive" in PURE splintage. Unless the splint is extensive in this sense it cannot immobilise the bone ends.

Often it is not feasible to make the splint extensive; for example, in the treatment of a fracture of the neck of the femur by a plaster spica, though rotation of the lower fragment can be controlled by keeping the foot at a right angle, the upper fragment is uncontrolled, because the body part of the plaster cannot be extended sufficiently to be angulated. This explains the frequent failure of PURE splintage to achieve its object—namely, the immobilisation of the fractured ends. We are not often aware of this failure, because we do not realise how seldom it is necessary truly to immobilise a fracture; for, as I hope I have made plain, immobilisation is only necessary when the muscles are unable to do the splinting.

Now, it is the necessity for making the splint extensive—i.e. for including two angles, one above and one below the fracture—that makes PURE splintage so harmful.

Alignment.—We sometimes consider ourselves unfairly judged when a patient criticises the result of a fracture on the score that the radiogram does not show perfect alignment. But is it not lucky for us that the patient does judge the result on the radiogram, since often he cannot read the radiogram—an unreduced Colles's fracture looks much the same to him as a reduced Colles's fracture. What if he starts assessing results in terms of function? Heaven forbid that he should do so, but ought not we to judge our results on this basis? After a fracture of the shaft of the femur it is wrong to be content with bony union in good alignment. The important criteria are the amount of shortening and the range of knee movement. Similarly in a bumper fracture the things that matter are the degree of stability of the knee and its range of movement. By all means let the patient amuse himself with the radiograms; let us concentrate on function. One need never fear being landed in a court of law for wrong alignment if the patient has regained perfect function. Of course, if wrong alignment is combined with loss of function, we become vulnerable, because the ill-informed layman

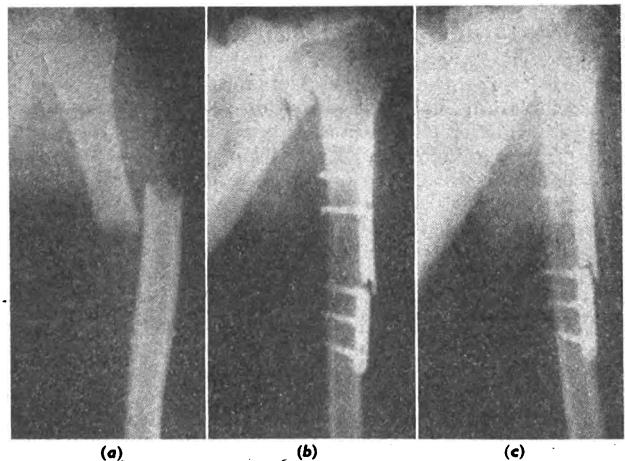


Fig. 5—Transverse fracture of humerus: (a) before plating; (b) 20 days after operation, showing plate broken accidentally by physical exercise but good alignment of bone; (c) 2 weeks after fracture of plate, exercises having been continued, showing good callus and preservation of alignment.

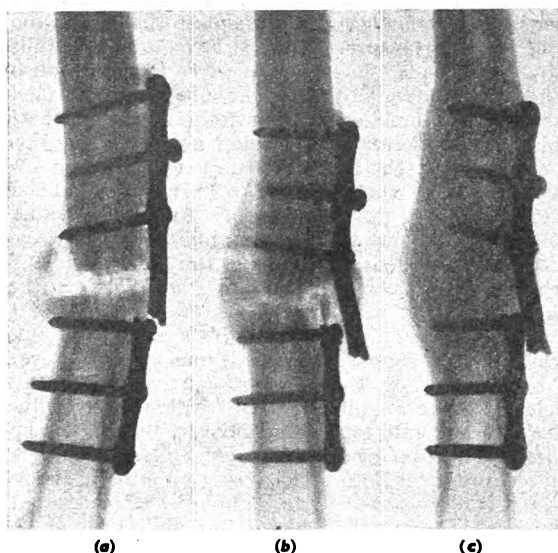


Fig. 6.—Fracture of femur: (a) 5 months after plating and just after fracture of plate, showing very little callus; (b) 2½ months after fracture of plate has allowed compression of bone ends, showing callus now being formed; (c) 16 months after fracture of plate, showing bony union and good alignment.

associates the two as cause and effect. But is it only the layman who is guilty of this error of logic? Do not we surgeons often fall into the same error and consider that poor alignment is necessarily associated with poor function and good alignment with good function? A year or two ago we listened to several papers on fractures of the shaft of the femur. Dozens of radiograms and diagrams were shown to depict the alignment obtained; yet never once was the ultimate range of knee movement mentioned. We have all been taught, and we all teach, the importance in a fracture of the tibia and fibula of securing a horizontal ankle-joint to avoid any lateral strain on the ankle during weight-bearing. Yet the ankle is well able to stand up to lateral strains, as witness the many people who habitually walk with their heels in pronounced varus or valgus; the ankle-joints of all these people are continuously subjected to lateral stresses and seem none the worse for it. I do not want to belittle the importance of good alignment, but I do want to emphasise that function depends more on other factors than on alignment.

Joint Stiffness.—Surely the most important of these factors is the restoration of full movement to all the joints of the limb. This leads to a further question: why should a healthy uninjured joint stiffen when splinted? Several likely explanations suggest themselves: the opposing layers of synovial membrane might adhere together from lack of lubrication; the capsule might lose its elasticity; and, above all, the muscles might lose their extensibility. I want to focus your attention on the last. Muscles have two attributes: they shorten, as is well known; what is not so readily appreciated is that they also lengthen. A muscle held lengthened for a time loses its power of shortening, as is well exemplified in infantile paralysis. We say that it has been overstretched, and in our treatment we take care to avoid this overstretching by holding the muscle relaxed in its shortened position. Similarly, a muscle held shortened for a time loses its power of lengthening, also well exemplified in infantile paralysis. We say that the muscle has developed a contracture, and we take care to avoid it by putting the joints through their full range of movement once a day, thereby stretching the muscles to their full.

Now, I believe that the main reason why a healthy joint stiffens as a result of splintage is that the muscles

lose their power of lengthening. Because the consequence is apparent in the joint we are inclined to blame the joint, though in fact the fault lies in the muscles. That joint stiffness after splintage is mainly the result of loss of extensibility in the muscles is an hypothesis difficult to prove. An argument that weighs heavily with me is that, after the knee has been immobilised in a plaster for a fracture of the tibia and fibula, there is rarely any difficulty in regaining full movement at the knee; whereas, when the knee is immobilised during the treatment of a fracture of the shaft of the femur, permanent limitation of movement of the knee is a common sequel. The important rôle played by the muscles in so-called joint stiffness was brought home to me dramatically just after the war 1914–18, when the surgeon for whom I was then devilling operated for a stiff knee. Instead of forcibly bending the knee under an anaesthetic, as I thought he would, he elongated the quadriceps tendon. Immediately this was done the knee, which before had only a few degrees of movement, bent without difficulty to a right angle. I realised with amazement that the limitation of movement was caused not by anything in the knee but by too short a quadriceps—a quadriceps which had lost its extensibility owing to prolonged splintage.

Assuming that joint stiffness is caused by the muscles losing their extensibility, can extensibility be preserved during splintage? I believe a muscle retains its power of lengthening if it is made to contract and relax periodically throughout the period of immobilisation. It is not necessary for the muscle to be stretched to its full extent (which could only be done by removing the splint and putting the joint through its full range). Consider the treatment of a fractured scaphoid. The wrist can be immobilised for six weeks, three months, or even six months without becoming stiff, provided the patient uses his fingers. In so doing the patient contracts synergically his wrist flexors and extensors. Similarly a patient with a fracture of the tibia, when he lifts his leg off the couch, contracts the flexors and extensors of the knee synergically. It is, I believe, the synergic action of the muscles that preserves the power of lengthening and so prevents joint stiffness.

A muscle under a splint will continue to act in a synergic capacity, provided that at least one of the joints over which it spans is free to move. Most muscles concerned with movement (in contradistinction to those concerned with fixation, such as the muscles that blend with the capsule of the shoulder-joint) span more than one joint, and, when all the joints over which the muscle spans are immobilised, synergic action is abolished. This is the reason why PURE splintage is so disabling. The surest way of stiffening a knee is to apply a long spica plaster. Most of us at one time or another have had the humiliation of aiming at an arthrodesis of the hip, and of getting a stiff knee and an unsound ankylosis of the hip—a crippling combination. In the treatment of a fracture of the shaft of the femur, if the knee and hip are both immobilised—as they must be if the splint is to keep the fractured ends from moving—the thigh muscles cannot act synergically, because their origins and insertions are both fixed. The consequence is a stiff knee. If, on the other hand, the hip is not splinted, and the patient is encouraged to lift his leg, the synergic action of the thigh muscles is retained, and the knee does not stiffen.

The contention that joint stiffness is the result of loss of muscle extensibility, and that this extensibility can be preserved by making the muscle act synergically, has, if correct, an important practical bearing. To preserve a mobile knee during the treatment of a fracture of the shaft of the femur it is not necessary to make the patient bend his knee; it suffices to make him lift his leg. This altogether changes our approach to the problem and makes it much more simple. It fills one with renewed admiration

for the intuition of that pioneer of orthopaedic surgery, Hugh Owen Thomas, in devising for a fracture of the femur a splint that was not tethered to the bed.

Extensive splintage, which is implicit in PURE splintage—the kind of splintage that must be used to hold the fractured ends immobile—is, I repeat, disabling. That is my answer when you say: Why not be on the safe side and employ PURE splintage in every case of fracture? Indeed PURE splintage may be so crippling in its effect that it is often better, when, by reason of the absence of internal muscle splintage, it is required, to substitute for it rigid internal splintage obtained at open operation. This is the universal practice in the case of an adduction type of transcervical fracture of the neck of the femur.

Gist of the Arguments.—(1) External splintage is of two kinds: (a) alignment splintage, whose purpose is to maintain good position, and which need not be protracted or uninterrupted or rigid or extensive; and (b) "PURE" splintage, whose purpose is to hold the bone ends immobile, and which must be protracted, uninterrupted, rigid, and extensive.

(2) When there are muscles attached to both fragments, the muscles form a natural splint that holds the bone ends immobile, and alignment splintage only is needed.

(3) When there are no muscles attached to one fragment, PURE splintage is essential to hold the bone ends immobile.

(4) PURE splintage induces so much joint stiffness that it ought not to be used unless absolutely necessary.

(5) On occasions when PURE splintage is indicated, it is often better, because of its disabling effects, to substitute rigid internal splintage.

FIBROUS UNION

The two ends of the fractured neck of the femur are joined by fibrous tissue—the kind of tissue that nature ordinarily uses for soldering. When we inquire into how nature sets about mending things, we are struck by the remarkable fact that bone is the only structure in the body that when broken joins by bone. This would not be surprising if other structures were joined by material similar to their own, muscle to muscle by muscle, nerve to nerve by nerve. But all divided structures except bone join by fibrous tissue. In its earliest phase all repair tissue is the same, and there must be an explanation why this embryonic repair tissue develops usually into fibrous tissue and only exceptionally into bone.

I suggest a physical explanation: that undifferentiated repair tissue is stimulated to transform itself into fibrous tissue when subjected to distraction, and is stimulated to transform itself into bony tissue when subjected to compression. I bring evidence in support of this contention: (1) it fits in with the observed facts, for all structures except bone gape after division, whereas after a fracture the ends of the bones are drawn together by the pull of the overlying muscles; (2) the more the muscles are activated during the repair of a fracture, the more the bone ends are compressed, and the greater the amount of ensheathing callus; (3) when compression between the ends of a fractured bone is abolished, either by excessive traction or by holding the ends apart with a plate, the embryonic repair tissue at the fracture site develops into fibrous tissue and not into bone.

Fig. 6a shows a fractured femur which had been plated five months previously. Note the comparative absence of callus. Directly the plate broke the longitudinal muscles were able to compress the ends of the bone against one another, and in consequence the fracture united with bone.

Fig. 6b was taken two and a half months, and fig. 6c sixteen months, after the plate had broken.

The rapidity of bone repair after the breaking of the plate could not be attributed to the stimulating effects of weight-bearing, because the man was walking about before and after the plate broke; the only difference in treatment being that, after the plate had broken, the leg was straightened under an anaesthetic and a plaster applied to prevent angulation.

MOVEMENT OF MUSCLES

If hitherto I have been half-hearted in my advocacy of activity, let me now be downright positive. As regards the muscles, is it to be rest or activity? Activity every time and all the time. Muscle activity confers three blessings: (1) it promotes a normal circulation in the limb (nobody disputes this); (2) it preserves the extensibility of the muscles and so avoids joint stiffness (this I have already spoken about); and (3) it stimulates the formation of callus.

Figs. 1-9 show how the laying down of callus is promoted by activity. Fig. 7a shows a fracture of the humerus due to a gunshot wound. The bone has refractured. The man arrived the day after the refracture, with the arm encased in plaster.



Fig. 7—Gunshot fracture of humerus: (a) refracture in plaster; (b) 5 weeks after substitution of sling for plaster, showing formation of callus.
 Fig. 8—Gunshot wound of tibia: (a) which had refractured while patient was ambulant without splint; (b) 3 weeks later, showing bony union.
 (c) 12 weeks after refracture, showing bony union.
 Fig. 9—Humerus of amputated arm: 1 1/2 in. of bone had been removed to obtain a pseudo-arthrosis, and active movement was encouraged; but instead bony union was effected.

We removed the plaster, put the arm in a sling, and started active exercises.

The radiogram in fig. 7b was taken five weeks later, when the patient was again using the arm normally. The original fracture had been treated with a shoulder spica plaster; note the meagre callus. The refracture was treated by putting the arm in a sling and encouraging movements; note the greater amount of callus. The man has a stronger arm now than he had before the refracture.

Fig. 8a shows a gunshot wound of the tibia. The patient was up walking about, when suddenly he felt pain in his shin. Radiography was thought to show nothing abnormal. The man was reassured.

I saw him three weeks later, when radiography showed callus formation (fig. 8b). When the original radiogram was re-examined, a linear crack extending through both halves of the bone could be seen. As the man had been walking about without any splint, it seemed unnecessary at this stage to apply one; so he was again reassured, and his symptoms soon disappeared.

The radiogram taken twelve weeks after the refracture shows consolidation (fig. 8c). The refracture in this patient, as in the previous case, had been beneficial in giving a much stronger bone. Compare again the amount of callus resulting from the two opposing lines of treatment: rest producing little callus, activity producing a great deal.

Fig. 9 shows the humerus of an amputated arm. My colleague, Mr. L. Gillis, had excised $1\frac{1}{2}$ in. of bone with the object of getting a pseudo-arthritis. After the operation the patient was encouraged to move the false joint; the result was the opposite to that intended—bony union instead of a pseudo-arthritis.

* * *

In the controversy on rest versus activity it must be apparent on which side my sympathies lie. It would be too much to hope that I have converted you to my point of view, but I shall be content if the next time any of you imposes a splint on a patient you pause a moment to ask yourself: "Why am I using this splint? What good will it do—and what harm?"

I am indebted to Mr. F. Durbin, of Exeter, for the radiograms shown in fig. 5.

ACUTE PORPHYRIA

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In the last few years our views on porphyrin diseases have undergone considerable development thanks to investigators in Scandinavia (Waldenström 1935, 1937, 1939, 1940, 1944, Waldenström and Vahlquist 1939, 1944), but their communications have almost all been published in German, so a brief review in English may be of interest. For details the reader is referred to the original papers cited and to the reviews of Vannotti (1937) and Dobriner and Rhoads (1940).

Porphyria is divided into symptomatic, congenital, and acute forms. *Symptomatic porphyria* is the pathological excretion of porphyrins as a symptom of known diseases (infections, anæmias, lead poisoning, &c.) and the only porphyrin excreted is coproporphyrin I. *Congenital porphyria* is a rare condition characterised by accumulation of uroporphyrin I in the blood and organs, especially the bones and skin, and excretion of this substance in the urine; small amounts of uroporphyrin III may also be present (Waldenström 1937, pp. 15 and 31). The condition has no hereditary connexion with acute porphyria.

Acute porphyria, so-called, is the most important of the porphyrin diseases; it has been divided into toxic and idiopathic forms, but according to Waldenström (1937, 1939) this distinction is unnecessary. The disease manifests itself in acute attacks of abdominal pain, vomiting, and constipation, often accompanied

by nervous symptoms and dark urine; but the underlying condition is a chronic disorder of pyrrole metabolism, which is latent between attacks. The term "acute porphyria" is therefore misleading. The nervous symptoms of acute porphyria have been reviewed by Waldenström (1939), and the abdominal symptoms are well known and need not be discussed here. It is a disease of adults and has not been observed before fifteen years of age.

The symptom suggesting the diagnosis of acute porphyria is usually the dark urine, and it is therefore important to know that the urine may be of entirely normal appearance in this disease. This is due to the fact that in acute porphyria the porphyrin is not excreted as such, but as a chromogen, named porphobilinogen (Waldenström and Vahlquist 1939), originally called chromogen by Waldenström (1937), which is stable in alkaline urine but changed to a mixture of uroporphyrin III and the red pigment porphobilin in acid urine. Small amounts of uroporphyrin I may, however, occur, and Grinstein et al. (1945) and Watson et al. (1945), of whose papers we have seen only brief extracts, have found considerable amounts of uroporphyrin I. The abnormal substances are found only in the urine and—contrary to what happens in congenital porphyria—not in the blood or the organs. In fatal cases necropsy practically always shows nothing abnormal.

Some cases of this chronic metabolic disorder never give rise to clinical symptoms and are known as latent porphyria; in such cases the excretion of porphobilinogen is most often permanent but may be intermittent (Waldenström 1944). The investigations of Waldenström (1937) in Sweden have shown that acute porphyria is hereditary, probably of dominant mendelian type, and in investigations of the heredity it is important to recognise the latent cases.

ÆTIOLOGY

Acute porphyria seems to have a universal distribution. Most of the cases described have been German or Swedish (Waldenström 1937), but cases are known to occur in many other countries: Denmark (Jørgensen and With 1945, Buch and Faarup 1945); France (Courcoux et al. 1929, Roger et al. 1939); Italy (Micheli and Dominici 1930, Massa 1935, Maugeri 1936); Netherlands (van Buchem and van der Zoo de Jong 1927); Norway (Wiig 1940). From England and U.S.A. a few cases have been published (Chandler et al. 1939, Rau 1940, Mason and Farnham 1931, Mason et al. 1933, Dobriner 1936, Turner 1938, Palmer 1940, Ford and Ulrich 1941). Some cases from South Africa have also been reported (Barnes 1945).

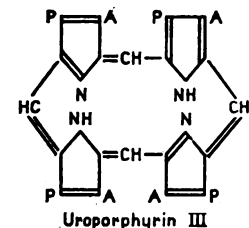
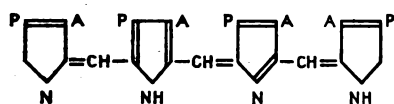
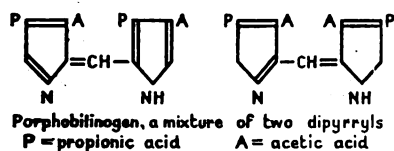
It is well known that sulphonal and trional may give rise to attacks (toxic porphyria), and Waldenström (1939, 1940) is of the opinion that barbiturates also may provoke attacks in persons with latent porphyria. As attacks of acute porphyria are often fatal, it is important to avoid barbiturates in this condition, especially in manifest cases. Waldenström (1940) found a case-mortality of 2 cases out of 36 when no barbiturates were given, as against about half the cases in most other published series, in which barbiturates were freely used.

Since the clinical picture of acute porphyria varies and may simulate other diseases, physicians, surgeons, psychiatrists, and neurologists should be on the look-out for the disease and be able to diagnose it with certainty. This can be done only by urine analysis, which is quite simple.

BIOCHEMISTRY AND CHEMICAL DIAGNOSIS

The chromogen porphobilinogen is specific to acute porphyria and is found in this disease only (Waldenström and Vahlquist 1944). It is stable in alkaline urine but is transformed into the pigments uroporphyrin III and

porphobilin if the urine is acid. Waldenström and Vahlquist (1939) concluded that the structural formulas of these substances were as shown in the figure.



The urine of patients with acute porphyria usually darkens on standing because its reaction is most often acid and the porphobilinogen is consequently transformed into uroporphyrin III and porphobilin. This process may take place in the bladder, for which reason the urine may be coloured when freshly voided. If, however, the urine is made alkaline by giving the patients sodium bicarbonate,

it remains the natural yellow colour. Alkali therapy however does not reduce the excretion of porphobilinogen (Waldenström and Vahlquist 1944) and consequently has no therapeutic value. If the darkness of the urine is due to some other cause, its colour will not be changed by the administration of alkali.

In cases in which the urine is of normal colour, the diagnosis has to be made by demonstrating porphobilinogen in the freshly voided urine. If porphobilinogen is not found, the patient cannot have an attack of acute porphyria, but he may have latent porphyria.

Porphobilinogen is demonstrated by Ehrlich's benzaldehyde reaction; it gives the same reaction as urobilinogen with Ehrlich's reagent but is easily differentiated from this substance by the fact that it is insoluble in ether, whereas urobilinogen is readily extracted with ether in an acid medium. If the fresh urine gives the benzaldehyde reaction, about 2 ml. of 50% acetic acid is added to about 20 ml. of fresh urine in a separating funnel and extracted twice with about 40 ml. of ether. If the extracted urine still gives the benzaldehyde reaction, porphobilinogen is present.

The diagnosis may be confirmed by demonstrating the porphyrin; but this is unnecessary because porphobilinogen is pathognomonic of acute porphyria. If the porphyrin concentration is sufficiently high, the urochlor reaction (Waldenström 1937) is positive:

To 1 ml. of urine 2 ml. of concentrated hydrochloric acid is added; if the reaction is positive, a red colour is seen, which, on addition of a drop of 3% hydrogen peroxide—not too old a solution—in a few minutes gives way to yellow and later becomes grass-green and ultimately fades.

This reaction is common to all porphyrins and is positive also in symptomatic and congenital porphyrias.

If the urochlor reaction is negative, the porphyrin may be demonstrated after chromatography of the urine on anhydrous aluminium oxide. The procedure is described by Waldenström (1935) and by Jørgensen and With (1945).

If closer chemical analysis is aimed at, more complicated procedures are required. For the isolation of uroporphyrin III, Waldenström (1937, p. 34) has developed a fractional extraction with ether and acetic ether at pH 3.2. After extraction, spectroscopic identification can be carried out, but this is not necessary in ordinary clinical work. Direct spectroscopic examination of the urine without previous purification is useless and may be misleading.

QUANTITATIVE ESTIMATION

Vahlquist (1939) has worked out a method for the quantitative determination of porphobilinogen in the urine.

The urine is made alkaline by giving the patient sodium bicarbonate and is extracted with ether after the addition of acetic acid. The red colour of the benzaldehyde reaction of the extracted urine is measured in the Pulfrich photometer (filters S.55 or S.53). Since porphobilinogen has not been isolated in the pure state the result is expressed in extinction units (p.u.). According to Vahlquist (1939) 1 p.u. is the concentration of a solution which gives the same extinction with the benzaldehyde reagent as does a urobilinogen solution containing 1 mg. per 100 ml., whereas according to Waldenström and Vahlquist (1944) 1 p.u. is the amount of porphobilinogen present in 100 ml. of such a solution of porphobilinogen. In our case-records the latter definition is used.

With this method of analysis Waldenström and Vahlquist (1944) observed the excretion of porphobilinogen in latent and manifest cases of acute porphyria. In two manifest cases the excretion was observed during longer periods after an attack and found to be fairly constant. We have made quantitative determinations in two cases: in a latent case the porphobilin excretion was observed during its disappearance and reappearance, and in a manifest case until the death of the patient. It is noteworthy that the excretion measured in p.u. was of the same order of magnitude in these two cases and in the two manifest cases reported by Waldenström and Vahlquist (1944).

CASE-RECORDS

CASE 1 (latent porphyria).—A diabetic man, aged 53, in the hospital from May 20 to July 17, 1944. No history of diseases suspect of acute porphyria in his family or himself. No diseases of importance up to 1934, when diabetes mellitus was diagnosed and treated by diet and insulin. During March, 1944, symptoms of neuritis developed in the legs. Examination showed no paresis but slight disturbances of sensibility pointing to a diabetic neuritis. Further clinical examination showed nothing abnormal except diabetes of moderate severity and porphyrinuria.

Soon after his admission to hospital it was noted that his urine was dark red and showed a strongly positive benzaldehyde reaction, which persisted after extraction with ether in an acid medium. The urochlor reaction was negative and after chromatographic concentration only doubtfully positive.

Careful investigation of the patient's consumption of medicine showed that he had taken 0.09 g. of phenobarbitone daily during two weeks in April, 1944. Quantitative determination of porphobilinogen after the urine had been made alkaline—by which it lost its red colour—showed the following values:

June 4.—5.3 p.u. per 100 ml. in 24-hour urine, and 52.3 p.u. per 24 hours.

June 5.—The different portions of urine were analysed separately and gave the following figures: 0 hr. 40 min., 10.2 p.u. per 100 ml.; 5 hr. 15 min., 4.6 p.u. per 100 ml.; 19 hr. and 21 hr. 30 min., only 0.04 p.u. per 100 ml.

June 6.—0.02 p.u. per 100 ml.

June 7.—0.01 p.u. per 100 ml.

After that the reaction was too weak for quantitative measurement.

The observations were made apparently just as the porphobilinogen excretion was disappearing—a process which mainly took place in a single day. After the disappearance of the porphobilinogen the administration of sodium bicarbonate was discontinued and the urine became acid, but the porphobilinogen did not reappear.

Provocative doses of barbiturates were then given. Starting from June 23, phenobarbitone 0.045 g. was given thrice daily, and allylisopropylbarbituric acid 0.1 g. in the evening. As the patient became very sleepy, 'Prominal' (*n*-methylphenylethylbarbituric acid) 0.06 g. was given thrice daily from June 26 instead of the phenobarbitone. On the 30th the urine was red and gave a strong positive reaction with benzaldehyde. The same day the barbiturates were discontinued and the administration of alkali was begun. From July 4 the urine was colourless, and quantitative determinations gave the following results.

July 4.—13.6 P.U. per 100 ml., and a minimal excretion of 20.4 P.U. per 24 hours (some urine had been lost).

July 5.—6.0 P.U. per 100 ml., and 36.0 P.U. per 24 hours.

July 7.—9.6 P.U. per 100 ml., and 134.4 P.U. per 24 hours.

July 9.—7.2 P.U. per 100 ml., and 86.4 P.U. per 24 hours.

July 10.—8.0 P.U. per 100 ml., and 80.0 P.U. per 24 hours.

Owing to the "people's strike" against the Germans in Copenhagen (restrictions of electricity) no more determinations could be carried out.

CASE 2 (manifest porphyria).—A housewife, aged 32, with no history of diseases suggestive of acute porphyria in her family or herself, and no other previous diseases of importance, was in the medical department from Dec. 22 to Dec. 29, 1944. On Dec. 10 she had begun to take allobarbitone 0.12 g. daily for nervousness; apart from this she took no other medicaments. On the 16th she had had an attack of dizziness, followed by two hours' unconsciousness. On the 17th she had had a similar attack, accompanied by transitory respiratory paresis. Her husband, an electrician who had been present at electric accidents and given artificial respiration, treated her with artificial respiration during several hours before she was able to breathe spontaneously.

On the 18th she had had an attack of abdominal colic and been admitted to a surgical ward, where her symptoms rapidly disappeared and her general condition ameliorated; but, as dark urine was observed, she was admitted to our department. Here, on the first evening of her stay, she was erroneously given soluble barbitone 0.35 g. as a hypnotic—the only dose of barbiturates taken since the 18th. Later only opiates were used as hypnotics.

On the 23rd an attack of diffuse uncharacteristic abdominal pain, general hyperæsthesia, and rapidly progressive paresis of all four limbs developed, with pronounced weakening of the tendon-reflexes. A neurologist examined the patient and thought that the pareses were of muscular origin. The breathing was in periods of gasping, with intervals of complete cessation of respiration. Paresis of the sphincters developed; on the 26th the bladder reached the umbilicus, and from that time daily catheterisation was necessary.

Lumbar puncture on the 28th showed normal cerebrospinal fluid with a negative Wassermann reaction. Electrocardiograms on the 23rd and 27th were also normal.

On the 29th the patient died from progressive respiratory paralysis accompanied by fever (104° F) and tachycardia. Necropsy showed nothing abnormal except bronchopneumonia in the right lower lobe.

Quantitative determinations of porphobilinogen carried out after the urine had been made alkaline gave the following values:

Dec. 26.—14.5 P.U. per 100 ml., and 145 P.U. per 24 hours.

Dec. 27.—9.5 P.U. per 100 ml., and 385 P.U. per 24 hours.

Dec. 28.—7.6 P.U. per 100 ml., and 118 P.U. per 24 hours.

Dec. 29.—9.5 P.U. per 100 ml., and 207 P.U. per 24 hours.

The volume of urine passed was 1000–4050 ml. per 24 hours, which is exceptionally large for this disease. Chromatography was performed, and the urochlor reaction was positive in the eluate. Examination of the fresh urine of two sisters of the patient showed no porphobilinogen.

SUMMARY

Recent progress in our knowledge of the so-called acute porphyria is reviewed.

This disease has hitherto attracted too little attention in the Anglo-Saxon countries.

There is strong evidence that barbiturates exert a harmful effect on patients with porphyria, even when it is latent. Two cases illustrating this effect are reported.

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RUBELLA AS A CAUSE OF CONGENITAL DEAFNESS IN ENGLAND

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THE association between maternal rubella in the early months of pregnancy and congenital cataract was first noted by Gregg (1941) among New South Wales children who had been in the early months of fetal life in June-August, 1940, when there was an extensive outbreak of rubella in Australia. The association was later confirmed by Swan and his associates in South Australia, who found that of 101 children whose mothers had had rubella in pregnancy 78 were born with various defects, mainly cataract, deaf-mutism, and heart lesions (Swan et al. 1943, 1944, Swan 1944, Swan and Tostevin 1946). Of the 78 mothers of defective children, 69 had had rubella in the first three months of pregnancy, 8 in the fourth, fifth, or sixth month, and only 1 in the last three months (seventh). They concluded from their findings that if a woman contracts rubella in the first two months of pregnancy the chances of her child being born defective are about 100%; if she contracts the exanthem in the third month the chances are about 50%; whereas later in pregnancy the chances are very low.

Evidence from the United States suggests, however, that women who contract the disease in the first two months of pregnancy may have normal children, and that the dictum of Swan and colleagues was unduly pessimistic—at least when applied to other parts of the world. Fox and Bortin (1946) investigated 152 cases of rubella in married women, notified in Milwaukee during 1942–44, and found that 11 had been pregnant at the time of the rubella, 5 in the first two months, 4 in the third or fourth month, 1 in the seventh month, and 1 in the ninth month. Of the 12 babies born (there was one set of twins) only 2 were abnormal, one of these being a stillborn hydrocephalic and the other a "blue" baby with a hydrocephalus that subsided spontaneously.

In his original paper Gregg (1941) did not mention the hearing of the affected children, but at the time when the paper was read (October, 1941) most of the children were only eighteen months old and none was older than two years, at which age deafness may well be overlooked, especially in children who are blind or otherwise defective. In 1942 and 1943 Gregg learned of more and more cases of deaf-mutism (Gregg 1945), and Swan and colleagues found 38 cases of deafness (4 doubtful) among their 78 children with various defects. Carruthers (1945) expects that severe defects of hearing will ultimately be detected in over half of the Australian children whose mothers had rubella early in pregnancy. The frequency of deafness associated with maternal rubella has been brought out by the inquiries of Welch (1945) in Queens-

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land and of a committee set up by the department of health in New South Wales (1945).

The Australian inquiries suggest that there is some connexion between the stage of pregnancy at which the mother contracts rubella and the type of malformation in her child. Swan and colleagues found that the average duration of pregnancy at the time of the rubella in the mothers of children with cataract was 1.4 months, in the mothers of children with heart lesions 1.5 months, and in mothers of deaf children 2.3 months. Carruthers (1945) concludes that if infection occurs in the first six weeks foetal damage will be widespread and may include the eyes, both divisions of the ears, the heart, and perhaps many other parts; after the sixth week the eyes and heart may escape and the semicircular canals be normally developed, but the cochlea is likely to be damaged and growth may be retarded; after the third month damage to the foetus is rare.

In the last two years congenital defects associated with maternal rubella have been reported from the United States, though the number of cases has been small, the largest series being the 11 cases reported by Erickson (1944). So far deaf-mutism has been an unusual finding, but this may again be an effect of early reporting, since most of the cases published have been in children under two years of age. Of 45 reported cases of congenital malformations following maternal rubella in pregnancy the main lesions were cataract in 39 cases; heart defects in 35 cases; and deaf-mutism and undescended testicles each in 2 cases (Reese 1944, Erickson 1944, Perera 1945, Adams 1945, Altmann and Dingmann 1945, Albaugh 1945, Rones 1944, Greenthal 1945, Krause 1945, Long and Danielson 1945, Conte et al. 1945). In all but one of these 45 cases the mothers had had their rubella in the first three months of pregnancy; in the one exception it occurred in the twenty-eighth week (Conte et al. 1945).

Several American writers suggest that a particularly virulent strain of rubella virus, responsible for the congenital malformations in Australia, was imported by troops into the U.S.A., leading to the appearance of similar defects there.

TABLE II—FINDINGS ON EXAMINATION IN CHILDREN AT CUCKFIELD ON MARCH 30, 1946

Case no.	Age yr. m.	Height ft. in.	Weight st. lb.	Circumference of head (in.)	Degree of deafness	Other abnormalities
1	5 6	3 5½	2 7	18¾	Mod	Nil
2	5 6	3 7¼	2 7½	18	Sev	Poor muscle tone; pale mottled skin; wide arch to upper jaw, very narrow lower arch
3	5 5	3 7¼	2 11½	19½	Sev	Systolic bruit in 2nd left intercostal space; slightly pot-bellied
4	5 7	3 10½	3 6	20¼	Sev	Pigeon-chested
5	5 5	3 6½	2 4	19	Mod	Grossly defective muscle tone
6	5 7	3 8	3 1	20½	Mod	Nil
7	5 7	3 10	2 12½	19½	Slight	Slightly pigeon-chested
8	5 6	3 8½	3 5	19¾	Sev	Pot-bellied; slight postural valgus; internal squint
9	12 6	5 1½	5 10	20½	Sev	Wide arch to upper jaw; narrow lower arch

INQUIRIES IN ENGLAND

It seemed important to find out whether there was an association between rubella and congenital defects in England, because here at last was a possible cause for previously inexplicable malformations, and a cause which might be preventable. Simpson (1944) had reported 2 cases of congenital cataract in West Country children whose mothers had German measles in pregnancy, but otherwise there were no British papers on the subject.

A simple way of approaching the question was to inquire for a history of German measles in the mothers of children in schools for defective children. Though such an inquiry will not tell us what proportion of mothers

TABLE I—SUMMARY OF ANSWERS RECEIVED TO QUESTIONNAIRES

No. and sex	Address of mother	Date of birth	Date of rubella	Week of pregnancy	Severity	Seen by doctor	Birth-weight lb. oz.	Feeding difficulty	First tooth at (month)	Walked at (month)	No. and sex	Address of mother	Date of birth	Date of rubella	Week of pregnancy	Severity	Seen by doctor	Birth-weight lb. oz.
<i>Cuckfield</i>																		
1 F*	Essex	Oct. 3, 1940	Feb. 10, 1940	7	Mod	Yes	6 0	Breast-fed; poor appetite for other food	20	14	10 F*	Cheshire	Oct. 12, 1940	Apr. 3, 1940	13	...	Yes	7 8
2 F*	Berks	Oct. 2, 1940	Feb. 14, 1940	7	Sev	Yes	4 2	Very slow in gaining	6	16	11 F*	Midddx	Dec. 7, 1940	Apr. 29, 1940	7	..	Yes	6 12
3 F*	Yorks	Oct. 26, 1940	March, 1940	8-12	Mild	Yes	6 0	Very difficult	10	18	12 F*	Lancs	Jan. 26, 1941	July, 1940	8-12	..	Yes	6 0
4 M*	Surrey	Aug. 21, 1940 (3 wk. prem.)	March, 1940	12-16	V mild	No	5 13	Easy on bottle	9	14	<i>Birmingham</i>							
5 F	Wilts	Oct. 15, 1940	Mar. 15, 1940-Apr. 15, 1940	10-14	Mild	Yes	4 4	Very poor feeder	17	20	13 F	Wores	Feb. 16, 1941	August, 1940	12-14	Mild	No	..
6 M*	Somerset	Aug. 29, 1940	Feb. 25, 1940	14	Mod	Yes	6 12	Very difficult for 3 months	?	12	14 M	Glos	Oct. 8, 1940	Feb. 26, 1940	8	..	No	..
7 F*	Sussex	Aug. 28, 1940	Feb. 10, 1940	12	Sev	Yes	6 0	Very difficult; suspected colic disease	4	23	15 M	Glos	Oct. 6, 1940	March, 1940	9-13	Mod	Yes	..
8 F	London	Sep. 20, 1940	Mar. 7, 1940	12	Mod	No	6 2	Breast-fed easily	12	21	16 M*	London	Nov. 6, 1940	April, 1940	9-13	Mild	No	..
9 F	Hants	Sep. 27, 1933	Mar. 17, 1933 (probable†)	13	V mild	No	6 8	Bottle-fed; very slow eater after weaning	V late	V late	17 F	Oxford	Oct. 5, 1940	Feb. 15, 1940	7	..	No	..
<i>Doncaster</i>																		
											18 F	Sussex	Nov. 7, 1940	Apr. 22, 1940	12	Mod	Yes	..
											19 ?	Surrey	Oct. 16, 1940	April, 1940	12-14	Mod	Yes	..
											20 F	Yorks	Oct. 16, 1940	Mar. 20, 1940	11	Mod	Yes	..

* The nine cases marked with an asterisk were included in Miss Sylvian Martin's series.
 † This mother said: "A rash appeared after about 3 months of pregnancy and lasted for 3 days; it might quite easily have been German measles, but feeling well otherwise I did not call a doctor."

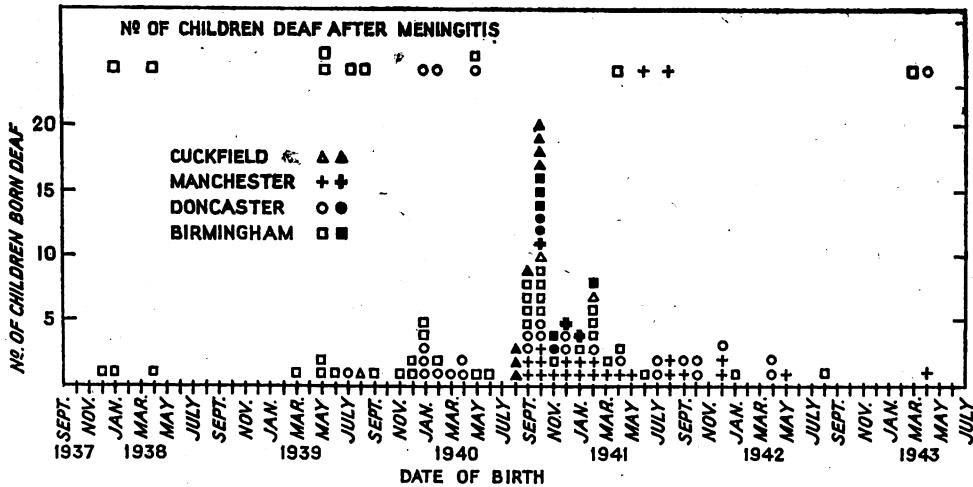


Fig. 1—Present inquiry: cases with maternal history of rubella are shown in solid black. Beyond the limits of the chart there were 6 Cuckfield children born deaf in October, 1929; June, 1930; August, 1932; September, 1933 (rubella positive); and September, 1935 (two).

who get German measles early in pregnancy give birth to defective children—this figure could only be learnt by a much larger and protracted inquiry—it should give a rough indication of the need for the application of preventive measures. It was decided to start with schools for the deaf.

The questionnaire drawn up for circulation to the mothers was intended to produce the essential information without giving any hint that it was for German measles that we were searching. The questions adopted were as follows:

- (1) Name and home address of your child with defective hearing.
- (2) Date and place of baby's birth.
- (3) Was the baby premature? If so, how many months?
- (4) How old was the baby when you first noticed the deafness?
- (5) Did you have any illness during that pregnancy?
- (6) If so, what was the illness? (If you are uncertain of its name, please say what it was like.)
- (7) Did a doctor see you in that illness? If so, please give his name and address.
- (8) Date of the illness. (If you cannot remember the date, can you say how long before baby was born it occurred?)

In the first place the form was circulated to the mothers of children at Cuckfield House Oral School for the Deaf, a small private school in Sussex. The replies were startlingly positive. Of the 18 children in the school, a history of rubella in the mother was obtained in 8, with a ninth probable and a tenth possible. Moreover, in all the positive cases (including the probable one) the rubella had been in the first four months of pregnancy (table 1). Another striking point was the birth dates of the children with a definite maternal history of rubella; these all lay between August 24 and Oct. 26, 1940, whereas the birth dates of the other children in the school were scattered between 1929 and 1941.

The questionnaires were next circulated in three larger schools for the deaf—the Royal Residential Schools for the Deaf, Manchester; the Yorkshire School for the Deaf, Doncaster; and the Royal School for Deaf Children, Birmingham.

The results at the three larger deaf schools were as follows:

School	No. of deaf children	No. with maternal history of rubella in pregnancy
Manchester	29	3
Doncaster	35	3
Birmingham .. .	50	5
Total	123	11 (8.9%)

Once again in every positive case the mother had had the rubella in the first four months of pregnancy (table 1); and once again there was a remarkable similarity in the birth dates, all 11 lying between Oct. 5, 1940, and Feb. 16, 1941, with 6 cases in October, 1940, whereas there was a wider scattering in the birth dates of the children with no maternal history of rubella (see fig. 1).

If one excludes all children in which the deafness was known, or strongly suspected, to have followed meningitis, measles, or other illness

in the child after birth, the total number of children at the three schools falls to 97 and the proportion with a maternal history of rubella rises to 11.3%; 72 of the 97 children were born in 1940-41, so a history of maternal rubella was obtained in 15% of the deaf children born in these epidemic years.

Miss Martin's Inquiry.—While this small inquiry was in progress, Miss Sylvian Martin (1945) briefly summarised the results of a rather similar investigation she had carried out among the children attending her speech-therapy clinic at the Infants Hospital, Vincent Square, and at various deaf schools throughout England. I have since analysed her material.

In Miss Martin's questionnaire the mothers were asked specifically: "During pregnancy, did you have German measles?" Altogether she received replies from 239 mothers, and 38 (15.9%) gave a history of German measles in the first four months of pregnancy. In no case was there a history of German measles later in pregnancy than the fourth month. The birth dates of the children are charted in fig. 2, which shows that there is again a striking grouping of the rubella-positive children between August, 1940, and February, 1941.

In a further brief report Miss Martin (1946) summarised her findings among children born in 1940-41 as follows:

	Boys	Girls	Total
Deaf children born in 1940-41	64	38	102
History of maternal rubella in first 4 months of pregnancy	16	20	36 (35%)

Hughes (1945) has reported a case of unilateral cataract, deaf-mutism, and patent interventricular septum in a child born on Nov. 21, 1940, whose mother had had rubella in the second month of pregnancy.

FINDINGS IN MORE DETAIL

The necessity for avoiding leading questions in drafting the questionnaire for circulation to deaf schools made it impossible to ask for details of the attack of German measles in positive cases. Some supplementary questions were therefore circulated to the mothers of the "rubella-

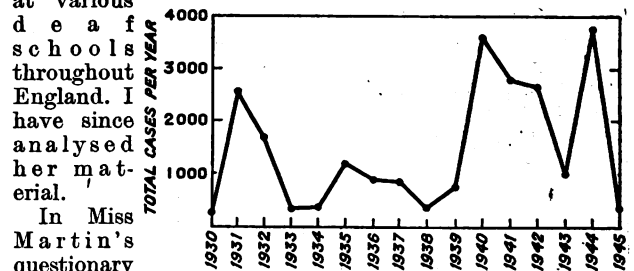


Fig. 3—Annual notifications of rubella in Manchester.

positive" children at Cuckfield School. The children were also examined clinically, and Mr. Maxwell Ellis estimated their hearing-loss with a 'Maico' audiometer. The replies to the supplementary questions and clinical findings are summarised in the tables.

Age and Parity of Mothers.—Of the 9 mothers of whom inquiry was made, 5 were under and 4 over 24 years when the affected child was born. All but 1 child were the first children of the family.

Severity of Rubella.—Table I shows that of the 15 cases where the severity could be estimated, the attack was severe in 2, moderate in 7, mild in 4, and very mild in 2 cases (including 1 where the diagnosis remains in doubt). There is no obvious relation between the severity of the mother's rubella and the degree of the child's defects.

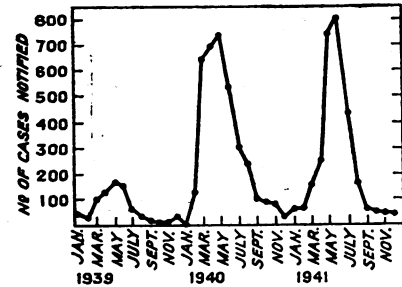


Fig. 4—Monthly incidence of rubella in Manchester.

weight was known, in 2 it was under 4½ lb., in 6 others it was under 6¼ lb., and in only 4 was it 6½ lb. or over.

Feeding Difficulties.—Of the Cuckfield cases, in which feeding difficulties were inquired for, only 2 had been fed easily and had gained weight normally from birth (cases 4 and 8). In the others the usual complaint was that it was hard to get the baby to take its feeds. A typical reply (case 3) to the question regarding feeding was: "She was very difficult to feed, as she refused to suck at the breast and only with a great deal of persuasion would take a bottle. She was also very difficult to suit. Many foods disagreed with her."

The poor appetite of these children seems often to have continued beyond the infant stage, and in cases 1 and 7 the mother remarks that the child is still a poor feeder. In case 7, after severe feeding difficulties in infancy, the child was suspected of having cœliac disease at the age of 2 years.

Teeth and Jaws.—Of 7 cases where the information is available, the first tooth did not appear until the child was a year old or older in 3 cases, and the average time of eruption was eleven months. No evidence of delayed

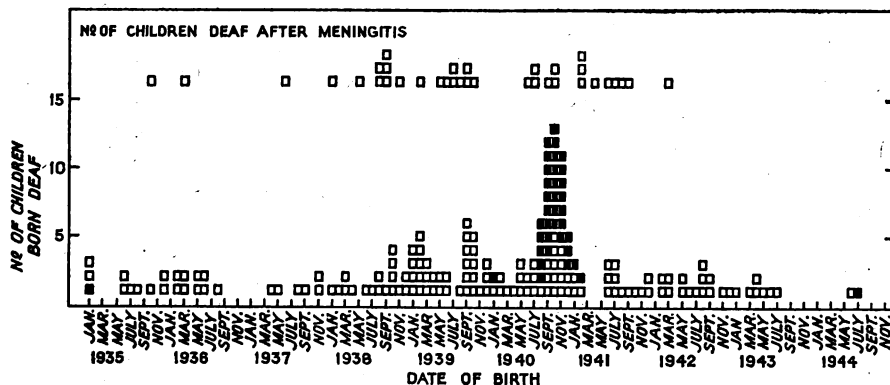


Fig. 2—Miss Martin's series: cases with maternal history of rubella are shown in solid black. Beyond the limits of the chart there were 10 children born deaf in February, 1929; February, 1930; March, 1931; August, 1931; May, 1932; June, 1932; March, 1933; January, 1934; August, 1934; and October, 1934; and 1 child, born in December, 1928, became deaf after meningitis.

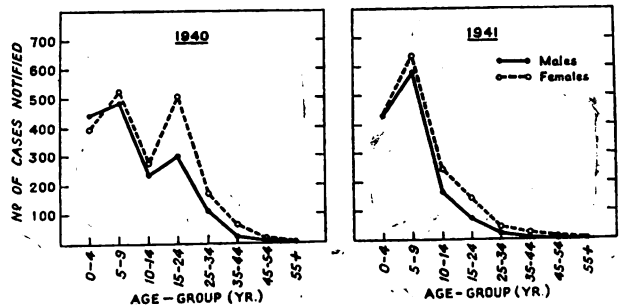


Fig. 5—Age- and sex-distribution of rubella in Manchester.

Maturity.—There was no obvious tendency to premature birth among the children: of the whole series 15 were born at full term and the remainder 2-4 weeks prematurely.

Birth-weights.—A low birth-weight was a common finding: of the 12 cases where the

eruption of the second teeth was noted on examination, and there did not seem to be any abnormal tendency to caries. In 2 cases (2 and 9) there was a well-marked deformity of the jaw, consisting in each case of gross narrowing of the mandibular arch, with a widely curved maxillary arch, producing crowding of the lower, and wide spacing of the upper, incisors. It should be noted, however, that case 2 was one of those in which feeding had been particularly difficult and breast-feeding had not been possible. In case 9 (the doubtful case) the baby was bottle-fed without difficulty, though from the weaning period to 6 years "she would not chew her food and held it in her mouth for hours."

Walking.—If we take fifteen months as the average age at which the normal child can walk well enough for there to be no doubt about it (Jewesbury 1932), walking was delayed in 5 out of 8 children, and grossly delayed (twenty months or later) in 3 cases.

Size of Head.—The circumference of the children's heads ranged from 18 in. to 20½ in. Hutchison (1925) gives 20 in. as the normal circumference of the head of a five-year-old child; so case 2 must be looked on as small-headed, case 1 as less definitely so, and only 3 of the children (cases 4, 6, and 8) as normal in this respect.

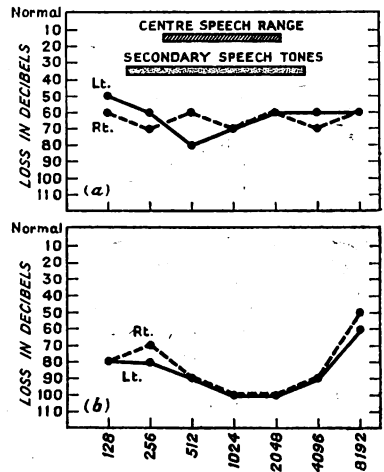


Fig. 6—Two examples of audiograms from children with a maternal history of rubella in early pregnancy: (a) case 1; (b) case 6.

Hearing.—The deafness, in all cases where it could be tested, was of the inner-ear type. In all cases the hearing defect was bilateral, and its degree was usually much the same in the two ears. The audiograms, of which two examples are given in fig. 6, showed no evidence of islands of hearing, and the loss was as a rule fairly uniform throughout the frequency range. In at least 5 of the 8 children tested there was only a partial loss of hearing.

When was the Deafness Noticed?—The answers to this

question ranged from six months to four and a half years of age, as follows:

Case no. . .	1	2	3	4	5	6	7	8	9	10
Age (yr.) . .	1	2	1 $\frac{1}{4}$	2	4 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	$\frac{1}{2}$	1 $\frac{2}{3}$?
Case no. . .	11	12	13	14	15	16	17	18	19	20
Age (yr.) . .	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	$\frac{3}{4}$	1 $\frac{1}{4}$	1 $\frac{3}{4}$	1 $\frac{3}{4}$	$\frac{1}{2}$	3	$\frac{3}{4}$

Other Abnormalities.—Except cases 2 and 5, the affected children looked in good general health and well nourished. Cases 2 and 5 were thin, with atonic muscles and a tendency to lordosis, but such children are common among the general school population. Cases 3 and 8 were pot-bellied, and case 8 also had a postural valgus. Cases 4 and 7 had a definite though slight pigeon-chest.

No definite *heart lesions* could be detected, the only abnormal cardiac finding being in case 3; this girl had a soft blowing systolic bruit best heard in the second left intercostal space and transmitted up into the neck; there was no thrill or clinically detectable cardiac enlargement.

The only *eye lesion* detected was in case 8, a girl with an internal strabismus of the left eye.

Intelligence.—The mistresses at Cuckfield School agreed that all the affected children were normally intelligent.

NOTIFICATIONS OF RUBELLA IN MANCHESTER

In this country there is no general notification of rubella, so the incidence and age-distribution are unknown. Some evidence on these points, however, has been obtained from Manchester, the only area in England in which rubella is now notifiable. Unfortunately the notifications only reveal the general trend, since an unknown number of people with rubella do not call a doctor, and even when they do so the diagnosis is often too uncertain to be relied on.

The Manchester notifications for 1930–45 are charted in fig. 3. The monthly notifications in the epidemic years of 1940 and 1941 are compared with those in 1939 in fig. 4. It will be seen that in 1940 the incidence was high in March–June, with the peak in May, and in 1941 it was high in May–July, with the peak in June. If this monthly trend was common to the rest of England, and if we accept that rubella damages the hearing during the second to fourth months of foetal life, we should expect to find unusual numbers of deaf-mute children being born in the autumn of 1940, and in the winter of 1941–42. Figs. 1 and 2 support this forecast as regards 1940, but not as regards 1941–42.

The explanation of this difference seems to be that the outbreak of 1940 affected women of child-bearing age more than did that of 1941. When the notifications for the two years are set out in sex- and age-groups (fig. 5), it is seen that in 1940 the figure for women of 15–24 years is almost as high as that for children aged 5–9, whereas this secondary peak is absent in 1941; the figure for women of 25–34 is also considerably higher for 1940 than for 1941.

DISCUSSION

The findings leave little doubt that the 1940 epidemic of German measles in England was responsible for many cases of congenital deafness by attacking the foetus during the second to fourth months of uterine life. There seems to be no other explanation for the disproportionate number of children in deaf schools who were born between August and November, 1940, and whose mothers give a history of rubella at this particular stage of pregnancy.

The Manchester figures for age- and sex-distribution of notified cases show that this epidemic was peculiar in attacking a high proportion of women of child-bearing age, and this may be the sole reason why the deaf schools can produce only an occasional example of deaf children born in other years with a maternal history of rubella in pregnancy. It must remain doubtful, however,

whether the 1940 epidemic differed in some more fundamental respect from those of other years—in short, was the 1940 disease rubella, perhaps in an unusually virulent form, or some other disease, with a similar clinical picture but a dissimilar tendency to damage the foetus in utero? This doubt was raised in Australia, and Swan et al. (1943, 1944) made a laborious inquiry into the illnesses which the mothers in their series had had in pregnancy. Memories were naturally faulty, but the picture that emerged was fairly typical of rubella as seen in adults, and Parsons (1946) says in his Blair-Bell lecture: "In my opinion it should be accepted that the disease was rubella." In the present series the brief accounts of the mothers pointed to the same conclusion, and in 13 of the 20 mothers their illness was diagnosed by a doctor at the time. But in the absence of a diagnostic test for rubella some doubt must remain.

As was noted in the Cuckfield children, the deafness associated with maternal rubella is rarely, if ever, complete. Carruthers (1945), who made a detailed study of 18 cases of deaf-mutism with a maternal history of rubella, found that many of the children gave some evidence of hearing over the tone range 512 to 2048 vibrations per sec. He tested the caloric labyrinthine reactions in 9 cases, and found them slightly reduced; in only 1 case—and then in only one ear—was there no nystagmus on caloric stimulation. It was, however, notable that none of the rubella group was made sick by caloric stimulation of the labyrinth, even when pronounced nystagmus was produced. In Carruthers's view the semicircular canals are largely spared in these cases, the main damage being to the cochlea. In an infant whose mother had rubella during the first month of pregnancy, and who died aged six and a half months with congenital cataracts and a patent ductus arteriosus, the outstanding feature of the inner ear at necropsy was the total absence of any differentiation of the primitive cells to form the organ of Corti in the cochlea. The eighth nerve and spiral ganglia were well formed, as were the bony and membranous semicircular canals, though the receptor end-organs (the crista) showed the same lack of cell differentiation as did the organ of Corti.

To explain the production of malformations by the rubella virus acting early in foetal life, it has been assumed that the cells which are in active division at the time of the virus attack are affected, while fully formed organs and quiescent primordia tend to escape (Mann 1944). On this view there is a critical period in the development of each organ at which it is susceptible to attack. The most rapid differentiation of the cochlea is taking place at about the 7th week. In the Australian series the average duration of pregnancy at the time of the rubella in the mothers of deaf-mutes was 2 months (Carruthers 1945) or 2.3 months (Swan et al. 1943, 1944); and, as would be expected from the embryology, these children mostly had some hearing, since the cochlea would be partly formed by that period. On the other hand, in the case whose necropsy findings are recorded by Carruthers, the mother had rubella during the first month of pregnancy, and the total absence of an organ of Corti suggests that this child would have been totally deaf. The tympanic cavity separates in the 9th week, and the drum and final stages of the meatus and external ear form after that; the fact that they escape damage must depend on factors other than those of development, since otherwise one would expect malformations of the middle and external ear in children born to mothers who had rubella in the 3rd or 4th month of pregnancy. To explain this we must postulate a local tissue susceptibility, which is, of course, a familiar feature of infection in the body. It must be assumed, too, that the foetus as a whole develops a resistance to virus attack by the 3rd or 4th month, even though active differentiation is still proceeding in certain organs.

As Parsons (1946) remarks, "the evidence produced is sufficiently convincing to make it unwise for expectant mothers—especially in the early months of pregnancy—to be exposed to the risk of infection with German measles and perhaps with other exanthemata also." This is a strong argument for making the work done on rubella widely known to the public, for the worst damage is done at a stage of pregnancy when most women will not have consulted a doctor or midwife—often indeed before they know themselves to be pregnant. Even when the risk is known, however, the explosiveness of rubella outbreaks and the triviality of the illness it produces will make avoidance of infection very difficult to ensure.

It seems clear that even at some expense, inconvenience, and trouble to the patients and their attendants all pregnant women who are not immune because of a previous attack should be protected against rubella at least during the first four months of pregnancy, and preferably for six months. The suggestion has been made that all girls should be infected with rubella, by contact with a case, before they reach the child-bearing age. But if this were feasible, which is doubtful, serious complications of rubella, though rare, are not unknown, and a few mishaps would soon bring the measure into disrepute. Passive immunisation seems more immediately feasible, and there is urgent need for research to devise a suitable and effective technique. The work of Barenberg et al. (1942) in children's wards in New York suggests that the injection of 30 c.cm. of human plasma will protect a child against rubella for at any rate a few weeks, but their findings cannot be said to be conclusive, even for children. On the analogy of measles, convalescent serum would be expected to be more effective. But normal adult and convalescent serum both carry the risk of homologous serum jaundice. Gamma globulin seems to be free from this risk, the dose is small, and the reactions it sometimes produces are rarely severe. Gamma globulin, preferably prepared from convalescent serum, therefore seems the most promising immunising agent, though its efficacy in rubella has, of course, still to be demonstrated. One injection would probably not protect for more than a month or so, but most mothers would not object to an injection repeated two or three times to tide them over the critical period once the need for protection was explained to them.

If a woman does contract rubella during the first four months of pregnancy the question will arise whether the pregnancy should be terminated, but, especially in view of the findings of Fox and Bortin (1946), doctors in this country will no doubt require more convincing evidence of the genuineness of the risk than is yet forthcoming before advising such a drastic step—Parsons (1946), for instance, finds the evidence insufficient to justify the termination of pregnancy. Moreover, the clinical diagnosis of rubella would often be too uncertain to be relied on; a complement-fixation or other serological reaction which will provide a reliable diagnostic test for rubella in pregnant women is badly needed (the presence of Türk cells in the blood is not confined to rubella). As the law stands, it is doubtful whether an abortion on these grounds would be legal in the United Kingdom (*Lancet* 1946).

SUMMARY

The association established in Australia between maternal rubella in the first three months of pregnancy and congenital defects—mainly cataract, deaf-mutism, and heart lesions—has been confirmed in the United States.

An inquiry has therefore been made in schools for the deaf to see whether a similar association could be demonstrated in England.

At one school with 18 children, 8 mothers gave a definite and 1 a probable history of rubella in the second

to fourth months of pregnancy. The 8 children with a definite maternal history were all born between August and October, 1940.

In three larger schools a maternal history of rubella in pregnancy—always in the first four months—was obtained in 11 out of 123 children; and in the positive cases the children were all born between October, 1940, and February, 1941.

Deaf children with a maternal history of rubella were found to have a bilateral, incomplete, inner-ear deafness usually fairly uniform throughout the frequency range. Difficulty in feeding during infancy was commonly reported, and examination showed a tendency to deformity of the jaw, pigeon-chest, and atonic musculature; intelligence seemed to be normal, and no cataract or definite heart lesion was detected.

Notifications at Manchester show that the rubella epidemic of 1940 was peculiar in involving an unusually high proportion of young women.

An attempt should be made to protect pregnant women against rubella in the first four months of pregnancy.

Inquiry should be made into the efficacy of gamma globulin prepared from convalescent serum for this purpose.

My thanks are due to Mr. Maxwell Ellis, F.R.C.S., for the audiometer charts; to Dr. A. H. Gale, of the Ministry of Education, and Mr. John Spalding, Mr. E. S. Greenaway, and Mr. F. W. Cockersole, the headmasters, for allowing me to include the figures for the Manchester, Doncaster, and Birmingham schools; to Dr. C. Metcalfe Brown, M.O.H. for Manchester, for the notification figures; to Dr. Margaret N. Jackson for her help with the inquiry; to Miss Corbishley and her staff for facilities at Cuckfield; and to Miss Sylvian Martin for allowing me to analyse her series.

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THE Association of British Chemical Manufacturers, of 166, Piccadilly, London, W.1, has produced a new edition of their directory, "British Chemicals and their Manufacturers," the first since 1939. The directory contains the names and addresses of the members of the association, followed by a 60-page classified list of their products and a separate list of proprietary and trade names. The lists include drugs and microscopic stains as well as chemicals used in industry. The directory will be sent free to anyone likely to purchase chemicals.

DUCT PAPILOMATA OF THE BREAST

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DURING the last five years I have been distressed to see, serving in H.M. Forces, a large number of young women under the age of 25 who have had one or both breasts removed because of bleeding from the nipples. I am quite sure in my own mind that very many of these mammary amputations were quite unnecessary. It will be agreed that a discharge of blood from the nipple is always alarming to the patient and often to the practitioner in charge of the case. Though a bloodstained discharge from the nipple may be due to carcinoma, it is far more often due to an intracystic papilloma of the nipple.

In the thirty years 1915-45 I have seen 119 patients who complained of a bloodstained discharge from the nipple. An analysis of these cases is as follows :

Diagnosis	No. of cases
Intracystic papillomata	62
Mastodynia	20
Scirrhus carcinoma	16
Duct carcinoma	10
Paget's disease of nipple	8
Encephaloid carcinoma	2
Sarcoma of breast	1

It will be seen that by far the commonest cause of a blood-stained discharge from the nipple is an intracystic papilloma.

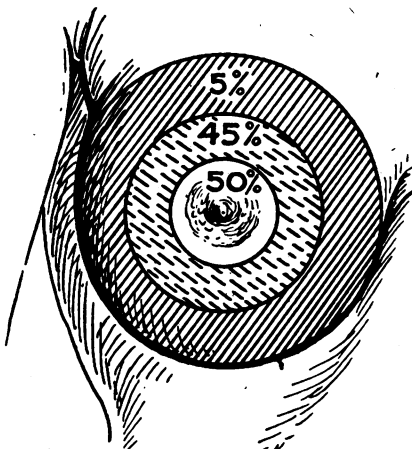


Fig. 1.—Situation of papilloma of breast in 62 cases.

tendency for the younger generation of doctors to avoid a careful clinical examination, the diagnosis being made simply on observation, a clinical sign or symptom, a radiological examination, or a certain pathological report. I do not decry the importance of the modern aids to diagnosis, but there seems to be a lack of the clinical acumen which was the hallmark of physicians and surgeons fifty years ago. It is had practice to say that, because a woman has a bloodstained discharge from her nipple, she has carcinoma of the breast and therefore should have her breast amputated. Yet this is the practice of some doctors.

A careful clinical examination is essential. Most duct papillomata are situated in the central zone near the nipple; in some cases the nipple may be retracted, whereas in others it may protrude as compared with the opposite side. In 2 cases the nipple appeared to be flattened, owing to large intracystic papillomata beneath

it. On the whole, the papillomata are usually small, about the size of a split pea. The cyst cavity in which the papilloma is situated may vary in size up to that of a large cherry, making it easy to palpate the tumour with the flat of the hand. The tumour is soft or cystic according to the degree of distension of the cyst. It is freely movable, and on pressure a serosanguineous fluid may be expressed from the nipple.

CLINICAL DIAGNOSIS

There is today far too great a tendency to microscopical examination to confirm the diagnosis. In some cases, where the tumour is not so obvious, a small probe or the blunt end of a straight surgical

As a rule these tumours are not painful and there is no enlargement of the axillary glands. However, if the tumour is situated at the periphery of the breast, especially in the axillary tail, the glands may be enlarged, owing to pressure on the lymphatics of the outer quadrant of the breast.

The age-incidence is from 20 to 60 years, with a peak between 40 and 45 years.

The clinical course of these cases is interesting, as the papillomata grow very slowly and may continue for years. The haemorrhagic discharge from the nipple is intermittent and may be serous, with no sign of blood.

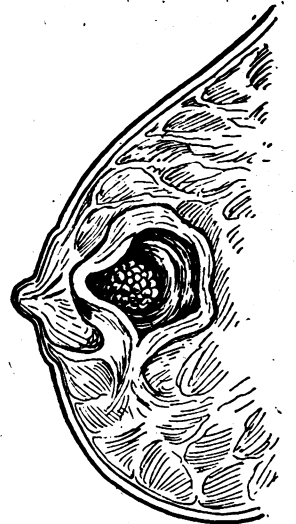


Fig. 2.—Intracystic duct papilloma of breast (museum specimen).

PATHOLOGY

Intracystic papillomata are always encapsulated growths (fig. 2). The small papillomata are seen within a cyst, whose wall is made up mainly of fibrous tissue. In some cases the growth fills the cyst cavity, whereas in others the growth has a stalk, and some pathologists refer to them as "single-stalk" papillomata.

TREATMENT

There can be no doubt that the treatment of choice is a local excision of the papilloma through a small single radiating incision from the nipple (fig. 3). An incision is made over the tumour, and the papilloma is excised from within the cyst; the cyst wall is then removed, together with a small portion of breast tissue. It is most important that the tissue removed should be subjected to microscopical examination to confirm the diagnosis.

In some cases, where the tumour is not so obvious, a small probe or the blunt end of a straight surgical needle can be inserted into the dilated duct and passed into the cystic cavity containing the papilloma. An incision is made on to the needle and the intracystic tumour exposed (fig. 4). With small rake retractors the cyst and its

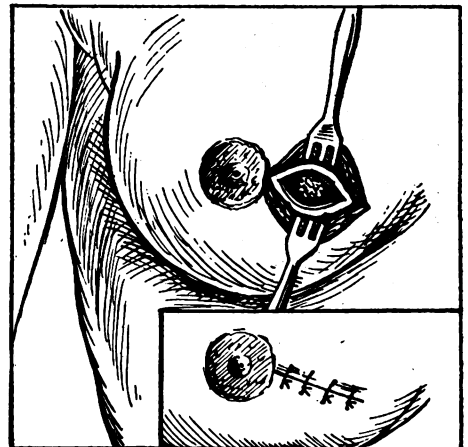


Fig. 3.—Local excision of duct papilloma of breast: inset shows small radiating incision necessary for this operation.

contents are carefully but completely excised. The small wound can be closed with a few interrupted 'Nylon' sutures.

Surgical excision is the only form of treatment that should be advised in these cases. X-ray and radium therapy are useless in the treatment of intracystic papillomata, because these tumours are not radio-sensitive, and the only effect of radiation therapy is fibrosis of the breast, leading to a painful functionless gland.

On the other hand, local excision of the breast is to be equally condemned, especially in young women. The patients grow introspective and depressed, and tend to become chronic invalids. I have case-records of 25 unmarried women under the age of 30 who have lost their breasts because of a bloodstained discharge from the nipple. All these women consider that they are not normal and cannot marry, and it is very difficult indeed to get them to alter this firm conviction.

Of my 62 cases of intracystic duct papilloma, I have "follow-up" records of 45, and in not one case has there been any malignant disease after local excision. The war period made "follow-up" records difficult, but the police have given me a great amount of help in finding

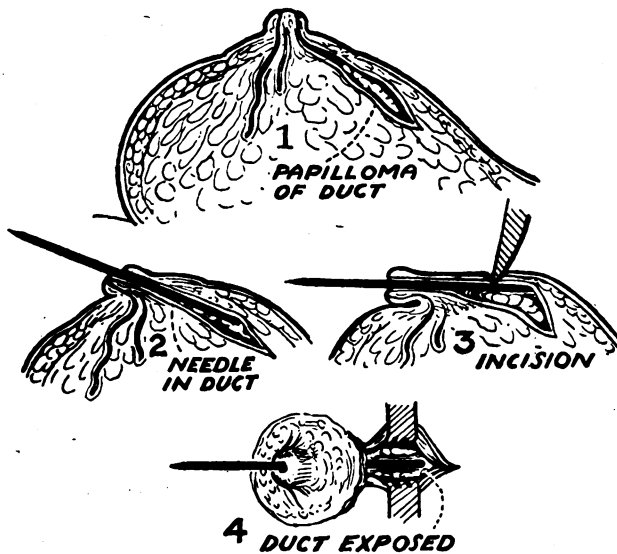


Fig. 4—Stages in excision of intracystic papilloma of breast (after Badcock).

out what has become of past patients, especially during the blitz on London and other cities; 8 of my old patients died in the various air-raids on this country.

SUMMARY

The commonest cause of a bloodstained discharge from the nipple is an intracystic duct papilloma.

Intracystic duct papillomata of the breast are benign growths and very rarely become malignant.

Local excision of the tumour and not local excision of the breast is the required treatment.

At a session of the general council of the Union Internationale de Secours aux Enfants, held last September at Geneva under the presidency of Dr. Pierre Depage, president of the Belgian Red Cross Society, the U.I.S.E. was amalgamated with the Association Internationale de Protection de l'Enfance (of Brussels) to form a new body, the Union Internationale de Protection de l'Enfance, to be based at Geneva. This U.I.P.E. has adopted as its basic principles the League of Nations "Déclaration des Droits de l'Enfant" of 1925; and its aims are to obtain recognition of these principles, or rights of the child, in every country in the world; to encourage the physical and moral welfare of children everywhere; and to collect funds to enable it to carry out its intentions.

PENICILLIN IN AGRANULOCYTTIC ANGINA

REPORT OF A CASE

I. A. R. MACKENZIE
M.B. Aberd.

HOUSE-PHYSICIAN, LAW JUNCTION HOSPITAL, LANARKSHIRE

THE literature on agranulocytosis shows at once that there is no definite or complete agreement about its aetiology and treatment.

Wintrobe (1942) agrees that, though a large proportion of cases are due to amidopyrin and other drugs able to diminish the number of circulating leucocytes, other cases are of undiscovered aetiology. He quotes reports which give the number of such "essential" cases as 44% (Jackson 1934), 38% (Rohr 1939), or far less (Kracke 1931, Plum 1937) but adds that in some such cases a more satisfactory history would have revealed the cause. On the other hand, Wilkinson (1945) considers it probable that all cases of agranulocytosis are due to exposure to, or the use of, drugs or poisons to which the individual's leucopoietic tissues react abnormally. Abicht and Wienbeck (1939) reported a case of puerperal agranulocytosis which was thought to be due to hormonal activity; when death took place nine months after discharge from hospital, necropsy confirmed the diagnosis of essential agranulocytosis. Israëls and Wilkinson (1937) reported 5 cases of agranulocytosis, in 3 of which no aetiological agent could be discovered.

Of the many forms of treatment advocated and tried in this condition, the use of nucleic acid derivatives ('Pentnucleotide') has for many years enjoyed the widest popularity. Jackson and Tighe (1939) found that the mortality (35%) in cases treated with pentnucleotide was half of that in untreated cases, but Plum (1937), Fitz-Hugh (1938), and Rohr (1939) did not confirm these results and were disposed to attribute the successes to spontaneous remissions and prohibition of the offending drug. Wilkinson (1945) still recommends the use of pentnucleotide in conjunction with prohibition of all drugs which may be causal factors, whole blood-transfusion, and, in cases in which there is severe sepsis requiring treatment, penicillin. Nixon et al. (1943) reported 3 cases of severe agranulocytosis due to sulphadiazine which were subsequently cured by continued administration of large doses of the same drug, and recommend the continued use of sulphonamides, preferably sulphadiazine, in agranulocytosis developing during sulphonamide therapy until the normal protective functions of the bone-marrow are again in action; this Wilkinson (1945) considers to constitute an unjustifiable risk until more evidence has been produced about its safety.

CASE-RECORD

An English-speaking German prisoner-of-war was admitted to the wards about 4 P.M. on July 6, 1946, with headache, lumbar backache, and sore throat. He had been quite well until two days previously, when he noted what he described as a heaviness in the legs and, a little later, shivering and headache; as he had been out in heavy rain on the day before and had got very wet, he thought that he was succumbing to an attack of "flu."

On the morning of the 5th he had reported sick, remained in bed, and had been given one aspirin tablet; subsequently he had taken one 'Askit' powder, which was his own property. He had been seen on the 6th by a medical officer of the R.A.M.C. who had noted that the temperature was 103.5° F but, apart from a doubtfully palpable spleen tip, had not discovered any other abnormality on physical examination.

On admission his temperature was 104.8° F and his pulse-rate 120 per min. He did not look very ill and, apart from his flushed appearance and profuse perspiration, was in no way distressed. He was now complaining of backache, heaviness in his legs, and some discomfort in his throat on swallowing. The throat was congested and very oedematous, and he appeared to have two developing quinsies; there was no

membrane, but the apices of the abscesses appeared to be hæmorrhagic. There was no ulceration and no necrosis. The tongue was clean and fairly moist, and there were no lymph-nodes palpable except some small ones in the groins. No abnormality could be detected clinically in the chest, and this was confirmed almost immediately by radiography; physical examination of the remaining systems gave entirely negative results.

Thick and thin blood films were taken to exclude malaria, and a white-cell count was made. The total leucocytes numbered only 1500 per c.mm., and in examining 500-600 white cells not one single representative of the granular series was seen; the differential count showed monocytes 65%, the remaining cells being large and small lymphocytes in about equal numbers. No malaria parasites were found and the red cells showed no abnormality.

In view of the severe sepsis in the throat, penicillin 30,000 units was given intramuscularly, and the same dosage was continued at three-hourly intervals throughout the night and following days. (Unfortunately, owing to the admission to the ward of other serious cases at this time, penicillin therapy was instituted before a throat swab and blood for culture had been taken.) At 10.30 P.M. further blood films were examined, and one granular cell was seen—a large immature cell which may have been a basophilic polymorphonuclear leucocyte or a myelocyte.

On the 7th patient's general condition appeared to be much improved; temperature 101.8° F. The throat was still very painful, though the swelling of the quinsies had subsided and both had burst; there was a profuse discharge of pus.

Differential white-cell counts carried out at 10 A.M., 10.30 A.M., and 12.30 P.M. showed respectively 6%, 14.5%, and 21.5% neutrophil polymorphs, all very immature, while the corresponding proportions of monocytes were 70%, 54%, and 38.5%. At 10.30 A.M. the white cells totalled 5000 per c.mm.

Urinalysis showed the presence of albumin ("one plus") and some granular casts; sp. gr. 1.026.

At 2.30 P.M. sternal puncture was performed, and examination of Leishman-stained films of the bone-marrow showed considerable scarcity of cells of the granular series (myeloblasts and myelocytes). Such polymorphonuclear cells as were seen were of extremely primitive types. There appeared to be a normal number of erythroblasts.

By noon on the 8th the temperature had come down to normal, and it has since remained between 97° F and 98° F; the pulse-rate has followed the temperature very closely. The throat infection had subsided, though a little pus was still exuding; there was much less pain, even on swallowing.

The white-cell count was now 5200 per c.mm., 45% being neutrophil polymorphs; most of these were still immature, but some poly-lobed forms were seen. The monocytes had now fallen to 19%.

By the 11th patient was feeling fully recovered and was looking very well. Penicillin was discontinued, after 1,200,000 units had been administered, and a differential count showed neutrophil polymorphs 53%.

On the 14th the white cells totalled 6800 per c.mm., of which 59% were of the granular series, 24% lymphocytes, and 17% monocytes. Urinalysis at this time revealed no abnormality, the albumin and granular casts having entirely disappeared.

DISCUSSION

In this case the appearance of the blood film, considered in conjunction with the profound leucopenia, suggested an aleukæmic leukæmia of the monocytic type; in view of the throat condition, however, the diagnosis of agranulocytosis was preferred. The question then arose whether it was wiser to attempt to raise the polymorphonuclear leucocyte count with pentnucleotide or to attack the infection. The patient's rapid improvement in both physical condition and leucocyte count seems to show that the latter course was correct.

The question remains whether this case was a primary essential agranulocytosis, with severe sepsis in the throat constituting one of its manifestations, or an agranulocytosis due to profound toxæmia with a specific action on the bone-marrow, in the presence of a severe throat and possibly generalised infection (Meakins 1944). Primary agranulocytosis is suggested by the rather typical onset of the illness, and by the fact that throat manifestations did not appear until the illness was fully

two days old, whereas the other type of agranulocytosis is suggested by the absence of any ulceration or necrosis of the throat.

It is doubtful if, even in a susceptible subject, the contents of one askit powder (aspirin 0.6 g., phenacetin 0.49 g., caffeine citrate 0.125 g., magnesium trisilicate 0.015 g.) could have produced such severe effects. Whatever the cause, the sepsis was rapidly and effectively controlled by penicillin, while the leucopoietic tissues recovered their normal activity without further stimulus.

I wish to thank Dr. Joseph Bryant, resident physician, for his advice and assistance in the conduct of this case; and Dr. F. N. Smartt, medical superintendent, and the Department of Health for Scotland for permission to publish the report.

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STAPHYLOCOCCAL FOOD-POISONING BY MEAT-PIE JELLY

F. A. BELAM

T.D., M.D. Lpool, D.P.H.

MEDICAL OFFICER OF HEALTH, GUILDFORD

A LIMITED outbreak of food-poisoning occurred in the borough and rural district of Guildford at the end of September, 1946.

On Sept. 30 information was received from Dr. Peter Milligan, of Guildford, that he had visited four cases of suspected food-poisoning and had arranged for their removal to the Royal Surrey County Hospital. The patients, Mr. and Mrs. A, both aged 47, Miss A, aged 19, and Mrs. B, aged 25, all came from the same household and had similar symptoms: vomiting, diarrhoea, and abdominal pain. They were in a state of collapse.

The other occupants of the house were Mr. B (husband of Mrs. B), child B, aged 2½ years, and Mr. and Mrs. C. All meals taken by the occupants were exactly the same except supper on Sept. 29, of which only the four patients and Mr. B partook.

This supper consisted of tea, bread and butter, and a portion of meat pie, weighing about ¾ lb. and purchased from a multiple firm on Sept. 28. All five persons ate a portion of the pie, but Mr. B took only a very small portion and did not eat either the pastry or the jelly surrounding the meat. The meal was taken at about 10 P.M., and the first person to become ill was Mr. A, who developed symptoms of food-poisoning at about 11.30 P.M. The other three patients became ill at short intervals after him, and by 12.30 A.M. all three were very poorly. Dr. Milligan was called in by the police at about 2 A.M. and immediately arranged for the patients' removal to hospital. A small quantity of the crust and jelly of the pie left by Mr. B was sent for analysis.

On the same day (Sept. 30), at 2.30 P.M., five cases of suspected food-poisoning were reported from the Guildford rural district. The patients were Mr. and Mrs. D, their two daughters, and Mr. E. Mrs. D, aged 42, and the daughters, aged 11 and 7 years, were admitted to hospital with acute abdominal pain, vomiting, and diarrhoea.

These people had also purchased pies from the multiple firm. Mr. D ate a portion of meat pie for breakfast on Sept. 29 and developed symptoms in 2 hours. On the

30th Mrs. D and the children ate the remainder of the pie for breakfast and developed more serious symptoms $1\frac{1}{2}$ –4 hours later. Mr. D had recovered by then, but the remaining three patients were admitted to hospital. Mr. E ate a portion of the pie on Sept. 29 for breakfast and developed similar symptoms.

The doctor called in to these cases tasted a portion of the pie and developed similar symptoms.

The hospital reports, obtained for me by Dr. R. C. Matson, pathologist, are all very similar.

Mr., Mrs., and Miss A, and the younger daughter of Mr. and Mrs. D vomited so profusely as to bring up blood. Diarrhoea was very acute in all cases. All patients were prostrate and collapsed and were treated in a similar way with mist. kaolin 1 oz., repeated 3-hourly, and 'Pethidine' 100 mg. intramuscularly.

The patients responded well to treatment, and symptoms subsided very rapidly. Four of the patients were discharged in 24 hours; the two children were kept for another 24 hours; and Mrs. D was kept until Oct. 6, as she was very badly shocked and had received atropine gr. $\frac{1}{100}$ and morphine gr. $\frac{1}{6}$.

The bacteriological findings of Dr. Matson are shown in the accompanying table, which shows that no salmonellae were isolated, and that the predominant organism isolated from each sample was *Staph. pyogenes*. All staphylococci isolated were of the aureus type. Pure cultures of each staphylococcus isolated were retained on agar slopes for subsequent typing, and the Public Health Laboratory at Colindale reported that all five strains showed the same pattern of susceptibility to the

BACTERIOLOGICAL FINDINGS

Specimen	Organisms isolated*
Sample of meat pie eaten by family A and Mrs. B	<i>Staph. pyogenes</i> (coagulase positive)
Faeces (liquid) of two members of family A	<i>Proteus morganii</i> † and <i>Bact. coli</i>
Faeces (liquid) of a member of family D	<i>Staph. pyogenes</i> † (coagulase positive), <i>Ps. pyocyanea</i> , <i>Strep. faecalis</i>
Vomit of same member of family D	<i>Staph. pyogenes</i> † (coagulase positive), <i>Strep. viridans</i>
Sample of meat pie eaten by family D ‡	<i>Staph. pyogenes</i> † (coagulase positive), <i>B. anthracoides</i>
Liver sausage	<i>B. anthracoides</i> , enterococci
Fresh pie §:	
Jelly †	<i>Staph. pyogenes</i>
Crust	Sterile
Meat	Sterile

* All specimens were examined for presence of intestinal pathogens and other organisms.

† The predominant organism.

‡ Jelly separated and kept in sterile petri dish overnight at room temperature. Macroscopic colonies of *Staph. pyogenes* (coagulase positive) developed within the jelly.

§ Further sample of meat pie, taken from a second consignment.

staphylococcal bacteriophages and were considered to belong to the same type.

DISCUSSION

Besides the above-mentioned patients several other persons were affected in a minor degree after eating pies from the same source.

Mr. B did not eat any of the jelly, and he was not ill after eating the meat. This pointed to infection of the jelly, and subsequent bacteriological analysis fully confirmed this.

The firm supplying the pies used a jelly mix which had previously been made with agar, but gelatin was used for the first time in the pies which became contaminated. From information supplied by Dr. W. Stott, medical officer of health for Southwark, it appears that the original gelatin was not infected, but that the gelatin mix was contaminated, presumably by a carrier.

SUMMARY

An account is given of 9 cases of food-poisoning arising after the patients had eaten meat pie; 4 patients came from one household and 5 from another.

Staph. pyogenes was isolated from both of the pies concerned and from another pie from the same source, and from the faeces and vomit of one of the patients.

A man who had partaken of one of the pies but had not eaten any of the jelly had no symptoms; and *Staph. pyogenes* was isolated from the jelly of one of the pies concerned and of a pie from a fresh batch.

The firm making the pies had for the first time substituted gelatin for agar in their mix. The gelatin appears to have been contaminated, presumably by a carrier, in the mixing.

I wish to thank Dr. R. C. Matson, pathologist, and Mr. C. A. Reading, his chief technician at the Royal Surrey County Hospital, and Dr. V. D. Allison, of the P.H.L.S. (Hendon), who undertook the final phage typing of the strains of *Staph. pyogenes* isolated.

Medical Societies

BRITISH ORTHOPÆDIC ASSOCIATION

THE annual meeting of the association, held in London on Oct. 18 and 19 under the presidency of Mr. GEORGE PERKINS, opened with a discussion on

FRACTURES OF THE OS CALCIS

Mr. N. W. ROBERTS and Mr. W. SAYLE CREER had each followed up some scores of cases over several years and had independently reached similar conclusions concerning compression-fractures involving the sub-astragaloid (subtalar) joint—namely, that the period of incapacity, which is about a year with treatment by reduction and immobilisation, is approximately halved with treatment by early movement. More than three-quarters of the patients ultimately returned to full work in their old occupations; and the proportion was not materially influenced by the method of treatment. Mr. W. GISSANE considered reduction important, and showed a film illustrating its performance and maintenance with a sagittal os-calcis pin. Mr. K. H. PRIDIE demonstrated some patients, including a policeman, who showed extremely good function after excision of the os calcis—an operation to be reserved for the most severely affected.

OTHER TOPICS

Prof. E. SORREL presented a paper on *Les Greffes d'Immobilisation dans le Traitement des Tuberculoses Osteo-articulaires*, in which the results of some usual and unusual extra-articular arthrodeses were illustrated. He strongly advocated eventual arthrodesis; but it should, he said, be deferred until active disease is at an end.

Prof. H. J. SEDDON showed a motion-picture representing preliminary work carried out with Dr. A. E. BARCLAY in the *cineradiography of joint movements*.

Mr. K. I. NISSEN gave a comprehensive account of *Morton's metatarsalgia*, with a clinical and pathological description of 13 cases in which he had excised the fibromatous thickening first described by L. O. Betts, of Adelaide, and had carried out a follow-up of 3 years and more.

Mr. I. LAWSON DICK discussed the long-term results of *iliac-bone transplantation*, which have confirmed expectations.

Mr. L. GILLIS showed a film of his operation for *nearthrosis of the humoral shaft* for amputations near the elbow-joint.

At the general meeting, Mr. S. A. S. Malkin was elected president for 1948–49; Prof. E. Sorrel was elected an honorary fellow; Prof. F. Godoy-Moreira, Sao Paulo, Kamel Hussein Bey, Cairo, and Dr. Sven Kiaer, Copenhagen, were made corresponding members; and Mr. F. G. Allan and Mr. E. A. Nicoll were elected to the executive committee.

The presidential address by Mr. PERKINS is published on another page.

Reviews of Books

Surgery of the Hand

(2nd ed.) R. M. HANDFIELD-JONES, M.S. Lond., F.R.C.S. Edinburgh: E. & S. Livingstone. Pp. 156. 20s.

IN this country the treatment of hand injuries and infections has too long been left to the care of newly qualified house-surgeons with little specialised knowledge. In this respect we have lagged behind. Some general hospitals now have hand clinics, and some special hospitals pay close attention to the subject. With the advance of industrial medicine this tendency will doubtless grow—with untold benefit to the worker. The appearance of the second edition of Handfield-Jones's little book is therefore timely. A short, clear, well-illustrated monograph, ideally suited for the young surgeon, it will also teach the practitioner the complexity of the hand problem, and should lead to earlier transference of hand cases to suitable clinics. It deals with infections and injuries at some length, and has a short section on congenital defects and tumours. Penicillin is recommended only as an adjunct to proper surgical understanding and treatment. The author has thought it wise to say little of reconstructive surgery, an enormous field receiving daily notice in books and journals. The better the early treatment the less the need for reconstruction. The importance of restoring function is emphasised throughout.

The Medical Annual 1946

(64th year.) Editors: Sir HENRY TIDY, K.B.E., D.M. Oxf., F.R.C.P.; A. RENDLE SHORT, M.D. Lond., F.R.C.S. Bristol: John Wright. Pp. 426. 25s.

NOW in its 64th year, the *Medical Annual* maintains its high standard. Selection may become more difficult, but the two veteran editors, with their distinguished company of contributors, continue to produce a review that is serviceable to all ranks of the profession. The time, however, is coming when more than one volume will be needed. The space now given to surgical problems is out of proportion to the main interests of most readers, and surgery and its branches might perhaps have a volume to themselves. In the present issue a chapter is devoted to medical films, and outstanding contributions include reviews of advances in medicine and surgery during the late war by Sir Alexander Biggam and Sir Heneage Ogilvie. In a section on "fatigue in civilian life," Prof. A. E. Barnes makes a valiant attempt to discuss the whys and wherefores of "that tired feeling" which we all know so well.

Seven Pamphlets on Parent Guidance

6d. each.

Children without Homes

Memorandum of Evidence presented to the Curtis Committee. RUTH THOMAS, senior psychologist to the National Association for Mental Health. Pp. 127. 3s. 6d. All published by the association, 39, Queen Anne Street, London, S.W.1.

A MONTH or two ago the former Provisional National Council for Mental Health became incorporated as the National Association for Mental Health. This change of name symbolises not only a change in the status of the association but is also an official acknowledgment of the adult status of psychology. The provisional council has played its part in collecting the data that give psychology this standing, but an equally important part of its work has been in disseminating psychological knowledge in a form and a language that can be understood by the uninitiated. These, the first publications of the association, show the two aspects of its work. On the one hand the careful solid fact-finding of the memorandum of evidence, on the other the light simple words of one syllable of the pamphlets. The pamphlets are light but not slight; theirs is the art that conceals art and the thought that conceals thought. They are the outcome of a careful study of young children in the light of modern psychological theory and an equally careful search for the best way of making their principles acceptable. In many respects methods advocated on psychological grounds run counter to those which were taught to doctors, nurses, and the "older genera-

tion" of parents. The evidence in support is far as yet from being common knowledge. Hence the need for something more than logical argument in presenting them. The pamphlets deal with problems that occur in the upbringing of every child. They should be of great help to health workers in their task of advising mothers and to the mothers invaluable.

Children without Homes complements and supplements the Curtis report. Not that it is not full of tragic case-histories and accounts of institutions as bad as those found in the official inquiry. It has, however, two encouraging features. In the first place it describes a series of residential homes well run not by accident but by design; in the second, it makes a most thorough analysis of the problem of running substitute homes for "homeless" children with constructive and concrete proposals as to what needs to be done. Any body that earned the censure of the Curtis Committee and now really wishes to do well by its children will find here complete instruction in how to do it. It will find that its main need is personnel, and that suitable staff are not to be had for the advertising. The Curtis Committee pointed out that there was no appropriate course of training for child care. Miss Thomas and her associates have devised one. That is to say, they have set forth the principles of selection and training, and wisely suggest that the exact course of study and length of training should vary with the previous education and experience of the individual candidates. This work is exacting and should not, they consider, be a life's work but only an episode in a career devoted to various aspects of child welfare.

Miss Thomas deserves great credit for the production of this memorandum. She is deeply aware that her story is painful and moves the imagination, but she never sentimentalises, under-estimates difficulties, or gives way to wishful thinking. Her future pupils and all others concerned with the care of children will find here a really first-class handbook.

Jonathan Hutchinson, Life and Letters

HERBERT HUTCHINSON, foreword by J. JOHNSTON ABRAHAM, F.R.C.S. London: W. Heinemann. Pp. 257. 12s. 6d.

THIS book cannot add to J. H.'s standing as a worthy disciple of the J. H. of the Hunterian Museum, but it enables the medical reader to see what the man was like. His son gives us a vivid and arresting picture, which can be filled in from the letters. Bred of yeoman farmers who left the Fens for Selby to market their flax, Hutchinson was brought up in a Yorkshire home segregated from the community, but one in which the discipline of life was always that of individual conscience, warmed by a glowing affection. It must have been then that he contracted the two remarkable qualities that fashioned his later conduct. The inborn museum habit of his mind was fed by contact with the elemental things of nature undisturbed by the usual childish interests. And the domestic harmony led to a habit of reasoned statement which loved discussion and eschewed controversy. Even in lecturing he did not dominate his audience; attendance should be optional, he held; he just stood up and with eyes cast down he told what he had observed and what conclusions he had come to. Without eloquence he collected and held a roomful of students as large as any in London. As a "suggestive teacher," Byers remarked, he was unrivalled. It was in the year of his election to the surgical staff of the London Hospital that Darwin published *The Origin of Species* and far from upsetting his universe it gave him the text ("in heredity nothing is ever lost") for a new belief in immortality which carried him courageously through life. Many of the letters to his wife, printed in this book, witness his longing to share his philosophical background with her; yet here again there is no pressure in his insistence. The turning point in Hutchinson's career was his surrender in 1890 of the presidency of the Royal College of Surgeons after failing to persuade his surgical colleagues to make Hunter's museum the educational instrument of his own conception. He then began to transform the barn and cowsheds of his Haslemere property into the galleries of a museum where he spent more and more of his time teaching natural history for a purpose; and (his biographer adds) the purpose was religious.



Fig. 1



Fig. 2



Fig. 3

LOSS OF SOFT TISSUE OF CHIN AND OF MANDIBLE

Gypsona as an adjuvant in reparative surgery

CASE-HISTORY—The patient was injured in July, 1941, when his ship was bombed and machine gunned. Examination showed the lower lip divided and a loss of soft tissue of chin and of mandible from right molar region to left incisors. On August 29th, 1941, two tube pedicles were raised on the neck. These were lengthened four weeks later. On October 22nd the scars were excised from the face and the two pedicles attached.

November 11th, 1941.—The pedicles divided.

February 24th, 1942.—A bone graft was inserted.

June 26th, 1942.—An acromio thoracic tube pedicle was raised.

July 22nd, 1942.—The pedicle lengthened.

July 31st, 1942.—The pedicle attached one end.

September 24th, 1942.—The pedicle attached the other end.

February 19th, 1943.—A further bone graft was inserted with Gypsona P.O.P. headcap and plaster between each pair of pins.

October 20th, 1943.—Chin dimple made.

The details and illustrations are of an actual case. T. J. Smith & Nephew Ltd., manufacturers of Elastoplast, are privileged to publish this instance typical of many in which their products have been used with success in the belief that such authentic records will be of general interest.

GYPSONA P.O.P. BANDAGES are prepared with 90% by weight of the finest P.O.P. firmly and evenly adherent to the fabric. This even impregnation with the maximum of plaster content permits minimum layers to be used to construct a cast having a great strength but extreme lightness. Gypsona bandages moisten in approximately 5 secs. and set in

5/10 mins. Setting time may be regulated. Gypsona P.O.P. bandages are supplied in 2", 3", 4", 6" × 3 yds.; 3", 4", 6" × 4 yds.; 4", 6" × 6 yds. Also in ready-cut slabs and in rolls of wide material.

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THE LANCET

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Three Possible Courses

ARE we not in danger of thinking too much about the doctor and too little about the patient? Current discussions on the Act suggest that this is so. Yet the doctor, after all, is chiefly a means to an end. The essential fact to be kept in mind is that everyone who has studied medical practice in this country agrees that the patient is not getting anything like the full benefit obtainable from modern medicine. In many hospitals he has to be content with care which by modern standards is second-rate or worse; and general practice, for all its excellences, too often resembles the small business which sells the customer what it has in stock rather than what he needs. Briefly, inadequate diagnosis and inadequate treatment are commonplace, and we are barely in sight of the promised land where health will be actively promoted. To create an orderly system in which everything that can be done for the patient really *will* be done is the object of the National Health Service scheme. This scheme is not an invention of the present Government but rather the final outcome of general discussion and planning over many years, and it embodies many of the features of schemes it has superseded. Some of the earlier versions of the service would have been less disturbing to the profession; but none of them offered the same prospect of radically improving the hospital system within a measurable time. Mr. BEVAN'S Act has withstood criticism in Parliament because, considering the many conflicting interests that must be taken into account, it is on the whole as sound and courageous a measure as one could hope for. It holds the field today because protracted exploration of alternatives has shown that in present circumstances there is no more comfortable means of getting the desired results. It also holds the field because it is an Act of Parliament. In announcing the B.M.A. council's provisional decision not to negotiate on its application, Dr. CHARLES HILL is reported as hinting that the association will now have to put forward their own scheme. We may be sure that if they do so it will be found to have many merits; but at this stage it would take a miracle-worker to substitute a new plan for the one which has obtained the acquiescence of everyone else concerned and which has become the law of the land. Failing a miracle, only three courses are open to the profession: (1) acceptance of the present Act, including any regulations the Minister in his wisdom may care to make; (2) negotiation on the present Act, so as to secure the best possible arrangements for both patient and doctor; or (3) rejection of the Act. Rejection, if it took the form of pressure on individual doctors to abstain from joining the service, would be a form of direct action intended to defeat the wishes of Parliament. As such it might be pleasing to those who have reasons of their own for wanting a change of administration, but it would

alarm anyone who respects the constitution of our country.

The first of the three possible courses—to take no part in shaping a service we mean eventually to join—has nothing to commend it. Are there really sufficient grounds for turning down the second in favour of the perilous third? It is perfectly true that a service which was bad for the doctor would in the long run prove bad for the patient, and that the price of rationalisation would be too high if it meant the loss of what is called professional freedom. But many of the fears expressed about this arise from misunderstanding or unreasonable mistrust. The letters exchanged this week between the Minister of Health and the presidents of the Royal Colleges should go far to restore a proper perspective, especially since they display Mr. BEVAN'S genuine desire to "negotiate freely" on the regulations which will make or mar the whole scheme. His letter states as a principle of the service that "there should be no interference with the clinical freedom of any doctor," and it will also reassure consultants about the continuance of independent practice and about their position on hospital staffs. Its outline of the Minister's views on the vexed questions of basic salary, appeal to the courts, "direction," and the filling of vacant practices suggests that these features of the scheme could usefully be debated on a rather lower emotional level than has lately been customary: some of them, such as the manner of remuneration, the Act itself leaves fluid, while the hardship inflicted by others might be made negligible. There are of course many further matters on which reassurance and modification would be welcome, and are indeed necessary; but acceptable arrangements are more likely to be produced by round-table discussions than by ultimatums. A condition of success for such discussions is that our representatives should address themselves to the technical problems of serving the patient—not regarding themselves, or allowing others to regard them, as a political bulwark.

Unfortunately no Minister, however conciliatory, could quite remove our anxiety lest organisation should somehow spoil the personal quality of medicine, which with all its shortcomings is still one of the great achievements of civilisation. No Minister could overcome the hesitation of a learned profession in entering what might become just another Government service. Undue emphasis on these misgivings, however, implies that we think of ourselves as an inert mass, to be changed by its environment but incapable of changing it. If we are to use our strength aright we should beware of such fashionable defeatism. The fact that the Minister of Health, a layman, is to be answerable to Parliament for this service need not prevent it from being very largely our own service, representing the best we can do. As in voluntary hospitals and elsewhere, administrative decisions will be taken by lay boards and often by lay officers; but thanks to the unselfish labours of innumerable colleagues, living and dead, the lay administrator and the lay board have a way of paying attention to what doctors say about their own work. At every level the Act enables and encourages the doctor to express his views, and if need be his grievances. The local executive councils, with which practitioners are to make their contracts, will have more medical

members than the present insurance committees. Hospitals will have their medical committees, regional boards will have their medical committees, and at the centre there will be the medical members of the Central Health Services Council, of the standing committees, and of the Medical Practices Committee. The management committees, the regional boards, and the boards of governors will all have doctors on them. If, with all this, the voice of medicine cannot make itself heard, or is suppressed by the Minister, it can be switched over to loud-speakers provided by the British Medical Association and other medical organisations, can be translated into print by the medical press, or can be raised in Parliament. Need we really fear an abashed silence? Can we not even hope to realise our own kind of service in which neither red tape, nor inefficiency, nor ignorance, nor poverty, nor any other creature, stands between our patient and the best we can give him?

An ideal like that is attainable only by long effort. New buildings, new administrative techniques, new confidence, and new habits of co-operation will be needed before the object of the National Health Service Act is realised. But a good beginning could be made now, in the next few months, in Whitehall. Returning to the spirit of the Medical Planning Commission, in which it played an impressive part, the British Medical Association should reverse last month's unhappy decision—based as it was on incomplete figures. The final returns published on another page show that of 42,123 doctors voting, 19,478 (46%) favoured negotiation, while 22,645 (54%) did not. The majority of 8% would probably have been further narrowed if more Service votes had been returned, and it can hardly be considered the substantial one which Dr. DAIN said would be necessary to justify breaking off negotiations. The council, we are told, was influenced by the large negative vote among general practitioners; but it might have attached at least equal significance to the fact that the younger doctors (in the groups 0-7 and 8-14 years after qualification) gave a majority for Yes. Nothing short of a new lead from the council or its more cautious members will induce the representative body on Jan. 28 to retrieve an impossible situation. But, in the light of today's letters, the second of the three possible courses is surely the only one for reasonable people.

Lining of the Pulmonary Alveoli

FEW organs have been studied with such enthusiasm as the lung, and the reward in knowledge of its function has been a rich one. Its structure, too, has been repeatedly scrutinised since the times of MORGAGNI and LAENNEC, and painstaking reconstructions of every subdivision of the air-passages would seem to have settled all doubts. Yet opinions still differ on the very existence of a cellular lining to the finest ramifications of the terminal air-spaces.

Is there a cellular barrier between the capillary plexus in the alveolar wall and the air-space, or is there direct contact between inhaled gases and the capillaries? One might think this easy to decide by the methods of histology, but a long list of supporters for either view can be compiled. The father of histology, VON KÖLLIKER, suggested a compromise in the form of non-nucleated epithelial squames; but he

had to admit that this unusual covering was far from complete. In recent years the argument has alternated between an extension of flattened lining cells from the terminal bronchioles, a pseudo-lining of mononucleated blood or reticulo-endothelial cells, called alveolar cells, and the denial of any lining whatsoever. It is clear that we must turn to other fields of research for a settlement of the difficulty.

The embryologist has entered the contest and has added facts which are of value. But here again uncertainty prevails. The classical school sees in the foetal lung a gland-like structure reposing in a vascular mesenchymal bed, with an appearance not unlike that of the thyroid gland depleted of its colloid secretion. The lining of these spaces is a cellular derivative of the primary bronchi, formed by budding of tubular structures from parent bronchial cells. The transition from the inert foetal condition to the state of incessant respiratory movement is accompanied by a flattening and perhaps loosening of the lining cells, preceded by an imposing multiplication of the air-spaces. But some investigators deny this hypothesis, claiming that new formation of lining cells does not keep pace with the exaggeration of air-space. S. B. ROSE in Canada and W. G. BARNARD in this country have been foremost in advocating a moulding of the mesenchymal support by the expanding lung whereby a labyrinth of tiny air-cavities lined by naked capillaries takes on the oxygenation of the red corpuscles. The lung thus shares some of the features of the air-spaces in birds and seems to be a device for ensuring the maximum contact with atmospheric oxygen with minimal diffusion space. Such a notion presents difficulties, however, especially when fluid exchange through capillaries is recalled. It is a dogma of physiology that the nourishment of tissues is primarily an ultrafiltration through the capillary membrane, controlled by the balance between the hydrostatic pressure in these minute vessels and the osmotic pressure of the circulating plasma. Unless the lung happens to be unique among tissues, such an ultrafiltrate must leave the alveolar capillaries to circulate throughout the alveolar walls, and tidy minds demand that there be a barrier between it and the air-cavities. A cellular lining to the smallest air-spaces thus seems to be needed. On the other hand, saturation of the air with water vapour might account for any excess of fluid not removed by capillarity. The nearest lymphatics are in the walls of the alveolar ducts and therefore cannot play any direct part in preserving this fluid balance. No solution of the difficulty has yet been offered, though any structural concept of the lung must take this fluid exchange into consideration.

SNOW MILLER, one of the greatest investigators of lung structure in his time, held that there was a true epithelial lining to the air-sacs and traced it directly from the bronchiolar epithelium. His figures are convincing until it is realised he depended wholly on pathological material for his preparations. All pathologists are familiar with the ease in which bronchiolar lining cells grow along the infundibular walls to the alveoli, so much of this kind of argument falls to the ground. Strange to say, the experimental pathologist has contributed little to the problem. He has shown the rich content of reticulo-endothelial cells within the lungs, and the tendency of these to mimic a lining of

the air-sacs; but he has failed to discriminate between these cells and epithelium. It looks as if we must wait for an answer until new techniques are invented.

The experimental study of lung healing by MONTGOMERY¹ in Edinburgh has raised the issues once again. He has shown in cats that proliferative activity of the bronchi around a wound of the lung initiates true healing, and new outgrowths from the parent stems appear at an early stage. A mass of blood-clot and collapsed alveoli together with the usual type of inflammatory reaction forms in the vicinity of the wound, whereby a collagenous scar results in due course. After some days irregular slits develop amid the collagen, some of which connect with bronchial buds and are lined by a cubical epithelium or by long flattened spindle-shaped cells. Others join up with alveoli. Some spaces also link up with capillaries, so reconstituting the vital vascular plexus. In this way expansion of collapsed alveoli and re-formation of alveoli among the split collagen leads to regeneration of the lung and proceeds until the whole wound is aerated and the scar reduced to a thin band. The unaffected lung tissue thus takes an active part in recovery from injury through the formation of bronchial buds which grow into the provisional scar tissue, aided no doubt by the regular expansion and contraction of the intact spaces—a true vis a tergo. The phenomenon calls to mind the classical idea of lung development, and indeed has great similarity with the mode of growth in glandular organs such as the liver. MONTGOMERY'S study, however, leaves untouched the vexed question of persistence of the alveolar lining. Once again a fruitful method of investigation has failed to give a clear answer to the riddle of the lung.

Medicine in Industry

IN 1943 the New York Academy of Medicine appointed a committee to review the economic and social changes now taking place, and the part which medicine plays and will play in "whatever new social patterns may ultimately appear." Prof. BERNHARD J. STERN was entrusted with the task of reviewing the history, development, and present status of occupational medicine, and the monograph¹ he has produced is an unusually careful and objective study. It goes far to explain why industrial medicine has developed slowly as compared with the public-health services.

STERN points out that the progress of industrial medicine, as indeed of all branches of medicine, has been intimately related to advances in general medical knowledge. The work of the Paris school of clinicians, he says, as well as of VIRCHOW and others, which challenged the older humoral pathology, was a necessary foundation for industrial medicine, and the study of the pathogenic micro-organisms by KOCH and PASTEUR was essential for its progress. Nevertheless "the preoccupation of medical men with the search for specific micro-organisms associated with communicable diseases distracted attention from research in other fields . . . and narrowed the field of public health and preventive medicine." Sometimes exclusive

interest in general hygiene obscured the causes of some occupational diseases. For example, the Royal Commission appointed in 1862 to inquire into the health of men in metalliferous mines ignored the opinion of miners and others that dust was a major cause of illness. The commission considered it to be of secondary importance to fumes of explosives and variations in temperature and climate. It was not until 40 years later that a committee of which J. S. HALDANE was a member put the matter in its right perspective, and 12 more years passed before HALDANE'S work was corroborated by E. L. COLLIS.

Research in the 20th century into deficiency diseases, into X-ray and other diagnostic techniques, and into organic chemistry, opened new horizons in industrial medicine. Specialisation, which has been conspicuous in industrial medicine as in other fields, has given results otherwise unobtainable; but it has tended to focus on "specific external hazards" rather than to develop an integrated approach to the health of the worker as a whole. Industrial medicine has been separated from the main stream of medicine and public health by dealing exclusively with risks in the factory, mill, and mine, isolated from the worker's health in the community. One of the major problems of contemporary industrial medicine, STERN says, is the recognition of the overlapping of these two provinces now formally and arbitrarily separated. Public health and industrial medicine were closely related in the minds of those English doctors who during the industrial revolution initiated the movements which led to the passing of the Factory Acts. The names of THACKRAH, PERCIVAL, KAY, BELL, BAILLIE, SOUTHWOOD SMITH, and later GREENHOW are honourable ones in the history of struggle for better conditions both in the home and the factory. It is interesting to note that CHADWICK'S 1842 report, which led to the establishment of public-health agencies in England, was based on the investigations of the Factory Commission established under the Factory Act of 1833.

A significant cause of delay in the progress of industrial medicine has been the reluctance of many employers to allow unimpeded research into the causes of ill health in their factories, while some of the trade associations have resisted the passing of legislation designed to improve factory conditions. STERN recalls that in the middle of the last century Manchester cotton manufacturers, in order to oppose the factory inspector's requirements for guarding machinery, founded the Factory Law Amendment Association—which CHARLES DICKENS, in *Household Words*, aptly called the Association for the Mangling of Operatives. It has been somewhat easier for the public-health services to develop, for, as the American doctor BENJAMIN W. MCCREADY wrote in 1837, "motives not only of mercy for the poor but of fear for ourselves, call for a reform; for infectious diseases when once fully developed do not always confine themselves to the localities in which they originate." Public-health measures affect the whole community, and the cost falls on the rates, whereas measures against occupational diseases and accidents affect only the occupational groups concerned. Not only is the stimulus of public opinion lacking in industrial medicine, but there is also resistance from employers who usually have to foot the bills. STERN says that

1. Montgomery, G. L. *Brit. J. Surg.* 1944, 31, 292.

1. *Medicine in Industry*. By Bernhard J. Stern, Ph.D., lecturer in sociology, Columbia University, and visiting professor of sociology, Yale University. London: Oxford University Press. Pp. 209. 8s. 6d.

much of the apathy of industrialists towards preventive services may be ascribed to the traditional indifference of management to the conservation of human resources, and to the fact that expenses incurred do not yield immediate returns. In the United States action in the field of industrial health has been undertaken by trade unions with an enlarged conception of their functions in the community.

Though there have been time-lags in the adaptation of social and legal institutions to the needs of modern industrial society, great strides have been made in social legislation since the early days of industrial capitalism, when whatever protection the guilds had previously given to workers was abolished by the practices of *laissez-faire* economy. Among the major legislative milestones on the long road of progress in industrial medicine have been factory inspection, and workmen's compensation, the regulation of the hours of labour, and the control over health conditions in the factories. But the departments dealing with public health, industrial hygiene, and compensation still need to be brought closer together. The broadly conceived approach of the pioneers in industrial medicine was a wise one. They acted on the principle that the conditions of housing and nutrition and the standards of home living are as much problems of industrial medicine as are hazardous working conditions. This is only another way of saying that health is indivisible.

Annotations

THE FAMILY

"Does not human welfare depend on a recognition that the unit of human existence is not the isolated individual but the family?"

Prof. J. C. Spence asked this question in his convocation lecture¹ at the National Children's Home. His sympathetic assessment of the duties of those who look after children in homes has a special force in view of the findings of the Curtis Committee. "They are the responsibilities of parents," he said, "without the instinctive sanctions of parenthood, the burden of responsibility without the privilege of power. As all sensible parents are at times aware of their own shortcomings with their children, so must you in greater degree feel these faults, for you spend your soul and spirit without the sustenance of certainty." He went on to speak of the seven stages of childhood, to which the parents, and especially the mother, respond instinctively, learning as they go, until the mother of a family of six or seven is an expert, bringing up her children with not only the quickness of instinct but the confidence of experience. In the neonatal stage, and in the second stage which ends when the child is about seven months old, mother and child respond to each other according to an inborn pattern. The mother, "and every woman like her, falls into the same habit of speech and noise-making with which she appropriately approves and disapproves, cheers and chides." Other interests leave her; all her decisions have to do with her child's welfare—"an irrational but deeply satisfying state," as one mother who is also a physiologist described it.

He mentioned an important experiment at the Babies' Hospital, Newcastle, where, when young children with critical illness are admitted, they are accompanied by their mothers who help to nurse them through the illness.

1. The Purposes of the Family. Convocation Lecture, 1946. Published by the National Children's Home, Highbury Park, London, N.5. Pp. 68. 2s. 6d.

If the child needs an operation he is received afterwards straight into his mother's arms. She is given as much responsibility as possible, and shares in the credit of his recovery. A contrasting group of mothers remained at home while their children were in hospital, and a study of the two groups over many years, Professor Spence said, revealed considerable differences. The first group had gained confidence, the second lost it: the weeks of anxiety and separation had left them fearful of every trifling symptom in the child. He sees here a lesson about responsibility, and about the social aids which parents need. He is not quite satisfied that the social aids we have provided for mothers so far are of the best quality: "they are relieved of their children when they should be relieved of their chores." He would rather see in action a philosophy of human welfare which recognises the right of every mother of a family to possess the means of home-making. As it is, Sir William Beveridge has summed up our dilemma: "a family still remains the greatest single cause of poverty."

The third stage of a child's life, from eight months to two years, is a time when he needs much individual attention, the stimulation of play with friendly adults; and Professor Spence doubts the propriety of putting many children of this age into public nurseries, where a communal life is imposed before they are ready for it. At two the child makes his first experiments in independence, and at four is moving towards his first wilful acts of self-reliance. He needs his mother or an older brother or sister at hand to reassure him; and here the older girls in the family should be getting their first experience of maternal responsibility. Between four and seven the child's personality is emerging and is expressed endlessly in play. Between eight and twelve boys and girls diverge. They begin to recognise standards and values and to discover ideal types. The outlines of character and conduct now formed will derive much from their experience of others about them. The years of puberty which follow are the most difficult for the growing child: "it is a fumbling, furtive, and temporarily unattractive stage of life, when the apprenticeship is over, and before the skilled craftsman has emerged."

For normal growth through all these stages the family provides the best environment, especially if it includes, besides the parents, four or five brothers and sisters without wide gaps between them. Two main forces guide the developing children—the instinctive responses of the parents to their needs, and the culture of the family handed down in simple precepts and rules. "Mothers preserve the craft of living and transmit it from one generation to another." He would like to see their instinctive and social knowledge reinforced by teaching in the principles of hygiene and nutrition, and the symptoms of the common preventable diseases.

Professor Spence ended his survey with a short section on the future of the family—the family as it must be among those who are individualists first and parents second. The nineteenth century saw three great revolutions: the notions of equality and liberty which loosened the social structure, the theory of evolution which loosened religious beliefs, and the industrial revolution which dissolved neighbourliness. For homeless children schools, orphanages, and hospitals were founded; but family allowances came late and little. He sees our civilisation declining if we cannot re-create neighbourliness.

A RETICULOCYTOGENIC FACTOR?

ONE of the puzzles of hæmatology has been the achrestic type of anæmia in which there is a megaloblastic marrow like that of pernicious anæmia but the liver contains a sufficiency of anti-anæmic principle. It is so far unknown why the liver principle is not available to the pro-erythroblasts in the bone-marrow: all the known factors necessary for normal erythropoiesis

are present, and yet the abnormal megaloblastosis persists. Oliva and Frascarelli,¹ of Perugia, suggest that there is an intermediate factor without which the liver factor is not in a form capable of utilisation by the marrow cells. They took plasma from patients who had a high reticulocyte-count indicative of active erythropoiesis, patients with pernicious anæmia at the reticulocyte crisis following liver treatment, or patients with microcytic anæmia being treated with iron. When 20–25 c.cm. of this plasma was injected intravenously into normal subjects it caused a slight but definite rise in reticulocytes—up to 4%—reaching a maximum 12–16 hours after the injection. A similar amount of plasma from a normal person produced no such result. They attribute the effect to a “reticulocytogenous” factor which is probably present in normal blood in amounts too small to be detected, but in patients at their peak of erythropoiesis is in sufficient concentration to produce a detectable reticulocytosis. They suggest that the anti-anæmic liver principle acts through—or in combination with—this reticulocytogenic factor, and when the factor is absent or insufficient the patient's anæmia appears refractory, or only poorly responsive, to treatment.

The combination of an active principle with a circulating “activator” is common in physiology, and the presence of accessory factors in connexion with the liver principle has also been postulated before.² There may be something in this suggestion. The next step is to try the effect of such “reticulocytogenic” plasma on a patient with a refractory megaloblastic anæmia; and it is important that the patients chosen for test should be truly refractory cases, not merely refractory to a liver extract of the Dakin and West type, whose action is known to be variable.

CANCER HOSPITAL RECORDS

A STANDARD method of recording the clinical, pathological, and therapeutic details of cancer cases¹ was introduced by the National Radium Commission in January, 1945. The directive booklet, issued by the Ministry of Health,² has now been followed by the publication, under the ægis of the Royal Cancer Hospital, of a description³ of the mechanical methods of recording and analysing the collected data—now in use at that centre. As in all variants of the punched-card method, the essential principle is the assignment of numerical values to each item of the clinical history. Thus treatment by surgery, radiotherapy, or chemotherapy is “coded” by noting on a standard form the figure 1, 2, or 3. These values, which are merely classificatory and have no arithmetical significance, are then permanently recorded on a card by punching holes in positions corresponding to these various values on appropriate sections of the card. The sorting out of, say, all cases treated by surgery is then effected mechanically by picking out all cards with a hole punched in the “1” position of the treatment section. Such mechanical methods are of course essential in any large-scale analysis of cancer data, and there are considerable administrative advantages in the adoption of such a system in any wide study of material collected from various centres.

In the day-to-day operation of the system the non-medical facts, such as hospital, age, sex, and occupation, are filled in by a clerk; the clinical details are inserted by the medical registrar on completion of treatment. The information is then coded and punched on a special card by a trained operator. Subsequent history is added

to the card as it accrues, and batches of completed cards are sent to a central statistical computing bureau for mechanical sorting and tabulation of the results. Such a central bureau might serve many centres, so the record cards have been made flexible enough in format to allow for local differences in the type of recorded information. At the same time, the basic outline has been standardised and it should prove possible to answer, by the analysis of the accumulated reports, questions, such as survival times after treatment, which need a statistical experience far greater than that of any one hospital. The extra labour involved in completing these standard forms is negligible, and it is more than offset by the speed and accuracy with which a central statistical bureau can furnish annual or other reports to each hospital's own specification.

PULMONARY SUPPURATION

CLINICAL teachers used to say that lung abscesses could be diagnosed at the doorway by the obnoxious smell; but it is now recognised that they are not inevitably associated with putrefaction. Fœtor is due simply to infection of the necrotic lung tissue and sputum by anaerobes; it depends partly on bronchial drainage, but its similarity to the fœtor oris of dental caries, and the common occurrence of dental sepsis among patients with lung abscess, suggest that the mouth may be the source of these organisms. The classical experiment of Quinn and Meyer,¹ showing that iodised oil introduced into the nose during sleep will find its way by aspiration to the terminal bronchioles at the lung bases, proved that such retrograde infection is possible.

The first phase of acute pulmonary inflammation is an interstitial pneumonitis, but with virulent infection or with lowered resistance this may be followed successively by pneumonia, lung abscess, or septicæmia.² Owing to the frequent difficulty of identifying an abscess cavity, patients in whom resolution of pneumonic consolidation is delayed must be regarded as potential candidates for lung abscess, and their case followed by serial radiograms, tomographic if necessary. It seems that bronchogenic abscesses are originally peripheral or subpleural, with a predilection for the subapical and axillary segment of the upper lobe or the apex of the lower lobe. Metastasis by direct bronchial spread can involve almost any neighbouring tertiary bronchus and its unit lobule of lung, though local interstitial spread is also seen. Embolic abscesses from blood-borne infection are a third possibility.

Recent clinical studies of pulmonary suppuration^{3 4 5} suggest that pneumonic consolidation may undergo every degree of gradual breakdown and proceed to suppurative pneumonia. Sellors and co-workers⁶ draw attention to the syndrome of “spreading suppurative pneumonitis” which is characterised by early consolidation and softening, with later “creeping” extension of the lesion, followed usually by resolution in the areas previously involved and often by permanent lung damage in the form of cavitation and bronchiectasis. Whereas with obstructive bronchogenic abscess the cavitation is an early and outstanding feature, in suppurative pneumonitis the appearances of consolidation overshadow those of cavitation. No causal organism could be demonstrated. The condition occurred in men of middle age; its onset was usually acute, with toxæmia, cough, and copious sputum, and its course protracted, with exacerbations and a high mortality. The clinical features sometimes resembled chronic pulmonary tuberculosis, while

1. Oliva, G., Frascarelli, R. *Rif. med.* 1946, 60, 437.

2. See *Lancet*, 1946, ii, 532.

1. See *Lancet*, 1944, ii, 572.

2. Ministry of Health. Treatment of Cancer. Directions for the use of Record Cards. London, 1945.

3. The Royal Cancer Hospital Mechanically Sorted Punched Card Index System. By D. W. Smithers, K. M. H. Branson, H. O. Hartley. Obtainable from the Royal Cancer Hospital, London, S.W.3.

1. Quinn, L. H., Meyer, O. O. *Arch. Otolaryng.*, Chicago, 1929, 10, 152.

2. Maxwell, J., Brock, R. C. *Trans. med. Soc. Lond.* 1938, 61, 222.

3. Tourett, A. S. W., Neuhof, H. *J. thorac. Surg.* 1941, 10, 618.

4. Barrett, N. R. *Lancet*, 1944, ii, 647.

5. Scadding, J. G. *Proc. R. Soc. Med.* 1938, 31, 1259.

6. Sellors, T. H., Blair, L. G., Houghton, L. E., Thompson, V. C., Pryce, D. M. *Thorax*, 1946; 1, 146.

in others the diagnosis had to be made from acute lung abscess, neoplasm, or bronchiectasis. One case of "congenital cystic lung" turned out to be the late result of this process. The effects of postural drainage, chemotherapy, and penicillin were uncertain, possibly because of inadequate trial,⁷ and the results of surgical drainage were uniformly bad. In selected cases the best results were obtained by excision of the lung.

Whereas up to 50% of lung abscesses may resolve on medical treatment alone, external drainage is necessary as soon as it is clear that improvement is not occurring with simpler measures. Brock⁸ has worked out fairly definite rules for the surgical treatment of bronchogenic abscess, based on the surgical anatomy of the bronchial tree.

COLON BACILLUS AND FRIENDS

THE gram-negative non-sporing rods classified under the generic term *Bacterium* comprise a wide range of organisms found in the intestine and other parts of the body, on plants, and in the soil. Two subgroups, the salmonella and shigella, are pathogenic and have other distinguishing features, but in general there seems to be a continuous series of intergrading types of coliform organisms which so far have defied precise definition. Most of the coliforms do not easily initiate pathological processes in adults, and this may be why we have been content with relatively crude biochemical tests to distinguish one from the other. However, cystitis, conjunctivitis, and abscesses are known to be caused by coliform organisms in human beings, while there is evidence that they produce scours and fatal septicæmia in young animals. Recent work on the aetiology of infantile enteritis has renewed interest in these potentially pathogenic coliform organisms, and, as Cruickshank¹ has pointed out, the infant is not only prone to endogenous infections but is ill adapted physiologically and immunologically to deal with them.

If the part played by potentially pathogenic coliforms in disease is to be accurately defined some reliable method of identification is needed. Sjöstedt² supports this view by finding among serologically typed strains a close relationship between the capacities to lyse red cells, to produce skin necrosis in rabbits, and to kill mice. These properties, together with the possession of a capsule which interferes with phagocytosis, are said to be common among strains found in pathological material. As the result of work by Kauffmann³ and his colleagues coliform organisms can now be divided into 25 groups depending on their somatic antigens, and into further types according to their capsular antigens. Using these two types of antigen Kauffmann has devised a scheme similar to that which has proved so useful in identifying members of the salmonella group. Difficulties were encountered in preparing flagellar or H antigens in the same way as for the salmonella group, but this problem has been tackled by Vahlne,⁴ who has now demonstrated some twenty H antigens. Vahlne could find no reliable or definite relation between the biochemical and the serological classifications; strains which culturally belonged to the colon and aerogenes groups gave identical serological reactions. On the other hand, he found no qualitative changes in the various antigens within the colon group, and if these findings are confirmed we may have to revise our criteria of identification.

The suggestion that antigenically related groups of coliform organisms cause particular infective conditions was made by Dudgeon in 1921, and Kauffmann has recently concluded that some serologically defined types

of *Bact. coli* are more pathogenic than the usual faecal strains. Vahlne, in a more extensive study, compared strains isolated from faeces with those recovered in cases of appendicitis, peritonitis, and cystitis. He could not show that definite serological groups or types cause particular pathological lesions, but he did find a greater variety of strains in normal than in pathological materials. Strains isolated from lesions were more often capsulated and hæmolytic than those in faeces. To get more evidence for the view that coliforms play an important part in such infections he examined 94 sera from patients with appendicitis and 203 sera from normal people. In about 10% of the sera from patients he could demonstrate O agglutinins for some of the coliforms in considerably higher titre than in the controls. These results are not impressive, but Vahlne points out that his sera were collected only six days after appendicectomy. A more satisfactory demonstration of the rôle of the coliforms in human infection might be obtained by studying other diseases, and there is still much to be learnt about the serology of these organisms. While antigenic analysis of the coliforms has a long way to go before it becomes a precise instrument like the Kauffmann-White scheme for the salmonellas, the Copenhagen and Lund workers have already signposted the route.

SAFETY CODE FOR ANÆSTHETIC APPARATUS

GONE are the days when the doctor armed with a bottle in one hand and a mask in the other could count himself a fully equipped anaesthetist. Now he has to familiarise himself with a score of anaesthetic agents and with almost as many methods of giving them. These methods are often mechanically complicated, and a vital part of his work is to understand and regulate the gadgets that go to their making. This complexity is perhaps unavoidable; but anaesthetists have been further handicapped by the absence of effective standardisation in the apparatus they are called on to use, and the resulting confusion has been the cause of fatal accidents.

In an attempt to lessen the confusion a code¹ has been prepared, at the instigation of the Medical Defence Union and the Association of Anaesthetists, by the British Standards Institution with the full co-operation of doctors and manufacturers. The code sets out long- and short-term policies. The long-term recommendations call for a complete system of non-interchangeable connexions for gas apparatus which will make wrongful coupling impossible; this, involving as it will new cylinder valves and couplings, must wait upon improved production, but it is the only truly foolproof safety measure. The short-term recommendations, which can be effected immediately, include proposals for distinctive marking of cylinders and pipes, planned storage, and selection and instruction of personnel.

The suggested colour-scheme for cylinder identification is in the main that already in use, as follows:

Gas	Colour of cylinder
CO ₂ for inhalation ..	Upper $\frac{3}{4}$ sea-green; lower $\frac{1}{4}$ black.
CO ₂ for snow-making ..	Sea-green.
Cyclopropane	Aluminium with red shoulder.
Ethylene	Mauve with red shoulder.
Helium	Brown.
Helium and oxygen ..	Brown with white shoulder.
Nitrous oxide	Black.
Oxygen	Black with white shoulder.
Oxygen and CO ₂ ..	Black with sea-green shoulder and white neck.

It is not clear why oxygen and nitrous oxide, the most likely cylinders to be confused, should still be so similarly

1. Code of Practice relating to Medical Gas Cylinders and Anaesthetic Apparatus. British Standards Institution, 28, Victoria Street, London, S.W.1. Pp. 15. Post free, 2s.

7. Stivelman, B. P., Kavee, J. *Ann. int. Med.* 1946, 25, 66.
8. Brock, R. C. *Quay's Hosp. Rep.* 1942, 91, 111, 131; 1943, 92, 26, 82, 123; 1944, 93, 90; 1946, 95, 40.
1. Cruickshank, R. *Proc. R. Soc. Med.* 1946, 39, 389.
2. Sjöstedt, S. *Acta. path. microbiol. scand.* 1946, suppl. 63.
3. Kauffmann, F. *Ibid.* 1944, 21, 20.
4. Vahlne, G. *Serological Typing of the Colon Bacteria, Ibid.* 1945, suppl. 62.

marked. The code does not mention one difficulty which has led to fatalities in the past—the lack of uniformity between the U.S.A. and ourselves. Unless the Americans can be persuaded to change their oxygen cylinders, for example, from the present green to our black and white, accidents may still arise from this cause. It might be well for those handling the cylinders to undergo, like engine-drivers and air pilots, tests of colour vision, but it should be impressed on all personnel that to repaint or otherwise deface a gas cylinder is a serious crime. The anaesthetist reading the code may pause to reflect on his own organisation. Is it as safe as he can make it, bearing in mind that it must often be worked by tired people in the middle of the night? Much that is traditional could go—for instance, the little white petticoats in which nurses shroud the cylinders, thus concealing their labels. Much time wasted in “cylinder-testing” could be saved by a rational scheme of cylinder rotation. It should, too, be the rule that whenever a gas cylinder is changed its contents must be confirmed by a second competent person. The code underlines the need for understanding between manufacturers, hospital authorities, and anaesthetists. Let us hope they will pull together to get existing apparatus brought in line with the new proposals as quickly as possible.

RHEOCARDIOGRAPHY

WHEN the heart contracts, the resistance to a current passed through the body is altered. This changing resistance can be recorded with the electrocardiograph, and according to Holzer and his colleagues¹ the records provide a useful measure of the two phases of ventricular systole—the isometric and the ejection phases. Experiments were first made on frogs and dogs, and the tracings obtained from these animals in circulatory collapse are interpreted in terms of altered contraction and relaxation of auricle and ventricle. The investigators' monograph also illustrates the R.K.G.'s of cases of aortitis, hyperthyroidism, heart-block, and tricuspid insufficiency, which last gives a peculiar curve as yet unexplained. An arch in the curve at the time of the first phase of ventricular systole is claimed to be an early sign of ventricular failure, preceding all others.

Though the value of rheocardiography is difficult to judge from this early work the method seems worth pursuing.

AWARDS FOR UNIVERSITY STUDENTS

It has long been recognised that boys and girls who have won open scholarships or exhibitions at the universities have sometimes been unable to take up their awards unless they have succeeded in supplementing them by additional awards or other means. They have thus been subjected to the strain of competing, for example, for a State scholarship as well as an open scholarship, and have often been obliged to pursue their course under the handicap of financial difficulties. In the words of the Norwood Committee: “There should be no need for a successful candidate to search round for means of supplementing the college or university award.”

Until recently the State has done little to remove these financial barriers. Up to 360 State scholarships have been awarded annually by the Ministry of Education on the results of the examination for the higher school certificate; the maximum value of these scholarships for the normal university year of three terms has been the payment of approved fees and a maintenance grant of only £100. Last May, however, more generous provision was announced by the Ministry.¹ Students who have won scholarships or exhibitions are now to receive further assistance. The supplement will provide for the

payment of approved fees and of a maintenance allowance sufficient, “after taking into account the value of the award, an assessed contribution, if any, from the parents or guardians, and the value of any other awards, to bring the student's resources up to the approved standard figure of maintenance.” There will no longer be a limit of £100 on the grant for maintenance, and it is expected that the number of awards qualifying for supplement may reach 1200 a year. This is certainly an improvement, but parents who have heard of it will naturally want to know how it affects them and their children. For what range of income will the awards apply? Will any allowance be made for special liabilities, such as those which doctors have to carry?

On Oct. 10 a questioner drew from the parliamentary secretary to the Ministry a little more information. Mr. D. R. Hardman said that no contribution is expected from a parent whose income does not exceed £600 a year. Parents with incomes above this figure will pay a contribution assessed on a graduated scale, which provides that an award will become honorary when the annual income exceeds £1500. “In arriving at the amount of income for this purpose allowances are made in respect of other dependent children and their educational expenses, dependent relatives, mortgage interest, and certain other liabilities.” But this is not very helpful. How much, for instance, is allowed for other dependent children? It is difficult to see why it should be necessary for the Ministry to announce these new arrangements by bits and pieces, or for parents to search *Hansard* and departmental circulars. A taxpayer is entitled to have information sufficient to enable him to calculate his obligations to the State. If he needs help for the further education of his children, why should he not be allowed to know whether he is likely to be eligible or not?

SPIRIT OF RESISTANCE

Prof. Ole Chievitz, Danish surgeon and resistance leader, whose death is recorded on another page, was a man whose full stature has yet to be recognised outside his own country. When Denmark was occupied her invaders made it clear that in exchange for civil obedience she would be allowed to go more or less her own way. At that time the defeat of Britain, Germany's last considerable opponent, seemed imminent; it might reasonably have been deemed futile to oppose an enemy in full occupation, without any substantial hope of victory, and in the knowledge that the only certain reward would be death or reprisals against fellow-countrymen and relations. Yet that is exactly what the elderly Chievitz and his friends did. “Tell your friends the British are going to win the war,” he would say to his students; and soon he was proving his faith in action.

In Denmark, as in other occupied countries, doctors played a proud part: Chievitz, Fog, Husfeldt—these are names to conjure with, and they are three among many. Aircrews shot down over Denmark will recall with gratitude their secret admission to a Copenhagen hospital; the concealment of their nationality in the open ward, despite Gestapo inspections (“this poor chap has dreadful burns on the face”); the journey to the dockside house; the uneasy moments in the fishing-smack's empty fuel tank during a further Gestapo visitation; and at last the trip to another land and freedom.

We live in somewhat dreary days; for too many of us the self-discipline and the sense of purpose have gone, leaving us relaxed and void. We can, if we will, find fresh heart in the memory of staunch friends, whose confidence in us and in our way of life never wavered. “The British,” said Chievitz, “are going to win.”

Mr. J. J. ROBERTSON, Labour M.P. for Berwick and Haddington since 1945, has been appointed to the General Medical Council as a Crown nominee in succession to Lord Hacking.

1. Rheocardiography (R.K.G.). By W. Holzer, K. Polzer, A. Marko. Vienna: W. Maudrich. Pp. 43.

1. Circular no. 104, May 16, 1946.

Special Articles

POSITION OF DOCTORS IN THE NATIONAL HEALTH SERVICE THE MINISTER'S ASSURANCES

THE following letters have been exchanged by the presidents of the Royal Colleges and Mr. Aneurin Bevan, Minister of Health.

The Presidents' Letter

MY DEAR MINISTER,

The opposition of a substantial part of the medical profession to any renewal of discussions with the Government regarding the National Health Service is causing us concern. We fear that it may lead to an impasse and we wish to do what we can to prevent such an impasse arising.

We recognise that certain of the principles of the new service are incorporated in the Act, but there are other issues of importance which will be determined by regulations and the form of the service will depend to a great extent upon what the regulations contain. We feel that there is an opportunity in framing the regulations to meet several of the objections of the profession. Moreover, the implications of some of the proposals for the new service are not clear to the profession and clarification of these points would be helpful. We hope, therefore, that you will clarify for us any of the points referred to later in this letter on which there may be misunderstanding and that you may be able to give us an assurance that you will endeavour, within the framework of the Act, to meet the views which are held so strongly by many practitioners.

Our first point is a general one. We believe that behind the opposition of members of the profession is the fear that to enter into discussions would compromise their position by implying their approval and acceptance of the main provisions of the Act.

In the general-practitioner part of the service there are three points on which we think that some statement from you would be helpful.

The first is the method of remuneration. This is left to be dealt with by regulations, and is therefore presumably open for discussion; but you have made clear your preference for a basic salary, apparently making it generally applicable because of your difficulties in particular cases. There is general agreement that there are circumstances in which a basic salary or a guaranteed minimum may be necessary, but this is not regarded as justifying a universal basic salary. Cannot the circumstances in which a basic salary is appropriate be left open for discussion?

Secondly, a large element in the opposition of some practitioners is the fact that if the tribunal recommend the expulsion of a practitioner from the service, his appeal is to be judged by the Minister who has appointed two of the three members of the tribunal. Neither the words nor the spirit of the Act prevent you from agreeing to seek the advice of the General Medical Council on every such appeal.

In the third place, there is a widespread and not unfounded fear that there will be serious interference with the liberty of movement of general practitioners. It would be useful if you would explain how you anticipate that this part of the Act will work in practice, with particular reference to partnerships and groups.

Among specialists there are also certain points giving rise to anxiety. In the background, just as in the case of the general practitioners, there is the general issue of the freedom of the profession and the availability to the people of independent medical advice. The whole

profession regard it as essential that independent practice should continue and that independent practitioners should have the necessary facilities for the treatment of their patients. We were therefore glad to receive from the Lord Chancellor and from yourself assurances that independent practitioners would be free to remain in attendance on their patients when admitted to the private wings of hospitals, and also to learn that consultants holding honorary positions on the staffs of hospitals would be at liberty to use all the facilities provided. You know our anxiety to induce specialists to do practically all their work within the precincts of hospitals; it is because of this anxiety that we stress these points. Any information you can give us on the practical operation of the consultant and specialist part of the service will be helpful.

We hope you will forgive us for intervening but we feel that the importance of the cause justifies this step.

Yours sincerely,

MORAN

President, Royal College of Physicians.

ALFRED WEBB-JOHNSON

President, Royal College of Surgeons.

W. GILLIATT

President, Royal College of Obstetricians and Gynaecologists.

The Minister's Reply

MY DEAR PRESIDENTS,

Thank you for your letter. I agree with you that an impasse between the Government and the medical profession would be a grave misfortune. I believe that some, at least, of the opposition on the part of the profession to discussions is due to a misunderstanding of the proposals and I am glad to answer any questions if by so doing I can make clear what is in doubt.

You say that some members of the profession fear that discussions would compromise their position by implying their approval of the main provisions of the Act. There is no ground for such a fear. Every doctor will have to decide for himself when the proper time comes whether or not he should take part in the new service, and the profession as a whole will be free to determine their views on the service when they know what it is to be. The resumption of discussions now would not prejudice these eventual decisions.

As you rightly point out, the ultimate form of the service will largely depend on regulations which have now to be framed. The issue for the medical profession today is not, therefore, whether they will join a service, the final shape of which cannot yet be known, but whether they will accept or forego the opportunity to influence its shaping. I want to have their help and advice in this task and I can certainly assure you that, if discussions take place, I shall endeavour to meet any views of the profession which do not conflict with the principles of the Act.

Let me here make one point. It has been said that I have not consulted the profession and that I have been unwilling to negotiate with them. That is not so. While the Bill was in preparation and before Parliament, discussions with the medical profession as with other interests were necessarily conditioned: I could not publish proposals before they were submitted to Parliament and I could not pledge Parliament in advance to their acceptance. Nevertheless I and my officers had full discussions with the negotiating committee and were throughout in close touch with the representatives of the profession. Thus the Government were at all stages fully informed of the views of the profession and the original proposals were modified in many important respects to meet those views. Now the position is

different. The Bill is law and within its terms I can negotiate freely.

GENERAL PRACTITIONERS

I turn now to the specific points raised in your letter. You ask three questions about the general-practitioner part of the service :

(i) *The method of remuneration*

Clearly both the method and rates of remuneration are open to discussion since they are matters which are not defined in the Act but have to be determined by regulation. I believe, however, that the Government's proposals have been misinterpreted. The Government have accepted the view of the profession that remuneration should be based substantially on capitation fees and have thus rejected the conception of a full salaried service. I have had it in mind that the remuneration of all general practitioners should include an element of salary, but that the element should be small. As you yourselves recognise, there are circumstances in which a guaranteed minimum is necessary and my own view has been that administratively the most convenient method of achieving this object is to make the basic element universal. But this is essentially a matter which I should like to discuss with the profession.

(ii) *The tribunal*

Here again there is, I think, some misunderstanding. The question to be decided by the tribunal is whether the retention of a doctor in the medical list would be prejudicial to the efficiency of the service, and I regard the setting up of an independent tribunal as an addition to the safeguards which have prevailed under the National Health Insurance for the last thirty-five years. The function of the General Medical Council is to determine whether a doctor has been guilty of unprofessional conduct and that remains unaffected. Moreover, a doctor, like any other citizen, has his rights at common law enforceable by the courts and these also remain unaffected. It is not true, as has been so widely said, that doctors in the new service will be civil servants. On the contrary, their full civic rights are preserved unimpaired. I will gladly discuss with representatives of the profession the procedure to be followed before deciding an appeal to me from a decision of the tribunal to remove a practitioner's name from the list, with a view to providing any additional protection possible within the framework of the Act.

(iii) *The fear of interference with the liberty of movement of general practitioners*

There is no power to direct a doctor to go anywhere or do anything. There is a provision in the Act the sole object of which is to avoid an undue concentration of doctors in any one area. Under this provision a doctor who wishes to practise in the public service in a new area will be required to obtain the approval of a central committee of nine, seven of whom will be medical practitioners appointed after consultation with the medical profession. Normally, however, he will make his arrangements locally through the local executive council, the approval of the central committee being formal. The details of how this will work have still to be discussed and settled, I hope in consultation with the medical profession, but I can say that what I have in mind as the everyday procedure is that in the case of a partnership or group of doctors the partners or members of the group will have the initiative in selecting a doctor to fill an approved vacancy and normally their selection will be confirmed as a matter of course.

Similarly, in the case of a single-handed practice the initiative in selecting the incomer will lie with the local medical committee.

You know, of course, that all doctors who, when the Act comes into operation, are already in practice as

principals will have an absolute right to enter the new service in the areas in which they are practising.

SPECIALISTS

You mention finally in your letter the position of specialists and stress the importance to them of ensuring the freedom of the profession and the continuance of independent practice. It is a basic principle of the new service that there should be no interference with the clinical freedom of any doctor—specialist or general practitioner.

It is also a principle of the service that independent specialist practice should be free to continue—specialists being free to remain outside the service or to join it either whole- or part-time, and, if they wish, to be on the staff of a hospital in an honorary capacity. In this way the position of consultants desiring to continue their association with hospitals after the age of retirement and of consultants who do not wish to accept more than a limited responsibility will be met. In the case of a consultant on a hospital staff—and I find it difficult to conceive of a consultant not on a hospital staff—he will be able to treat his private patients in the private beds of his own or other hospitals, subject to availability, and I recognise with you the need for both public and private accommodation, as indeed I have made clear in Parliament on a number of occasions.

The details of all these arrangements will obviously need to be discussed with the profession, but I am confident that round a table we shall be able to make satisfactory arrangements which will encourage specialists to work within the precincts of hospitals—a point to which, like you, I attach the utmost importance.

If you think it desirable I have no objection to the publication of this correspondence.

Yours sincerely,

ANEURIN BEVAN.

THE LONDON REGIONS

A LETTER commenting on the areas proposed for the London regions has been addressed to the Ministry of Health by King Edward's Hospital Fund.

"The proposals," the letter says, "are fully in accord with the views which this Fund has from time to time expressed. It is essential that the hospital services of London and the Home Counties should be taken together, and that the arrangements should be such as to secure to the full the advantages expected to accrue from the extension of the University influence upon the standards of hospital work. At the same time, we appreciate that the area is as a whole too large to be operated as a single region, and we would agree that the division of the area into four regions offers the best practical alternative open to the Minister. In saying this we would not wish to prejudge the question of the advisability of some reconstruction of the boundaries of the regions on the lines now being suggested by the Voluntary Hospitals Committee for London."

"The experience of the Fund shows that it is especially in the populous periphery of the Metropolitan area that the need for further development is most apparent. This development must be completely integrated with the hospital services of the central area, and we are strongly of opinion that the advantages of such a plan as that now proposed will in the long run far outweigh the possible conveniences of any alternative plan such as might be framed to coincide with the present boundaries of the County of London."

The letter ends by quoting a memorandum from the Fund in 1944, commenting on the suggestion that the L.C.C. area should constitute a single authority. The Fund then said that its experience in the Metropolitan Police District proves unmistakably that such an arrangement would only perpetuate one of the primary sources of the maldistribution of hospital facilities in the metropolitan area. "In so far as there is a lack of adequate

hospital services in the London area, it is to be found on the periphery of London where new populations have sprung up within recent decades—where it has proved difficult for voluntary provision to keep pace with the growth of population, and where the local authority has equally failed to meet the situation. If ever there was a case for coördinated planning, it is over this wide area that transcends the county boundaries.”

AMERICAN DEAF SCHOOLS.

Mr. A. W. G. Ewing, PH.D., and Mrs. Ewing, M.S.C., of the department for the education of the deaf of Manchester University, have just returned from lecturing and from a tour of deaf schools and deaf children's clinics in the United States and Canada; and on Jan. 3 they gave the Deaf Children's Society an account of their experiences.

There are three types of schools for the deaf in the United States, Dr. Ewing said—public residential schools, begun as voluntary enterprises in the last century and now taken over by the various States; public day schools, founded in this century by cities, or occasionally States; and denominational or private schools. The first of these take more than 12,000 children, the second some 4000, and the third some 1100. They visited 23 schools, and also saw the aural rehabilitation centres which have been set up for deafened Servicemen. In these centres the men receive 4-6 weeks' training in the use of hearing-aids combined with lip-reading. About 5% of those passing through the centre get on well enough to discard their hearing-aids, and the rest learn to use their aids successfully—quite a difficult feat in itself.

Mrs. Ewing, speaking of provision for children under the age of 5, described the great variety in educational policy in different States. In New York State, for example, there is a law that deafness must be reported by the age of 6, and education is provided for all deaf people between the ages of 3 and 21. In Tennessee, on the other hand, there is no education provided for the deaf below the age of 7. Yet, however the educational standards differed, the material conditions were always high. She saw not a single dull uninteresting shabby classroom: lighting, equipment, and furniture were of the best. The teachers were young and gay, wearing pretty frocks, and the clothes and shoes of the children were both good and pretty. There was a grand piano in every classroom. She spoke of the “amenities and dignities” of the environment in which these children are taught as something we must seek to give ours. Yet, in spite of all, she saw no better lip-reading than she sees in English schools, and though speech was often better articulated than among our children, its use was not so free and vital; the children on the whole did not seem to think in words as readily as ours. In Canada there were no schools for deaf children under 5 up to the time of the Ewings' visit; but in Ontario, partly as a result of their lectures, a clinic is now being founded and a worker is being sent to Manchester to train. In the United States, as here, she found two approaches to the teaching of the under-5 child. In most schools, teachers used methods designed for older children, and modified them as well as they could to suit these younger pupils; in a few, efforts are being made to devise special methods for children at this stage of their development. Ordinary nursery-school methods, which aim at teaching the three-year-old independence, will not do, because the deaf are already, in a sense, too independent: they are isolated and must learn to coöperate and enjoy social life. American teacher-parent associations are much more active and friendly than ours. The mothers often help in the school, by playing the piano for rhythmic training, or by minding the children during the teachers' luncheon hour.

Dr. Ewing, taking up the tale, noted that the early schools in America were first modelled on the French Institute for the Deaf, in Paris, where teaching was entirely by signs; and the oral tradition, which has such a firm hold in England, came late. Nowadays, however, some 70% of children are taught wholly or chiefly by speech, and in the Clarke School for the Deaf, and

St. Joseph's School at St. Louis, Missouri, teaching is entirely oral. If signing ever gets into a school, whether it is used for teaching or not, it persists out of school hours, and he knows of only one residential school in England—at Northampton—where there is no signing among the children at play; but in St. Joseph's and the Clarke School he saw no signing, the children using speech among themselves. From the Clarke School about 8 children every year get on well enough to finish their education in ordinary high-school. In a few American public residential schools there is a combined system of teaching, children getting 1-2 years of oral teaching on admission, between the ages of 4 and 5, and later being taught partly by finger-spelling and signing. They observed that where finger-spelling was introduced into teaching in this way speech faded out altogether among the children; and he mentioned an older boy who had only been deafened at the age of twelve, but who handed them a note asking them to learn one-handed finger-spelling so that they could converse with him. In one particularly well-equipped school where signing was used the children were extremely happy since they never encountered a situation in which they were at a disadvantage; and many were unwilling to leave. They were well trained in occupations, such as printing, beauty-culture, and hairdressing, in which they could make a good living; but what, he asked, would be their social and emotional experience once they left school? They found a similar situation at a college for the deaf, where comely and well-dressed young people were enjoying a fraternity meeting, but there was complete silence except for the sounds of the dance band. They came back more than ever convinced that where oral teaching methods are at all possible no others should be used.

B.M.A. PLEBISCITE

FINAL FIGURES

A FINAL report on the British Medical Association's plebiscite, embodying all replies up to the closing date of Jan. 6, has now been issued. Since the preliminary totals were published on Dec. 16 the number of replies received has risen to 42,123 (civilians 39,013; Services 3110), and the result now reads: Yes 19,478 (46%); No 22,645 (54%). Replies have now come in from 38% of Service doctors; 56% of these voted Yes and 44% No, the same proportion as was recorded in the preliminary results. As the tables show, among serving doctors the strongest support for negotiation was recorded by those qualified for 8 years or more, and by those holding permanent commissions or specialist posts.

4. SOME IMPORTANT PERCENTAGES: CIVILIAN AND SERVICES

	Total % voting	% voting "yes"	% voting "no"	% not voting	Of those who voted	
					% voting "yes"	% voting "no"
<i>All civilian categories:</i>						
Great Britain	81	37	44	19	45½%	54½%
England and Wales only	83	38	45	17	45½%	54½%
<i>Groups 1 to 4</i> (Consultant or specialist, general practitioner principals and assistants, whole-time voluntary hospital):						
Great Britain	92	37½%	54½%	8	41	59
England and Wales only	94	38	55	7	41	59
<i>Groups 2 and 3 only</i> (General practitioner principals and assistants):						
Great Britain	88	32	56	12	36	64
England and Wales only	90	32	58	10	35½%	64½%
<i>All Services</i>	38	21	17	62	56	44

I. CIVILIAN PRACTITIONERS

Group	Description	England and Wales		Scotland		Ireland		Totals		Total replies received
		Yes	No	Yes	No	Yes	No	Yes	No	
1	Consultant or specialist	1907	2140	201	283	23	56	2131	2479	4610
2	General practitioner principal	4744	8854	587	972	148	198	5479	10,024	15,503
3	General practitioner assistant	820	1181	135	190	23	33	978	1404	2382
4	Whole-time voluntary hospital	1827	1343	248	241	41	36	2116	1620	3736
5	Whole-time local-authority general hospital	949	504	94	48	11	13	1054	565	1619
6	Whole-time local-authority special hospital	710	307	95	53	22	6	827	366	1193
7	Whole-time public-health service	1125	660	146	90	21	15	1292	765	2057
8	Whole-time Government service	440	221	85	38	11	4	536	263	799
9	Whole-time teacher	242	112	66	35	4	6	312	153	465
10	Whole-time research	191	65	23	11	1	3	215	79	294
11	Whole-time non-Government post	213	200	18	23	1	5	232	228	460
12	Medically qualified dental surgeon	65	161	14	36	..	2	79	199	278
13	Retired	1136	1763	140	240	15	23	1291	2026	3317
14	Unclassified	996	909	171	174	32	18	1199	1101	2300
	Totals	15,365	18,420	2023	2434	353	418	17,741	21,272	39,013

2. AGE-GROUP (PERIOD SINCE QUALIFICATION): CIVILIANS ONLY

Description	0-7 years		8-14 years		15-21 years		22 years and over		Period not stated		Total "yes"	Total "no"	Grand total
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No			
Consultant or specialist	92	85	482	342	505	586	1017	1430	35	36	2131	2479	4610
General practitioner principal	395	644	932	1639	1366	2519	2703	5114	83	108	5479	10,024	15,503
General practitioner assistant	536	782	259	362	87	105	84	138	12	17	978	1404	2382
Whole-time voluntary hospital	1522	1304	459	226	54	26	52	38	29	26	2116	1620	3736
Whole-time local-authority general hospital	592	398	260	91	98	34	85	34	19	8	1054	565	1619
Whole-time local-authority special hospital	285	159	203	84	147	43	179	74	13	6	827	366	1193
Whole-time public-health service	142	64	275	143	321	179	520	369	34	10	1292	765	2057
Whole-time Government service	118	54	115	38	89	36	200	129	14	6	536	263	799
Whole-time teacher	82	42	78	34	62	27	82	45	8	5	312	153	465
Whole-time research	103	36	54	12	18	4	35	26	5	1	215	79	294
Whole-time non-Government post	32	31	48	45	60	59	86	91	6	2	232	228	460
Medically qualified dental surgeon	6	26	17	31	17	36	34	104	5	2	79	199	278
Retired	16	23	30	28	50	56	1155	1866	40	53	1291	2026	3317
Unclassified	632	444	251	204	108	111	189	316	19	26	1199	1101	2300
Totals	4553	4092	3463	3279	2982	3821	6421	9774	322	306	17,741	21,272	39,013

3. AGE-GROUP (PERIOD SINCE QUALIFICATION): SERVICES ONLY

Group	Description	0-7 years		8-14 years		15-21 years		22 years and over		Period not stated		Totals		Grand total
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
15	Permanent commission	36	31	126	101	89	69	219	116	4	6	474	323	797
16	Temporary commission specialist	132	47	113	36	35	7	15	9	5	2	300	101	401
17	Temporary commission graded specialist ..	164	115	16	7	3	..	..	1	4	..	187	123	310
18	Temporary commission general-duty officer ..	633	768	26	22	10	10	94	14	13	12	776	826	1602
	Totals	965	961	281	166	137	86	328	140	26	20	1737	1373	3110

Health Centres of Tomorrow

II—THE URBAN CENTRE

THE population of England and Wales before the war was 41,215,000, cared for by 18,870 general practitioners, each of whom had an average of 2184 patients. During the war the civilian population decreased; but owing to differential Service needs the decrease in the number of general practitioners looking after them was proportionally greater, and in December, 1943, there was one to each 2786 civilians. The number of doctors now in general practice cannot be far short of the first-quoted figure, and may indeed exceed it.

Inquiring in 1943 into the pre-war distribution of general practitioners the Central Medical War Committee found that in 1939 the average number of patients per doctor was over 3000 in 16 (9%) of the 176 areas into which the country was divided. Except for East Yorkshire, all these areas were industrial: Ashton, Barnsley, Consett, Gateshead, Stockton, Sunderland, West Bromwich, and Tower Hamlets are examples.

It seems safe to assume that, if they were evenly distributed, our present complement of general practitioners would suffice to provide one doctor for every 2200 people.

THE AMOUNT OF WORK

Information about the incidence of illness is somewhat scanty. Moreover, it is derived mainly from National Health Insurance figures, which can be applied to the general population only tentatively, because the inclusion of women and children, and private patients, in a comprehensive National Health Service will almost certainly raise the average number of medical attendances per person.

Items of service to panel patients probably average about five per year, though nothing authoritative can be said of their distribution between the doctor's surgery and the patient's home. On this basis, 2200 patients would require 11,000 items of service in a year.

Can this be done? It is highly unlikely that doctors will ever get the clear-cut working week of $5\frac{1}{2}$ days which other professions enjoy; but they ought to be able to look forward to its equivalent in hours, even if their work is spread over more days. Most practitioners would probably regard an average of 40 items of service per day as not unreasonable, divided, as required, between home visits and attendances at health centre or surgery. The equivalent of $5\frac{1}{2}$ working days in a 48-week year would give 264 working days; and if on each of these an average of 40 items of service were rendered the annual total would be 10,560 surgery or home visits. This figure differs by less than 500 from the number of items of service already mentioned as theoretically required on the basis of panel experience.

With whatever qualifications the figures are considered, it does seem possible to say, first, that a start could be made with the new service, and secondly, that 5000 additional practitioners, either as full members of the service or as assistants, would enable it to function smoothly by reducing the number of patients per doctor to something like 2000.

Figures of this nature may enable the profession to discuss with the Minister the limitation of the lists of single-handed doctors to a ceiling of 2500-3000, and to formulate ideas on the remuneration appropriate.

SITUATION

In siting health centres, ease of access by patients will be of prime importance.

At the 1931 census there were 1120 urban areas, of which 113 were towns with more than 50,000 inhabitants. In these urban areas the average density of population was 7.1 persons per acre, or 4544 per square mile. In

most large towns, however, it was a good deal higher than this: in Greater London, for example, it was more than twice as high (18.5 persons per acre), and in the administrative county of London it was more than eight times as high (58.7). In most urban areas, therefore, a circle with a radius of one mile will enclose more than 20,000 people, and if we place a health centre at the centre of this circle few of the 20,000 it serves will have to walk more than a mile to reach it. Many of course would be able to use public transport.

A population of 20,000 would require the services of six or seven general practitioners and at least two dentists, and this would still leave scope for two or three other doctors to take part in the public service from their own surgeries. A centre of this size would not be cheap either to erect or to maintain; but, besides offering good facilities both to patient and doctor, it would enable assistants to receive a thorough training in general practice. The same population would require a building for its local-authority services (maternity and child welfare and school clinic), and if this were on the same site something would be done to break down the administrative barrier between the curative and preventive health services.

It is hoped that some day the suitably qualified and experienced general practitioner will take charge of the clinics on which the child-health services are based. While it would be generally thought undesirable for the treatment of sick children to pass solely into the hands of a single member of the health-centre group (since the emphasis in English medical training has been on producing all-round doctors rather than "general-practitioner pædiatricians") there would nevertheless be considerable scope for a practitioner having a special interest and training in infant welfare (and possessing a diploma in child health) to work at the infant-welfare centre attached. The fear that by seeing so many mothers and children he would gain unfair advantage in the competition for patients will be overcome if satisfactory arrangements within the group can be arranged.

If opportunities are taken, group practice will do much to counteract the tendency towards a full-time school medical service and removal of the school-child from the family doctor. Much of the minor treatment is at present carried out by the school nurse under medical direction, and this can be done equally well when the medical direction comes from the local practitioner. Moreover, if the health centre is near a school, the local practitioner should become the obvious person to advise on the health problems of the school; and both in this way and by health talks he would have a chance to provide progressive health education. Most children would welcome a regular health talk as a relief from ordinary lessons.

Placing the health centre and the local-authority clinics together would also have other advantages. The health visitor is to have her sphere of work considerably enlarged, and is to come into closer relation with the family doctor. Her natural bases are the public-health centre and the patients' homes, and it will help if one of these is beside the family doctor's base. The midwife has a similar clinic base, and possibly the district nurse could usefully do some of her work from the same centre.

An almoner will probably not be needed at the health centre: with a national insurance system and a National Health Service there seems to be no real opening for her there. There ought however to be a close link with the local office of the Ministry of National Insurance, if only to enable certificates to be collected daily from the centre. Many positive advantages to both patient and doctor might be secured by such a link, and nobody with first-hand knowledge of the work of the Unemployment Assistance Board will be afraid of its being repressive.

STAFF

It is less easy to be specific about the numbers and categories of non-medical staff required in a health centre; experience and experiment are necessary. Except for the doctors and dentists, staff will all be whole-time employees of the local health authorities and will properly expect their hours of duty (though not necessarily their times of duty) to be much the same as those of other employees, which are about 38 per week. Unlike the ordinary office, however, the health centre will have to be open in the evening as well as during the day, so that working patients can attend in their free time. It may have to be open from 8.30 A.M. to 8 P.M. on five days a week, and from 8.30 A.M. to 1 P.M. on the sixth—a total of 62 hours. The doctors would hold two surgeries, of about two hours each, on a full working day, and one surgery on the half day. The dental surgeons would have two three-hour sessions daily from Monday to Friday.

A telephone system with one or two Post Office lines and a full system of internal communications is an obvious necessity, and will require the services of a fully trained telephonist and a relief clerk, if not two telephonists. In a busy centre there may have to be a night telephonist to deal with emergency calls.

Clerks and typists will be needed most in the morning and in the evening when the public will be making most use of the centre. During the busiest hours, from 8.30 A.M. to 12 NOON, and again from 4.30 to 8 P.M., not less than two must be on duty, to direct patients, sort out and re-file cards, attend to certificates and letters, help in the making of appointments, and assist generally. A third, on duty from 10 A.M. to 6 P.M., could help in this work and deal with callers when there are no doctors in the centre.

These numbers are of course minimal, and allow, in effect, only half a secretary per doctor. They offer no prospect of relieving the doctor of the actual writing of case-notes, prescriptions, and certificates. Nor does it seem that any system would permit this, short of arranging for each doctor to have a confidential secretary-typist who could be present in the consulting-room when patients were being examined. Such an arrangement would be ideal, if cost would allow.

The clerical, caretaking, and cleaning staffs of the centre would probably function most efficiently if under the direction of an experienced clerical officer, to be known by some such title as "centre secretary." He (or more probably she) would be responsible both to the medical officer of health, as representing the local health authority, and to the senior doctor or the medical committee of the centre.

Even this cursory examination of the clerical needs of a health centre shows that any authority responsible for several centres will need a central pool of clerks who can be drafted to any centre in the area to meet holiday or sickness absences among the workers.

In addition many other kinds of worker have to be considered. Caretakers, cleaners, and handyman-stokers will be wanted, in numbers depending on the size of the centre and the hours at which the work must be done. The staff—though probably not the patients—will have to have a canteen. (The doctor on night duty will presumably depend on the good offices of the caretaker for such refreshment as he needs.)

The chiropodist will on the whole be best accommodated in the maternity and child-welfare or "public health" centre, where ultraviolet light treatment may also be given. (Physiotherapy proper will remain the function of the hospital outpatient department.)

The appointment of a pharmacist to dispense prescriptions on the spot, to take charge of drugs and dressings, and possibly to be responsible for dried milk for the maternity and child-welfare centre would be convenient

to patients, but is not an absolute necessity. The social worker should be called in when required.

Finally the greatest need, apart from clerical assistance, will be for nurses. The nurse can assist in the examination of female patients, do minor dressings, take charge of the minor operations' room, sterilise instruments and dressings, and assist in a hundred ways. In a centre of the kind here discussed two nurses will be a minimum, and experience may show the need for twice as many. Whether the nurse should be district nurse, health visitor, or school nurse may very well depend on local circumstances, but her rôle in a health centre will certainly be very important.

EFFICIENCY WITHOUT EXTRAVAGANCE

In staffing a health centre we must keep a sense of proportion and must particularly avoid too much specialisation. It is out of the question to arrange for the continuous presence, throughout the day and throughout the year, of each of the many kinds of worker—medical and lay—who might prove useful. To provide a continuous service of pharmacists, for example, it is estimated that every centre would need at least four of them; and if we were to plan the rest of the staff on a corresponding scale we should have an organisation which the community could not possibly afford.

Drawing parallels from the animal world, the modern hospital is a large organism in which many different kinds of cell are well represented. The health centre on the other hand is an organism with comparatively few cells, and it would be extremely vulnerable if each of these was highly specialised. Its salvation will lie in the capacity of the staff to adapt themselves and their working to the changing needs of the hour, and they should all be able to perform when necessary the functions of two or three of their associates. Thus a system of "alternates" might be developed to cover absences off duty, on holiday, or through illness.

General competence and a good spirit will in fact prove more valuable than elaborate organisation. Nevertheless, one of the primary reasons for having a health centre is to economise in medical man-power; and neither the profession nor the public will be satisfied unless it is run at least as efficiently as a good private surgery. The next two articles will give an idea of the centre in action and how its affairs might be managed.

MEDICAL PLANNING COMMISSION AND GROUP PRACTICE

THE *Times* of Jan. 6, in reviewing the issues in dispute between the Government and the British Medical Association, says:

Early in the war all the principal medical organisations combined to establish a Medical Planning Commission. This authoritative body published an important interim report in the summer of 1942, when the Beveridge report was in preparation and public opinion, for the first time in a generation, was ready for a major reform of the social services. So far as the general practitioner service was concerned, the Commission's report supplied the main inspiration both for the Coalition scheme (outlined in a White Paper of February, 1944) and for Mr. Bevan's Act. The Commission, by a majority, wanted more than a mere extension of the existing National Health Insurance scheme, but rejected a whole-time salaried service. It favoured a middle course. The practitioner should be free to work partly in and partly outside the public service. All the "essentially sound" features of the N.H.I. scheme—such as "free choice of doctor, the minimum of interference by the State, and the central negotiation of terms and conditions of service"—should be retained. But radical steps should be taken to improve the efficiency of the general practitioner, handicapped by "the continuance of traditional individualism" into an age when rapid scientific advance and the growing complexity of medical practice demanded "group or coöperative general practice" by doctors using "a health centre . . . provided by a statutory health authority." Group practice was the means whereby "the value of the practitioner to his patient would gain immeasurably."

Public Health

PREVENTION OF EPIDEMIC NEONATAL DIARRHŒA

D. M. STERN

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OBSTETRIC SURGEON, CHISWICK AND WEST MIDDLESEX COUNTY HOSPITALS

NEONATAL diarrhœa is a disease of infants in the first three months of life, characterised by the passage of frequent loose stools. The main feature is a progressive loss of weight, due to dehydration. As a rule the stools are yellow or orange, though the first few may be green, and while still frequent they are sometimes formed, being passed from the bowel with accompanying liquid which soaks into the napkin and may be mistaken for urine.

In general, the younger the infant the shorter is the incubation period and the more severe the disease. Premature infants, those enfeebled by disease and deformity, and those with feeding difficulties are especially attacked. It may occur, sporadically or in epidemics. Vomiting is a feature of some cases.

Epidemic neonatal diarrhœa is not to be confused with endemic gastro-enteritis, which attacks adults at least as often as children. This latter disease appears to be an air-borne virus infection, and recovery is usual.

THREE EPIDEMICS

The views on prevention set out below have been based on observations of three epidemics during the late war.

The *first epidemic*, at the West Middlesex County Hospital, began in a small ward containing 5 premature infants, 3 of whom contracted the disease and died. In the ensuing ten months 68 babies were attacked in all, and 53 died. The epidemic lasted nine months, becoming on the whole less virulent towards the end.

Various methods were tried to prevent the diarrhœa from spreading, including isolation of all suspect cases and removal from the maternity unit of the babies with the disease. The chief difficulty was early diagnosis. Many infants have an occasional green stool when establishing feeding, whether breast or artificial, and it was only when an infant lost or failed to gain weight while taking adequate feeds that the diagnosis could be made. In spite of these precautions, and others in changing napkins and in feeding, fresh cases of the disease kept occurring at irregular intervals, sometimes several at a time. The disease was not limited to special wards or nurseries.

Treatment consisted of fluid replacement by intravenous saline, cessation of milk-feeding, sulphonamides, large doses of vitamin A, and intravenous plasma. The plasma was given because it was thought that the infection might be influenzal in origin, and the plasma would contain immune bodies. No treatment had much, if any, effect on the course of the disease. Many small babies died within twenty-four hours of the onset.

Towards the end of the epidemic, when a fresh review of the cases was made, it was noticed that no completely breast-fed baby had developed the disease. The diarrhœa, however, was not prevented by any antibodies obtained by breast-feeding, because breast-fed babies with supplementary artificial feeds were equally affected with those completely artificially fed. Further, the source of the infection was not in cow's-milk mixtures, because some affected babies had received none, being bottle-fed on expressed breast milk only. Isolation of the affected babies and the nurses attending them failed to prevent fresh cases occurring, so it seemed that the spread was not due to infection or contagion, but this was not certain since the causal organism was unidentified. Repeated bacteriological investigation of the infants

in the epidemic never revealed any pathogenic bacteria.

The *only common factor in all cases was the use of pooled feeding-bottles and teats*, though only 32% of all babies using bottles became ill.

The *second epidemic* was very small, and began while these investigations were proceeding. It occurred in Chiswick Hospital, which had been newly opened a few months previously. Two babies only were attacked, and these were both moved from the hospital. All bottles were withdrawn, and all babies needing supplementary or artificial feeds were spoon-fed. The same milk mixtures were used and no more cases occurred.

The *third epidemic* started in the West Middlesex County Hospital in November, 1943 (see table). It was not so virulent as the other two. The first babies affected were transferred from the maternity unit, but fresh cases occurred. These later ones were isolated in the maternity block, where each baby was given its own new bottle and teats, and these all recovered. Of the 9 babies transferred to the children's isolation ward 7 died; the bottles here were pooled after each feed.

On Dec. 13 all bottles and teats in the department were withdrawn, and spoon-feeding was substituted. The same milk mixtures were used, and no more cases occurred.

DAILY INCIDENCE OF NEW CASES OF NEONATAL DIARRHŒA

November, 1943

Date ..	11	12-21	22	23	24	25	26	27	28	29	30
New cases	1	0	1	0	7	3	2	5	3	0	2

December, 1943

Date ..	1	2	3	4	5	6	7	8	9	10	11	12	13→
New cases	1	0	1	0	0	1	0	0	1	0	1	2	0

Bottles used for infant feeding gradually acquire an ever-thickening deposit of protein and fat on the inside. It was found, acting on a suggestion of Dr. Gordon Signy, that boiling these bottles failed to sterilise them. The thicker the deposit, the more profuse and rapid was the bacterial growth in culture media introduced into the bottle. New bottles, and those free of film, were made sterile by boiling.

Insufficient bacteriological investigations were carried out at the time of the epidemic for any suggestion to be made as to the causal organism.

DISCUSSION

It seems that the bacterial content of the feeding-bottle is gradually built up with use and progressive thickening of the film which forms inside. The affected baby's condition, therefore, may be due to the intake of a very large dose of an organism or organisms from a bottle which it did not use before, owing to the pooling of the bottles after each feed. These organisms, which might be non-pathogenic to older children and adults, will not be killed in the stomach of the infant, as they would be later in life, and they will presumably continue to multiply in the intestinal tract, growing in the warm milk medium. Products of proteolysis, such as histamine, will be absorbed in the tissue fluids and produce the systemic signs of neonatal diarrhœa. If, however, only one baby uses the bottle throughout its stay in hospital, it will become acclimatised to the organism as the dose increases, unless, by careless technique, a large number are introduced from the outside.

This may explain the frequency of diarrhœa in hospitals and institutions, and its rarity in the solitary baby at home, and why, when an affected baby is given water only for a time, it will tend to improve until milk-feeding is reintroduced. It may also explain why different organisms are found in different epidemics, and the success of sulphonamide treatment in some cases and

its failure in others. Additional evidence in support of this hypothesis is the absence of inflammation of the gut on necropsy.

In some epidemics completely breast-fed babies are said to have been attacked, but in some hospitals and maternity homes the night staff are in the habit of giving a bottle-feed to fractious babies, unless special instructions are given to the contrary.

No further case of neonatal diarrhoea has occurred in the West Middlesex County Hospital during these last three years. In this period a high incidence of breast-feeding—over 98%—has been maintained, largely owing to the efforts of Dr. Martha Dynski-Klein, the hospital pædiatrician.

SUMMARY

After the study of an epidemic of neonatal diarrhoea in a hospital, in which the only common factor seemed to be the use of pooled feeding-bottles and teats, two further epidemics were checked by the substitution of spoon-feeding for bottles.

It is suggested that infection may be spread by the heavy and increasing contamination of the film which forms in feeding-bottles in constant use.

The risks of bottle-feeding may be lessened by keeping a separate bottle and teats for each baby, or by sterilising the bottles after they have been thoroughly cleaned of film. The teats cannot be sterilised without destruction.

Bacteriological examination of feeding-bottles during an epidemic may lead to the identification of the causal organism.

I am indebted to the staff of the departments of obstetrics and pathology at the West Middlesex County Hospital, and to London Wholesale Dairies Ltd. for their coöperation.

Infectious Disease in England and Wales

WEEK ENDED DEC. 28

Notifications.—Smallpox, 0; scarlet fever, 943; whooping-cough, 1149; diphtheria, 210; paratyphoid, 6; typhoid, 3; measles (excluding rubella), 7038; pneumonia (primary or influenzal), 760; cerebrospinal fever, 38; poliomyelitis, 1; polioencephalitis, 0; encephalitis lethargica, 0; dysentery, 55; puerperal pyrexia, 90; ophthalmia neonatorum, 41. 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, 5 (1) from diphtheria, 5 (0) from measles, 4 (0) from whooping-cough, 104 (15) from diarrhoea and enteritis under two years, and 33 (5) from influenza. The figures in parentheses are those for London itself.

Bury reported the fatal case of an enteric fever. There were 15 deaths from diarrhoea and enteritis at Liverpool, 11 at Manchester, and 8 at Sheffield.

The number of stillbirths notified during the week was 220 (corresponding to a rate of 28 per thousand total births), including 22 in London.

WEEK ENDED DEC. 21

Amended Notifications.—Diphtheria, 243; measles, 7789; pneumonia (primary or influenzal), 699.

NEW YEAR HONOURS

BESIDES those mentioned in our last issue, the New Year honours list included the names of the following doctors:

O.B.E.

Major H. M. SEIN, M.R.C.P., I.M.S.

M.B.E.

Major R. M. MARQUIS, M.B. Edin., R.A.M.C.

ISAAC B. A. ADJAYE, M.R.C.S.

ALEXANDER S. FRATER, M.B.

CECIL V. JUMEAUX, L.M.S.

HUGH WANDS, M.B. Glasg.

Major J. H. COWDREY, N.Z.M.C.

A.F.C.

Squadron-Leader H. M. SCOTT BROWN, M.B. Durh., R.A.F.

In England Now

A Running Commentary by Peripatetic Correspondents

I WAS delighted to read that the morning the coal-mines passed into national ownership was marked by the hoisting at every pit-head in Britain of the National Coal Board's ensign—a rousing banner of royal blue with the device N.C.B. stitched on it in large white capitals. At Penallta, in Glamorgan, a brass band marched through the inky streets at 5.30 A.M. in full blast with *Salute the Happy Morn!* and the miners are now, it seems, to elect a Coal Beauty Queen in honour of the occasion.

When another appointed day breaks on us, I hope its advent will be marked with equal enthusiasm. A flag, of course, will be raised over every hospital, medical school, chemist's shop, mortuary, and doctor's house in the country. This ensign will have a field of scarlet and white diagonal stripes, like the barber's pole, bearing the initials of the National Health Board in white capitals. It will thus be readily distinguished from the yellow and white flag emblazoned with N.G.B. on top of the gas-works, the electric-blue standard marked N.E.B. on the power station, the smoky-grey banner lettered N.R.B. on the railway booking-office, others decorated with N.C.B. and N.S.B. flying from cotton mills and steel foundries, and the small pennants inscribed N.T.B. fluttering from the bonnets of every lorry bound farther than forty miles. I hope by then there will be a gigantic golden flag with N.B.E. on it waving its shadow on Threadneedle Street. And perhaps we shall all be provided with buttonholes bearing the initials of the National Registration Office stamped on a tiny flag of the country of our birth.

The hospital flag has great possibilities as a reminder of the new order of life. It might be raised each morning and lowered each sunset by the medical superintendent, before an audience of the medical and nursing staff and all ambulatory patients, standing at the salute. Perhaps it will occasionally be topped by the personal standard of the visiting regional chairman, which will be broken at the masthead, with bugle calls, on his arrival. Should the Minister himself drop in, a blue silk banner with "Welcome!" on it may be drawn from its locker by the yeoman of signals. Any doctor going so far as to demur at some ministry decision will be shamed into silence by a pained "Remember the flag, old man!" from his colleagues.

Before sunrise on that wonderful day brass bands will march through the all-night dancers in the hospital courtyards. What will they play? *There's a Good Time Coming? Ain't it Grand to be Bloomin' Well Dead? Rule Britannia? St. James's Infirmary Blues?* Anyway, then we can get down to the election of the Health Beauty Queen.

Angling in the hidden depths of my bearer Lakhmi's mind one day I brought to light an unexpected quota of diplomacy worthy of Solomon himself.

Once upon a time, he told me, he had under him a very lazy mali who could never get up in time to water the garden before sunrise. Instead he did the job never before nine o'clock and sometimes as late as ten o'clock, by which time, of course, the forenoon sun was beating fiercely on all the flowers, shrubs, and trees. Nor was this all; after watering he potted about, picking off dead flowers and leaves and performing no other more arduous tasks, until he retired for his noontide meal (the usual handful of chicken-feed), after which he had a long siesta. He would make his next appearance in the garden about four o'clock in the afternoon and give it the evening watering long before sundown, so that he could go home for his supper not later than seven o'clock and thereafter put in many more hours on his beloved charpoy.

Now, watering a garden in the full blaze of sunshine is very bad for the plants. The effect (which is ruin) has something to do with rapid evaporation of the water by the sun's rays. So finally his master could stand it no longer and called in conference Lakhmi, who was in charge of all his other bearers, cooks, plate-washers, bhists, and so on. Lakhmi asked his master to summon the mali, which was done forthwith. "O mali, at what hour do you have your tiffin?" asked Lakhmi. "At twelve o'clock, noon." "And your supper?" "At

seven o'clock." "Well, in future you will have your tiffin at three o'clock in the afternoon and your supper at midnight." Loud lamentations and perfervid protests from the mali. His digestion would be upset, his sleep ruined, his whole life thrown out of gear. "Then why," asked Lakhmi, "do you give the roses their breakfast at ten o'clock and their supper at four? You are upsetting their digestion, ruining their sleep, and throwing their whole life out of gear." "Shabash," exclaimed the master, "in future every time the mali is late with the morning watering he is to be kept here without food till 3 P.M., and every time he gives the second watering before sundown he is to be kept here without food till midnight. Enough, I have spoken."

* * *

To wake up one morning with diplopia was to see life literally from a new angle. To walk across the floor with the rugs and furniture tilted and twisted in all directions was to enter a new cubist world, almost a surrealist one. For a married woman to see two husbands anxiously gazing at her was to receive the impression that she had inadvertently committed bigamy. Our young maid gave the most bizarre effect. She stood in the doorway of my bedroom, with the dark passage behind her, and a pale oval face floated over her head, its chin resting on her vertex. I stared at her, fascinated, as at a new type of ghost or a medium complete with spirit head, forgetting to answer her query about the baker or what not. When at last I remarked that it was queer to see a head floating over her, she looked startled, as well she might, until I explained.

The remedy, of course, is to close one eye or put on spectacles with one lens blacked out; then the world suddenly becomes normal again. Sometimes one forgets, and, preparing to get out of bed, sees four Glastonbury slippers neatly ranged to receive as many feet. While pleased to see a plethora of slippers, one regrets the multiplicity of feet—too atavistic—then hastily shuts an eye.

My oculist opines that this is an ocular palsy due to the food-poisoning from which I have been suffering, and that I may recover "in time." No doubt he is right. And it was not even a nice ice-cream; it was so nasty that I only ate half of it.

* * *

My military career was not distinguished, but by the time I had reached the stage of demobilisation leave I had acquired a modest row of three campaign ribbons. During this period I took my son to a lecture given in a village hall by my cousin, a professional soldier, known to my boy as Uncle Harry. In full uniform and with three rows of ribbons and a general's cap Uncle Harry is certainly impressive. After a time I noticed my son's gaze wandering from Uncle Harry's chest to mine. Mine was the broader but relatively colourless. I knew what was coming. "Daddy, have you got a v.c.?" After a moment I decided that I hadn't and tried to pass it off gracefully. There was a short pause and then another inquiry. "Daddy, have you got a d.s.o.?" I was again forced to admit that by a curious oversight this had not come my way. He then said, "Look at Uncle Harry." I began to explain, rather feebly, that whereas Uncle Harry was a professional soldier I had merely been a doctor in the army, in fact taking a little time off from my ordinary work, but I could feel my prestige falling. At this moment an old lady in the crowd rose to inquire of the speaker, who was discussing the British troops in Austria, the present condition of the Albigensians. Seeing Uncle in difficulties I rose and asked leave to explain that the Albigensians were a sect who lived in the south of France in the 12th century and were suppressed with great violence. The speaker gracefully acknowledged my explanation and the old lady sat down. Since then my reputation has been restored, and I have even been asked my opinion on model railways.

* * *

"I've had ma wee grandson at the Eye Infirmary. He's only two and he's got a cataract. Just imagine, a wee thing like that wi' a cataract! Our own doctor said he *thought* it was a cataract but we had better see the specialist, and he says it *is* a cataract. I could hardly believe it, but I've looked it up in ma 'Home Doctor' book and the specialist is right enough."

Letters to the Editor

LAY OR MEDICAL ADMINISTRATION?

SIR,—Your correspondent's challenging article on hospital administration (Jan. 4, p. 36) calls for friendly and constructive criticism. To take matters of detail first, it should be recognised that many men and women find, *after* achieving a professional qualification, that their talents lie in administration. Those who have taken a medical degree ought not to be debarred on that account from an administrative career. The medical curriculum is a good foundation for postgraduate studies in administrative medicine, because it is both scientific and humanistic in its approach to life. It will become better still when the proposals of the Goodenough Committee are fully implemented.

Controversy about the relative efficiency of lay and medical administrators is sterile. Both are necessary, and each is an expert in his own sphere. Most people will agree that the title of "medical superintendent" is no longer appropriate for a modern hospital or group of hospitals. The parallel system which has proved its worth in many voluntary hospitals has won a well-deserved victory over the hierarchical scheme characteristic of the municipal services. In the regional organisation of the future the administrative division of each group will be just as important as the surgical, the medical, or the nursing division; and the medical administrator will work side by side with his lay colleague. The function of each will be to interpret the technical aspects of hospital administration to the lay committee, and there will be a progressive enlargement of the field in both lay and medical administration.

Your correspondent's comment on the doctor's rôle, however, raises matters of general principle on which the profession must make up its mind. To suggest that the status of the medical profession is, and ought to be, bound up with its function of giving advice savours of the cloister rather than the world of men. When we depart from this, we are no doubt involved in policy; but in point of fact a great many medical men and women are engaged in formulating and directing policy without becoming entangled, and there will be little hope for medicine unless they continue to do so. The awful threat that "policy means, in the last resort, politics" should disturb no-one but Mr. Faint-heart. Politics—the science and art of government, whether of a nation, a hospital, or a health service—is a fitting study for the wise in any profession. Great names of the past crowd to the mind—one need mention only Stokes, Acland, Osler, and Dawson; and many medical men and women of today are joining with their fellows in the other sciences to broaden, strengthen, and humanise both national and local administration. "It is of great importance to a country," said Sydney Smith nearly 150 years ago, "that there should be as many understandings as possible actively employed in it."

London.

J. M. MACKINTOSH.

THE B.M.A.'S DECISION

SIR,—To Dr. Cox I answer Yes! I am a democrat, and a practising one. I want every person in the land to be able to have all necessary treatment when sick, without carping care as to whether they can afford it; and I want us, the doctors, to serve under terms of service that will enable us to give our best skill to every one of our patients, and still have time for thought, discussion, and study, as well as time off for rest and refreshment of body and mind.

This should have been ready for the men and women in the Services when they came back. Posts with an income, in part assured, should have been there for all those young doctors to step into. They were not. Let the past be forgotten, and let us get on with the future. This is to settle down and discuss how these two things needed can best be secured. The time for negotiating is passed; the word infers some degree of compromise and disagreement. It is discussion that we want, with men and women sitting round tables thrashing out difficulties, of which there are many. Three months have been lost, and no-one knows where he is with regard to where he will be on April 1, 1948. Unless this is done

at once, the arrangements made, and the terms of service will be bad; and once made will be very difficult to change.

I have long maintained that these terms of service should be discussed before the rates of pay, by separate bodies or committees. For the rates of pay, which may need negotiations, I know no better group of men than the B.M.A., and therefore I think they should have this job, which would make them ineligible for the others. That is why I think that, in the end, it may be well that they have repudiated the duty entrusted to them. No! I do not know any organised body that can represent the whole profession, any more than the B.M.A. does; yet it does not even represent its own members in these matters, some of whom joined in order to attend the clinical meetings, many because they were persuaded to do so on qualification, and most because they want the *British Medical Journal* without trouble. But I do not want to run down the B.M.A. which has much good work before it in its proper sphere.

I am a disciple of Wilfred Trotter, and he said that "it is no longer possible to conceal the wholly unique importance of medicine for the very existence of social life." It is deplorable that just as the time has come for us to take up our proper position in regard to this, we should represent ourselves to the world at large as a reactionary selfish body of men and women, threatening to wreck the King's Government, refusing to work an Act that has become the law of the land, and so, instead of setting an example for high-minded altruism, putting before those of less good education than ourselves a bad example of how to serve the State. But Wilfred Trotter also wrote about the herd instinct, and as a result of this part of men's ancestry it is possible for a small number of persons working on the quiet behind closed doors to build up an organisation whereby they can impose their views upon the many, stifle all independence of thought, and then at the appropriate moment stampede the herd in the direction that they wish. This is the sort of thing that we want to avoid in the next stages of our social evolution. It is what has been happening with the B.M.A. and the medical profession since 1912; and it will be well if the repudiation of its self-assumed functions by the B.M.A. results in our throwing off this influence.

We can sum up by saying that the National Health Service is now the law of the land; and it is up to us, one and all, to make it a good one. No-one can do it for us.

London, S.E.1.

T. B. LAYTON.

SIR,—It is necessary to correct Mr. Layton's suggestion (Dec. 28) that the leaders of the B.M.A. have "herded" the will of the profession and influenced the plebiscite vote. The official B.M.A. communications received by me have always been restrained and non-directive, as have been the editorial articles appearing in the *British Medical Journal* on the subject of the recent Act. The correspondence published in the journal accurately reflects the opinions freely expressed at well-attended divisional meetings of practitioners.

The *Times* has applied the word "emotional" to B.M.A. policy. If the adjective is accurate it must be applied to the general body of practitioners, and I would point out that situations which conflict heavily with any individual's conviction of right and wrong will usually produce emotional response.

Stamford, Lincs.

E. C. TILL.

EFFECTIVE AGENT AGAINST SCORPIONS

SIR,—For some years workers have been looking for an easily synthesised chemical to replace the expensive and scanty pyrethrum and derris, which up till now have been the most effective agents against the scorpion. We have investigated the suitability of 'A.L. 63' (D.D.T. 10%) and a new insecticide 'Gammexane' (the gamma isomer of benzene hexachloride), both of which are manufactured by Imperial Chemical Industries Ltd. The effect of A.L. 63 on scorpions was found to be very weak.

Gammexane, on the other hand, has proved extremely effective. It is a free-flowing powder with excellent dusting properties, harmless to man and the higher animals under normal conditions of use; experiments

on rats, rabbits, and guineapigs have established the lethal dose at 20 g. per kg. body-weight, or about 3 lb. for an average man. The dust can be safely used indoors. Scorpions exposed to 1-4 g. of powder containing only 1% gammexane in talc are paralysed within 30-60 minutes. Greater concentrations kill the scorpions more rapidly, but the interval before death is, of course, unimportant so long as the scorpion is paralysed. Gammexane is, we submit, the chemical of choice in combating scorpions.

Faculty of Agriculture,
Fouad I University, Cairo.

H. S. SOLIMAN

A. H. MOHAMED.

VARICOSE VEINS

SIR,—In the journals of this country I can find no records regarding the prevalence of varicose veins; there have been but few references to the influence of hormones as "varicosity factors" in its aetiology; and little has been said about the relative absence of specialist treatment for the varicose patient in many parts of the country.

Recently I drew attention to the fact that during the war years diseases of veins caused the highest surgical admission-rate to our E.M.S. hospitals, 10% of all admissions being due to this cause¹; and most of these patients remained in hospital for more than three weeks.² These figures are so remarkable that I approached Dr. Cecil Roberts, who has sent me the results of the examination of 10,000 candidates for the Post Office service between 1937 and 1939:

Age	Male candidates			Female candidates		
	No. examined	With varicose veins		No. examined	With varicose veins	
		No.	Per-centage		No.	Per-centage
Under 25 ..	1839	5	0.27	4785	55	1.14
25-34 ..	2143	37	1.72	117	9	7.68
35-44 ..	1160	37	3.18	66	11	16.6
45 and over	56	3	5.35	32	9	28.12
Total ..	5198	82	1.57	5000	84	1.68

Here there is self-selection, since both men and women knowing that they suffer from varices would probably not offer themselves for this employment. We may take it therefore that the incidence among the general public is very much higher. These figures show that more than a quarter of the women of 45 and over suffer from varicose veins—a very big increase over that in women between 35 and 44. There is no doubt that the menopause brings to light many cases.

Further information is required about the influence of hormones on varices. The fact that varices tend to swell at puberty, during menstruation, in early pregnancy, and at the menopause is accepted. During the premenstrual phase every woman is in a state of pseudo-pregnancy, and one may regard the menstrual flow as a miscarriage of the unfertilised ovum. The enlargement of varices in the premenstrual phase and in the early days of pregnancy may therefore be accounted for by the same hormonal influence. The action of progesterone on the plain muscle of the uterus is recognised, and its action on veins is probably similar.

Varicose veins may become severe in the early days of a pregnancy, before mechanical pressure or pelvic congestion has occurred. By contrast, it should be noted how little effect a large fibroid or an ovarian cyst may have on a varix, in spite of the pelvic pressure. Recently, I saw a young girl in the prepuberty stage with severe varices; six months later periods commenced and the varices retrogressed in a sensational manner.

Dr. Marizita, of New York, has been treating the varices of pregnancy with alpha-cestradiol dipropionate

1. *Brit. med. J.* 1946, ii, 680.

2. On the State of the Public Health during Six Years of War. H.M. Stationery Office. 1946.

('Di-ovocilin'),² and claims remarkable improvements in most of his cases.

We need more careful statistical surveys of this prevalent condition. Without further figures we cannot analyse the many factors which together cause the vein to follow its wayward path to varicosity.

London, W.1.

R. ROWDEN FOOTE.

DETECTION OF EARLY PULMONARY TUBERCULOSIS

SIR,—To one who has watched, during the past twenty years, the progress of efforts to detect pulmonary tuberculosis at an early stage it seems regrettable that, with the introduction of miniature-film mass radiography, the merits of serial screening have almost sunk into oblivion. I do not know of any published comparative studies on the efficiency of the two methods; but the average figure (0.3%) of active cases needing immediate treatment obtained by screening (fluoroscopy), quoted by Clark et al.¹ and presented in earlier statistics, is not much below that obtained by miniature-film radiography (0.4%).¹ If optimal adaptation of the eye is secured by a preparatory period of at least 15 min. (a prerequisite which must be rigorously adhered to), and if the working capacity of the retina is not overtaxed (flagging may be expected after 100 min.), inflammatory and caseous lesions as well as retrogressive (fibrous or calcareous) changes are easily discernible on both the miniature film and the screen. For the detection of isolated thin-walled cavities, screening, with its possibilities for turning and tilting the patient, may in some cases provide the better chance, and the same is true for small foci on a level with the clavicle, but on the whole the miniature film must be considered more efficient.

An experienced tuberculosis worker who spends two or three hours a week in serial screening can deal in a year with about 2500 persons—not a large proportion of a district community but still, in view of the limitations of mass radiography, a valuable contribution to the programme of discovering new cases.

Most patients who come to the sanatorium as a result of mass radiography, in my experience, have had lesions of dubious activity or fresh inflammatory consolidations. We have been told² that mass radiography reveals pulmonary tuberculosis in its earliest recognisable form and at a stage seldom discovered in ordinary routine work. The clearly defined or more diffuse shadow of the "early infiltration" may well be regarded as the starting-point of the progressive phase, and the importance of its demonstration in the precavernous phase can hardly be overrated. But according to prevailing opinion it represents a secondary development, superimposed on the pre-existing foci of the nodular seeding, which is, as a rule, the initial lesion of the postprimary epoch and remains symptomless till the localising inflammatory exacerbation ("early infiltration") appears. Even the full-size film is not always conclusive about the fresh granulomatous spread; only when the nodules have reached a certain density will they produce the distinct tenuous "mottling." On screening, a slight ill-defined opacity may raise suspicion, in which case liberal use should be made of the full-size film. I have seen, within five years, among sanatorium admissions due to mass radiography, only 2 cases of this "earliest recognisable" form of postprimary tuberculosis—i.e., the seeding not yet aggravated by inflammatory or destructive changes. Figures showing to what extent it can be recognised on miniature films would be welcome. It is reported that development of progressive lung disease has been observed immediately after the patient had passed a mass-radiography test with negative result; probably a delicate non-inflammatory spread had escaped detection on the miniature film.

If the case-finding methods comprised under the term "routine dispensary work" are fully used; if persons exposed to massive infection are followed up longer than a mere few years after exposure and especially during

the critical period between the ages of 15 and 25 years; and if hidden sources of infection are searched for in every way, including serial tuberculin-testing, the truly initial stages of postprimary lung tuberculosis may be detected not less often by the district tuberculosis officer than by the mass-radiography unit. Of course, if routine work contents itself with examining applicants who have developed symptoms, the early stages will not be discovered.

These remarks are not designed to raise opposition to the further development of mass radiography, the high value of which for finding new cases is not disputed. Serial screening should be regarded as a useful and by no means obsolete substitute so long as there are not sufficient miniature-film units available. To the question whether mass radiography is superior to the routine dispensary methods in tracing the early stages of lung tuberculosis the last word has not yet been spoken. Needless to say, the question is a theoretical one; the two approaches to the task must be combined.

Westmorland Sanatorium, Meathop,
Grange-over-Sands.

E. FRAENKEL.

SINUS ARRHYTHMIA IN THE YOUNG

SIR,—Recently I have made a point of looking for sinus arrhythmia at all routine examinations of children, with the result that in an unselected series of children and young people (including 647 boys between 12 and 17 years of age) I have found signs of what I take to be sinus arrhythmia, on deep breathing, in every case. Is this condition, usually described as one of frequent occurrence, present in all children? A physician with whom I discussed this finding expressed no surprise, but I doubt if it is general knowledge.

What I find constantly present is a rhythmical variation in heart action correlated with respiratory phase and affecting: (1) the heart-rate (maximal at the end of inspiration, and minimal at the end of expiration); and (2) the loudness of the first sound and sharpness of the second sound (both minimal at the end of inspiration, and maximal at the end of expiration). The few murmurs encountered varied correspondingly in audibility.

All of these changes were most readily evident in nervous children; in placid older boys they were largely confined to the end-points of respiratory excursion.

Middlesbrough.

JOHN CAHILL.

A MORAL PROBLEM

SIR,—Mr. Kenneth Mellanby has added two more "moral problems" to the one originally discussed in your annotation, and it is important to realise that these problems, though related, are distinct.

On the original issue of whether useful results obtained by criminal experiments should be published or destroyed, his conclusions seem essentially correct. Those taking the opposite view appear to subscribe to an oversimplified moral theory—namely, that an action must be either 100% good or 100% bad. Actually, any action produces many results, some good and others bad, in varying degrees. Undoubtedly the harm done by such experiments outweighs any possible good that might accrue, and they should not be performed. But they have in fact already been performed, and it is impossible to undo them. If their results are capable of being put to useful purposes, and we destroy them, we are ensuring that they have produced nothing but evil. If we publish and use them, then at least some good will have followed. No-one would suggest that information on traumatic brain lesions should be suppressed because the persons developing them have usually been the victims of attempted murder or war wounds, or would imagine that publication of such information is scientific justification for murder or war.

We do not yet know what useful results, if any, the Nazi scientists have produced. But let us suppose that they have found the perfect typhus vaccine, or a really effective cure for pulmonary tuberculosis. Do Mr. Layton, Dr. Nelson-Jones, or the writer of your annotation seriously suggest that such results should be destroyed? And if so, will they explain how "our duty to our neighbour" is fulfilled by allowing him to die of diseases it is in our power to prevent? Even if the actual results are only of minor importance, the moral problem is exactly the same.

3. *Med. Rec.* July, 1946.

1. Clark, K. C., Hart, P. d'A., Kerley, P., Thompson, B. C. *Spec. Rep. Ser. med. Res. Coun., Lond. no. 251, 1945.*
2. Davies, T. W., Davies, M. *Brit. J. Tuberc.* 1945, 39, 23.

A new point raised by Mr. Mellanby is whether "serious research-workers" who have performed harmful experiments on human beings without their consent are guilty of a crime. He appears to doubt whether they are guilty, and in an interview given before his departure for Germany is represented as deprecating Russian action in trying and condemning certain eminent German scientists for this offence. But the answer to this is simple. The actions performed are admittedly criminal in any system of national or international law, and scientists are as subject to the law as other persons; they can claim no personal immunity on the grounds that their crimes are committed for disinterested motives.

Mr. Mellanby's reference to the use of condemned murderers as volunteer experimental subjects, though interesting, is scarcely relevant. This practice is or was legal in certain States of the U.S.A. (Goldberger's classical experiments on pellagra are an example); and many might be prepared to argue that it should be made legal here on the same conditions—namely, that the condemned man be allowed entire freedom of choice in the matter, and the death penalty remitted if they survive. There appears to be no evidence that any such choice was allowed to the subjects of the Nazi experiments.

DENIS HERBERT

Hon. Secretary, Medical Sciences Committee, A.Sc.W.

ACUTE INFECTIOUS LYMPHOCYTOSIS

SIR,—In connexion with Dr. Steigman's paper (Dec. 28) we should like to report the following case.

The patient, a girl of 3 years, was admitted, under the care of Dr. H. H. Chodak-Gregory, on Nov. 22, solely on account of failure to gain weight during the previous twelve months. The home conditions were not good, but the child had been given iron for anaemia and vitamin C for some months as an outpatient of a London hospital.

Clinically there were few signs—one or two enlarged cervical glands and a rather bulky liver, but no splenomegaly. Routine blood examination revealed a white-cell count of 79,200 per c.mm., with 62.5% small, and 17% large, lymphocytes. The character of the blood-cells did not suggest either leukaemia (there were only 1% lymphoblasts) or infectious mononucleosis. There was no evidence of whooping-cough and no fever.

The white-cell count has gradually fallen to 16,450 per c.mm., and the proportions of polymorphonuclear leucocytes and lymphocytes are now approximately normal.

We think that this must be a case of acute infectious lymphocytosis.

Three Counties Emergency Hospital,
Arlesey, Beds.

E. V. FOYLE

R. J. REYNOLDS.

TREATMENT OF TUBERCULOSIS

SIR,—Dr. Houghton and Dr. Corrigan (Dec. 14) have shown that in certain patients amphetamine relieves apprehension—a useful contribution. It now appears that other forms of treatment which they agree are of great benefit have also extreme disadvantages; according to Dr. Brailsford (Dec. 28) these are so great as to make it advisable to treat the patients at home. That apprehensive patients are to be found among those with tuberculosis is clear, but it is going too far to suggest that a modern sanatorium is a place of universal anxiety and alarm. If it be so, it is a strange reflection on the power of the physician to suggest confidence and to raise and maintain morale. More than chemistry is needed then.

Many types of temperament and reaction are found among tuberculous patients. Only today one patient in this hospital said that he had spent such a good Christmas that he hoped he would be able to have thoracoplasty done and prolong his stay to enjoy another. This statement was no more a joke than the apprehensions of others; but it does not warrant a theory of general indifference to mutilation. I find that the majority of patients here accept the need for active interference without emotional upset and weigh sensibly the considerations which so seriously affect their future.

This is not to deny that the physical effects of tuberculosis, with its serious mortality, may be depressing, and that the social and economic distress may be severe.

It is surprising that cheerfulness keeps breaking in and that wards of tuberculous patients who are in hospital for long periods contain so many who face their difficulties with understanding and balanced optimism.

Vere Pearson and Morland first helped us to understand the psychology of the tuberculous, and the former's recently published autobiography answers effectively Dr. Brailsford's question as to the place and value of sanatorium treatment. Does Dr. Brailsford think that the anxieties and stresses of the patient are absent at home? They are often ætiological factors in the illness. For many patients a spell of sanatorium treatment puts into better perspective their distorted view of their own mental and physical state. "Long rest with mental serenity" is often easier to obtain than in the home. "Think of the housewife trying to rest where she can hear every footstep . . . of the business man equally fretted by business or family disquiets" (Pearson).

Let us judge our patients according to their individual needs; some may be better at home, but many will profit by a period in a suitable sanatorium. Let us also take a reasonable view of the extent of apprehension and alarm in sanatorium patients.

Clare Hall County Hospital,
South Mimms, Barnet.

F. A. H. SIMMONDS.

POSTOPERATIVE CHESTS

SIR,—The importance of the "freedom of the bed" is emphasised in your leading article of Dec. 21. Surely this argues in favour of local or spinal as opposed to ether inhalation anaesthesia? With a local or spinal anaesthetic freedom is from the first complete, except for reflex inhibition from the operation area, and immobility of the legs with spinal anaesthesia. The patient coming round from ether narcosis, on the other hand, undergoes a varying period of complete decubitus, with associated reduction of pulmonary ventilation.

Workshop.

M. HAYDON-BAILLIE.

IMPENDING DEATH UNDER ANÆSTHESIA

SIR,—I was very interested in Mr. Hamilton Bailey's article last week, for I had a similar case some five years ago.

This was a woman of 60 for whom I did a partial gastrectomy for gastric ulcer, using spinal anaesthesia (light 'Duracaine'). I had got about halfway through the operation when she stopped breathing and shortly afterwards the heart ceased beating. Rhythmical pressure on the chest failing to produce any response, massage of the heart through the diaphragm was begun, and adrenaline was injected into the heart. We did not time the duration of stoppage of the heart from the beginning, but there was no return of cardiac contractions for 5 minutes from the moment when timing was started, and I should guess this as fully 2 minutes after the heart-beats had been noticed as absent. Weak and irregular beats then began and gradually returned to strong contractions; the operation was eventually finished without further incident. The patient was mentally confused for some forty-eight hours, but eventually made a complete recovery from every point of view.

This was an interesting though alarming experience, but the real interest lay in the method I used to restart the respiratory movements. As there was no response to the usual methods and my hand was in the region of the œsophageal opening in the diaphragm I dragged on this muscle with my forefinger placed in the opening, and immediately it was obvious that the lungs were being well-inflated at each stroke. Alternately drawing down the diaphragm and relaxing it kept up artificial respiration most effectively, and with so little expenditure of muscular effort on my part that it could have been kept going for hours with ease had it been necessary; in about 10 minutes spontaneous respirations were established.

On two occasions since (without cardiac stoppage) I have found the same manœuvre act most efficiently, and in my opinion it is much the most effective way of restarting breathing in any case in which the abdomen is open. I have not seen or heard of this method being used before, though it is an obvious thing to do, and it is certainly most efficient.

Leeds.

E. R. FLINT.

Obituary

OLE CHIEVITZ

M.D. COPENHAGEN

Prof. Ole Chievitz, senior surgeon of the Finsen Institute, Copenhagen, who died on Dec. 27 after a short illness, was known not only as a brilliant doctor but as a leader in his country's resistance to German domination.

Born in 1883, the son of J. H. Chievitz, the anatomist, he came of a family closely linked with the best cultural traditions of Denmark. He qualified at Copenhagen in 1909, and was for many years Rovsing's first assistant. He was appointed to the Finsen Institute in 1921, and in the years that followed became surgeon at the Radium Institute, lecturer in surgery at the University of Copenhagen, and, when war threatened, adviser in surgery to the Civil Air Defence. In the 1918 and again in the 1939 Russo-Finnish wars he commanded Danish red-cross ambulances in Finland. He was chairman of the Danish Surgical Society from 1934 to 1936, and was awarded honorary degrees by the universities of Copenhagen and Oslo.

The invasion of Denmark in April, 1940, was followed by a period of utter despair. It seemed hopeless to resist the ruthless invaders who were overrunning one country after another. But Chievitz soon made his decision: "I have chosen. I am going my way, whether many or few are coming." The downhearted and bewildered were decisively influenced by this positive lead from a man who was loved and respected. His contempt for the Nazis and his faith in their enemies was expressed without fear or restraint; in the days of the London blitz he would end his lectures in surgery with, "Tell your friends that the British are going to win the war—that's what Chievitz says."

Soon he was actively engaged in illegal work. In 1942 he was arrested as a member of the staff of the important clandestine newspaper *Frit Danmark*; he was gaoled for four months, then sentenced to eight months' imprisonment. The Germans, still arrogant, released him as a harmless idealist. This "harmless idealist" happened to be organiser of the Allied intelligence service in his country and a leader of the Special Forces—parachutists sent from Britain.

Chievitz's imprisonment caused thousands to join the resistance. After release he resumed his ordinary hospital work and joined the Council of Liberation. The council, which was the underground government, had twelve members, of whom three were professors of the medical faculty at Copenhagen—Chievitz and Husfeldt, both surgeons, and Fog, the neurologist. In July, 1944, Chievitz himself had to go underground. He suffered all the hardships and privations of a hunted man, and was involved in close gunfights with the Gestapo. By his nom-de-guerre, "Jens," he was known to many British airmen who were rescued and returned to Britain by his organisations. With untiring energy he continued to collect and transmit invaluable intelligence to the Allies until, on May 5, 1945, Denmark was liberated; his task completed, he resigned his commissions.

As a surgeon Chievitz had a comprehensive knowledge and experience, and an enthusiastic but critical turn of mind. Though writing little, he influenced developments in the surgical treatment of cancer, tuberculosis, and endocrine disorders. He was loved by his patients, students, and assistants: to have been Chievitz's assistant was in itself a high qualification.

His understanding of his fellow-men was broad and forgiving. His wit was legendary; though usually kindly, it could be a lash. To those who came for help or advice he gave without stint; the despairing he consoled. The daily problems in hospital, the minor tactical questions in the fight—these would cause him doubt and anxiety. But in moments of decision he struck like lightning. Heedless of danger, and claiming nothing for himself, he carried out his task. This ever-burning heart was the true greatness of Chievitz, who took his stand where there seemed to be no hope.

K. H. K.

Appointments

- BARNES, JOSEPHINE, D.M. Oxfr., F.R.C.S., M.R.C.P., M.R.C.O.G.: asst. gynaecological surgeon, Elizabeth Garrett Anderson Hospital, London.
- BREWER, ANGUS, M.R.C.S.: clinical pathologist, Hampstead General and North-East London Hospital.
- CRAWFORD, F. J. H., B.Sc., M.D. Lpool., D.P.H.: M.O.H. and school M.O., Radnorshire.
- HENDERSON, WALTER, M.B. Edin., F.R.C.P.E.: paediatrician, York County Hospital, York City General Hospital, and York Maternity Hospital.
- LIPSCOMB, J. F., M.B. Sydney, F.R.C.S.: otolaryngologist, Kent county council.
- MULVEIN, MARGARET, M.B. Glasg.: asst. school M.O., North Riding education committee.
- NICOL, C. G. M., M.B. Lond., D.P.H.: M.O.H. and school M.O., Barnsley.
- SHERNE, JACOB, M.B. Leeds, F.R.C.S., D.O.M.S.: ophthalmic surgeon, Leeds Public Dispensary and Hospital.
- WALLACE, H. J., M.D. Camb., M.R.C.P.: dermatologist, Royal Surrey County Hospital.
- Albert Dock Hospital, London:**
FREEMAN, HARRY, F.R.C.S.: senior asst. surgeon.
KELLY, P. M., B.CHIR. Camb., F.R.C.S.: second asst. surgeon.
- National Temperance Hospital, London:**
FREEMAN, HARRY, F.R.C.S.: asst. surgeon.
HOLLINS, A. S., O.B.E., M.B. Camb., M.R.C.P.: asst. physician.
- County Borough of Croydon:**
BEVAN-JONES, JOHN, M.D. Lond., M.R.C.P., D.P.H.: physician and paediatrician.
CLIFF, A. F., F.R.C.S., M.R.C.O.G.: senior M.O. for obstetrics and gynaecology.
- Kingston County Hospital, Surrey:**
BOGGOON, R. H., M.S. Lond., F.R.C.S.: consulting surgeon.
BROWN, A., M.B. Aberd., D.A.: anaesthetist.
CALVERLEY, MARIE H., M.B. Leeds, M.R.C.O.G.: obstetric registrar.
CUNNINGHAM, A. A., B.Sc., M.D. Dubl., M.R.C.P., D.P.H.: medical superintendent and physician.
DOWE, J. B., M.B. Sydney, D.L.O.: asst. ear, nose, and throat surgeon.
FRANKLIN, R. H., M.B. Lond., F.R.C.S.: consulting surgeon.
HIRD, G. F., M.R.C.S.: casualty registrar.
HOLLINGS, G. B., M.D. Lond., M.R.C.P.: asst. physician.
LEASK, L. R., M.B. Lond., F.R.C.S.: asst. surgeon.
MCKENZIE, W. S., M.B. Camb., F.R.C.S.: consulting ear, nose, and throat surgeon.
MIMPRISS, T. W., M.S. Lond., F.R.C.S.: consulting genito-urinary surgeon.
MURPHY, W. R., L.R.C.P.I., D.A.: anaesthetic registrar.
STENHOUSE, A. B., M.R.C.S., M.R.C.O.G.: asst. obstetrician.
- Manchester Royal Infirmary:**
HANSEN, R. E. A. S., M.B. Camb.: medical chief asst. to medical neurological unit.
YOUNG, N. A. J., M.B. Manc., F.R.C.S.E.: asst. aural surgeon.
- Manchester University Centre for Study of Chronic Rheumatism, Devonshire Hospital, Buxton:**
BARBER, H. S., M.D. Dubl., F.R.C.P.I.: part-time clinical director.
SUTCLIFFE, G. R. M., M.B. Durh.: senior M.O. as asst. to director.
- Salisbury General Infirmary, Wilts:**
BURT-WHITE, HAROLD, M.D. Lond., F.R.C.S., M.R.C.O.G.: gynaecologist.
DUFF, ALEXANDER, M.D. Glasg., F.R.C.S.E.: surgeon.
GORDON, J. C., M.B. Camb.: obstetrician.
GUBBIN, J. H., M.B. Lond.: physician.
HALL, A. S., M.D. Lpool.: dermatologist.
LONGRIDGE, R. G. M., M.R.C.P.: physician.
MARTIN-JONES, J. D., M.D. Camb., D.O.M.S.: ophthalmic surgeon.
SIMPSON, A. D. H., M.R.C.S., D.A.: anaesthetist.
TAYLOR-YOUNG, H. S., F.R.C.S.: surgeon.
WAKEMAN, A. C. R., B.Sc., PH.D. Birm., M.R.C.S., D.M.R.E.: radiologist.
- Colonial Service:**
ARCHIBALD, H. M., M.B.E., M.B. Glasg.: M.O., Nigeria.
BARBOUR, DIANA E., M.B. Lond.: lady M.O., Malaya.
BOLBOURNE, M. J., M.B.: M.O., Gold Coast.
CARSON, H. M., M.B.: M.O., Gold Coast.
FAIRBAIRN, HAROLD, M.D. Glasg., D.T.M. & H.: M.O. i/c of trypanosomiasis research station, Tinde, Tanganyika.
FURNESS, J. E., M.B. Lond.: M.O., Nigeria.
GRIFFITHS, H. W. C., M.B.: M.O., Northern Rhodesia.
HOLROYD, L. H., M.B. Glasg.: M.O., Northern Rhodesia.
ISAAC, R. H., M.R.C.S.: M.O., Malaya.
JOSEPH, W. T. B.M.: M.O. Leeward Islands.
McPHERSON, H. J., M.B. Edin.: M.O., Malaya.
MANNING, J. D., M.R.C.S.: pathologist, Nigeria.
MURPHY, J. C. V., M.B. Lpool.: M.O., Gold Coast.
O'DRISCOLL, G. C. V., M.B. Dubl.: M.O., Nigeria.
RUDYARD, FREDERICK, M.B. Sheff.: M.O. grade II, British Solomon Islands.
SASEGBON, A. O., M.B. Dubl.: M.O., Nigeria.
SMART, G. E., M.B. Calcutta, F.R.F.P.S., D.P.H., D.T.M. & H.: M.O., Hong-Kong.
SMITH, E. B., M.B.: M.O., Nyasaland.
STEPHENS, P. R., B.Sc., M.B. Birm.: M.O., Northern Rhodesia.
VANROSSON, W. F., L.R.C.P.E.: M.O., grade C, Trinidad.
- Examining Factory Surgeons:**
BROWN, W. R., L.R.C.P.E.: Greenock.
CLEMENTI, K. J.: Windermere.
URQUHART, D. A., M.B. Edin.: Shrewsbury.

Notes and News

A FRENCH VIEW OF HEALTH CENTRES

BRITAIN is not the only country where medical reform is in the air. Dr. Marc Nédélec¹ has a plan for France which includes the promotion of group practice and of health centres. For urban areas he recommends one centre, staffed by eight doctors, for every 10,000-15,000 population. He would divide the working day into three parts: from 7 A.M. to 12.30 P.M.; from 12.30 to 6 P.M.; and from 6 to 11 P.M. On three days a week (Mondays, Wednesdays, and Fridays) three of the doctors, X, Y, and Z, would see patients at the centre, one at each of these times; on these days they would make only urgent visits, reserving their routine calls for the other three working days. Three more doctors, A, B, and C, would see patients on Tuesdays, Thursdays, and Saturdays, and visit on the intervening days. The two remaining members of the team would be juniors who would do night duty, retaining charge of patients seen at emergency calls; in the daytime they would assist the other six. The centre's ancillary staff would comprise two secretaries and a resident secretary-attendant for night duty.

For rural areas Dr. Nédélec proposes units of two doctors. In the country the work would be divided into morning consultations, afternoon visits, and night duty. On the basis that the visits would take longer than the consultations, he suggests that the doctor responsible for the consultations should also be on call at night; but the two doctors would alternate in their duties. For auxiliary services he recommends a midwife, with a small maternity home open to all who wish to enter it, a secretary-attendant, one or two chauffeurs, and a rural social worker.

Dr. Nédélec emphasises the need for the freest possible choice of doctors and admits that his scheme may need revision in the light of this requirement. He anticipates, with the adoption of a comprehensive plan, a rapprochement between those in preventive and those in clinical medicine. Relations between these two groups seem to have been no more genial in France than in Britain.

University of Cambridge

The following degrees were conferred on Dec. 14:

M.D.—R. I. S. Bayliss (by proxy).
M.B., B.Chir.—C. W. A. Pullan, A. S. Wigfield (by proxy);
 H. S. Eyre.
M.B.—A. F. Alsop (by proxy).

University of Liverpool

The following were successful in recent examinations:

M.Ch., Orth.—J. A. P. Cameron, J. P. Heron, C. Hollenberg, D. M. Jones, W. Lamont, R. Roaf, G. D. Rowley, E. W. Stout, A. K. Talwalkar, F. R. Tucker.
D.P.H.—L. Findlay (with distinction), J. Norris.
Certificate in Public Health.—E. M. Calvey, G. S. Clouston, Margaret L. Magee, W. H. Patridge, Constance M. Rampling.
D.T.M. & H.—*W. H. H. Andrews, F. H. Budden, E. M. Craggs, D. Gall, F. E. D. Griffiths, Margaret E. Holness, W. T. Joseph, S. G. Loh, A. McKelvie, J. M. S. Manson, P. R. Mohan, S. Newman, P. Pattison, J. N. Robertson, H. B. L. Russell, S. D. Sawyer, D. Scott, Alice Speight, Margot M. Stern, *R. H. Strudwick.
 * Recommended for the Warrington Yorke medal.
 † Recommended for the Milne medal.

Order of St. John of Jerusalem

The King has sanctioned the following promotions in, and appointments to, this order:

As Knights.—Surgeon Vice-Admiral Henry St. Clair Colson, C.B.E., M.B., Air Marshal Sir Andrew Grant, K.B.E., C.B., M.B., R.N.S.

As Commanders.—Robert Barr MacGregor, C.M.G., M.B., Major-General Philip Henry Mitchiner, C.B., C.B.E., M.D., F.R.C.S., Frederick William Morton Palmer, M.D., Colonel Allan Robert Stanley Vickers, M.B., Frances Christina Burrell McKay, M.B.

As Associate Commander.—Major Shiyavax Ardeshir Paymaster, L.M.S., I.M.S.

As Officers.—Lieut.-Colonel Colin Macphail Forbes, M.B. (since deceased), Robert Nelson, M.B., John Cecil Rankin Buchanan, M.D., Brigadier Cuthbert Scales, M.C., M.B., Major John Henry Plumridge, R.A.M.C., Brigadier Douglas Gordon Choyne, C.B.E., M.C., M.D., Richard Davies Jones, M.R.C.S., Ralph James Walker, M.B., Joseph John Mangion, M.D., Colonel Richard Irvine Boston, M.D., late R.A.M.C., Michael Colin Lavin, M.B., Henry Burton Pare, M.B., Colonel Cornelius Godfrey Lodewyk van Dyk, M.B., Lieut.-Colonel Jordan Constantine John, O.B.E., M.B., I.M.S., Colonel George Gratton Lees Stening, M.B.

As Associate Officers.—Simon Joseph Hoffman, M.R.C.S., Dr. Prabhar Kumar Chatterjee.

Royal College of Surgeons of England

A course of lectures on ophthalmology will be delivered between Jan. 20 and 27 by Mr. George Black, Dr. Dorothy Campbell, Dr. O. M. Duthie, Mr. John Foster, Dr. I. M. Michaelson, Mr. O. Gayer Morgan, Mr. Michael Oldfield, and Dr. G. I. Scott. The lectures will be given at 3.45 and 5 P.M., except on Jan. 23, when they will be given at 3.45 and 6.15 P.M.

Royal Faculty of Physicians and Surgeons of Glasgow

A lecture on Surgery of the Thymus Gland will be delivered by Mr. Geoffrey Keynes in the hall of the faculty, 242, St. Vincent Street, Glasgow, on Wednesday, Jan. 15, at 4 P.M.

Harveian Society of London

The society's annual general meeting will be held at 26, Portland Place, W.1, on Wednesday, Jan. 15, at 8.15 P.M. Brigadier H. L. Glyn Hughes will deliver a presidential address on Normandy to the Baltic from a Medical Angle.

Royal Medical Foundation of Epsom College

Applications are invited for a Challice annuity (present value £32 per annum), which is to be awarded to a medical practitioner who, on account of age, has been compelled to retire from professional work. Forms of application can be obtained from the secretary's office, Epsom College, Surrey.

Fellowships at Crichton Royal

Fellowships in psychiatry at the Crichton Royal Hospital, Dumfries, for 1947, have been awarded to Dr. Denis Martin, Dr. Eric Harrison, and Dr. Charles Lacey.

Association of Clinical Pathologists

The 37th scientific meeting of the association will be held at the National Hospital, Queen Square, London, W.C.1, on Friday and Saturday, Jan. 24 and 25.

International Society of Surgery

The society's 12th congress will be held in London between Sept. 14 and 20, under the presidency of Dr. Léopold Mayer (Brussels). The chairman of the English committee is Prof. G. Grey Turner, and the congress secretary is Mr. H. W. S. Wright, 9, Weymouth Street, London, W.1.

National Association of Maternity and Child Welfare Centres

The association is to hold a conference on parentcraft and homecraft at Friends House, Euston Road, London, N.W.1, on Thursday, Jan. 30. The chairman at the morning session, starting at 10.30, will be Miss Myra Curtis; in the afternoon Sir Wilson Jameson will be chairman. Inquiries should be addressed to Miss M. R. Lovelock, 5, Tavistock Place, W.C.1.

St. George's Hospital, London

Dr. S. D. Elek has been appointed teacher in bacteriology at the medical school.

King Edward's Hospital Fund for London

The Fund has received a further instalment of £75,000 from the Nuffield Trust for the Special Areas. Altogether £575,000 has now been received, the first £250,000 of which was, at Lord Nuffield's request, allocated to Guy's Hospital.

Fellowship at a London Hospital

Messrs. Boots Ltd., the chemists, have endowed for seven years a research fellowship of £1000 per annum at St. Mary's Hospital. Dr. R. E. B. Hudson has been elected the first fellow.

Specimens of War Injuries

The National Collection of Pathological Specimens of War Injuries, organised by the Medical Research Council, has been transferred to the Examination Hall, 8, Queen Square, London, W.C.1. (Tel.: Terminus 3270.)

Surgeon's Gift to Benevolent Association

Mr. Joseph Cuning, F.R.C.S., and Mrs. Cuning, M.B., have presented their estate, Broome Park, Betchworth, Surrey, to the Electrical Industries Benevolent Association as a memorial to their son, James Erskine Cuning, who was killed in a raid over Essen in 1941. The property will be used as a home for old people.

"British Journal of Cancer"

As mentioned in a leading article on Jan. 4, a new *British Journal of Cancer* will be the official organ of the British Empire Cancer Campaign. It will appear quarterly from next March. The annual subscription is 2 guineas, and the publishers are Messrs. H. K. Lewis and Co. Ltd., 136, Gower Street, London, W.C.1.

1. Essai sur la Réforme de la Médecine. Paris: René Julliard. Pp. 230. Fr. 48.

Tour of Czechoslovakia

The Czechoslovak authorities are extending a hospitable welcome to a party of British doctors who will make a tour of the chief spas of that country, on the lines of a similar and very successful one that was carried out between the two wars. On this occasion the party will leave London on March 20, returning on April 8. Only a limited number of doctors can be taken. Further details may be obtained from Mr. Henry Baerlein, Bath Club, 41, Brook Street, London, W.1.

"Medical Bookman"

We have received a copy of the first number of this new periodical, which is to be published monthly by Messrs. Harvey and Blythe, 6, Hanover Square, London, W.1 (price 6d.). The publication hopes "to bring the reader into easy and interesting contact with the medical publications of the whole world."

Retirement of Colonel Harrison

Colonel L. W. Harrison, C.B., D.S.O., F.R.C.P.E., whose retirement from the staff of the Ministry of Health is announced, has been associated with the control of venereal diseases in England and Wales for nearly half a century. He did pioneer work in devising aids to diagnosis, and played a leading part in establishing the efficacy of "606." Early in the first world war he commanded a venereal-disease military hospital in France, and later he was adviser to the War Office. In 1919 he was appointed adviser to the Ministry of Health, and from then until 1936 he was director of the V.D. department at St. Thomas's Hospital. Last year he was presented by the American Social Hygiene Association with the William Freeman Snow medal—an annual award for "distinguished service to humanity."

Deaths in the United States

During 1945 there were 1,401,719 deaths in the United States; this was fewer than in either of the two preceding years. Heart disease accounted for 30.3%, cancer for 12.7%, and vascular lesions of the brain for 9.2%. Accidental deaths numbered 95,918, motor-vehicle accidents accounting for 28,076 (compared with 24,282 in 1944). Deaths from infectious diseases were fewer than in 1944, with record low figures for pneumonia and influenza. Tuberculosis caused 52,916 deaths—fewer than in any previous year.

Return to Practice

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

Dr. T. G. REAH, 4, Spring Grove, Harrogate.
Dr. N. LLOYD RUSBY, 135, Harley Street, W.1.

Births, Marriages, and Deaths**BIRTHS**

BARNES.—On Dec. 30, at Andover, the wife of Dr. J. M. Barnes—a daughter.
ELLIOT-SMITH.—On Dec. 26, at Oxford, the wife of Mr. Arthur Elliot-Smith, F.R.C.S.—a son.
ELMES.—On Dec. 25, at Lagos, Nigeria, the wife of Dr. B. G. T. Elmes, Colonial Medical Service—a son.
FINNEGAN.—On Jan. 2, at Purley, the wife of Dr. D. P. Finnegan—a son.
FLEMING.—On Dec. 26, at Bath, the wife of Dr. R. J. K. Fleming—a daughter.
HERFORD.—On Dec. 26, at Bristol, the wife of Dr. M. E. M. Herford—a daughter.
HESTER.—On Jan. 2, at St. Albans, the wife of Mr. K. H. C. Hester, F.R.C.S.—a daughter.
NAIRN.—On Jan. 5, at Liverpool, the wife of Dr. R. C. Nairn—a daughter.
PEILL.—On Dec. 23, at Whitechurch, Salop, the wife of Wing-Commander Ralph Peill, R.A.F.—a daughter.
POWELL.—On Dec. 26, at Lagos, Nigeria, the wife of Dr. H. J. Powell—a daughter.
WOOD.—On Dec. 27, in London, the wife of Dr. Paul Wood—a son.

MARRIAGES

BUCKLER—HAMILTON.—On Jan. 4, at Weybridge, Frederick Ridsdale Buckler, M.R.C.S., to Iris May Hamilton.
ECKSTEIN—SAWARD.—On Dec. 28, in London, Friedrich Max Peter Eckstein, M.B., to Beatrice Saward.

DEATHS

GIBSON.—On Dec. 23, at Haslemere, Surrey, Edwin Arthur Gibson, M.D. Glasg., aged 76.
SCOTT.—On Dec. 31, at Staggsden, Arthur Bodley Scott, M.R.C.S., aged 81.
TRAILL.—On Jan. 1, at Bagshot, Cecil Grahame Traill, M.B. Edin., aged 86.
WILKINSON.—On Dec. 28, at Newton Abbot, George Tandy Wilkinson, L.R.C.P.E., L.R.C.S.I., aged 87.

Arrangements in Scotland for Yellow-fever Inoculation

The Department of Health for Scotland have arranged for centres in Edinburgh, Glasgow, and Aberdeen where those intending to visit yellow-fever areas may obtain free inoculation. Additional centres are to be established at Dundee and Inverness.

Reorganisation of Dover Hospitals

By an arrangement which came into effect on Jan. 1, the Royal Victoria Hospital, Dover, is dealing with surgical conditions, while the county hospital is accepting medical cases. The agreement, which is thought to be the first of its kind, includes the pooling of resources, so that medical, nursing, and medical-auxiliary staffs will be interchangeable.

Rutin Tablets

Rutin, a flavonol glucoside isolated from the flowers and leaves of buckwheat, has given promising results in the treatment of capillary fragility associated with hypertension (see *Lancet*, 1946, ii, 16). Messrs. Allen and Hanburys Ltd. have now placed on the market tablets containing 20 mg. of rutin, issued in bottles of 100 tablets. They note that rutin is less effective if vitamin-C deficiency is present, so care should be taken to see that the patient has an adequate intake of that vitamin.

Diary of the Week

JAN. 12 TO 18

Monday, 13th

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1
8 P.M. Pathological meeting.

Tuesday, 14th

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5 P.M. *Experimental Medicine and Therapeutics*. Dr. J. C. Waterlow: Nutritional Liver Disease in West Indian Babies. Dr. H. Holler, Dr. S. E. Dicker: Renal and Hepatic Lesions in Relation to Dietary Deficiencies.
5.30 P.M. *Psychiatry*. Dr. James Tanner: Morphological Level of the Personality.
EDINBURGH POSTGRADUATE BOARD FOR MEDICINE
5 P.M. (Royal Infirmary) Prof. F. A. E. Crew, F.R.S.: Death in the Blue Book.

Wednesday, 15th

ROYAL SANITARY INSTITUTE, 90, Buckingham Palace Road, S.W.1
2.30 P.M. Prof. R. H. Parry: Health Centres.
BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck Street, W.1
5 P.M. Prof. W. V. Mayneord: Applications of Atomic Physics in Medicine. (Third of six lectures.)
HARVEIAN SOCIETY OF LONDON
8.15 P.M. (26, Portland Place, W.1.) Brigadier H. L. Glyn Hughes: Normandy to the Baltic from a Medical Angle. (Presidential address.)
ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW, 242, St. Vincent Street
4 P.M. Mr. Geoffrey Keynes: Surgery of the Thymus Gland.

Thursday, 16th

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
5 P.M. Mr. R. H. Franklin: Congenital Atresia of the Oesophagus. (Hunterian lecture.)
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. Mr. R. C. Muirhead Thomson, D.S.C.: Recent Knowledge about Malaria Vectors in West Africa and their Control.
BRITISH INSTITUTE OF RADIOLOGY
8 P.M. Mr. T. Holmes Sellors, Dr. D. Evan Bedford, Dr. J. Duncan White: Cardiac Radiology.
SOCIALIST MEDICAL ASSOCIATION
7.30 P.M. (296, Vauxhall Bridge Road, S.W.1.) Dr. J. N. Morris: Social Aspects of Juvenile Rheumatism.

Friday, 17th

ROYAL SOCIETY OF MEDICINE
8 P.M. *Obstetrics and Gynaecology*. Mr. J. D. S. Flew, Prof. H. N. Lloyd, Dr. Peter Denham, Mr. G. F. Gibberd: Management of the Normal Third-stage Labour and of the Haemorrhage Therein.
8 P.M. *Radiology*. Dr. Stanley Nowell: Tomography. Dr. A. Elkeles: Disseminated Ossified Nodules in the Lungs associated with Mitral Stenosis.
FACULTY OF RADIOLOGISTS
2.30 P.M. (Royal College of Surgeons.) *Diagnosis section*. Mr. J. J. Mason Brown: Arterial Injuries (with reference to Arteriography in the Diagnosis).
LONDON CHEST HOSPITAL, Victoria Park, E.2
5 P.M. Dr. K. F. W. Hinson: Pathology of Solitary Tuberculous Foci in Lung.

Saturday, 18th

LONDON COUNCIL OF SOCIAL SERVICE
10.30 A.M. (Bonnington Hotel, Southampton Row, W.C.1.) Conference: Special Forms of Catering for the Aged, Invalids, and Infirm.

THE OUTLOOK FOR PHYSIOLOGY*

C. LOVATT EVANS

D.Sc. Lond., LL.D. (Hon.) Birm., F.R.C.P., F.R.S.

JODRELL PROFESSOR OF PHYSIOLOGY AT UNIVERSITY COLLEGE,
LONDON

DURING the last half-century the exact sciences have shown an amazing growth; there is every reason to suppose that their active growth will continue, though perhaps the advances cannot be expected to maintain during the next fifty years the dramatic and revolutionary quality which has marked the progress of these sciences during the first half-century. A feature of the second half of the century that is widely expected to be without any precedent in the history of mankind, however, is the application of the results of research in the pure sciences to the needs of man, and the ultimate fulfilment of the promise of a world of leisure and plenty. Parenthetically, no biologist can be blind, though it is a convention to pretend to be, to the obstacles in the way of a realisation of these hopes—the prerequisite changes in the structure of society and even in the nature of man himself—for history shows that the pains of war, like those of labour, are soon forgotten under the compelling force of primal instinct.

The biological sciences have also progressed in an astonishing manner and at ever-increasing speed. Their progress has in no small measure been a consequence of the advances in the exact sciences, on which they largely depend for techniques and for conceptions in which to express their results. The striking features in the developments of the last fifty years have been, on the one hand, the bewildering increase in detail and complexity in every subject, and, on the other hand, the growing recognition of the unity of all knowledge. The frontiers between the exact sciences, and between them and philosophy, have become shadowy, and the same holds good for the biological sciences. Science is one and indivisible, and physiology, as one branch of it, has been involved in the general trend.

The biological sciences possess, to a greater degree than the more fundamental sciences, qualities of growth, differentiation, and plasticity. This is not surprising in view of the properties of the living material which it is their purpose to study, and which preclude them from making arbitrary simplification of their problems. The exact sciences grow in detail, and therefore in bulk, as they get older; but, despite some vagueness at their boundaries and some degree of subdivision internally, each of the main subjects exhibits a uniform discipline and a centripetal coherence. Thus, despite its growth, chemistry remains one science. The biological sciences show rather a centrifugal tendency, a proneness to divide by fission to form new subjects, or at least to give new names to old branches.

PROGRESS OF PHYSIOLOGY IN THE LAST FIFTY
YEARS

Let us glance at physiology of fifty years ago and try to contrast it with its present state. During the 17th and 18th centuries this country had made to the medical sciences contributions quite out of proportion to the size of its population, and many of these discoveries fell within the province now called physiology. In the 19th century we fell far behind the Continent in these studies, and only began to regain ground during its last three decades. At the turn of the present century things were improving rapidly; there were in this country some distinguished physiologists, then ageing, who had been instrumental in the recent revival and were greatly

to influence the future development of physiology. Foremost among them were Sir John Burdon Sanderson, of Oxford, and Sir Michael Foster, of Cambridge, both of them former pupils of Sharpey at University College, London, and both original members of the Physiological Society, founded in 1876. Foster, a prime mover in this, had also been largely instrumental in starting the *Journal of Physiology* in 1878, and the International Congress of Physiology in 1889; this was due to hold its fifth meeting at Turin in 1901. Of middle age and still actively at work, there were, for example, Schafer, recently appointed at Edinburgh, Gaskell, J. S. Haldane, Gotch, Halliburton, Yeo, Langley, and Brodie. At earlier years of their careers were the intense generation comprising Dale, J. Barcroft, Bayliss, Pembrey, Leonard Hill, Sherrington, Starling, Hopkins, Thomas Lewis, then very young, and many others.

A glance at the papers published in Great Britain at the turn of the century shows interesting features of comparison with one for the years 1938-39. In 1900 the bulk of the papers contributed came from Cambridge, Oxford, and University College, London; by 1938-39 the contributions from these sources had fallen from about 70% to about 40% of the whole, but those from special research institutes now took about 12% and communications from abroad rose from 15% to 30%. Other features revealed by this rough analysis are the great increase in the total number of publications, and the rise in the number of contributions from the provincial schools. The scale of absolute all-round increase in publication can be seen from the numbers of papers published from the physiological laboratories of University College and issued at intervals in the form of "Collected Papers"; for example, vol. XII, 1900-02, contained 30 papers, whereas vol. XXXIV, 1937-39, listed 97. The increase in output is still more striking in the case of the provincial schools.

The reasons for the uneven distribution of activity in 1900 are various. Though for the preceding fifty years physiology had been pursued actively in several Continental countries, especially Germany and France, it was, in 1900, only about a quarter of a century since the first separate chair of physiology had been founded in England. This was in 1874, at University College, London, the first occupant being Burdon Sanderson. Michael Foster occupied the first chair in Cambridge in 1883; the Waynflete chair at Oxford was also created in 1883, and its first occupant was Burdon Sanderson. These three places, University College, London, and the universities of Oxford and Cambridge, thus took the lead in founding modern British physiology. In Scotland physiology was well established. The provincial schools in England, however, lagged very far behind as regards space, equipment, and personnel, and it was a solitary and uphill task for any of the few whole-time physiologists to attempt to engage in research work in physiology in any provincial university or medical school in those days. Nevertheless Sherrington did classical work at Liverpool.

One factor which accelerated the development of physiology was the antivivisection activities which led to the Royal Commission of 1875 on experimentation on living animals. The influence was for good, inasmuch as it drew physiologists together and so led to the foundation of the Physiological Society in 1876, and because the Act of Parliament (39 & 40 Vict. Cap. 77) to which it gave rise has since served to regulate and protect experimentation and to make not only the perpetration of cruelty but also the systematic persecution of investigators less easy.

The position is vastly encouraging now compared with what it was in the opening years of the century; every provincial school has laboratories, some of them large and

* Abridged from the second Bertram Louis Abrahams lecture delivered at the Royal College of Physicians of London on July 16, 1946.

finely equipped, in all of which work is actively in progress; there are well-equipped institutes for pure research, and several commercial undertakings have also set up efficient laboratories for routine and applied research work.

Another contrast between the publications in physiology in 1900 and now is an increase in the average number of authors to a paper. The change, which is world-wide, is due to the increasing complexity of all investigation, with the result that most types of modern investigation are beyond the powers of a single worker. In a measure also it is an expression of the fashion for "schools" of research, in which a leader expresses his talents through the medium of his pupils, and often for their benefit. The practice, in this country, of placing authors' names in alphabetical order certainly prevents a display of permutations and combinations of names in multiple publications, but it has the drawback that for purposes of bibliographical reference all but the first author, when there are more than two, are relegated to the anonymity of "et al."

The type of work done has shown a great change too in the half-century now nearing its close. By 1900 the tide of experimental work on muscle and nerve had for the time being spent itself, and most of the work in hand involved acute experiments on mammals, or else was of a biochemical nature; there was but little done on the human subject. It was a phase, somewhat belated as compared with the Continent, of exploration of the fundamental phenomena of mammalian physiology. In this phase British physiology soon took a place second to none in the world and held it for several decades. Flexner (1912) wrote: "the medical sciences are cultivated in Germany for their own sake. . . . With the single exception of British physiology, the medical sciences in Great Britain and France, on the other hand, have remained in an instrumental relation to medicine and surgery. . . . The history of British physiology proves conclusively that what is best for a subject is best for all the varied purposes which directly or indirectly it serves."

At the opening of the century the most highly developed branches of British physiology concerned muscle-nerve physiology, circulation, and histology. The pathfinding studies of Sherrington on the nervous system, Haldane on respiration, Barcroft on the blood, Bayliss on general physiology, and Starling on experimental physiology were in their early beginning; a host of other major subjects, including later, and within the last 30 years, the whole topics of the vitamins, the endocrines, and reproduction, were to follow.

BIOCHEMISTRY

The growth of biochemistry was also deferred, largely because an insufficient number of first-class chemists took interest in the unpromising messes, incapable of crystallisation or distillation, with which the physiological chemist then had to deal. So physiologists at the opening of the century did the best they could with them. Biochemistry and physiology are, in my opinion, so closely linked as to be incapable, without damage to both, of complete separation from one another. But the essentially chemical background of modern biochemistry has led to its being set up in separate departments in many of our schools. This separation has proved all to the good in the advancement of biochemical research; but, in so far as it might lead to the loss of interest in important branches of their subject by physiologists, regrettable gaps in the teaching of it may become possible. We can only try to hold the subjects together from both sides as best we can.

The importance of applications of chemistry to physiology is shown by a consideration of its contributions to the advances in the whole outlook of physiology in the

present century. At its outset the nature of carbohydrates and proteins was being worked out; intermediary metabolism was scarcely touched; the words "hormone" and "vitamin" were not yet coined; tissue oxidations were almost a sealed book; practically nothing was known of the functions of the "ductless glands," the physiology of reproduction, or the formation of urine; micro-methods of analysis had not yet been introduced; from the chemical aspect, the phenomena of muscular contraction, now an intricate and still largely unsolved puzzle, were a clean slate; the known enzymes were few and of simple action; the whole subject of physical chemistry, which was to find such extensive applications in biological inquiry, was in its earliest beginnings, and even organic chemistry had barely reached a stage of technique at which it could begin to be a reliable help in the attack on biological problems.

BIOPHYSICS

It now seems that, just as physiology budded off from anatomy and then itself threw off, as an offshoot, the subject of biochemistry, so now it is preparing to develop another new branch called biophysics. Moreover, the fear has been expressed that, what with the handing over to specialists, each "maintaining with no little heat his various opinions," of such branches as histology, biochemistry, general physiology, clinical science, nutrition, experimental pathology, pharmacology, endocrinology, and so forth, any further branching will imperil the parent trunk. My view is that this fear represents a parochial view and that the ultimate parent trunk is knowledge. Perhaps some hard pruning of old wood might encourage still more vigorous new growth, especially if combined with judicious "disbudding." Though biophysics is now an active growing-point, it is too early to say whether it will earn for itself a separate place as a subject for undergraduate study. When it has produced such fruit as biochemistry has done, we shall know that it has earned such a place. In the meantime it should be nourished and shielded from the east wind; the results of its research work will be valuable in any case.

Sometimes the biochemical and biophysical approaches to a problem lead apparently to different conclusions. Take, for instance, the important question of neuromuscular or interneuronal transmission. The chemical line of inquiry leads to the opinion that transmission of excitability depends on the liberation of acetylcholine, which is in due course destroyed by choline esterase. Biophysical study, on the other hand, leads to the conclusion that the phenomenon is mainly electrical, and that, in neuromuscular transmission, for instance, the potential changes constituting the nervous impulse lead to the establishment of end-plate potentials which, by their magnitude, timing, and location, are adequate to stimulate the adjoining muscular tissue. It is not improbable, however, that the divergence between these two points of view is less in reality than in appearance, and I fully believe it will ultimately be shown that physical and chemical changes are the common accompaniments of a fundamental physico-chemical change, the nature of which is yet to be revealed.

In 1870 Bert wrote: "Physiology must defend itself from two dangers: absorption by zoology and absorption by medicine, the second the most to be feared." Now, if physiology is in danger of absorption, it is by physics and chemistry. This is no doubt its ultimate destiny, but that lies very far ahead.

TEACHING OF PHYSIOLOGY

So far as the instruction of medical students is concerned, I feel no qualm whatever that physiology will long maintain the place it has won as a focal point in preclinical education. Class teaching of physiology,

especially the practical work, has undergone a revolution in our five decades. At the start of the century, histology occupied a place of first importance; experimental work consisted almost entirely of frog nerve-muscle physiology; physiological chemistry of urine-testing and spotting of dietary components. So far as I know, no mammalian experiments were ever demonstrated, still less performed, by the student. Human physiology was represented, if at all, by exercises with simple clinical instruments, such as the sphygmograph, ophthalmoscope, or laryngoscope. In lectures, histology, elementary embryology, muscle and nerve, and circulation occupied nearly all the time. The divorce from clinical interests was almost complete.

How different is the picture now. Half a century ago the phenomena studied were either evident to the unaided senses, or could be made so by the use of the most simple and unequivocal devices; now they are often beyond the range of the unaided senses and require complex tools and specialist knowledge for their study. If the insignia of the physiologist were then the microscope, smoked drum, inductorium, and a bottle of ammonium sulphate, today they might be the electron microscope, cathode-ray tube, photo-electric cell, manometric apparatus, and Geiger counter. If his small units were then the millimetre, milligram, and second, and his results communicable in simple words or numbers, today his units are often a thousandth of those, and his results expressed in logarithmic scales and nomograms, or in conventional statistical form.

In lectures much attention is still given to blood, circulation, and respiration, and relatively little to nerve-muscle; the nervous system, diet and digestion, metabolism, the endocrines, and reproduction take increasingly important places; applications to clinical subjects, daily life, industry, &c., are emphasised, and clinical demonstrations are arranged. Histology and embryology are taught by specialists, and often in connexion with anatomy. Adequate courses in organic chemistry and biochemistry are held; talkie films are on the way as a regular feature of instruction; and mammalian and human experiments performed by the students occupy a conspicuous place. Emphasis is laid on the nature of scientific evidence, including that derived from statistical inquiry, and on the significance of the controlled experiment.

What can one expect for the future? The rapid expansion of biochemistry and the gathering speed of development of biophysics lead us to ask what will be the relation of these to physiology, and the position of physiology itself, if they develop along lines which take them far from common ground with physiology. This, I think, is almost certain to happen eventually, and in the interests of progress we should not deplore such an unfolding. What might be deplorable would be the possible effects of such developments on physiology as the study of function, particularly in relation to medical education. It is not so much the partitioning of physiology into biochemistry and biophysics that is to be feared, as the dwindling of the outlook on integrated function which might ensue from such a partitioning.

It may be that in the very distant future some broad generalisations will emerge, as a result of which all physiological phenomena will be capable of expression in a few mathematical formulæ and chemical equations; but such a final crystallisation could only emerge from a mother-liquor supersaturated with exceedingly abundant and intricate detail. In the protracted meantime it seems to be essential that the study of normal function be held together in the form of a subject which, whatever its name, will be a lineal descendant of the physiology of today. The right solution in these circumstances will be the introduction of a centripetal tendency to counteract the centrifugal one. If bio-

chemistry, and ultimately biophysics, move away beyond the ambit of physiological interest, it will be necessary to bring back such portions of those subjects as may by that time be essential to, and within the comprehension of, the physiologists, or which have ancillary value to him as tools. This will conveniently take the form of establishing, within physiological departments, sections which will deal with biochemistry and biophysics in relation to the study of function as understood by physiologists. This has already been done in some places; but I think that a close collaboration between departments of physiology, biochemistry, and biophysics (when research units in that subject arise) is at present practicable and is the better solution. An essential condition, however, is propinquity.

As regards teaching, I see, in the future, adequate laboratories for practical instruction in all our medical schools, some as yet uncreated; selected classes of future research-workers receiving a broad training based on a sound foundation of exact science; a regular supply of healthy animals for experimental work; specially planned laboratories for instruction and research in human physiology; new techniques of biophysics to enable a student in a few hours to grasp and confirm the conclusions of a lifetime of earlier researches, just as easily as today he can in a few experiments confirm the findings which it took the immortal Harvey years of patient toil to reach. I see, in the very near future, the teacher aided by talkie films, in colour, prepared by experts; frequent interchanges of lecturers between schools in this and other countries; symposia and seminar teaching largely substituted for lectures; and young investigators and selected students given facilities to study abroad.

Another aspect of physiological teaching which will, I believe, become more important in the future is the dissemination of physiological knowledge among the general public. The need for it has been brought home to us by the war, especially in relation to diet. Whoever has heard the cheery common-sense talks by the "Radio Doctor" must have realised the value of such knowledge and its potential appeal to a wide circle. Writers from Huxley (1854) to Krogh (1939) have emphasised the desirability of instruction of the public in the knowledge of their own bodies. In Denmark such instruction is general in schools, and I should like to see it become general here.

RESEARCH

In the research field, we may expect important advances in the applications of physical chemistry to the study of the dynamic equilibria in cells and tissue fluids. Biochemical and biophysical analysis of the mechanisms of tissue activity should also add greatly to our knowledge; much has already been done by way of unravelling the phenomena concerned in muscular contraction and in the transmission of excitatory states; but, complex as the findings now appear to be, it cannot be supposed that anything more than a scratching of the surface has been achieved, or that investigation of other processes, such as secretion, would not yield an equally rich harvest.

We can expect a good deal of experimental work on man, and this of three types. First, a continuation of work already begun on a considerable front, which, briefly, amounts to the re-examination, using human subjects, of the salient facts of classical physiology worked out on other species, mostly under anaesthetics; results already reached have, to a surprising extent, vindicated the findings of classical physiology. Some of this work can be carried out on normal subjects without much inconvenience; for example, the circulation in skin and muscle can be studied, and many aspects of the physiology of circulation, respiration, digestion, and urine formation investigated. For some of the work we are

indebted to the restless ingenuity of surgeons, who have severed most of the nerves, fistulated the hollow viscera, cannulated the tubes, and removed in part or whole, intentionally or otherwise, most of the organs of the body. For example, it has been shown in man that, after section of both vagi, reflex gastric secretion ceases—a classical finding of Pavlov on dogs. No-one can have listened to Penfield's recent Ferrier lecture without appreciating the fruitfulness of "combined" surgical operations on man.

Secondly, these techniques and this confirmed knowledge can be applied to the experimental study of disease, and this I take to be one of the objectives of clinical science. For example, it has been shown that in the anæmias the blood volume is reduced and the cardiac output increased.

Thirdly, there is the important study of the ecological factors concerned with response of man to altered conditions in the external environment—such conditions as climate, temperature, humidity, clothing, diet, pressure and composition of the air, acceleration, mechanical commotion, radiations, and so on. Many problems in this category became urgent during the war, but there is a vast territory still waiting for exploration.

In these and other ways yet to be disclosed physiologists of the future, as in the past, like true *physiologi* will faithfully follow our great master's exhortation "to search and study out the secrets of Nature by way of Experiment."

All this sounds very optimistic and confident; but there is another side to the picture, and it should be mentioned, though it involves problems that confront not only physiology but also all science and many other aspects of modern life. They are summarised in the words information, coöperation, man-power, and cost.

The position regarding information is that there were before the war 36,000 periodicals devoted to scientific subjects on the "World List" and some 25,000 not listed; of the 750,000 papers appearing in the 15,000 best-known journals "only about one-third are referred to in any one of the 300 leading journals providing abstracts or indexed" (Hutton 1946). These figures speak for themselves.

PLANNING

As regards scientific man-power, the situation has been made clear by the Barlow report to the Lord President of the Council. Briefly, this country will by 1955 probably have a minimal deficit of 26,000 scientists, unless the rate of production by the universities can be speeded up in some unforeseeable way. This problem and those of cost and coöperation hang very much together.

The question arises whether the best way of dealing with a situation which verges on the chaotic might not be by some form of deliberate planning. It is an era of planning—not the first in our history. It is at the moment merely very self-conscious and impatient. But remember the advice given by Shakespeare:

"... Much more, in this great work,
Which is, almost, to pluck a kingdom down
And set another up, should we survey
The plot of situation and the model,
Consent upon a sure foundation,
Question surveyors, know our own estate,
How able such a work to undergo,
To weigh against his opposite; or else
We fortify in paper and in figures,
Using the names of men instead of men,
Like one that draws the model of a house
Beyond his power to build it; who, half through,
Gives o'er and leaves his part-created cost
A naked subject to the weeping clouds
And waste for churlish winter's tyranny."

—Henry IV, part 2, Act 1, Scene 3.

The resounding success of planned researches in connexion with the war effort has given rise to a belief that planning of scientific research in general would be followed by a similar acceleration in the development of scientific knowledge. I believe such a view to be incompatible with the spirit of science; none the less, the danger may be imminent—it has been given a name. "Augustus," wrote Gibbon (1776), "was sensible that mankind is governed by names: nor was he deceived in his expectation that the senate and people would submit to slavery, provided they were respectfully assured that they still enjoyed their ancient freedom." The National Health Service Act has very little to say about medical research; but the sentence to the effect that the Minister will be empowered to conduct research may be more pregnant than it looks.

In war we utilise, in every sense, capital reserves accumulated in peace, and the general theoretical background of science provides the intellectual capital for war-time applications of science. These exploitations, though yielding good dividends, were of the nature of development and did not constitute research at all in the sense of creation of fresh intellectual capital. The speed and precision with which these dividends were obtained was sometimes as surprising as their magnitude, and the types of war problems into which even physiology entered were many and varied. Though science was excluded from mention in the British victory parade of June 8, 1946, it is common knowledge that applications of science became matters of major importance in almost every aspect of war activity. But the success, even in these purely applied fields, was the result of a vast effort; often it was reached through the good will and initiative of individuals and teams, and rather in spite of than because of the administrative machinery. Ultimately all research is either a highly individual matter or one for small and closely knit teams of workers.

How then can the State fulfil its duty without having encouragement take the form of a directive? Any scientific man would answer that we need laboratories, equipment, and time; these it is the duty of the State to provide; give us these tools and we will, and we alone can, finish the job. We do need broad planning to give us these things. Since only we know what we want, we need strong and direct representation on such planning committees and not too much filtration through "proper channels." We do *not* need anyone in an official position to tell us on what problems we may, or must, and, more especially, on what we may not, or must not, work. Committees of experts, however, can be very helpful to individual workers or teams by facilitating contacts, as well as by providing ways and means. But all research in university institutions should be entirely free from bureaucratic control in any shape or form.

One of the best ways of encouraging research work would be by the provision of research funds on a more liberal scale to all universities. Each scientific department should have a fund of its own, proportionate to its size and activity, for provision of facilities for its workers according to their needs.

Bush (1945), director of the Office of Scientific Research and Development, advances the conclusions of the committees which deliberated on a programme for post-war scientific research. "New frontiers of the mind are before us," President Roosevelt had written, "and, if they are pioneered with the same vision, boldness, and drive with which we have waged this war, we can create a fuller and more fruitful employment and a fuller and more fruitful life." Here was a tempting invitation to planners. The report has much praise for our Medical Research Council and University Grants Committee, which it regards as pioneers in the State support of research, and says: "Between World War I and World War II, the United States overtook the other nations

in medical research, and forged ahead to a position of world leadership. If this leadership is to be maintained, some form of Government financial aid to the medical schools will be necessary." The report makes recommendations for an administration not unlike our efforts at State support, but even more far-reaching. The committee also expressly states—and I could not agree more—"that this aid, if misdirected, may do serious harm," and "The agency should not attempt to dominate or regiment medical research, but should function by creating greater opportunities and more freedom for investigation, and by aiding in coöperative efforts. It should not attempt to influence the selection of personnel, the conditions of tenure, the salary level, or other internal affairs of the institutions to which it gives aid. . . . The establishment of lifetime research professorships or of protracted research fellowships at the expense of Federal funds is considered unwise." Exceptional individuals should be supported from general research funds or through a grant in aid. The agency also "should avoid even the semblance of scientific authority. . . . Its integrative and catalytic efforts are to be carried out by recommendation and invitation rather than by direction."

In an editorial in the *New York Times*, under the title of "The Lesson of the Bomb," it was claimed that to leave scientists quite free in their work was a policy of *laissez-faire*. In a masterly rejoinder Dr. Warren Weaver made the position of pure science quite clear: "Even if some way were found to force scientists to work within such a system, every evidence of scientific history and scientific fact emphasises that the procedure would fail. . . . The humdrum following up of ideas and methods already at hand—this can be charted out and scheduled by men of moderate ability. But one can no more produce fundamental and truly original work by means of some grand over-all planning scheme for science than one can produce great sonnets by hiring poets by the hour. . . . The important gaps in science are the ones we do not see and cannot foresee."

MAN-POWER

Regarding man-power, the procuring of trained workers in physiology is a matter of fundamental importance in this country. The supply of physiologists is far below the demand. First, for the reason, common to the whole scientific community, that the war, as regards the production of potential scientific workers no less than as regards the creation of fresh intellectual capital, has not merely not advanced science, but also has greatly hindered it by the creation of a ten-year gap in the production of potential workers. Secondly, because the ranks of physiological research-workers are decimated by the rival claims of teaching and of cognate subjects of investigation, such as industrial applications, clinical research, pathology, &c. There is at present less provision for the production of workers than there is for the direct furtherance of research by grants in aid. The problem naturally divides into two parts: the selection of individuals, and their subsequent preliminary training. The very best type of worker commonly selects himself, or is fairly easily picked out by his teachers. All he needs is guidance, and what sort of guidance should he be given? First of all, he must understand that physiological research work nearly always involves the use of methods of work and thought characteristic of other sciences, particularly physics and chemistry. He should therefore have such a knowledge of one or both of these subjects as to enable him at least to speak to chemists or physicists in their own language, and he should get it early. Here we meet with the real dilemma of medical education: that we are likely in the interests of the few to overload the curriculum for the many. The only solution is two kinds of medical education: one mainly fundamental for

the benefit of such future research-workers, and one more directly vocational, but by no means sketchy, for the bulk who will be concerned with the urgent problems of treatment of the sick. For the more vocational group the course should be much as at present, but of a definitely more vocational character in the premedical and pre-clinical years. Then, if any of them wish, after all, to specialise in, say, physiology, an extra year could be spent at this subject before passing on to the clinical years. Though this last is the line we at present encourage the promising medical students to follow, it must be admitted that all too often their basal knowledge of chemistry and physics is not adequate for the needs of such a course.

The alternative, since a really complete course of training would be so long, is for physiologists and biochemists to be trained on the science side only and to stop short of any clinical training. Though it cannot be gainsaid that research-workers so trained have contributed greatly to our science, I should deem it a misfortune for physiology and for medical education in general if most of those engaged in the teaching of medical students had not themselves obtained a qualification in medicine.

ENVOI

Physiology, a science in its own right, and a main pillar in the edifice of scientific medicine, has undergone great changes in the past few decades; it has become vast and complex. It has been largely responsible for the birth of modern biochemistry and is now taking its share in developing biophysics. It has returned to a closer connexion with medicine and the phenomena of daily life, and there is a need for education of the public in elementary physiology. British physiology has a past of which we can be proud, and a future to which we can look with confidence. Its present state, in common with that of other sciences, is one of flux and perplexity; with proper material support its own fecundity will ensure that it will go on beyond these difficulties and from strength to strength. Its development cannot be planned or directed. The functional outlook which it represents, by whatever titles it may be called, will long continue to be an integrative influence in medical education and an inspiration to research.

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" . . . On 30 June, 1946, when it was already beginning to decrease, the professional personnel of UNRRA numbered 1363, of which 229 were locally recruited in the countries where they worked. The international staff was recruited from 35 different countries. The countries supplying the largest number for international service were the United States (263), the United Kingdom (206), Belgium (104), France (101), the Netherlands (82), Denmark (53), Eire (39), Canada (39), and Poland (34). The Chief Medical Officers, too, were from many different countries. Among the professional personnel, 568 were physicians, 584 nurses, 60 sanitary engineers, and 40 dentists. . . . The largest individual country mission was that to China, where UNRRA had 90 physicians and 95 others of the health professions. Headquarters professional staff was small: 14 in Washington and 15 in London. All but 4 nurses were in the field.

" International teamwork in health dates back many years. Unlike most other cultural work it has not been hurt but strengthened by the cataclysms of the two world wars. It has now come of age and disasters of war are no longer needed for incentive."—*UNRRA Epidemiological Information Bulletin*, Washington, Dec. 15, 1946, p. 971.

THE SUPRASPINATUS SYNDROME

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Codman¹ pointed out that lesions of the supraspinatus tendon and subacromial bursa were the commonest cause of pain in the shoulder.

These lesions and the typical syndrome they produce still pass unrecognised far too often. This paper is based on 89 cases collected in just over three years. In 31 of them the subacromial bursa and supraspinatus tendon were exposed during acromionectomy.

The *mechanism* by which the syndrome is produced is simple. In the middle range of abduction of the humerus the supraspinatus tendon, with its covering bursa, impinges against the overlying acromion (fig. 1). When a lesion of tendon or bursa exists, this pressure causes pain, and reflex muscle spasm accompanies any movement that tends to bring the lesion into contact with the acromion.

The *pathology* of the various lesions of tendon and bursa is not so clear-cut, and probably several conditions may produce the typical syndrome. The primary lesion may be of the tendon or of the bursa; but, as these two are so intimately connected, often both may be involved.

The *cause* of most lesions appears to be trauma—usually a single contusion but occasionally repeated minor injuries. The typical history is of force applied to the abducted arm. Such an injury may produce a small tear of the supraspinatus tendon, due presumably to a sudden strain on this structure, or a tendinitis, caused by contusion of the tendon against the overlying acromion. This latter injury seems to be associated almost invariably with a subacromial bursitis, also traumatic in origin.

In some instances the lesion appears to be a typical bursitis, with a macroscopical appearance exactly like that observed in prepatellar bursitis.

Finally, calcification of the supraspinatus tendon may be degenerative, though an initial injury or repeated minor traumata may be a factor in this degeneration.

PATHOLOGICAL FINDINGS

In the 31 patients in whom the subacromial bursa was opened and the supraspinatus tendon inspected during acromionectomy the macroscopical findings were as follows:

(1) In 15 cases there appeared to be a tendinitis associated with a bursitis. In the normal shoulder the subacromial bursa is thin-walled and almost transparent, and the underlying tendon is smooth, white, and shining. In this group of cases the bursal wall appeared inflamed and œdematous and the tendon red and thickened. The bursal changes were greatest near the tendon and varied in different circumstances. In 2 cases, explored soon after injury, the œdema of the bursal floor over the tendon was so severe that the synovial lining formed red œdematous folds almost $\frac{1}{2}$ in. long. In 3 cases explored some months after injury a localised roughened reddish patch about $\frac{3}{4}$ in. in diameter was observed in the same area. Various degrees of change between these two extremes were seen in the remaining 10 cases.

(2) In 6 cases calcified deposits in the supraspinatus tendon were seen on radiological examination. When explored, the bursa in these was a little thickened and more opaque than usual. The tendon also appeared a little thickened, reddish, and less smooth than normal. No effort was made to scrape or otherwise remove the deposit.

(3) In 5 cases tears of the tendon were found. In 3 of these the tendon was partly detached at its insertion. The extent of the detachment was about $\frac{1}{2}$ in., and in no instance had there been any significant retraction of the tendon. In the

remaining 2 cases small rents in the tendon were found, through which the articular surface of the humerus could be seen.

(4) In 5 cases the primary lesion appeared to be a bursitis. There was generalised thickening of the bursal wall, which was red and densely adherent to the acromion. In 2 cases the bursa contained multiple small loose bodies similar to those sometimes seen in a chronically inflamed prepatellar bursa. In the remaining 3 cases the bursa contained a little free fluid, and the synovial lining was plicated, œdematous, and inflamed. It was not easy to differentiate this group from tendinitis associated with bursitis, the main point being that the changes appeared to be generalised and not localised to the region of the tendon.

SYMPTOMS AND SIGNS

The cardinal signs of supraspinatus syndrome are a painful arc of movement somewhere between 60° and 120° on abducting the arm, a reversal of the normal scapulohumeral rhythm (see below), and tenderness on deep pressure over the supraspinatus tendon. Unfortunately this syndrome is not always so characteristic. The findings in the series under review can be summarised as follows:

History of Injury.—Most patients gave a history of the sort of accident already described. Except in those in whom the tendon was torn, symptoms did not arise immediately but appeared 12–24 hours after injury. Presumably at the time of injury the tendon and bursa are compressed against the acromion, but the typical syndrome does not appear before œdema has developed. At the time of injury there is often little or no pain, and the function of the shoulder is normal. For this reason patients do not always attribute their symptoms to their accident.

Pain.—Three types of pain are usual:

(1) Aching of the shoulder, usually referred to the insertion of the deltoid, but often of a much wider distribution. Pain may be referred to the whole of the outer side of the arm and dorsum of the forearm, or even to the neck. This widely referred aching pain is very real and, if this fact is not recognised, the surgeon may be misled or may unjustly suspect the patient of exaggerating his symptoms. Another almost constant feature is that the aching is most severe on sitting down and in bed at night, and is less troublesome while the patient is up and walking about. I believe the reason for this to be that, when the arm is unsupported, the humerus drops away from the acromion and pressure round the tendon and bursa is relieved.

(2) Painful arc of movement. The mechanism of this has been discussed above. This finding is one of the most distinctive features of the syndrome. The painful arc is somewhere between 60° and 120° of abduction and forward flexion; the exact site and area vary a little, as does the severity of the pain. In the less severe cases there may only be a slight "hitch" at about 90° of abduction, and in many instances patients have developed a trick movement, usually full external rotation of the arm, to ease the arm past the painful point. In the most severe cases the patient cannot move the arm past the painful arc, even when lying down and assisting movement with the opposite hand. Once the arm is past the painful arc, however, movement is free, and the arm can be moved about above the head without pain. Patients do not always observe that pain is associated with certain movements—i.e., with abduction and forward flexion through a certain arc—and that other movements are free, and simply complain of pain in the shoulder when the arm is moved.

(3) A sharp stabbing pain on any start or sudden movement of the arm. This is referred to the region of the subacromial bursa and is probably due either to a sudden contraction of the supraspinatus or to a sudden jarring of the lesion against the acromion. This unexpected sharp pain is one of the most annoying and troublesome features of the syndrome.

Reverse Scapulohumeral Rhythm.—Some degree of reversal of the normal scapulohumeral movement is constant. This is due to reflex muscle spasm on any movement which tends to bring the lesion into contact

1. Codman, E. A. The Shoulder, Boston, 1934.

with the acromion. Instead of the normal humeral movement throughout the first 90° of abduction, scapular movement takes place as soon as the painful arc is approached, and the whole shoulder is typically raised.

Local Tenderness.—It is often possible to localise a deep tenderness quite sharply to the area of the subacromial bursa. By passive movement of the arm it is also possible to rub this painful area against the acromion, producing a typical pain, and this manoeuvre often produces the sensation of something slipping past the acromion, a sensation which can be detected by both patient and surgeon.

True Limitation of Movement.—This greatly complicates the clinical picture and makes diagnosis difficult. The cause of a true limitation of movement is probably disuse; the patient finds that abduction is painful, and perhaps pain is so severe as to render this movement impossible, and so for weeks or even months all abduction is voluntarily avoided. As a result peri-articular adhesions form, and abduction is genuinely limited, even though the original tendinitis or bursitis may have resolved.

DIFFERENTIAL DIAGNOSIS

Several conditions are often confused with the supraspinatus syndrome:

Complete Rupture or Avulsion of Supraspinatus Tendon.—As a general rule this lesion occurs in rather older men, usually as a result of a more severe injury. The condition is characterised by loss of the power to abduct the arm, together with pain on all movements. Although a painful arc is found on abduction when the lesion is brought into contact with the acromion, the chief feature is loss of power and inability to initiate or sustain abduction. It is of the utmost importance to recognise this injury at once, because immediate surgical repair of the tendon is indicated.

"Frozen Shoulder."—This is probably due to a peri-arthritis and adhesions. There is a generalised stiffness of the joint, with pain on attempting to force passive movement.

Tuberculosis of Shoulder-joint.—This does not present the typical features of the supraspinatus syndrome; its typical features are aching, pain at the extremes of movement, muscle spasm, muscle wasting, radiographic changes (ill marked in the early stages), and a raised sedimentation-rate.

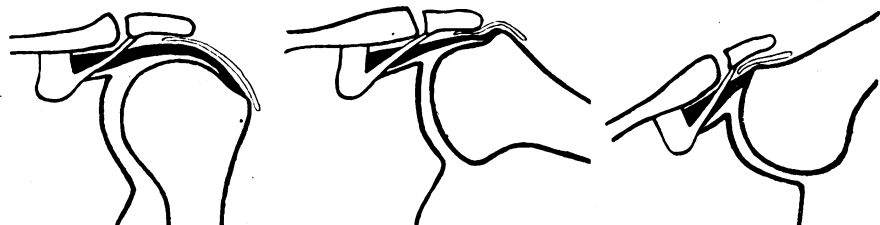


Fig. 1.—In the middle range of abduction the supraspinatus tendon, covered by the subacromial bursa, impinges against the overlying acromion process.

Fibrositis.—Because of the referred pain, many typical syndromes are dismissed with the vague diagnosis of fibrositis of the arm or shoulder.

Neurosis.—It is surprising how many of these patients are dismissed as "neurotic." In many instances the wide distribution of the pain, and the fact that the patient can move the arm freely at the extremes of movement and yet complains of pain on movement, lead to the assumption that the most is being made of some trivial disability. The pain associated with the true supraspinatus syndrome tends in any circumstances to "get the patient down," and this attitude is accentuated if,

on seeking medical advice, they are dismissed with little sympathy, or assured that their trouble is only mental.

PROGNOSIS

So far as prognosis was concerned, in the present series two points became clear: (1) Except when calcified deposits were present, about two-thirds of the patients with the typical syndrome recovered in 1-3 months, irrespective of treatment. The difficulty was that I could discover no means, other than by observation for some months, of telling which patients were not going to recover spontaneously. (2) Those patients in whom calcified deposits in the tendon could be demonstrated radiologically tend to recover very slowly, if at all.

TREATMENT

Many different methods of treating the supraspinatus syndrome have been described; and, as is to be expected in a condition in which two-thirds of the patients recover spontaneously, good results have been reported with each. In the present series many of these measures were of doubtful value. Broadly speaking, treatment can be divided into conservative and operative. The following measures were used in the conservative treatment:

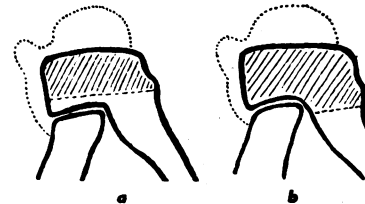


Fig. 2.—The acromion can be removed in such a way as to preserve the acromioclavicular joint (a). This is not always satisfactory, and it is better to remove the acromion process completely (b).

Rest.—If seen in the early stages it seems logical to rest the limb, so that the lesion may have a chance to resolve without constantly being irritated and made worse by repeated impingement against the acromion. The arm may be immobilised in a sling, or in abduction either on a frame or in plaster. Immobilisation in abduction might be expected to relax the supraspinatus tendon to some extent, but in my experience this position had no particular advantages, and its use was reserved for those patients in whom a small tear of the tendon was suspected.

If a shoulder was immobilised either in a sling or a splint for too long a true limitation of movement developed, due presumably to adhesions. For this reason immobilisation was never continued for longer than three weeks, and after the first week the patient was instructed to exercise the shoulder through a full range of movement twice a day. Most patients, when lying supine, could ease the arm past the painful arc without much difficulty, and once past this point the arm could be fully abducted and exercised in this position without pain.

Active Exercises.—After a period of rest in recent injuries, or in older lesions which had not recovered completely, patients often seemed to benefit a great deal from active exercises performed under supervision. These were particularly effective in cases in which the lesion appeared to have resolved but the shoulder had become stiff through disuse.

Injection with Local Anaesthetic.—If the painful area is sufficiently widely infiltrated with local anaesthetic, the painful arc of movement can be temporarily abolished. It has been claimed that many patients are permanently benefited by one or two infiltrations, but in our experience this was not so. In no instance was a patient much relieved, and in 12 of the 31 patients in which

acromionectomy was necessary repeated injections with local anaesthetic had been tried without success.

Radiant Heat and Short-wave Diathermy.—Most patients with painful shoulder are treated with radiant heat or short-wave diathermy or with both these measures at some time or other. I could not find any evidence that any patient gained anything more than temporary relief from these measures, and in many instances no effect whatever was produced.

Manipulation of Shoulder.—A gentle manipulation of the shoulder under general anaesthesia may be of some value when the lesion has subsided but the joint has become stiff through disuse. In the acute stages, however, a manipulation is dangerous and harmful.

ACROMIONECTOMY

About a third of all patients were unaffected or only partially relieved by any form of conservative treatment. In these circumstances I excised the acromion. This procedure, first suggested by Watson-Jones,² removes pressure on the tendon and bursa and permits a full range of painless movement. Relieved of repeated irritation the lesion of the tendon or bursa tends to heal or resolve.

The amount of acromion removed is of the utmost importance. In the first 9 patients operated on, the acromion was divided immediately lateral to the acromioclavicular joint (fig. 2a) so that this articulation was preserved intact. Though on examination on the table this appeared to give adequate clearance to the upper end of the humerus on abduction of the arm, in practice it was found that in some instances symptoms were only partially relieved. In 3 of these patients a second and more complete excision was performed, with complete success, and in 2 others permission for a second operation was sought and refused. In the remaining 22 patients the acromion was excised as far medially as and including the acromioclavicular articulation, with completely satisfactory results (fig. 2b).

Of the 31 patients operated on, 29 were completely cured, though in 3 sufficient bone was not removed at the first operation, and a more complete excision was later necessary. In 1 there was only partial relief and a tendency to pain on certain movements, probably because sufficient acromion had not been excised; but permission for a second operation could not be obtained. In 1 there was no benefit from operation, probably because sufficient bone had not been removed; but again permission for a second operation was refused.

So far as subsequent function of the shoulder was concerned, excision of the acromion caused no disability. From the cosmetic point of view there was no obvious alteration in contour, but the scar was visible.

Indications for Acromionectomy.—Two conditions were regarded as indications for operation: (1) A supraspinatus syndrome causing material disability and associated with radiologically demonstrable calcified deposit in the tendon. In my experience the response to conservative treatment in such cases was so poor as to warrant immediate operation. (2) A supraspinatus syndrome causing material disability which does not respond to two or three months of conservative treatment.

Contra-indication.—There is one important contra-indication to operation—true limitation of shoulder movement. In those cases in which disuse has led to a true limitation of movement of the shoulder-joint operation should not be undertaken before a full range of passive movement has been restored. Active exercises, if necessary a gentle manipulation followed by exercises, should be persisted with until all adhesions have been

broken down. In patients with gross muscle spasm due to pain the true range of movement should be tested by infiltrating the lesion with local anaesthetic before examination.

Operative Technique.—The patient lies on the sound side, and the surgeon sits at the upper end of the table, facing the superior aspect of the shoulder. The arm is controlled by an assistant, being rotated and abducted as necessary.

An anteroposterior incision of the sabre-cut type is made over the acromioclavicular joint and acromion. A flap of skin and subcutaneous tissue is turned outwards, so that the upper surface of the acromion is exposed. The periosteum is incised, and a flap is turned inwards, so that the line in which the acromion is to be divided is exposed. The superior acromioclavicular ligament is also detached and turned inwards. With a thin-bladed osteotome, held very obliquely, the acromion is divided from before backwards. The divided acromion is lifted with a blunt spike and grasped with sequestrum forceps while its deltoid attachments are divided from behind forwards with a scalpel. The last structures to be divided are the remaining acromioclavicular ligaments and the coracoacromial ligament.

In some instances the subacromial bursa is very adherent and may be opened as the acromion is dissected free. If not, the bursa is opened as soon as the bone is removed, and the arm is abducted and rotated so that the tendon and interior of the bursa can be inspected. When the extent of the lesion has been determined, the bursa is closed with fine catgut, and the deltoid is sutured to the cut surface of the acromion, using the flap of periosteum already turned back. The skin is sutured, and a pressure bandage is applied.

Postoperative Treatment.—The arm is immobilised in a sling for a few days, and about a week after operation active exercises are started. Abduction against gravity is usually impossible for about ten days, and then returns quickly. Movements are full between three and four weeks after operation, and a short period of treatment at an organised rehabilitation centre is often of value at this stage.

SUMMARY

In the middle range of abduction of the humerus the supraspinatus tendon and its bursa are pressed against the acromion. If there is a lesion of either tendon or bursa this pressure causes pain and reflex muscular spasm. The cause of such a lesion is usually trauma.

The cardinal signs of supraspinatus syndrome are: (1) a painful arc (between 60° and 120°) on abduction of the humerus; (2) reversal of the normal scapulohumeral rhythm; and (3) tenderness on deep pressure over the supraspinatus tendon.

Pain may lead to disuse, adhesions, and limitation of movement.

Two-thirds of the patients recovered spontaneously.

The remaining third were cured by acromionectomy.

Where there is true limitation of movement, acromionectomy should not be done before all adhesions have been broken down by exercises.

"... what medical practitioners have for years been asking for in vain is a continuity of medical records without which there can be no continuity of treatment. Should they want to piece a case together which presents some diagnostic difficulty, there ought to be a full dossier automatically following each individual whether he be a hopeless chronic invalid or a perfectly sound person, or only appeared to be so. The resulting simplification would benefit doctor and patient alike."—Dr. GEORGE DE SWIET, *Fortnightly Review*, January, 1947, p. 51.

2. Watson-Jones, R. *Fractures and Joint Injuries*, Edinburgh, 1943, p. 418.

MUSCLE-RELAXING ACTION OF MYANESIN

F. M. BERGER

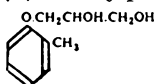
W. BRADLEY

From the Research Department of
The British Drug Houses Ltd., London

DURING an extensive investigation of the chemical and pharmacological properties of glycerol ethers the observation was made that α : β -dihydroxy- γ -(2-methylphenoxy)-propane, subsequently named 'Myanesin,' caused muscular relaxation and paralysis. A few other α -substituted glycerol ethers were found to possess similar pharmacological properties, but myanesin was the most potent and safest of all the compounds examined. This communication describes briefly the properties and mode of action of myanesin* and draws attention to the applications it may have in clinical medicine.

CHEMICAL AND PHYSICAL PROPERTIES

Myanesin belongs to the class of α -glycerol ethers. It is α : β -dihydroxy- γ -(2-methylphenoxy)-propane:



Myanesin is a colourless odourless crystalline solid with a melting-point of 70–71° C. Its solubility in water at 22° C is 1.09 g./100 ml. of water, but stable supersaturated solutions can easily be obtained by cooling solutions prepared at higher temperatures. Myanesin is very soluble in alcohol and propylene glycol. It is a neutral solid, and the pH of its solution is practically the same as that of the pure solvent. Urea and its derivatives, particularly ethyl urea, greatly increase the water-solubility of myanesin. Solutions of myanesin are stable and unaffected by light, air, cold, and dilute acids and alkalis; they can be sterilised by heat or filtration and are compatible and freely miscible with solutions of sodium chloride, glucose, and derivatives of barbituric and thiobarbituric acids.

PHARMACOLOGICAL PROPERTIES

Effect on Muscles.—Rabbits injected intravenously with 10–12 mg. per kg. of body-weight showed muscular relaxation. Doses of 30–50 mg. per kg. produced flaccid paralysis without loss of consciousness. The rabbits regained muscular power 5–10 min. after injection and remained well. Larger doses caused paralysis of longer duration. Doses of 350 mg. per kg. were tolerated when injected over a period of 30 min. Myanesin has a low toxicity and a distinct margin of safety. The mean lethal and mean paralysing doses in mice after intraperitoneal administration were 610 \pm 10 mg. per kg. and 178 \pm 8 mg. per kg. respectively. Excitement, tremors, or convulsions did not develop at any time after administration of myanesin.

Myanesin was quickly detoxified and broken down in the body. It did not exert a cumulative action and did not cause habituation. It also had a weak curare-like action when administered in large and nearly lethal doses. In dilutions of 1:10,000 it did not affect the isolated guinea-pig's ileum or rabbit's duodenum.

Effect on Blood-pressure and Respiration.—Intravenous injections of 30 mg. to rabbits or cats did not influence blood-pressure or respiration. Larger doses caused a fall of blood-pressure and a decrease in rate and an increase in depth of the respiratory movements. Toxic doses caused death by respiratory paralysis.

Anticonvulsant Action.—Myanesin, in doses insufficient to cause paralysis, had a strong antagonistic action against strychnine convulsions and was in this respect much superior to hexobarbitone. In convulsions produced by

* Myanesin was submitted for clinical trial under the name 'B.D.H. 312.'

leptazol, hexobarbitone was very effective and myanesin relatively ineffective (see table). These observations suggest that the pharmacological actions of myanesin are due to its depressant action on the spinal cord.

Potentiating Effect on Barbiturate Anaesthesia.—Simultaneous injection of an ineffective dose of myanesin and an ineffective dose of soluble hexobarbitone caused deep narcosis without excitement in the prenarcoctic stage and with complete muscular relaxation during narcosis. The depth and duration of anaesthesia could also be increased by administration of small doses of myanesin. Myanesin also effectively suppressed prenarcoctic excitement and muscular fibrillations or spasms during anaesthesia. A full report of the pharmacological properties has been published in the *British Journal of Pharmacology and Chemotherapy* for December, 1946, p. 265.

DISCUSSION

Muscular relaxation during light anaesthesia can be obtained by the cautious use of curare. This method is not, however, without danger, because the amount of curare necessary to produce muscular relaxation is very close to that producing paralysis of the diaphragm. Myanesin, on the other hand, produces relaxation without embarrassment of respiration. Even with doses that produce muscular paralysis no respiratory embarrassment results.

Myanesin does not appear to act on the brain, because it does not affect consciousness and never causes prenar-

ANTAGONISM OF MYANESIN AND SOLUBLE HEXOBARBITONE TO STRYCHNINE AND LEPTAZOL CONVULSIONS IN MICE

(Drugs injected subcutaneously in 2½% gum-acacia solution)

Strychnine (mg./kg.)	Leptazol (mg./kg.)	Myanesin (mg./kg.)	Hexobarbitone (mg./kg.)	No. of mice	Convulsed (%)	Died (%)
1.33	..	..	..	109	68.9	49.6
1.33	..	100	..	140	19.3	2.8
1.33	..	..	100	100	97.0	29.0
..	120	..	..	60	96.6	53.3
..	120	200	..	40	92.5	42.5
..	120	..	50	20	0	0

cotic excitation. It cannot, therefore, be classed among the anaesthetics. Myanesin is not a curare substitute, because its mode of action is quite different from that of curare.

The experimental results indicate that the administration of myanesin together with barbiturates in amounts only sufficient to produce unconsciousness causes profound muscular relaxation without the disadvantages inherent in the use of deep general anaesthesia, spinal anaesthesia, or curare. Myanesin may also be worthy of clinical trials in the treatment of spastic paralysis and dystonic states and for the prevention of traumatic complications in convulsive shock therapy.

SUMMARY

Myanesin, α : β -dihydroxy- γ -(2-methylphenoxy)-propane, given in suitable doses, produces muscular relaxation and paralysis without causing respiratory arrest or influencing the blood-pressure. It has a low toxicity and is quickly destroyed in the body.

Myanesin efficiently antagonises strychnine convulsions, counteracts excitement due to barbiturates, and potentiates barbiturate anaesthesia. Its action is apparently due to depression of reflexes in the spinal cord.

Myanesin seems likely to prove useful for producing relaxation during light anaesthesia and may have other valuable uses in medicine.

We thank the directors of The British Drug Houses Ltd. for their interest in our work and permission to publish the results, and Messrs. R. A. Hall and F. G. Sayer and the Misses B. J. O'Brien, D. M. Culver, and H. McInnes for technical assistance.

A NEW SYNTHETIC CURARISING AGENT IN ANÆSTHESIA

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SOME time ago I was asked by the research department of The British Drug Houses Ltd. to undertake the clinical trials of a synthetic drug, 'B.D.H. 312,' said to have an action resembling that of curare and which might be of value in anæsthesia. This drug had been administered experimentally to animals but not to man.

I have been so impressed with the potentialities of B.D.H. 312, or 'Myanesin' as it is now called, that I feel that a description of experience and results in the first 112 cases should be published now without awaiting the outcome of the prolonged clinical investigation which is in progress. In this way as wide a comparison with the now accepted preparations of curare may be made available as expeditiously as possible by experienced workers in the field of anæsthesia. This paper is intended therefore only as a preliminary report.

CHEMISTRY AND PHARMACOLOGY

Myanesin is a synthetic substance having the formula $\alpha : \beta$ -dihydroxy- γ -(2-methylphenoxy) propane. It is put up as a solution, in ampoules containing 1 g. in 10 c.cm. The solution may be boiled. It possesses antibacterial properties. Solutions of 'Pentothal sodium' and myanesin may be mixed without the formation of a precipitate.

The pharmacology of myanesin has been thoroughly investigated in animals (Berger and Bradley 1946, 1947). There is no evidence of toxic effects on any organ of the body in doses well in excess of those therapeutically effective. Further, no effect has been noted on tonus and contraction of intestinal muscle.

Although in animals narcosis is produced in addition to paralysis, the injection of about 13 mg. per kg. of body-weight in a conscious patient produced no demonstrable narcotic effect; the addition of a small dose of pentothal produced narcosis accompanied by good abdominal relaxation (case 1). In another patient 27 mg. per kg. produced some weakness of limb muscles and full abdominal relaxation without narcosis (case 2). Neither patient had any difficulty in conversing and making comments on subjective symptoms. Neither experienced any such distress as has been reported with curare.

The absence of narcosis in human beings may be explained by the relatively small doses given, 200-300 mg./kg. being necessary for the production of narcosis in animals (Berger and Bradley 1947). This is an impressive indication of the wide margin of safety experienced with myanesin. Its action is so enhanced by pentothal that full abdominal relaxation is easily obtained in man with doses of 10-15 mg. per kg.

METHOD OF USE

Premedication.—As with most anæsthetic agents, premedication is desirable but not essential (case 11). 'Omnopon' and scopolamine are very satisfactory.

Administration.—After anæsthesia has been established an injection of 5-10 c.cm. of myanesin is made intravenously a few seconds before the peritoneum is opened. Full relaxation follows in a few seconds. Doses of 5-10 c.cm. may be repeated as often as required during long operations. In an exceptional case as much as 50 c.cm. has been used during a long operation without the slightest postoperative effect. Doses which are adequate even for high abdominal surgery rarely if ever

produce intercostal paralysis. Sometimes slight respiratory depression develops but lasts only a minute or so.

Anæsthesia.—(1) *Pentothal-N₂O-O₂*: relaxation with this technique is easily obtained with the lightest possible depth of anæsthesia; for example, plane I with pentothal-N₂O-O₂ has been found adequate for gastrectomies (cases 3 and 6). The average lower laparotomy can often be carried through on 0.5 g. pentothal (case 4), though a really sthenic patient may require up to 0.9 g. Relaxation can be maintained with anæsthesia so light that the patient is making slight movements (case 5). Deeper (plane II) anæsthesia with a given dose of myanesin causes longer rather than more profound relaxation (see table).

(2) *Pentothal-cyclopropane*: plane I again is sufficient. Relaxation is often secured with slightly smaller doses of myanesin and often lasts much longer (case 7, and see table).

(3) *Pentothal-N₂O-O₂-ether*: a few patients have received a small induction dose of pentothal (0.2-0.4 g.) and plane I has been maintained with N₂O-O₂ plus minimal ether (average 10 drachms per hr.). The results are the same as

AVERAGE DURATION OF ABDOMINAL RELAXATION IN PLANE I ANÆSTHESIA

Anæsthetic	Av. 1st dose		Av. duration of relaxation	Depth of anæsthesia
	Pentothal (g.)	Myanesin (c.cm.)		
Pentothal-N ₂ O-O ₂ ..	0.49	7.5	17 min.	Light plane I
Pentothal-N ₂ O-O ₂ ..	0.7	9.0	23 min.	Normal plane I
Pentothal-N ₂ O-O ₂ -ether*	0.4	10.0	24 min.	
N ₂ O-O ₂ -ether†	..	18.0	1 hr.	
Pentothal-C ₂ H ₆ ..	0.5	7.0	1 hr. 45 min.	Plane II
Pentothal-N ₂ O-O ₂ ..	1.0	9.0	53 min.	

* Av. amount of ether 10 drachms per hr.

† Single case; ether 1 oz. per hr.

with other anæsthetics; the exceedingly small amount of ether used should be noted.

(4) *N₂O-O₂-ether*: one case has received "straight gas-oxygen-ether" with similar results according to expectation (see table).

ILLUSTRATIVE CASES

CASE 1.—Sthenic man, aged 32. Hemorrhoidectomy. "A" risk.

11.50 A.M.: myanesin 10 c.cm. given during 3 min. No demonstrable effect; no paralysis; no narcosis.

11.54 A.M.: pentothal 0.15 g.; consciousness lost; still moves on operative stimulus.

11.56 A.M.: pentothal 0.3 g.; sphincter completely relaxed; good abdominal relaxation; plane I anæsthesia.

11.58 A.M.: groaning, but still relaxed.

12.02 P.M.: operation stopped; beginning to open eyes; still abdominal relaxation.

12.20 P.M.: fully conscious.

CASE 2.—Woman, aged 38. Saphenous ligation. "A" risk.

11.50 A.M.: myanesin 20 c.cm. "Felt tired," could still lift leg. but "muscles felt weak"; no distress; no dysarthria; complete abdominal relaxation.

11.53 A.M.: pentothal 0.2 g.; apnoea 1 min.; slight depression respiration following restart (without intercostal paralysis) 2 min.

11.56 A.M.: operation started.

11.59 A.M.: gas-oxygen started; abdominal relaxation +++.

12.55 P.M.: operation stopped; no further pentothal has been administered; anæsthesia plane I.

12.57 P.M.: patient awake and talking.

CASE 3.—Man, aged 32. Gastrectomy for ulcer. Chronic bronchitis. "B" risk.

11.30 A.M.: pentothal 0.45 g. + N₂O-O₂; plane I.

11.37 A.M.: myanesin 10 c.cm.; relaxation +++; no respiratory depression.

12.08 P.M.: very light, moving fingers; pentothal 0.15 g.

12.12 P.M.: relaxation good, but additional requested for manipulation of stomach high under costal margins; myanesin 3 c.cm.; relaxation +++.

12.40 P.M.: relaxation less; anæsthesia verging on 2nd stage; myanesin 3 c.cm. + pentothal 0.15 g.; respiratory depression 2-3 min.; no intercostal paralysis.

1 P.M.: operation stopped. Time 1¼ hr.

CASE 4.—Woman, aged 23. Large ovarian endometrioma. Blood-pressure (B.P.) 112/76 mm. Hg.

- 2.30 P.M.: pentothal 0.5 g. + N₂O-O₂; plane I.
 2.36 P.M.: no abdominal relaxation; B.P. 106/70.
 2.40 P.M.: myanesin 10 c.cm.; relaxation ++; B.P. 106/70.
 2.45 P.M.: cyst delivered; Trendelenburg position; B.P. 112/75.
 3.05 P.M.: de-trendelenburg; B.P. 108/70.
 3.10 P.M.: peritoneum sutured; relaxation still; patient moving arm slightly; B.P. 106/76.
 3.15 P.M.: operation stopped; B.P. 112/78.

CASE 5.—Man, aged 20. Very heavy sthenic athlete. Acute appendix. "A" risk.

- 11.30 A.M.: pentothal 0.5 g. + N₂O-O₂; plane I.
 11.32 A.M.: struggling and coming round; myanesin 10 c.cm. and pentothal 0.25 g. mixed.
 11.33 A.M.: quiet and well relaxed.
 11.40 A.M.: moved on incision; pentothal 0.1 g.; well relaxed.
 11.45 A.M.: slight movements; well relaxed; pentothal 0.1 g. + myanesin 5 c.cm.
 11.55 A.M.: myanesin 4 c.cm. to assist closure of peritoneum.
 12.05 P.M.: slight movements.
 12.08 P.M.: moving and wriggling.
 12.10 P.M.: operation stopped.

CASE 6.—Woman, aged 54. High gastrectomy for ulcer. "B" risk.

- 12.10 P.M.: pentothal 0.5 g.
 12.30 P.M.: pentothal 0.25 g. + N₂O-O₂; plane I-II.
 12.35 P.M.: myanesin 4 c.cm.; relaxation ++; no intercostal paralysis.
 12.50 P.M.: pentothal 0.15 g.; anaesthesia very light.
 12.55 P.M.: myanesin 4 c.cm. for high manipulation of stomach; relaxation ++.
 1.40 P.M.: pentothal 0.1 g. + myanesin 5 c.cm.; apnoea 2 min.; no subsequent intercostal paralysis; relaxation +++.
 1.55 P.M.: operation stopped. Time 1³/₄ hr.

CASE 7.—Woman, aged 29. Lower laparotomy. Tuberculous peritonitis. Bilateral salpingectomy and ovarian cystectomy. Pulmonary tuberculosis. "B" risk.

- 2.30 P.M.: pentothal 0.5 g. + cyclopropane-O₂; plane I.
 3.30 P.M.: peritoneum opened; myanesin 8 c.cm.; relaxation ++.
 4.30 P.M.: peritoneum closed; relaxation still adequate, but less.
 5 P.M.: operation stopped.

CASE 8.—Woman, aged 24. Hysterotomy (3 months pregnant) and sterilisation. Aortic incompetence. Mitral stenosis and incompetence. Pale, cyanosed, orthopnoic hypostatic congestion. "D+" risk.

- 2.25 P.M.: pentothal 0.5 g. slowly; 100% oxygen; plane I.
 2.30 P.M.: myanesin 10 c.cm.; relaxation O.K.
 2.50 P.M.: operation stopped; patient almost conscious. Has since made uninterrupted recovery.

CASE 9.—Man, aged 86. Suprapubic cystotomy. Kidney function poor+. Hypostatic congestion. "C" risk.

- 9.50 A.M.: pentothal 0.3 g. slowly. Preliminary cystoscopy.
 10.04 A.M.: myanesin 8 c.cm. + pentothal 0.2 g. for abdominal opening; very light plane I.
 10.13 A.M.: operation stopped. Practically conscious.

CASE 10.—Boy, aged 6. Premedication: 'Seconal' gr. 1¹/₂. Right inguinal hernia. "A" risk.

- 12.15 P.M.: pentothal 0.5 g. + N₂O-O₂.
 12.20 P.M.: insufficiently relaxed; myanesin 5 c.cm.; relaxation +.
 12.30 P.M.: insufficiently relaxed; myanesin 5 c.cm.; relaxation ++.
 12.50 P.M.: operation stopped.

CASE 11.—Woman, aged 43. No premedication. Placenta prævia. Twin pregnancy, not in labour. Classical caesarean section.

- 11.20 P.M.: pentothal 0.2 g. + myanesin 5 c.cm. mixed.
 11.22 P.M.: N₂O-O₂.
 12 NOON: operation stopped; relaxation adequate.
 Gas anaesthesia much smoother and more easily induced. Plane I throughout. Very light. Vomited food plus at end operation; fully conscious in 2 min. No effect on uterus. Babies: no anxiety.

CASE 12.—Woman, aged 47. Radical mastectomy. Moderately severe diabetes, on insulin. No special preparation carried out. Chronic bronchitis. Poor myocardium. "C" risk.

- 10.20 A.M.: pentothal 0.5 g.
 10.30 A.M.: myanesin 10 c.cm. Relaxed pectorals ++.
 11.25 A.M.: operation stopped. Moderate shock.
 No postoperative disturbance of diabetes whatever; diet and insulin normal.

RESULTS

All kinds of risk up to D+ and including emergencies have been accepted (case 8) for administration of the drug. Patients with poor kidney function have not been excluded, and such cases have included a number of Harris and Millin type prostatectomies. Ages have ranged from 3 to 86 years, and operation times from 15 min. to over 3¹/₂ hours.

Blood-pressure.—No significant alterations have been noted that could be attributed to myanesin.

Intestines.—No definite evidence has been obtained of any clinical effect on intestinal muscle. During one of the gastrectomies it was thought that there might be some slight diminution of tone though peristalsis was active.

Vocal Cords.—The effects on the vocal cords have been somewhat variable. Intubation as a rule was not so easy as has been described by Gray and Halton (1946) with curare (on the other hand such heroic measures as these authors described were not employed). I must confess I was a little disappointed with curare also in this respect. Bigger doses of myanesin may give better relaxation of the vocal cords, and work is proceeding on these lines. My experience has been that unexpectedly big doses of both pentothal and the curarising agent are needed with both drugs. The severe laryngeal spasm which is common when intubating under pentothal alone is never seen when myanesin is used. With doses of about 0.75 g. of pentothal and 15 c.cm. of myanesin the cords can usually be seen moderately abducted for a few seconds, but in most cases they close when the stimulus of laryngoscope or tube is applied. When the tube is passed, however, as a rule on a cough, the patient usually settles down again quickly, though coughing on the tube has been a persistent nuisance in one or two cases in which no analgesic jelly was used to lubricate it. Laryngeal spasm occurring under pentothal-gas-oxygen from any cause can be rapidly controlled with an injection of myanesin.

Cæsarean Section.—The smoothing effect of combining a few c.cm. of the drug with an otherwise inadequate dose of pentothal has been exceedingly useful in such operations as cæsarean section, where it is held to be important to keep the amounts of pentothal to a minimum and yet premedication is contra-indicated, the metabolic rate is high, and pharyngeal and laryngeal reflexes are apt to be unusually sensitive owing to the presence of food in the stomach (case 11). No increased tendency to hæmorrhage or other undesirable effects on the uterus have been observed, and no effects on the babies born by cæsarean section.

Postoperative Condition.—After major operations the patients given myanesin have been strikingly brighter and more comfortable than those receiving spinal or deep general anaesthesia or curare to produce relaxation. Observations in one diabetic receiving insulin suggest that myanesin causes no upset of carbohydrate metabolism or postoperative acidosis (case 12). The incidence of vomiting has been low; only 12% of the patients have vomited at all, and only 4% more than twice. No patient has given rise to anxiety on the table through the use of myanesin, and none has died within at least five days of the operation.

CONCLUSIONS

As I have emphasised with curare (Mallinson 1945), a true assessment of this or any curarising agent must await the long-term results of tens of thousands of cases. Myanesin must still be considered an experimental drug for use by the expert anaesthetist so that further reliable data and experience may be gained.

I do feel very strongly, however, that the technique of curarisation of muscle to obtain abdominal relaxation, which was so bravely introduced by Griffith and Johnson (1942) with curare, has with myanesin reached a point at which it bids fair to become the greatest advance in anaesthesia since the introduction of pentothal.

SUMMARY

Myanesin, a new synthetic drug, appears to have well-marked advantages over curare.

It has a wider margin of safety than curare. Doses of 5–20 c.cm. (about 7–28 mg. per kg.) produce no undesirable effects; this is not unexpected since 200–300 mg. per kg. is tolerated by animals.

Abdominal relaxation is obtainable even in the conscious patient; and without any distress.

The drug does not cause intercostal paralysis in doses producing full relaxation of the abdominal muscles.

In most cases it is much more effective with barbiturate anæsthesia than is curare and apparently enhances the action of the barbiturates.

So easily is abdominal relaxation obtained under pentothal-N₂O-O₂ when myanesin is used that the use of the more toxic agent cyclopropane is not necessary.

It is effective under the lightest possible anæsthesia; this is of great importance in reducing the amount of general anæsthesia needed.

No bronchospasm or salivation occurs even when no atropine or hyoscine has been given and even in the conscious patient (Cullen 1944).

I wish to thank those surgeons who have coöperated with me in this research, particularly Mr. Kenneth Heritage, whose patience and pertinent criticism have been invaluable. Also Mr. C. K. Vartan and Mr. E. Hesketh Roberts. I am indebted to The British Drug Houses Ltd. for the supply of B.D.H. 312 (myanesin) used in this research.

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TREATMENT OF

RENAL FAILURE IN WEIL'S DISEASE BY SPINAL ANÆSTHESIA

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CONSIDERABLE interest has been taken recently in the renal lesions associated with crush syndrome, incompatible blood-transfusion, yellow fever, Weil's disease, and other conditions. Maegraith et al. (1945) demonstrated the similarity of their renal pathology and suggested that the term "renal anoxia" should be used to describe the renal failure which develops in all of them. Lauson et al. (1944) have shown that the effective renal blood-flow in the circulatory collapse accompanying various injuries is reduced more than can be explained by the fall of blood-pressure or the circulatory rate.

Our knowledge of the renal circulation has been greatly increased by the work of Trueta et al. (1946), who have shown experimentally that, in animals, on appropriate nerve stimulation, the blood may be diverted, wholly or in part, from the cortex and short-circuited through medullary blood-channels. They suggest that the oliguria in Weil's disease and in allied conditions is due to a similar mechanism. Wylie (1946a and b) has shown, by the injection of trypan-blue into guineapigs infected with *Leptospira icterohæmorrhagiae*, that a diminution of cortical blood-flow is present from the first day of infection, and that it becomes progressively more severe until death ensues. Such a diminution could readily explain the rise of blood-urea so early in the disease. These observations point towards vascular spasm as a cause of the diminution of glomerular blood-flow.

The view that the reduction in glomerular blood-flow is brought about by spasm is supported by the success of paralysis of the sympathetic nerves in the treat-

ment of these conditions. Peters (1942) reports success with splanchnic block in a case of anuria following blood-transfusion, in a man aged 32, who had been anuric for 7 days. He cites Rubritius, Havlicek, and Haslinger as having relieved reflex anuria by this means. Two further cases of its successful use, in post-abortion anurias, are recorded by O'Sullivan and Spitzer (1946).

The use of high spinal anæsthesia in anuria due to Weil's disease seems therefore to be amply justified, and Robertson (1946) has treated three cases with high spinal anæsthesia up to the level of D7. The first was in a woman of 20, who had been anuric for 60 hours. Diuresis occurred, and she made a complete but slow recovery. The second case was in a man of 35, who was admitted moribund with a blood-urea level of over 500 mg. per 100 c.cm., having been anuric for several days. Though diuresis took place, his condition continued to deteriorate, and he died in uræmic coma. The last case was in a man of 58, who had been anuric for 48 hours. He started to secrete small quantities of urine, but his urinary output never rose above 30 oz. a day, and he died 2½ days later.

There appear to be three possible causes for the failure of high spinal anæsthesia in the last two cases. The first is that the sympathetic nerve-supply to the kidneys was not successfully interrupted; the fact that urinary secretion started again immediately after the attempted sympathetic block in both cases suggests that the object was at least partly achieved. The second is that the blood-pressure after high spinal anæsthesia (90 mm. Hg systolic) was not high enough to allow of full urinary secretion. Finally it was thought that the oliguria and anuria had persisted too long before the induction of high spinal anæsthesia.

If, as the experimental evidence suggests, the cortex is ischæmic because of selective spasm of the renal vessels, the earlier this spasm is broken, by paralysis of the sympathetic nerves, the less renal damage will take place. It is known that the prognosis in Weil's disease becomes progressively worse with age, and this may be due to a decreased tolerance to ischæmia of the renal tissues of the older patients. Therefore it is suggested that, to cut down the mortality in severe cases of Weil's disease, sympathetic paralysis should be employed in the oliguric stage of the disease, if correction of the dehydration and hypotension has not increased the urinary secretion.

In the case described here, the blood-pressure was well raised and maintained by intravenous infusion of plasma and the intramuscular injection of 'Methedrine' (*d*-N-methylamphetamine hydrochloride) 30 mg. Dehydration was relieved by encouraging the patient to take fluids liberally by mouth, and by continuing the intravenous infusion with alternating litres of 4.3% sodium sulphate and 5% glucose-saline.

CASE-RECORD

A strong and healthy man, aged 61, who had been employed in the watercress beds at the head of the river Test for 21 years, was taken suddenly ill with nausea, vomiting, and weakness, but did not complain of pains in his limbs or back.

He was feverish that evening, and remained so for the next four days. On the 5th day he noted that he was jaundiced, and sent for the doctor, who found his temperature to be normal, pulse-rate 90 per min., and liver enlarged and tender. The patient remained apyrexial for the next two days, with increasing jaundice, and was admitted to hospital on the evening of the 7th day.

On admission his temperature was 97° F, pulse irregular and feeble, rate 80 per min., blood-pressure 85/65 mm. Hg. Next day he was brightly jaundiced, with arteriolar flush of forehead and face; one small petechial hæmorrhage on inside of lip, and many others on his back. Tongue brown, dry, and furred; conjunctivæ suffused; pulse-rate 80 per min. fibrillating; blood-pressure 100/70 mm. Hg. Liver enlarged and tender; spleen not palpable. Catheterisation

produced 8 oz. of urine. No neck rigidity or muscle tenderness. Cranial nerves and fundi normal; reflexes present and equal, plantars flexor.

Blood: Hb 100%, white cells 15,800 per c.mm. (polymorphs 91%, lymphocytes 8%, large hyaline 1%). Blood-urea 321 mg. per 100 c.cm. Icteric index 97. Blood injected intraperitoneally into a guineapig enabled *L. icterohæmorrhagicæ* to be isolated, but serum was negative in all dilutions on agglutination.

Urine: acid, trace of albumin, scattered leucocytes, some red cells, occasional hyaline and epithelial casts; bile pigment present.

Cerebrospinal fluid: cells 132 per c.mm. (polymorphs 75%); protein 35 mg. per 100 c.cm.; chlorides 640 mg. per 100 c.cm.

Treatment with penicillin 30,000 units intramuscularly 3-hourly was started. After 1 pint of plasma given intravenously and the intramuscular injection of methedrine 30 mg., blood-pressure rose to 130/90 mm. Hg and remained round that level. The patient was drinking well, and the plasma was followed by 4.3% sodium sulphate by slow drip. Later 0.5 mg. of 'Digoxin' was given by mouth.

At 6 P.M. there had been no increase of urinary output, so high spinal anæsthesia (16 c.cm. of light 'Nupercaine,' the patient sitting up for 55 sec.) was administered, producing skin anæsthesia up to the level of D7.

By next morning he had received 105 oz. of fluid and had passed 52 oz. of urine, containing 1.75 g. urea per 100 c.cm. He had stopped hiccoughing, and felt less drowsy. His pulse was regular at 88 per min., blood-pressure 110/80 mm. Hg. More cutaneous hæmorrhages had appeared, so he was given 10 mg. of vitamin K intramuscularly. Later in the day the blood-urea was 328 mg. per 100 c.cm., and urinary urea 1.95 g. per 100 c.cm. There was a trace of agglutination to *L. icterohæmorrhagicæ* in dilutions up to 1/300. Penicillin and vitamin K were continued, and the intravenous infusion was also continued with 5% glucose saline.

On the 10th day further cutaneous hæmorrhages appeared and he had a slight epistaxis, but his urinary output continued to rise, and he felt much better. Blood-urea 232 mg. per 100 c.cm. Agglutination titre unchanged. Blood-pressure 130/80 mm. Hg. Treatment was continued as on the previous day. Next day the penicillin, vitamin K, and intravenous infusion were discontinued, as his general condition and fluid intake were so good.

He made an uninterrupted recovery from then on, with no secondary rise of temperature. On the 18th day his agglutination reaction to *L. icterohæmorrhagicæ* was positive in dilutions up to 1/300, with a trace at 1/1000.

DISCUSSION

It is fully appreciated that, in Weil's disease of this severe type, spontaneous recovery may take place without the active measures used in this case—

thus Walch-Sorgdrager (1939) records spontaneous recovery with blood-urea levels up to 360 mg. per 100 c.cm.—but the close time relation between the induction of high spinal anæsthesia and the start of urinary secretion suggests

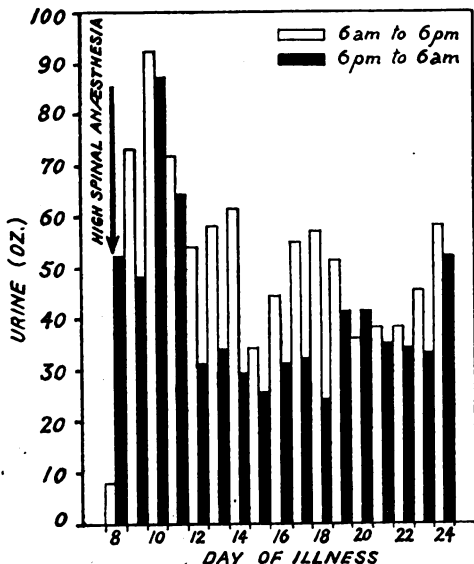


Fig. 1.—Diuresis following high spinal anæsthesia on the evening of the 8th day of illness.

that this treatment played some part in his recovery. High spinal anæsthesia was chosen, rather than splanchnic block, for technical reasons. It was considered that this was the surest method of interrupting the sympathetic impulses to the kidney, though the danger of collapse was fully realised. The blood-pressure was raised not only to diminish the chances of such collapse but also to keep it well above the renal-filtration level throughout the whole procedure.

Hitherto sympathetic paralysis has only been used in the treatment of well-established anurias when all other measures have failed. In view of the increasing evidence that renal vascular spasm is a cause of this type of anuria, the procedure should be given a

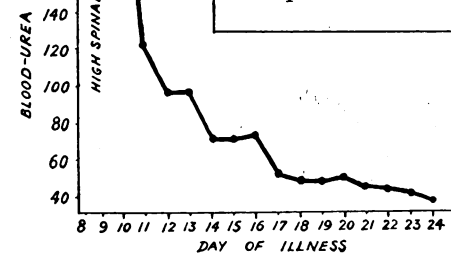


Fig. 2.—Rapid fall of blood-urea after diuresis had become well established.

trial before irreparable damage has taken place. It would be interesting to know if either splanchnic block or high spinal anæsthesia has been employed in the oliguric

stages of blackwater fever or yellow fever before complete anuria has set in.

SUMMARY

A man of 61, suffering from Weil's disease for 8 days, was drowsy, deeply jaundiced, and dehydrated, with blood-pressure 100/70 mm. Hg and blood-urea 321 mg. per 100 c.cm. He was still secreting small quantities of urine, the exact amounts and urea content of which were not recorded. Since recovery from such a state is extremely rare, particularly at the age of 61, it was decided to adopt active measures to increase his urinary output and remedy his hypotension before irreparable renal damage had taken place. When his blood-pressure had been raised to 130/90 mm. Hg, high spinal anæsthesia was induced up to the level of D7. The results were most dramatic, and diuresis began, with a good urea content of the urine (1.75 g. per 100 c.cm.). After a day's lag the blood-urea level fell at a remarkable speed. Fluid intake was well maintained by mouth and by intravenous infusion, and the diuresis continued despite the fact that the effect of the spinal anæsthesia wore off. Recovery was complete.

I wish to thank Dr. C. B. S. Fuller for allowing me to publish this case; Dr. C. H. Wrigley, pathologist to the Royal Hampshire County Hospital, and Dr. J. C. Broom, of Wellcome Research Laboratories, for their assistance with the pathological investigations; and my colleagues for their helpful criticism.

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BACTERIOPHAGE CLASSIFICATION OF SHIGELLA SONNEI

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A NEW way of classifying bacterial strains was demonstrated by Craigie and Yen (1938), who, using bacteriophages, differentiated between several distinct types of *Bacterium typhosum* which could not be distinguished by ordinary serological or biochemical methods. The types were constant. Subsequently other bacteria also were classified by means of bacteriophages: *Bact. paratyphosum B* by Felix and Callow (1943), *Staphylococcus aureus* by Fisk (1942) and Wilson and Atkinson (1945), and soil bacteria by Conn et al. (1945).

I have tried to type *Shigella sonnei* by means of phages and present the results here. I isolated 25 Sonne phages, 7 of which came from partly lysed Sonne colonies of human origin, 2 from filtrates of faeces from dysenteric subjects, 12 from filtrates of animal faeces (pig, hen, horse, cat), and 4 from filtrates of sewage and dung water.* The phages were "purified" by transplantation of isolated plaques after serial dilution; 3-5 passages were made, and the last of them was passed through a Chamberland filter. In relevant cases, either the strain itself or one epidemiologically related to it was used in the passages.

METHOD

The classification of the types was in accordance with the method of Craigie and Yen (1938). I tried to carry out the tests under as constant conditions as possible. The agar concentration was kept throughout at 1.25%, and a sufficient stock of the medium was prepared so that a considerable number of tests could be made under uniform conditions. The critical test dilution (C.T.D.) was regularly controlled against selected strains of different sensitivity. Moreover, the phage dilutions were subjected from time to time to a bacterial sterility test. Only calibrated platinum loops were used. The agar plates, before use, were dried in the incubator for 10-15 min. at 37° C, and after inoculation with the broth cultures for another 15-30 min. at the same temperature. The broth drops were thus thoroughly dried (incomplete drying may give a misleading reaction). The phages were then added without delay. If the interval between the inoculation of the culture and the addition of phages is too long, the reactions may be indistinct. This happens if the interval considerably exceeds an hour at 37° C or 3 hours at room temperature. The plates were examined in a simple microscope after incubation for 4½-6 hours.

RESULTS

I first investigated whether the S and R forms of the Sonne bacteria differed with regard to lysosensitivity. In preparing the phages a difference was already noticeable. The 13 phages first isolated yielded preparations with a high titre for the corresponding R strain, but only S for the S form also; the other 5 phages did not lyse S forms of the corresponding or other strains at all, or else reached merely low titres with a pronounced secondary growth. No phages which acted exclusively or mainly on the S forms were observed. Thus, S+R and R phages could be distinguished. In spite of repeated attempts on different S strains, the R phages could not be transformed to S+R phages. Generally speaking, the Sonne phages were found to be scarcely amenable to adaptation. The S+R phages with weak S component, on the other hand, could have this component moderately increased by propagation on the S strain.

With a C.T.D. of the 21 phage preparations, the S and R forms of 112 strains from 42 places were tested. In

tests with an S+R phage a qualitative difference between the S and R forms of the same strain, whether it was sensitive or resistant, was never observed, regardless of whether the phage was propagated on the S or R form or not. The R phages, on the other hand, lysed only R strains. Control tests yielded identical results, provided that the C.T.D. was carefully adjusted. In testing against R phages it was essential that the strains should be in a pure R form. Even a slight content of the S form might mask the lysosensitivity. Testing the cultures with an absorbed Sonne S serum and plating definitely showed whether the strains were in pure R form or not.

As it appears from the above that R strains are best suited for attempts to classify Sonne bacteria, and as, moreover, R forms but not S forms can regularly be obtained from a Sonne strain, only R strains were tested in the subsequent investigations.

When additional phages had been isolated, the tests of a selected part of the above-mentioned R strains were continued. Moreover, additional strains were studied with all the phages. The number of Sonne strains was 108 from 71 places, the number of phages 25. On the basis of the relation of the strains to these phages, 14 types of Sonne could be distinguished. It was found that this classification could be made on the results obtained with 7 of the 25 phages (see table). Of the others, 6 behaved like some other phage, whereas the remainder, though showing deviations from all other phages, did not make any further classification possible, at least on the basis of the existing material.

The classification is based on a very distinct difference between the lysosensitivity of the strains—i.e., confluent lysis or negative reaction. Some strains, with C.T.D. of certain phages, yielded isolated plaques. By including such strains in determining the C.T.D., and by careful titration, it was possible to select such a dilution that this reaction with isolated plaques could be clearly distinguished from a positive reaction with confluent lysis, as well as from a negative one. How reactions with

CLASSIFICATION OF STRAINS OF *Shigella sonnei* USING 7 BACTERIOPHAGES

Strains	Bacteriophages						
	IV	V	VI	VII	X	XIV	XVI
139	+	+	+	+	+	+	+
85	+	+	-	+	+	+	+
83	+	+	+	+	-	+	+
81	-	+	-	+	+	+	+
93	+	+	-	+	-	+	+
129	100	+	-	+	+	+	-
2770	100	-	-	+	+	+	100
25	+	+	+	+	-	-	+
6901	-	+	-	+	+	-	+
86	+	+	-	-	-	+	+
5	+	+	-	+	-	-	+
128	100	+	-	-	-	+	-
158	-	-	-	+	-	-	100
43	-	-	-	100	-	+	-

+ = confluent lysis; - = negative reaction.
100 = approximate number of isolated plaques.

isolated plaques are to be judged, and whether they can be used along with confluent lysis and negative reaction as a special criterion in distinguishing Sonne strains, must be left for future investigation. The above classification was not based on phage effects in the form of isolated plaques.

* The last-mentioned 16 filtrates were kindly placed at my disposal by Mr. Lilleengen, reader in bacteriology, School of Veterinary Medicine, Stockholm.

The investigations hitherto made indicate constancy of the type. During a Sonne epidemic 46 strains were isolated from 42 persons. All of them belonged to the same type—i.e., that corresponding to strain 85 in the table. Moreover, groups of 2–10 epidemiologically related strains of several other types showed identity of type, and 3–7 strains from the same persons exhibited type constancy. This question is being made the subject of further studies.

SUMMARY

With 7 bacteriophages of different origin 108 strains of *Shigella sonnei* could be divided into 14 types. Judging from the investigations made up to the present, epidemiologically related strains, as well as strains from the same individual, display constancy of phage-types.

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PAROXYSMAL HYPERTENSION

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PAROXYSMAL hypertension is a clinical finding of the first importance. MacKeith (1944) classifies it as (1) essential, when the blood-pressure (B.P.) is persistently raised between the paroxysms; (2) symptomatic, as in lead poisoning, eclampsia, tabes dorsalis, aortic regurgitation, angina pectoris, thalamic tumour, angina vasomotoria of Nothnagel, and affections of the vagus; and (3) due to phæochromocytoma (adrenal medullary tumour).

It is important that a phæochromocytoma should not be missed, because permanent recovery may follow its surgical removal. That its recognition is not easy, however, and especially its distinction from a tumour of the brain, is shown by the following case.

CASE-RECORD

A man, aged 62, was admitted to the Eastern District Hospital, Glasgow, on Sept. 29, 1945. Two weeks previously, while walking along the street, he had suddenly felt giddy, lost consciousness, and fallen. He recovered consciousness in about half a minute, he thinks, and although a bit shaky he got up and walked on. He had two other similar attacks before admission to hospital; in the second, three days before admission, he did not lose consciousness completely, and he felt his left arm and left leg twitching violently. Throughout there had been no loss of power of arm or leg. Previously he had never been troubled by headaches, giddiness, fits, or similar complaints.

On examination he appeared healthy and rather highly coloured; he lay comfortably in bed and answered questions freely. There was no anaemia, no abnormal urinary constituent, and indeed no evidence of disease apart from a B.P. of 200/110. Radiography of the skull and ophthalmoscopy revealed no abnormality, and the Wassermann reaction was negative.

Repeated routine B.P. readings showed a progressive fall in pressure: 155/95 on Oct. 11, 145/85 on Oct. 15, and 140/95 on Oct. 18. He was about to be discharged, when on Oct. 22 he had an epileptiform seizure. He first of all lost the power of speech, then had twitchings, at first in the left arm and immediately thereafter in the left leg. He did not lose consciousness. The attack lasted about three minutes. The B.P. immediately after the attack was 190/110; next day it was 170/100.

Between that day and Nov. 18 he had three similar attacks. The B.P., read twice in this interval, was 130/68 and 160/95. On Nov. 18 a similar seizure was accompanied by a B.P. of 260+/140. In view of the association of the attack with a rise of B.P., it was decided to read the B.P. daily pending a

further attack. Daily readings revealed pressures between 125/80 and 140/90 until Nov. 27, when another seizure was accompanied by a B.P. of 260+/140. An hour after the attack the B.P. was 200/120, two hours after 130/100, and five hours after 110/70.

On Nov. 6—i.e., after the fourth seizure—the left leg was weak, and on Nov. 22 the left arm was weak.

The differential diagnosis seemed to rest between cerebral tumour, suggested by the jacksonian epilepsy and gradually increasing hemiparesis, and phæochromocytoma, suggested by the paroxysmal variations in B.P. If the latter diagnosis were correct, the hemiparesis could be attributed to repeated damage to the internal capsule as a result of the recurring attacks of vasoconstriction.

Against the diagnosis of brain tumour were the absence of headache and of vomiting, a normal skull X-ray picture, and the absence of papilloedema on repeated ophthalmoscopy. Further, though it would be reasonable to expect a rise in B.P. as the result of a fit, such large increases seemed more than could be explained by the comparatively mild localised seizures. In addition, considerable fluctuations of pressure were noted in the absence of fits, and, as pointed out above, the pressure remained elevated for some time after a fit, only gradually falling to normal.

Accordingly, investigations were carried out to discover whether an adrenal medullary tumour was present. These were negative, apart from an apparently positive cold pressor test (Hines 1940). The B.P. before immersion of the hand, with the patient supine, was 135/95, immediately thereafter 175/110, and forty minutes later there was a seizure lasting five minutes and accompanied by a B.P. of 260+/150.

It had been decided that a laparotomy would be advisable, when the patient's condition became rapidly much worse. Some stiffness of the neck developed, and the right pupil became larger than the left. There was now little doubt but that there was a rapidly growing space-occupying lesion of the right hemisphere, perhaps a glioblastoma with developing tentorial pressure cone. The patient died on Dec. 28.

At necropsy the convolutions of the right cerebral hemisphere were greatly flattened, but there was no flattening of those of the left side. A large pressure cone had formed on the undersurface of the cerebellum, and the tentorium had grooved the uncinatè gyrus. A large glioblastoma was present in the right cerebral hemisphere, occupying the parietal and occipital lobes. It was situated dorsally and did not encroach on the thalamus and hypothalamus. There was no adrenal medullary tumour.

DISCUSSION

Such large variations in B.P. are not a well-recognised feature of cerebral tumour. Further, the extremely high B.P. of 260+/140–150, in association with only mild jacksonian epilepsy, in a patient whose B.P. was normally 125–140/80–90 appears to be unusual. These findings, associated with an apparently positive cold pressor test, made the diagnosis of phæochromocytoma one to be seriously considered. The patient's rapid downhill course, however, left no doubt about the correct diagnosis.

SUMMARY

A patient, in whom a cerebral tumour was found at necropsy, was thought to have an adrenal medullary tumour, because of large variations in blood-pressure, both spontaneous and induced. The case shows that such paroxysms of hypertension may be caused by a rapidly growing cerebral tumour, even when it is not apparently invading the thalamus or hypothalamic region. Further, a well-marked rise in blood-pressure may take place when the hand of such a patient is immersed in cold water.

My thanks are due to Prof. Noah Morris and Mr. J. Eric Paterson for the interest they took in the case, and to Dr. M. Ross, Dr. M. McGowan, and the resident medical staff at the Eastern District Hospital for their coöperation.

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- Hines, E. A. (1940) *Amer. Heart J.* 19, 408.
 MacKeith, R. (1944) *Brit. Heart J.* 6, 1.

Reviews of Books

Operative Surgery

GEORGE BANKOFF, M.D. Florence and Erlangen, F.R.C.S.E., E.M.S. surgeon, SS. John and Elizabeth Hospital, London. London: Medical Publications. Pp. 416. 63s.

IN this short treatise on operative surgery the author's aim has been to produce a readable and complete work for medical students and general practitioners. The text—simple and lavishly illustrated—adequately describes the standard operative procedures students must know for examination purposes. Along with these everyday operations, diagrams of rarer—much rarer—operations are inserted. These will distract the novice, and they are inadequate for anyone wishing to master the procedure. For instance, besides the usual description of amputation at the lower end of the thigh, no fewer than three methods of osteoplastic amputation are illustrated but not described. The chapters on thoracic and plastic surgery are well written and complete, supplying a want in many students' textbooks. Orthopædists will not be pleased with the injunction to use the finger, "the gentlest and most sensitive instrument of all," in open operations for fractures; nor will most agree that removal of two-thirds or three-quarters of the medial meniscus is the usual result after making a 2–3-in. incision in the knee.

Omissions there must be in a first edition, but one would wish to include the modern standard method of ligation and injection in a chapter on varicose veins which details such older methods as stripping.

Oral Medicine

LESTER W. BURKET, D.D.S., M.D., professor of oral medicine, the Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania; professor of oral medicine, Graduate School of Medicine, University of Pennsylvania. London: J. B. Lippincott. Pp. 674. 72s.

THIS book represents an attempt to correlate general medical conditions with oral manifestations. The sections dealing with oral diseases associated with general conditions are good and the illustrations are excellent, but there is a tendency to find oral manifestations in nearly all diseases. Thus even hæmorrhoids are mentioned, though save in the presence of reversed peristalsis it must be somewhat difficult to demonstrate their effects in the mouth. Dental surgeons may be interested in the exhaustive chapter dealing with occupational diseases of dental practice, but the embryo dentist may well be alarmed to discover that among other things he is liable to hæmorrhoids, pulmonary infections, and—unless he wears cotton socks inside woollen ones—foot troubles. There is a section on oral aspects of aviation medicine by Major Alvin Goldhush.

La Cultura in Vitro del Midollo Osseo

A. FIESCHI; G. ASTALDI. Pavia: Tipografia del Libro. Pp. 306. 1000 lire.

THIS volume gives a comprehensive and exceptionally well-illustrated account of the behaviour of human bone-marrow explanted into tissue-culture medium. Marrow from normal subjects and from patients with pernicious anæmia, leukaemia, and Cooley's (Mediterranean) anæmia was cultured. The technique was simple; the explanting medium was a mixture of the subject's plasma, chick plasma, and chick-embryo extract; and all the usual methods of examination were exploited. Like others before them, Fieschi and Astaldi find that the most useful observations are those within the first four days of the culture; after that the human hæmopoietic cells show degeneration, and fibroblasts and phagocytes predominate. Recognising these limitations, they have made some very interesting observations. The hæmocytoblast is found to be a cell that is definitely hæmopoietic, but will develop into red-cell or granular white-cell series. The normoblast can lose its nucleus in one of three ways—extrusion, fragmentation, or lysis. Of these, extrusion is the commonest, and some photographs of the process are given. Evolution from

pro-normoblast to erythrocyte takes about four days, but in culture the red cells did not become fully orthochromatic, owing presumably to lack of hæmoglobin. Myelocytes can mature into polymorphs, but often in an irregular and incomplete manner. Megakaryocytes could not be seen forming platelets. The authors confirm the suggestion that plasma cells are not derived from lymphocytes but from a separate line of precursors.

Observation of marrow from pernicious anæmia before and after liver treatment shows that the effect of the liver principle is to make all non-hæmoglobinated cells—including those here called pro-megaloblasts—mature along the normoblastic line and produce normocytes; all later megaloblasts continue to mature as megaloblasts and are not transformed into normoblasts; the action takes place without the addition of liver extract to the medium. In acute leukaemias, Fieschi and Astaldi conclude, the hæmocytoblasts are pathological cells incapable of further differentiation; in the chronic leukaemias the cells appear normal and the disease is of a different type. Culture of marrow from cases of Mediterranean anæmia suggests that the defect is in the mechanism by which the normoblast loses its nucleus.

This monograph is of great interest to hæmatologists, and confirms, for the most part, the conclusions of workers in this country and elsewhere. It is produced on good paper, with 122 first-class photomicrographs and 10 fine colour-plates.

De behandeling van Hypertensie

Met Zouloos Dieet en met Utdrijving van Keukenzout. (Treatment of hypertension with salt-free diet and sodium-chloride depletion.) H. J. VIERSMA. Amsterdam: N. V. Noordhollandsche Uitgevers Maatschappij. Pp. 322.

THIS monograph chiefly concerns the influence of salt depletion on the level of hypertension and the course of hypertensive disease in a small but thoroughly investigated series of 8 cases of essential hypertension, 2 cases of chronic glomerulonephritis, and 4 cases of malignant hypertension. In benign essential hypertension and in chronic glomerulonephritis sodium-chloride depletion brought about by a salt-free diet and by the administration of mercurial diuretics and ammonium chloride induces a moderate fall in the systolic and a very slight fall in the diastolic pressures. The effect is achieved chiefly through a diminution in blood volume. In uncomplicated benign hypertension there is no abnormal NaCl retention and the treatment used depends on actual salt depletion. In malignant hypertension the treatment is without notable influence on the systolic and diastolic levels. In this condition there is spontaneously an excessive NaCl loss in the urine, chiefly it is supposed by virtue of the polyuria, and Dr. Viersma finds that therapeutic salt depletion has actually a harmful influence on renal function, depressing the urea-clearance values and precipitating the final uræmic phase.

The extensive data here presented on the whole confirm the old and the more recent literature which is extensively reviewed, but the work is important because it is so detailed and because the effect on malignant hypertension has not previously been widely recognised. The reader may gain the impression that salt depletion, with its attendant loss of enjoyment of food, has a restricted place in the treatment of uncomplicated benign and especially in the treatment of malignant hypertension, though it may be of value in complications such as cardiac failure and hypertensive encephalopathy.

Sir William Baynes has for many years been honorary legal adviser to the British Hospitals Association, and the second edition of his *NOTES ON POINTS OF LAW AFFECTING VOLUNTARY HOSPITALS* (London: British Hospitals Association. Pp. 136. 10s. 6d.) covers the most recent legal decisions besides including a number of useful model forms. Many problems not discussed in the first edition have been dealt with in recent years by memoranda prepared by Sir William and published by the Central Bureau of Hospital Information. These and others have been incorporated in this new edition. The whole is couched in terms easy for the non-legal mind to comprehend, and though it does not claim to be a complete compendium of hospital law it is indispensable to all concerned in hospital administration.

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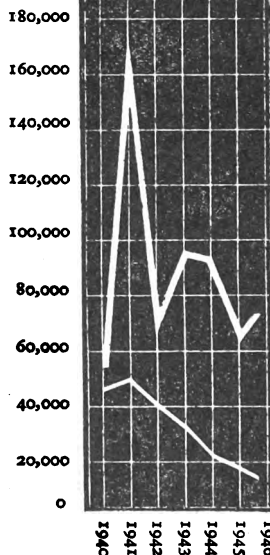
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THE LANCET

LONDON: SATURDAY, JAN. 18, 1947

Old and Ailing

"WHEN people grow old there is a very narrow borderline between sickness and health." This simple fact, recalled by Lord AMULREE in the Lords' debate on Oct. 8, is one which we cannot afford to forget when it comes to planning for the care of the aged. Healthy old people are common enough, and could be commoner if we gave the old better care: but like the very young they need shelter and protection if they are to keep well, for small ills readily attack them and readily grow to serious disease. Lord AMULREE justly fears that if under the new Acts healthy old people are to be under a different authority from those who are ailing, some of the worst faults of the old poor-law infirmaries may be perpetuated. The distinction simply cannot be made: every old person is liable to need a few days or weeks in bed from time to time; he will have bouts of bronchitis, rheumatic joints which get better and worse, long-term foot troubles, eye and ear defects, bowel disturbances, cardiovascular disorders, or some other sign of a failing body. Some of these will clear up quickly with little treatment beyond rest; some will need investigation and regular treatment over several weeks or months. Because these disasters, great and small, are the common lot of the old, every institution housing the "healthy" aged will need a sick-bay; and if an old person is in a comfortable bed, getting some medical and nursing attendance, it is hard for him or anyone else to believe that he ought to be moved into a different bed in a different institution, even to get his illness properly investigated and actively treated. Delays from this cause are specially likely now, when any old person who has found a bed in an institution enjoys something of the proud singularity of a winner of the Irish Sweep.

The scarcity of beds for the chronic sick and the aged is an indirect outcome of the Public Health Act of 1929 and of the Emergency Medical Service. When the public-assistance authorities took over the poor-law infirmaries they converted many of them wholly or partly into general hospitals for the acutely ill; and though this meant an advance in standards, and a much-needed increase in acute beds, it also meant that many of the old and ailing now have nowhere to go. Nevertheless this situation may lead to a better state of things, for most of the old infirmaries were outside the hospital tradition, and even now there are many institutions where people lie in bed year after year without proper examination or treatment, as Lord AMULREE pointed out. How much can be done for such patients has been demonstrated at the West Middlesex Hospital,¹ where 60% of the patients who come into the chronic-sick wards are discharged well enough to return either to their own homes or to homes taking healthy old people.

Certainly very large numbers of old people now in infirmary beds might be living active and happy lives at home if thoroughly treated. Infirmaries are often seriously short of nurses and domestic staff, and rely for medical attendance on a visiting general practitioner. Housed in obsolete buildings, they are overcrowded, dingy, and wretched, lacking both the equipment and the staff necessary for the scientific investigation of disease.

Some of the neglect these patients suffer comes of referring to them as the "chronic sick." Rightly or wrongly, this term has come to imply hopeless and incurable disease, and has outlived its usefulness. Perhaps it might now give place to some such term as "ailing," which has no pessimistic connotation and suggests rather a challenge to medical skill.

The Nuffield committee whose report is summarised on p. 112 suggest two ways of caring for ailing old people, and think that both may have a place in our future health service. Certainly the old person should go first, they consider, into the wards of a general hospital for study and treatment; and afterwards he should go either to his relatives or to a home, or else to a unit for chronic cases attached to the general hospital. There are, of course, some old people who will need continued medical and nursing care of a high order for the rest of their lives; and it is certainly better that these should be warded in units attached to a general hospital than relegated to an infirmary. But most will be able to return to ordinary life for long spells; and it should be made easy for them to move between hospital and residential home as their condition requires or allows. If homes for old people are under the authority which controls the hospitals, their care will be conceived as a whole and it will be easier to transfer them directly into the wards without unnecessary delay when they fall sick, and to send them back to their familiar surroundings as soon as they are fit to go.

The question remains, what should these familiar surroundings be? Not the drab, unhomelike quarters of the old type of institution: we must try to get rid of the poor-law spirit in the care of the old as we are doing in the care of the young. Lord AMULREE² suggests that we might follow the good example of the French, who have comfortable homes for old people who can pay about £1 a week, and simpler homes for those who can pay less or nothing at all. In these homes there are no rules worth talking about: the residents come and go as they like, go down to the neighbouring estaminet for coffee or beer and a game of dominoes, come in when they please—old people seldom care to keep late hours—and sometimes go to stay with their friends or their children for a week or two at their own discretion. Those who saw the French film *Fin du Jour* will know exactly the kind of home for old people that he has in mind—comfortable, friendly, run with humanity and the minimum of interference—as different as can well be imagined from the old type of poor-law infirmary where the sexes are segregated and rules are many and officious. These French homes, like the hospitals, are under the Assistance Publique. Whether an old person is ill or well never raises an administrative problem, because

1. Warren, M. *Lancet*, 1946, i, 383, 841.

2. *Lancet*, 1946, ii, 801.

if he is well he is either with his family or is living a normal boarding-house life in a home; if he is ill he goes into hospital, where he can be investigated and treated properly. The kind of live-and-let-live spirit evident in the French homes does not come readily to the British today, though we once had it. It is worth reviving.

Peritoneal Dialysis

THERE are few more harrowing situations for the physician than to have charge of a patient who is in uræmia because of renal damage from which recovery is known to be possible. Such constitute a minority of uræmic cases, since more often the failure is the inevitable and irreversible conclusion of a destructive renal process. This inevitably fatal uræmia is mostly seen in elderly subjects. Recoverable renal damage, on the other hand, is the result of incompatible blood-transfusion, renal crush syndrome, sulphonamide poisoning, renal failure of acute infections, or surgical shock, and all these events are as likely, if not more likely, to arise in the young. In such conditions there is reason to believe that if uræmic death can be averted the kidneys will in time resume their function, and eventually the patient will recover. The therapeutic problem is how to get rid of the urea in the blood while the kidneys are out of action.

In attempts to promote extrarenal excretion, sweating and purgation have been intensively practised, but quantitative estimations of the excretion of various nitrogenous products by dermal and alimentary routes have shown that these measures are pitifully inadequate. A profuse sweat may eliminate 2 g. of urea, which would clear some 0.5-1 litre of uræmic blood. The devising of more physiological substitutes for renal action necessitates a consideration of renal function. Basically this consists in the production by the glomeruli of a dialysate of blood plasma, and its subsequent concentration in the tubules. With sufficient water the glomerular mechanism alone can probably maintain life for some time. VIMTRUP¹ has reckoned that the total area of the glomerular membrane in a pair of kidneys is about 3 square metres, so any substitute dialysing membrane should be of comparable dimensions. Recent years have seen two main avenues of approach to this problem. A few weeks ago we reviewed the remarkable work of KOLFF² in the construction of an artificial kidney. This consists of a 'Cellophane' tube 23 mm. wide and 30-45 metres long—i.e., a total membrane area of between 2.2 and 3.3 sq. metres—wound spirally round a cylinder rotating in a tank containing 70-100 litres of a solution of 0.6% NaCl, 0.2% NaHCO₃, 0.04% KCl, and 1.5-2% glucose. The blood is heparinised, and cannulæ inserted into the radial artery and vein enable the apparatus to be placed in circuit with the patient's circulation. By this means as much as 260 g. of urea has been removed from the circulation, and there is presumptive evidence that at least two patients owe their life to the apparatus.

An alternative method, to which REID and colleagues³ have lately drawn attention, is to exploit the dialytic powers of the peritoneum. The total surface

area of the peritoneal membrane is around 6 sq. metres; and, as PUTNAM⁴ demonstrated experimentally 23 years ago, it is freely permeable to crystalloids and the smaller organic ions, the exchanges following in general the theoretical laws of pure osmosis. Lately, in Boston, FINE, FRANK, and SELIGMAN⁵ have applied peritoneal irrigation to the treatment of uræmia both experimentally in dogs and in human cases. They calculated that in the animals the procedure was 40-75% as effective as normal kidney function in clearing the blood of urea. In dogs made uræmic by bilateral nephrectomy peritoneal irrigation could prolong life by several days, and their death was apparently due not so much to uræmia as to peritonitis following bacterial contamination along the irrigation tracks. In four cases of uræmia in man peritoneal irrigation was followed by a striking biochemical improvement with reduction of blood-urea nitrogen to figures approaching normal. What is even more important, this change was associated with much relief of such symptoms as headache and stupor. One of these patients, suffering from sulphathiazole damage to the kidneys with 5 days of complete anuria, fully recovered. In one of the other three cases recovery was impossible because the uræmia was due to ureteral obstruction by carcinoma. An important feature of the results is that in none of the cases did any gross peritonitis develop, although in two of them organisms such as *Bact. coli*, *Staph. albus*, *Cl. welchii*, and enterococci eventually appeared in the drainage fluid. As Dr. FINE points out in his letter on another page, this tendency to the development of peritonitis is probably the biggest single danger in the procedure. Such relatively satisfactory results were obtained not only by strict asepsis but by the use in the irrigation fluid circuit of a large Berkefeld filter which permitted a flow of 40-60 ml. a minute, and by the inclusion of penicillin in the modified Tyrode solution. Where there is no suggestion of renal sensitivity to sulphonamides, sodium sulphadiazine may be added. Complete bacteriostasis of the fluid awaits the plentiful supply of an antibiotic (perhaps streptomycin) which includes *Bact. coli* in its range; Dr. FINE notes that when streptomycin is used prophylactically *Bact. coli* tends to become resistant to the drug. KOLFF,² who has used this method in ten cases, limits the duration of lavage to 36 hours because of the risk of peritonitis at the site of entry of the catheters.

Peritoneal irrigation requires a volume of fluid in the neighbourhood of 40 litres a day, corresponding to 28 ml. per min.; such a quantity makes possible a blood-urea clearance of 15-25 ml. per min. FINE and his colleagues⁵ demonstrated clearly that the maintenance of the patient's water and electrolytic balance is just as important as the mere reduction in blood nitrogen. In two of their four cases pulmonary oedema resulted from the excessive administration of intravenous fluid and absorption from the irrigation. The anuric patient requires only enough water (about a litre a day) to replace loss by vaporisation. The Boston workers eventually decided that 2% glucose in the irrigating fluid would prevent the absorption of water. Furthermore, the absorption of glucose from

1. Vimtrup, B. *Amer. J. Anat.* 1928, 41, 123.

2. Kolff, W. J. *The Artificial Kidney*, Kampen, Holland, 1946; see *Lancet*, 1946, ii, 720, 726.

3. Reid, R., Penfold, J. B., Jones, R. N. *Lancet*, 1946, ii, 749.

4. Putnam, T. J. *Amer. J. Physiol.* 1923, 63, 548.

5. Fine, J., Frank, H. A., Seligman, A. M. *J. Amer. med. Ass.* 1946, 130, 703; *Ann. Surg.* 1946, 124, 857; *J. clin. Invest.* 1946, 25, 211.

35 litres of such fluid amounted to 200–300 g., constituting a valuable contribution to the patient's nutrition. Another point emphasised is the necessity of using peritoneal drainage-tubes made of an "inert" metal, such as stainless steel. Such tubes showed no tendency to become blocked by adhesions forming round their ostia, whereas rubber catheters, though suitable for the inflow, gave endless trouble when used for drainage. There is much useful detail in these admirable papers, and anyone contemplating the application of the method should consult them in the original.

Peritoneal irrigation obviously has possibilities, but its proper application demands the highest technical, nursing, and chemical care. More work needs to be done to determine the optimum composition of the irrigating fluid and to perfect the other details. In cases of uræmia due to such intrinsically fatal conditions as neoplastic blockage of the ureters, and uncomplicated by cardiovascular disease, the prospect of temporary benefit justifies a trial of the method. On the other hand, as DANZIGER⁶ insists, peritoneal irrigation is not to be lightly embarked upon in moribund patients. With potentially recoverable cases of uræmia it will be difficult to decide when the procedure should be applied and when recovery will occur unaided. The safer peritoneal irrigation becomes, the less important will be the decision.

Alternative to Curare

ANÆSTHESIA must be paid for in physiological injury to the organism. If modern surgery demanded no more than the relief of pain the price would be small; for light anæsthesia, maintained even for long periods, has strikingly few after-effects. Many important branches of surgery, however, involve regions of the body where surgical trauma initiates powerful reflexes. The abdomen and thorax are outstanding examples, where surgery is hardly possible unless these reflexes are obtunded. Reflex contraction of the muscles of the abdominal wall and of the larynx, for example, results in the well-known phenomena of "tight abdomen" and "pushing guts." In thoracic operations the responses consist in the peculiar type of coughing which Americans aptly term "bucking." These disturbing reflexes are abolished by profound anæsthesia; a level is reached at which the only signs of life are continued respiration and heart-beat. For this state—in reality one of approaching death—the patient pays heavily in terms of complications and delayed recovery. Anæsthetists in the last few decades have therefore concentrated their efforts on providing a relaxed and tranquil abdomen for the surgeon in a way less costly to the patient than deep anæsthesia. Until three years ago light general anæsthesia combined with some form of block of the nerves supplying the abdomen held the field. In this technique the particular variety of block is selected according to the patient's physique and the skill of the anæsthetist. A robust patient may be suitable for spinal anæsthesia; the frail may need no more than the small dose of anæsthetic required to make him unconscious. The nature of the anæsthetic seems to be of secondary importance to the quantity given.

In 1943 curare burst on an astonished but receptive anæsthetic world. Astonished, because of the ease and simplicity with which it is administered; anybody capable of giving an intravenous injection could now produce a replica of a spinal anæsthetic so far as the abdominal surgeon is concerned. Receptive, because the imperfection of methods up to that time was fully realised. The skill required, and the time consumed by local anæsthetic techniques, coupled with the frequent and unpleasant cardiorespiratory and neurological sequelæ of spinal anæsthesia, assured any reasonable alternative a welcome. Curare has passed its early clinical trials with flying colours, and dozens of enthusiastic reports have been published from all parts of the world. Its site of action is now well known. Instead of breaking the reflex arc in the manner of a regional block by interrupting the nerve pathway, curare prevents the muscles themselves from responding. Curare is of tremendous importance to anæsthesia and surgery, and it is unfortunate that its long-term investigation and appraisal is being hampered by shortage of supplies. The only source of the raw material is central South America, and it is intolerable that the availability of such a boon should depend on the moods of native witchdoctors, themselves swayed by all the imponderables of jungle magic. Substitutes, natural or synthetic, are urgently needed. Many substances are already known which have curare-like properties. These mostly belong, chemically, to the group designated by ING¹ as "onium salts"—a generic term for cations of the ammonium, phosphonium, and sulphonium type of the general formula $(\text{CH}_3)_4\text{N}^+$. At least two substances, beta-erythroidine² and quinine methochloride,³ have been tried with success on human subjects for the relief of myotonic conditions. The freedom from side-effects which characterises curare prompts the hope that such synthetics as the quaternary ammonium salts,¹ which have a similar chemical structure to curare, will be given a clinical trial.

In this issue appear reports of 'Myanesin,' a synthetic glycerol ether which, when injected, produces clinical effects not unlike those of curare but with some important and valuable differences. The new drug shows a well-marked antagonism to strychnine and an apparent potentiation of barbiturate anæsthesia, besides other features, which give the investigators the impression that its pharmacological action is as different from that of curare as is its chemical formula. While curare acts on the myoneural junction, myanesin appears to act on the spinal cord. To myanesin are ascribed virtues such as a selective action on the abdominal muscles, a high therapeutic ratio, and an absence of side-effects which, if extended clinical and pharmacological studies confirm them, will make this drug even more useful to the anæsthetist than curare. Moreover, there are possible applications in obstetrics and neurology which have yet to be explored. The British Drug Houses Ltd., who have made this new drug in their laboratories, are for the present confining its issue to a small number of anæsthetists. Their reports will be eagerly awaited.

1. Ing, H. R. *Physiol. Rev.* 1936, 16, 527.

2. Burman, M. S. *J. Pharmacol.* 1940, 69, 143.

3. Harvey, A. M. *J. Physiol.* 1939, 95, 45; Harvey, A. M., Marsland, R. L. *J. Pharmacol.* 1941, 73, 304.

6. Danziger, R. W. *Lancet*, 1946, ii, 848.

Annotations

THE CAPITATION FEE

LAST week the Ministry of Health announced that—

"An agreement has now been reached between the Minister of Health and the Insurance Acts Committee of the British Medical Association on the application of the Spens report to the current capitation fee under the existing National Health Insurance scheme. Mr. Bevan has proposed that the present capitation fee of 12s. 6d. should be increased to 15s. 6d., with effect from Jan. 1, 1946, and that there should, in addition, be an increase in the special payments made to rural practitioners."

This announcement will be received with general satisfaction. It resolves a controversy which only a few weeks ago seemed about to disrupt relations with the Ministry and precipitate widespread resignations of doctors from the panel service.

The principal cause of disagreement was the Minister's unwillingness to discuss the proper level of the N.H.I. capitation fee without at the same time discussing the mode and amount of remuneration appropriate for the new National Health Service. The Insurance Acts Committee, having neither the power nor the wish to negotiate on anything other than National Health Insurance matters, maintained that they should be allowed to settle the single issue of the current fee without having to enter into the much more controversial field of future remuneration. Their will eventually prevailed, and a settlement has been reached. The figure agreed, although not as high as some doctors may have hoped in view of the high betterment figure quoted by Dr. Dain in his Exeter speech, is very appreciably higher than Mr. Bevan's interim payment of 12s. 6d., and is even in excess of the I.A.C.'s own suggestion of a 15s. fee made less than a year ago. Before answering the Minister, the I.A.C. submitted his offer to meetings of local medical and panel committees throughout the country, and in these meetings acceptance was strongly favoured. In accepting the offer the committee have, however, stated that they do so "without prejudice to the assessment of remuneration in any future service." It is of course now generally agreed that new factors arising in the new service, such as the inclusion of children and the extension of the service to all people in all income groups, will make it necessary for the doctor to have higher remuneration for each patient than under National Health Insurance. This necessity is well recognised by the Minister himself; it is, in fact, stressed in the official statement from the Ministry, which continues:

"In making this offer the Minister has made it clear that remuneration under the new National Health Service will be a matter for negotiation with the medical profession. Some of the factors on which the 15s. 6d. is based will, in his view, have a bearing on the negotiations for the remuneration in the new service which, it is agreed, will be on a higher level than the remuneration now settled for health insurance."

Altogether, this is a very satisfactory position to have reached, and one reflecting credit on the negotiators on both sides.

CARE OF SPASTICS

THE British Council for the Welfare of Spastics was established on Dec. 12 at a meeting held in the London School of Hygiene and Tropical Medicine.¹ Prof. J. M. Mackintosh, who took the chair, could give no exact estimate of the numbers of cases of spasticity due to cerebral palsy in Great Britain, though he noted that 234 spastic children are known to the school medical officer in Glasgow alone. The meeting was attended by representatives of 7 Government departments, 12 medical associations,

9 ancillary medical services, 26 educational and welfare bodies, 2 organisations of medical officers, and 2 schools for spastics—evidence of a wide national interest in the care of children and grown people affected in this way. The Ministries of Education, Labour and National Service, Health, and Pensions, and the Scottish Departments of Health and Education, all assured the council of their support in a task which at this stage is well suited to the voluntary approach. The council will act as an advisory and consultative body, coördinating the work of all agencies for the care, education, and training of patients with cerebral palsy. It will also foster interest in this condition, help to provide schools, clinics, and equipment for the care and education of those affected, will train staff in educational methods and in treatment, and will encourage research. One school for spastic children has already been founded at Croydon, and another is being established in Birmingham. The Birmingham school has been given by Mr. Paul S. Cadbury, and is to be named Carlson House after Dr. Earl R. Carlson, the American pioneer in work for spastics.

The council appointed Lord Horder as medical vice-president, Professor Mackintosh as chairman, Mr. Cadbury as vice-chairman, Mr. H. P. Weston as secretary, and Mr. Isaac Wolfson as treasurer. The executive committee was composed of Mrs. Lionel Hitchens, Mr. R. A. S. Lloyd, Dr. Hamilton Hogben, and Mr. S. K. Quale, who has taken an active part in the founding of the council. The headquarters of the council will be at 34, Eccleston Square, London, S.W.1.

VOLUNTEERS FOR COLDS

THE virus of the common cold has not yet been cultured, and the only susceptible laboratory animal, the chimpanzee, is hard to obtain, expensive, and difficult to handle. Hence the only practicable way of establishing the presence of the virus is by human inoculation, and our knowledge of the cold virus today is as limited as was our knowledge of the influenza virus up to 1933, when the ferret was found to be susceptible.

Last summer the Medical Research Council and the Ministry of Health set up a common-cold research unit.¹ Since July volunteers have been received at the Harvard Hospital, Salisbury, which was built during the war for American volunteers, was later occupied by the United States Army, and has since been presented to the Ministry of Health. The volunteer must be aged between 18 and 40, must be free from respiratory infection, and should have a normal susceptibility to the cold. On arrival he is thoroughly examined and his chest is radiographed. He remains for ten days, during the first four of which he is observed for the cold he may have contracted before arrival. Fluid is then instilled into his nose, half the volunteers receiving infected fluid and the other half acting as controls to check the efficiency of the isolation measures and the accuracy of observations by doctor and volunteer. So far no control has developed a cold. The need for isolation calls for gentle discipline; but the volunteers, who live in pairs, are free to make use of the opportunities for games and to walk where they will, provided they do not approach other people.

The principal source of volunteers so far has been university students, in whose estimation the less-than-even chance of a mild cold is a trifling price for ten days' peaceful retirement in a comfortable flat, with all found and three shillings a day pocket-money. In term-time, however, the number of students does not suffice to keep the investigation going. Although the British Red Cross has stimulated recruitment, and a few industrial undertakings have encouraged their employees to volunteer, still more are needed to bring the total to the

1. See *Lancet*, 1946, ii, 624, 889.

1. See *Lancet*, 1946, i, 822.

required 600 a year. Last week a press conference was held to announce the formation of a national panel of volunteers.

It was emphasised that rapid progress is not to be expected; the work must be measured in years rather than months, the first aim being to find a susceptible animal or to develop a laboratory technique. It is at least encouraging, however, that the problem of the cold is at last being energetically tackled on both sides of the Atlantic.²

SEX HORMONES IN PERIPHERAL VASOSPASM

In his classical description of the syndrome named after him Raynaud observed that "the complete disappearance of local syncope has always been noted by this lady as the first index of a commencing pregnancy."¹ Nearly 70 years later, in 1929, Snapper² noticed that a female patient's acrocyanosis improved when she received oestrogenic hormone for ovarian dysfunction; and similar clinical observations have since been repeatedly made. In 1935 McGrath³ injected ergotamine tartrate into albino rats, some of which were also given an oestrogen. Gangrene of the tail developed in all male rats and in every female which had not received the hormone; but among 40 females protected with the hormone gangrene resulted in only 2. It has also been shown that castrated male rats treated with the hormone have the same immunity as females.⁴ The physiological explanation seems to be that oestrogens cause local liberation of acetylcholine.⁵

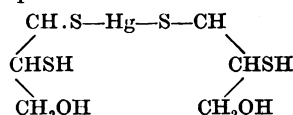
Recently Burckhardt,⁶ recording the time taken for artificially lowered skin-temperature to return to normal, has confirmed the vasodilator effect of oestrogens when administered by injection or in the form of linguets by mouth. Their action persisted for several weeks after the implantation of crystals. Male sex hormone had a similar, but less pronounced, effect, which is difficult to explain, seeing that more men than women get Raynaud's disease. A series of 345 patients treated for vasomotor disturbances with the female hormone have been followed up by McGrath and Herrmann,⁷ who have no doubt of its efficacy, though White and Smithwick⁸ deny that oestrogens will prevent vasospasm in the early stages of Raynaud's disease. It is well to remember that spontaneous improvement is common, and though this is usually temporary it may be sustained. Furthermore, sex hormones are not lightly to be prescribed for women between puberty and the climacteric; it is seldom justifiable to interfere with the menstrual cycle to avoid a harmless frostbite.

SULPHYDRYL COMPOUNDS IN MERCURY POISONING

It has long been known that —SH compounds will reduce or abolish the toxicity of mercury salts. In 1908, for instance, Chick¹ reported that ammonium sulphide not only stopped the disinfectant action of mercuric chloride on bacteria, but apparently reversed toxic compounds formed between the metal and the substance of the bacterial cell. Again Rapkine² in 1931 found that cysteine or thioglycolic acid could protect sea-urchin eggs against the toxic action of mercuric chloride on cell division, and Fildes³ in 1940 noted that the antibacterial

growth effect could be reversed by sulphydryl compounds. These observations were an indication that mercuric salts combine with some —SH constituent in the cells.

Research on B.A.L.⁴ (2, 3-dimercaptopropanol) has demonstrated its effectiveness against poisoning by some other metals, such as cadmium and mercury, in addition to arsenic, and Gilman et al.⁵ have used it successfully in mercuric-chloride poisoning in dogs. In Baltimore Prof. W. T. Longcope and his associates have found B.A.L. a remarkably effective antidote in patients with mercuric-chloride poisoning. (Oddly enough, this is a fairly common drug for suicides to choose.) It has been suggested that the complex formed by B.A.L. with mercury salts has the composition:



A recent study by Long and Farah⁶ at Harvard is instructive. The organic mercurial diuretic, mersalyl ('Salyrgan'), is toxic to the heart-lung preparation of the dog, 150 mg. producing a severe heart-failure. This can be immediately relieved by as little as 10 mg. of B.A.L.; it is interesting that a larger amount (100 mg.) of glutathione had a similar effect. In the intact cat or dog, the cardiac changes produced by a lethal dose of the mercurial—such as sudden drop in blood-pressure and electrocardiographic changes—were counteracted immediately by the —SH compounds, B.A.L. again proving more effective. It seems advisable therefore to have a —SH compound ready where there is any possibility of mercurial poisoning.

EMERGENCY BEDS

In quite a small room in Old Jewry three recent WRENS sit taking and making telephone calls. They face a wall covered with the names of hospitals and coloured tallies hung on hooks. The King's Fund emergency bed service began work on June 21, 1938, in an experimental and hopeful mood. Hospitals had agreed to play in this new game of snap, where beds must be matched with patients; so every day a report of vacant beds was obtained from all hospitals of substantial size. Tallies showing not only the number but the types of beds available were then hung on the wall so that the girls at the telephones could see at a glance where a gynaecological bed, say, could be found for a postpartum haemorrhage in Putney, or where a native of St. Pancras could take his perforated gastric ulcer. An early fear was that calls would be too few to justify the experiment. On the first day there were only seven calls, and beds were easily found; but they were the first of a total now exceeding over 40,000, and bed-finding is sometimes not easy at all. Apart from looking for beds the service undertakes to answer urgent inquiries from doctors, finding what they want, from iron lungs to mother's milk. The first request for mother's milk, made before the days of milk banks, stumped the girl on duty, but she answered hardily: "Yes, doctor, I'll ring you back in five minutes"; and then with brilliant aplomb rang up the General Nursing Council. There was silence for a moment at the other end; then the voice said firmly: "Try the London Hospital." Within very little over five minutes the doctor had been put in touch with the milk-supply.

When hospitals were evacuated, at the Munich crisis, the emergency bed service, on its own responsibility, collected a daily report of the bed state of all hospitals

2. *Ibid.*, 1946, ii, 355.

1. Raynaud, A. G. M. De l'asphyxie locale et de la gangrène symétrique des extrémités, Paris, 1862.

2. Cited by Hitzbenberger, K. *Wien. klin. Wschr.* 1937, 50, 465.

3. McGrath, E. J. *Arch. intern. Med.* 1935, 65, 942.

4. Suzman, M. M., Freed, C. C., Prag, J. J. *S. Afr. J. med. Sci.* 1938, 3, 29.

5. Reynolds, S. R. M. *Science*, 1938, 87, 537.

6. Burckhardt, W. *Schweiz. med. Wschr.* 1946, 76, 1147.

7. McGrath, E. J., Herrmann, L. G. *Ann. Surg.* 1944, 120, 607.

8. White, J. C., Smithwick, R. *Autonomic Nervous System*, 2nd ed., London, 1942.

1. Chick, H. J. *Hyg., Camb.* 1908, 8, 92.

2. Rapkine, L. *Ann. Physiol. Physicochim. biol.* 1931, 7, 382.

3. Fildes, P. *Brit. J. exp. Path.* 1940, 21, 67.

4. Peters, R. A., Storton, L. A., Thompson, R. H. S. *Nature, Lond.* 1945, 156, 616.

5. Waters, I. L., Stock, P. C. *Science*, 1946, 102, 601.

6. Young, L. *Ibid.*, 1946, 103, 439.

7. Gilman, A., Allen, R. P., Phillips, F. S., St. John, E. J. *clin. Invest.* 1946, 25, 649.

8. Long, W. K., Farah, A. *Science*, 1946, 104, 220.

in Greater London and sent it to an astonished Ministry of Health. After that crisis passed the service, on the instructions of the Ministry, told the hospitals to return to normal. But the experience had been useful, leading the service to plan, with the Ministry, what eventually became the sector casualty bureaux. When action stations were called, in August, 1939, the service closed, and on Sept. 1 ten of the staff were sent out to the sectors, one girl to each sector, to stiffen the inexperienced staff of civil servants in the bureaux. It was a tall order to get a daily return of vacant beds from 400 hospitals, most of which were new to the idea, but on Sept. 2 the first complete bed state, covering some 40,000 vacant beds, was received at London regional H.Q.

Things were so quiet in those early war days that by the middle of September a new staff had been recruited and the service had opened again at Old Jewry; and there it stayed, through blitz and rockets, though the telephones were twice destroyed and the office set on fire once. Each time it started again; its last blow fell in August, 1944, when the windows were blown in by a flying bomb. One of the staff, slightly injured, waited till the dust had settled to finish the case she was engaged on, and ten minutes later the ambulance was picking up the patient she was working for. Calls fell off as London emptied, so the night service and, late in the war, the regular return of vacant beds were given up; but once the last rocket had fallen, demands on the service rose, straining the skeleton staff and reaching a peak of 1100 in January last year, which nearly overwhelmed them. By summer additional staff released from the Services could be appointed; it was as well, for the war staff were beginning to leave as husbands came home from the Forces. Now the service is running at full strength, twenty-four hours a day, and more and more doctors are learning how it can save their time and patience. The telephone number is Mon. 8515.

BONY NODULES IN THE LUNG

RADIOLOGISTS have long been familiar with opaque nodules in the lungs which often turn out to be tuberculous or silicotic, but are sometimes associated with leukaemia, Hodgkin's disease, sarcoidosis, or lymphangitis carcinomatosa, and rarely with fungus infection, histoplasmosis, or (in children) haemosiderosis. In recent years a few isolated cases of mitral stenosis with disseminated calcified pulmonary nodules have been reported on the Continent and in the U.S.A., but this curious finding has not so far been convincingly explained. In recording the first case from this country, Elkeles and Glynn¹ put forward an ingenious hypothesis.

A young man with long-standing mitral stenosis terminating in auricular fibrillation and congestive cardiac failure showed on X-ray examination numerous tiny, densely opaque nodules in both lung fields. The lesions were mainly in the right lower zone, particularly in its periphery, though they could also be seen low down in the left lung; the apices were clear. Autopsy confirmed the diagnosis of stenosed mitral cusps and showed that the lung lesions were truly osseous particles occupying alveoli or groups of alveoli and their corresponding alveolar ducts. The framework of the lung was incorporated in the developing bone, and in some areas acellular material resembling osseous ground substance pointed to a precursor of the true bone found elsewhere in the lung. Degenerative and inflammatory changes were present in the smaller pulmonary arteries (diameter 0.1-2 mm.), chief among which was severe fibrinoid medial necrosis with destruction of the elastic membranes. The intima of such vessels was remarkably thickened by fibrocellular tissue containing capillaries, and the adventitia was moderately infiltrated with lymphocytes and

polymorphs. The vasa vasorum in the larger of these arteries showed some obliterative endarteritis. Such changes appeared to be independent of thrombosis and mural haemorrhage. Some of the smaller arterioles presented endothelial cell proliferation.

In excluding the usual causes of disseminated bony nodules in the lungs, Elkeles and Glynn suggest that they may be the late result of rheumatic pneumonia. The concept of rheumatic infection of the lungs has clearly emerged from a mass of disconnected facts, largely owing to the pioneer observations of Hadfield.² The characteristics of this condition are a fibrinous, almost acellular alveolitis, followed some days later by a monocytic infiltration, the lesions being confined to the regions of gaseous exchange. Alveolar ducts remain widely open and are lined by a hyaline eosinophil membrane, which may contain a protein exudate which later may be replaced by fibroblasts, leading to an interstitial fibrosis. The distribution of the bony particles in Elkeles and Glynn's case is similar to that of the more acute lesions described by Hadfield. In both conditions the same characteristic lung unit is affected, and it is reasonable to suppose that the intra-alveolar exudate has undergone organisation and later ossification, possibly because of some peculiar quality which the rheumatic exudate possesses. A hypothesis based on a single case calls for caution, but this study will stimulate others to look for and investigate similar curiosities.

THE END OF UNRRA

THE United Nations Relief and Rehabilitation Administration, established in 1943, is closing down. Difficulties both political and practical have disappointed some of the hopes of those who saw it as the first stage in a tremendous international effort for the restoration of general prosperity and peace; yet we can all be grateful that even in its more limited task of applying first-aid to devastated countries it has made further reconstruction possible. It has averted terrible disasters; and, whatever the recipients may think of the deficiencies of its help, the participating nations can take a certain pride in the knowledge that despite their own troubles they have devoted some £900 million to the relief of people abroad, without any condition save need. Of this large sum, £650 million has come from the United States and £165 million from Britain.

On the health side UNRRA was by far the biggest international undertaking in history: it did much to prevent major epidemics; it bridged the gap in the work of the international sanitary conventions, and its dying gesture was to aid in setting up the World Health Organisation. Its major efforts were in China, Greece, Italy, and Poland, and for displaced persons; of its total health budget of some 168 million dollars, 146 million was spent on medical supplies. Among these it provided and shipped 3 million pounds of D.D.T. powder, of which 600,000 lb. (of 10% concentration) was for typhus control; and it is fair to link this with the fact that, despite all the destruction and poverty, the incidence of typhus in Poland, for example, has been less than a tenth of what it was in a comparable period after the first world war.

Imperfect no doubt, and certainly incomplete, the work of UNRRA has nevertheless saved innumerable lives and preserved hope. Incidentally it has enabled many of our colleagues to continue a great tradition by giving as good service to the world as they could give to their own country. The growth of that tradition is one of the necessities of our time.

Sir HENRY MARTYN, K.C.V.O., F.R.C.S., formerly surgeon apothecary to H.M. Household at Windsor and consulting surgeon to the ear, nose, and throat department of the King Edward VII Hospital, Windsor, died in Devon on Jan. 7, at the age of 58.

1. Elkeles, A., Glynn, L. E. *J. Path. Bact.* 1946, **58**, 517.

2. Hadfield, G. *Lancet*, 1938, ii, 710.

Reconstruction

THE PRINCIPLES AND THE PRACTICES

FROM A CORRESPONDENT

THE success or failure of the National Health Service Act will depend on the future action of the medical profession. The Act has been much criticised, but few of its critics have made more than passing reference to its merits or have pointed out how far the claims of the profession have been met in its passage through Parliament. The need for a comprehensive and national medical service has been acknowledged, and the Act embodies many of the suggestions put forward by the profession from time to time.

When the Bill was formulated the Negotiating Committee had published seven principles thought essential for the proper organisation of the country's medical services. It may be useful to consider these principles and see to what extent they have been implemented in the Act.

SALARIED SERVANTS

Principle I.—The medical profession is, in the public interest, opposed to any form of service which leads directly or indirectly to the profession as a whole becoming full-time salaried servants of the State or local authorities.

This is the principle which, it is claimed, has been chiefly violated by the Act. It is recognised of course that at the present time there are several thousand full-time salaried doctors. Nor is very strong objection taken to salaried remuneration of specialists on the staff of hospitals, most of whom will be holding part-time appointments and will continue private practice. But in the case of general practitioners it is widely believed that abolition of the power to buy and sell practices, and payment partly by a basic salary, as suggested by the Minister of Health, must eventually lead to a full-time salaried service.

It should be remembered that on these points the profession may be held to have changed its mind. Among those doctors who answered the questionnaire of two years ago there was a clear majority for the abolition of the power to sell any practice—quite apart from the question of its being publicly remunerated—so long as reasonable compensation were given. Negotiations were entered into with the Ministry—of course without commitment—as to the amount of compensation which would be equitable to compensate the whole body of general practitioners, and the sum of £66 million was considered reasonable. Though the drawbacks of the sale of practices have doubtless been over-emphasised, and it has generally proved itself a fair method of procedure, it cannot be denied that there are many objectionable features connected with sale and purchase; otherwise it would be hard to understand why 56% of the doctors who replied to the questionnaire voted for its abolition. In any case abolition of the sale of practices would not necessarily lead to full-time salaried service. Of course those who remain outside the National Health Service will retain the goodwill of their practices and can sell them if they wish, and it is by no means certain that the value of these private practices will fall to the degree anticipated in some quarters.

The basic salary is not referred to in the Act, and by negotiation it might be reduced to a minimum, or given only a limited application to which none would take exception. But even if it became a regular feature of the method of remuneration it would not necessarily be a step towards a full-time salaried service. Rather the contrary. The principle of free choice of doctor has been allowed by everyone and by all political parties; and in recognising it as a basic right the present Government have clearly shown that they regard the retention of a capitation fee as necessary to attain the free choice

of doctor. (This was made plain in the debate on clause 33 in the committee stage in the House of Commons.) It is difficult therefore to maintain that the adoption of a basic salary, even if it materialises, must have the evil consequences which some expect.

FREEDOM FOR DOCTOR AND PATIENT

Principle II.—The medical profession should remain free to exercise the art and science of medicine according to its traditions, standards, and knowledge, the individual doctor retaining full responsibility for the care of the patient, freedom of judgment, action, speech and publication, without interference in his professional work.

The second principle has certainly not been infringed, and those who (like myself) were very indignant over the action of the Willesden borough council should be encouraged to know that the new Act will take away the power of such high-handed conduct from the local authorities and transfer the hospitals to the control of the regional hospital board which will be at the university level. In this connexion it is notable that the white-paper proposals of the Coalition Government put most hospital doctors directly or indirectly under a committee which had a majority of local-authority members—a position abhorrent to the profession and corrected in the present Act.

Principle III.—The citizen should be free to choose or change his or her family doctor, to choose, in consultation with his family doctor, the hospital at which he should be treated, and free to decide whether he avails himself of the public service or obtains the medical service he needs independently.

So far as one can judge, the patient within the National Health Service will have much the same freedom of choice of doctor and hospital as at present. If he wishes to obtain medical attention outside the service he can do so, though he must foot the bill himself.

Principle IV.—Doctors should, like other workers, be free to choose the form, place, and type of work they prefer without governmental or other direction.

Here the main discussion has concerned the word "place"; for some hold that the new Act permits the Government to exercise undue control over the place where the doctor is to practise—that he will have to go whither the Minister wishes and will thereby lose much of his freedom. Mr. Bevan, on the other hand, denies this, saying that the Act gives him "no power to direct a doctor to go anywhere or do anything."

The words "control" and "direction" carry odium, particularly when joined to the word "governmental." Nevertheless one should not allow the dislike of a word to prevent impartial examination of the scheme proposed.

Here again we must differentiate the position of the consultant from that of the general practitioner. At present nearly all consultants are under the direct control of lay boards of management. No consultant would claim, without qualifying the statement, that he is free to practise where he likes. He must satisfy a lay committee before he can gain his position. Under the new scheme the procedure of his election to posts on hospital staffs should not be worse and may be better than at present.

With the general practitioner it will be different. Anyone who wishes to start in practice or to change his area of practice in the new service must obtain the consent of the Medical Practices Committee; but we are assured that normally the arrangements will be made by the local executive council (advised by its medical committee), the consent of the central committee being formal. Should there be no vacancy in the district where he wants to settle he must either wait till there is one or put his name down for another district. Should there be several applicants for a vacancy there will be competition. From the decisions of the Medical Practices

Committee (of whose 9 members 7 will be medical and 5 in active practice) there will be a final appeal to the Minister.

How does this compare with the present system? Today when a man wishes to practise in a particular area he may go to an agency and see whether there be a practice for sale in that area; if not he must either wait till there is or must choose another district. Or he may go to the district and squat; but squatting is no longer favourably regarded. Hence it is quite common for a doctor in search of a practice to spend many weeks or months going from one part of the country to another till he obtains a suitable opening. The new scheme may not be better than the old one, but it should not be worse.

Those who followed the debate in the House of Lords will be aware that an amendment was inserted there by which "regard should be paid to any desire expressed by an applicant to practise with other medical practitioners already providing medical services in the area, and of any desire expressed by such other medical practitioners to take an applicant into practice with them." This addition is valuable and reasonable.

Principle V.—Every registered medical practitioner should be entitled as a right to participate in the public service.

This is a curious claim. Though there is no manner of doubt that in the working of the Act every registered doctor who wishes to participate will be allowed to do so, it would be difficult for any Government to guarantee this in the wording of an Act. It would mean that a doctor would be able to compel the Minister to take him into the service, although the Minister would have no power to compel the doctor to enter. Such one-sided compulsion could not be accepted by any Government. It would be defensible only if the Ministry had a monopoly of all medical services, whereas we know that a practitioner may continue in practice outside the service. The consultant on the staff of a hospital is in a different category, and should receive some guarantee from the Ministry. His position has been improved by the statements in Mr. Bevan's letter to the Presidents last week.

PLANNING AND ADMINISTRATION

Principle VI.—The hospital service should be planned over natural hospital areas centred on universities in order that these centres of education and research may influence the whole service.

Principle VII.—There should be adequate representation of the medical profession on all administrative bodies associated with the new service in order that doctors may make their contribution to the efficiency of the service.

These two last principles are fulfilled in the Act. Due regard has been paid to medical education and research. The Government has given way on an important point which the Negotiating Committee pressed—namely, that the regional board should have administrative and not merely advisory powers. And the claim for adequate representation on all administrative bodies has been fairly met.

CONCLUSION

This brief review shows that there are in fact few respects in which the Act contravenes any principle enunciated by the profession; and it certainly embodies much for which the profession has been working. Nevertheless the scheme has blemishes, and the only means by which these are likely to be removed or minimised is the "free negotiation" which the Minister invites.

The profession is full of exaggerated fears about the curtailment of freedom. But perhaps we are not yet sufficiently alarmed about the consequences of refusing our help in deciding the conditions under which the doctor of the future will work.

Special Articles

OLD PEOPLE

NUFFIELD FOUNDATION'S REPORT

DISJOINTED evidence of hardships suffered in old age has been reaching the lay and medical press for some time; and an authoritative survey of the problems of ageing and the care of old people is therefore timely.¹ This has been undertaken by a committee, appointed by the Nuffield Foundation, with Mr. B. Seebohm Rowntree as chairman.

The other members of the committee were Miss Ellinor Black, Mr. E. C. Bligh, Dr. A. D. Briggs, Mr. L. Farrer-Brown, Mrs. A. V. Hill, Prof. Aubrey Lewis, F.R.C.P., Mr. Fred Messer, M.P., and Mr. Roger Wilson. Two members of the committee as originally appointed—Mr. W. Hyde and Mr. F. D. Stuart—died while the work was in progress. Advisory members were Mr. Howell E. James for the Ministry of Health, Mr. J. Mason Allan and Mr. W. Birrell for the Department of Health for Scotland, and Sir Geoffrey King and Mr. H. Fieldhouse for the Assistance Board.

As Mr. Farrer-Brown, secretary of the Nuffield Foundation, says in the preface, the report "makes abundantly clear the great opportunity for voluntary enterprise to help in securing a happy life for our old people." The Nuffield trustees intend to further such enterprise, and hope other bodies of similar views will join them in discussion and action. The foundation's programme of assistance is to be announced shortly.

SCOPE OF THE SURVEY

The committee have studied the incomes of the old, their houses and living conditions, the homes and institutions provided for their care, their recreations, their possible employment.

In addition the report carries fifteen informative appendices, listing such things as existing charities for old people, the number of people of pensionable age living in public-assistance institutions or receiving outdoor relief under the poor-law on May 1, 1946, and the public-assistance homes and institutions visited by the committee; describing endowed charities for old people in a large city (York), life in an institution for old men, and welfare facilities in an urban and a rural district (Merseyside and Cambridgeshire); and analysing the living conditions of old people in five county boroughs, the employment of elderly workers in four county boroughs, and the circumstances of old people applying for admission to a voluntary home.

Recommendations Summarised

Though sympathy for the hardships of old people is widespread just at present, the committee remind us that our country's resources of wealth and labour are now limited, and that the proportion of old people in the population is growing. Nevertheless they see much that can and should be done.

THE INDEPENDENT AGED

The great majority of old people—perhaps more than 95% of them—live in their own homes or those of members of their family. But many old people living independently or with their children are unfit on physical or mental grounds to do so. Their enthusiasm for independence is undoubtedly due to the lack of suitable homes and the fear (often, but not always, justified) of regimentation. If enough homes with a homelike atmosphere can be provided more old people will prefer to enter them, and this will lessen the need for extensive home-help, home-nursing, home-visiting, and home-meals services.

1. Old People. Published for the trustees of the Nuffield Foundation. London: Oxford University Press. Pp. 202. 3s. 6d.

BUILDING

The need to build special houses for the old can be exaggerated, because many of them do not want to live in such houses, most of which would have to be placed on the outskirts of towns, far from social and shopping centres, and from the friends of the residents. Moreover, there are many existing small houses suitable for old people which are occupied by young couples or others. They found that old people occupying houses too large for them can often be persuaded to move to a suitable small house. The committee suggest that in the national house-building programme 5% of all houses should be for the aged; and that the exact number needed in any area should be decided after a local-authority survey.

Where building for old people is undertaken the sites should be as close as possible to the places where they previously lived, and near to a bus stop, shops, a place of worship, and a cinema. The dwellings should have a living-room with a ventilated bed-recess or a separate living-room and bedroom, a kitchen, bathroom, and water-closet, storage for provisions, indoor storage for coal, and ready means of getting hot water and disposing of refuse. In rural areas a second bedroom should be provided for a relative or friend coming to look after the old person in case of illness.

Large private houses could be converted into one- or two-roomed dwellings, provided with cooking facilities and a sink. One bathroom and water-closet on each floor should suffice.

ALMSHOUSES AND CHARITIES

Many almshouses are in bad repair, but even where funds exist to cover reconditioning, trust deeds may compel their use for other purposes. A body with funds at its disposal might well undertake the repair and modernisation of the country's almshouses.

The committee note that the administration of many endowed charities is so confused, and the trust deeds often so archaic, that the spirit in which the charities were originally endowed is frustrated. The administration of many such charities needs to be overhauled, the trust deeds being altered to give the trustees wider scope. The committee suggest that an ad-hoc body, on which the Charity Commission should be represented, should be appointed by the Government to review endowed charities for old people and indicate the changes needed to make full use of these resources.

FINANCIAL SECURITY

As a result of the supplementary pensions scheme introduced by the Old Age and Widows' Pensions Act, 1940, acute poverty is no longer the lot of the aged, and the flexible administration of the Assistance Board adjusts benefits to need. Thanks to the retirement pensions introduced under the National Insurance Act, 1946, many people will be better off, and none of the present old-age pensioners worse off. A supplementary pension scheme remains in force to cover individual cases of difficulty. The National Health Service will provide free spectacles, dentures, and hearing-aids, and other medical appliances; but old people need to have this made known to them personally—press or radio announcements will not suffice.

INSTITUTIONS AND HOMES

Nearly all the 5% of old people who do not live independent lives are in public-assistance institutions or homes administered by public authorities or voluntary bodies. In most of these the structure, equipment, and regulations are unsuited to the needs of most old people. The committee recommend:

1. That enough homes should be provided by local authorities and voluntary bodies to receive all the old people now living in institutions, and also the many now seeking but unable to find places in homes. Several thousand such homes will be needed in the course of the next 15-20 years. Homes for 30-35 residents can be run at a cost per head little if at all greater than that of an institution.

2. Meanwhile, as an interim measure, highly classified institutions should be provided, offering reasonable comfort for up to 200 old people. Restrictive rules should be reduced to a minimum. Few, if any, of the old workhouse buildings are suitable for this purpose.
3. An all-purposes institution should take old people who are unsuited to the freer life of a home.
4. There should be institutions for senile demented, but the residents must often be carefully examined by a doctor to ensure that those who improve sufficiently are removed at once to the care of their relatives or to a home or institution.

THOSE ABLE TO PAY

At present there are hardly any homes for old people with private means, able to pay between £2 10s. and £5 a week. These might well be provided.

In some existing homes run for profit old people are exploited and neglected.

Though statutory inspection of these and all other voluntary homes is desirable, the committee were unable to find a definition which would make such inspection administratively possible. They suggest that the way to get rid of ill-conducted homes is to provide enough good ones at competitive prices.

AILING OLD PEOPLE

The committee put forward two methods of caring for the long-term sick. In all cases the patient should first be admitted to a general hospital for examination and treatment. After that he should go, either to a unit for such cases closely associated with the general hospital, or else to an ordinary home under a good matron.

They found that many authorities were uncertain about the best ways of dealing with various categories of ailing old people; and also that those nursing them had not been suitably trained for the work. They wish to see a centre established in which the best ways of caring for the three following groups could be studied:

1. Those merely feeble through old age.
2. Those with sight and hearing failing to a degree that makes life difficult.
3. Those suffering from such long-term illnesses as rheumatism, arthritis or partial paralysis, or from senile changes.

Those wishing to specialise in the care of the aged could be trained in such a centre.

RECREATIONS

More clubs are needed where old men can meet, talk, and play cards or billiards. Handicrafts and reading could be encouraged in institutions and homes. Since employment delays the appearance of senile changes the old should be encouraged to stay at work as long as they wish to do so, and the committee suggest financial inducements. Employers insisting on a retiring age of 65 should reconsider the matter in the new circumstances of full employment, social security, and an ageing population.

A CENTRAL BODY?

Continued systematic study of all matters affecting the aged is needed. The committee see that a strong case can be made for a central body with authority and resources to focus interest and increase activity on behalf of the aged; but they do not specifically recommend its formation, though they think it may develop spontaneously as a result of the discussions which the Nuffield Foundation hopes to arrange with other bodies.

The Medical Aspects

A medical subcommittee was composed of the following members: Mr. A. S. Parkes, sc.d., F.R.S. (chairman), Dr. A. Greig Anderson, Dr. A. D. Briggs, Prof. Aubrey Lewis, Dr. J. H. Sheldon, and Dr. F. Yates.

They reported briefly on directions in which research into the process of ageing is being or might be conducted.

There should be no centralisation, they think, of research on ageing, which on the contrary could be most effectively promoted by supporting over a period of years research units tackling special problems; by establishing fellowships at suitable research centres; by providing grants and research expense grants; by offering bibliographic and other guidance to research-workers; and by using a medical subcommittee to coördinate the whole research programme and advise on fellowships and grants.

A HOME FOR THOSE IN NEED

THE R.M.B.F.'S NEW VENTURE

FOR several years the Royal Medical Benevolent Fund have been considering the foundation of a home for some of their beneficiaries, especially widows. A substantial endowment fund was left for the purpose by Dr. Arthur Holdsworth Davis, and at the end of the war a subcommittee appointed for the purpose began to look for a suitable house. This has now been found at Westmoreland Lodge, Inner Park Road, Wimbledon Common, London, and has been purchased freehold. It is a mid-Victorian house, without a basement; it has a good garden, and is near a bus stop and within easy reach of shops and cinemas. It will receive twelve women residents as well as the warden, and each resident will have her own bed-sitting room with either gas or electric heating and cooking arrangements. There will also, it is hoped, be central heating. The warden and her staff will provide a substantial midday meal; for other meals residents will have the opportunity and interest of fending for themselves. Two large refrigerators have been provided for their foodstuffs, and they will have the use of convenient washing-up places. The dining-room on the ground floor is large enough to serve as a common-room as well; it has a glass-enclosed verandah for use on sunny days. Some furnishings have already been given, but more are needed, including carpets (especially stair-carpet) and curtains. The cost of purchase and of alterations, amounting to some £10,000, is being provided out of Dr. Davis's bequest. This large initial outlay naturally reduces the income of the fund; and since the cost of upkeep is likely to be considerable the profession are asked to help financially.

Only candidates able to look after themselves, clean their own rooms, and cook their own breakfasts and suppers will be accepted; but if the experiment is successful a hostel for infirm or bedridden beneficiaries may be considered. The name of Dr. Davis is to be associated with the new home, which will be opened, it is hoped, by the early summer of this year. Visitors who wish to view the home are already welcome, but should telephone Putney 8128 in order to be sure they will find someone there. Further information about the home may be had from the secretary of the R.M.B.F., 1, Balliol House, Manor Fields, Putney, S.W.15.

In Westmoreland Lodge the Royal Medical Benevolent Fund have an opportunity to create an example of the right kind of home for old people, and by doing so could perform a valuable service to others besides their own beneficiaries. One of the principal aims of such a home should be to give its occupants at once a sense of security and a sense of freedom, rules being reduced to a minimum. The residents should enjoy the same consideration as occupants of a good boarding-house, and should be spared any of the regimentation so often associated with otherwise excellent charitable undertakings. Nobody would wish to see them burdened unduly with affairs, but perhaps it would be possible for them to take an active part in the management of their own home. Many doctors would certainly be willing to contribute to an experiment on these lines.

Sir ALFRED WEBB-JOINSON, F.R.C.S., has been elected a foreign member of the Academy of Surgery of Paris.

Major-General R. J. BLACKHAM, M.D., has been re-elected a member of the court of common council of the Corporation of London for the 22nd consecutive year.

Health Centres of Tomorrow

II—STRUCTURE AND FUNCTION

THE internal organisation and furnishings of the health centre offer an opportunity for emphasis on the new approach to positive health. Here can be evolved something quite different in plan and appearance from the well-known pattern of the hospital outpatient department.

To a large proportion of the population the health centre will afford their first contact with the health service; so it is important that as far as possible they shall be free of apprehension, embarrassment, or discomfort, and that the convenience of those who seek advice shall be a primary consideration. Let us see how this principle might be applied in the kind of urban centre sketched in the previous article.

WAITING AND CONSULTING ROOMS

Harley Street discovered long ago that it is sound psychology to furnish consulting-rooms and waiting-rooms in the style of an ordinary dwelling. The health centre may be furnished on the same principle—except of course the room where minor surgery is undertaken.

A centre housing from four to six doctors will have to accommodate a good many patients during "surgery" hours, particularly in winter. By some the suggestion of a common waiting-room is rejected for fear of cheerlessness, lack of privacy, and an "outpatient" atmosphere. Instead, they favour small waiting-rooms for each doctor, which would open off a common entrance hall, as also would offices for receptionist and/or telephonist and for nurses. Others, however, still advocate the single large waiting-room. This would certainly cost less and avoid architectural complication; and it would ease the work of shepherding patients. It might, moreover, offer the best hope of reasonable space and ventilation, thus minimising the risk of droplet-infection. Where ground is not scarce or expensive this waiting-room could be placed centrally as a single-story structure with roof windows. The reception desk should be in this waiting-room near its entrance. At busy surgery hours patients may often have to wait their turn before being dealt with, and it is less depressing to wait in an open room, with chairs, than in a corridor queue. Large waiting-rooms when cheerfully decorated, as they have been in a few modern clinics, have commended themselves to their users as preferable to the small isolated purgatories of tradition. When, in the years to come, people from all walks of life meet at the centres the spaciousness of the large room may prove more acceptable than the enforced intimacy of the small. Radio and magazines, perhaps supplied by patients themselves, might be welcome amenities; but if these are to fulfil their purpose the sound must be subdued and only the less dog-eared papers retained.

Whichever type is selected, special provision should be made for children. Some healthy adults, and certainly most of the sick, resent the normal noisiness of the young, who should be diverted to a separate play-waiting-room. There should also be ample washing and lavatory facilities, conveniently placed, for both adults and children.

The atmosphere of the centres will be largely determined by their interior decoration. The halls and waiting-rooms should be light, spacious, cheerful, and as comfortable as possible, while the doctors' rooms should be arranged in a personal style, to encourage relaxation and confidence. Much can be done—and at little extra cost—by good lighting, by the intelligent use of light woods and of bright but restful colours (pale blue and shell-pink, for example), and by decoration of the walls with a few middle-brow pictures such as those which

the London County Council provided before the war for their schools. These may be judged trivial points, but anyone who has attended as a patient some of our older hospitals will vouch for the depression fostered by dim lighting, tiled walls, chocolate paint, and wooden benches. Chairs should be of the steel-framed "stacking" variety, with canvas seats and backs, or better. Clearly legible on or above each consulting-room door should be the name of the doctor occupying it, and, when he is not available, the name of the locum doing his work.

As has been indicated, practitioners may at first have difficulty in meeting all demands; so nothing should be overlooked which might save their time. A most potent source of lost time at surgeries is the undressing and dressing of patients before and after examination. If the proposal for a large central waiting-room is accepted, this waste could be overcome by placing an examination room, with separate cubicles, between each of the doctors' rooms. Male and female rooms would alternate, and they would have doors leading to the doctor's room on each side, so that every doctor would share his examination rooms with one of his two neighbours. The contention that this arrangement would introduce an institutional atmosphere seems to be outweighed by the advantage to the patient in being able to undress and dress at leisure and in privacy.

RECEPTION AND RECORDS

On arrival patients go to the reception desk and get an interview "card" in the form of a clearly numbered ivory tablet, inscribed "Please hand this to the doctor when your turn comes." A set of these cards for each consulting-room, consecutively numbered and either differently coloured or inscribed with the doctor's name, will help to prevent place-jumping. (The same colour could be inset on a panel on each consulting-room door.) It might be helpful to give all casual patients even-numbered cards, reserving the odd numbers for patients who deserve priority, because they have made appointments or for some other good reason.¹

The medical records in the centre are kept in a locked filing cabinet near the receptionist's desk. As each patient receives his numbered card at the desk his record is found and a metal clip (coloured and numbered to correspond to the ivory card) is attached to the notes. From time to time the reception clerk takes a bundle of these into the doctor's room, bringing out with her the records of patients already seen.

The form that these records shall take must be finally decided before the Act comes into operation; the Services know by experience the difficulty of altering a system in being. The desiderata are simplicity and standardisation. Any complex method would waste valuable time; it would, moreover, not be fully used. Notes should be contained in a standard canvas envelope showing the patient's name on the outside; it should be strong enough to bear repeated sealing with paper labels, so that it can accompany the patient attending hospital. Both envelope and record would, of course, be taken by the doctor visiting the patient at home. The record itself should be on a form similar to the present "panel" cards. Where notes are written conscientiously little more than a simple request should be needed when the patient is referred to hospital; the hospital returning the patient, whether after outpatient or inpatient treatment, should report on a sheet of the same standard size.

There would be great advantage in duplicating all records by the simple expedient of making a carbon copy through a "flimsy" upper sheet; for some years this method has been used, with conspicuous success, by the Royal Air Force. The "flimsies" would remain in

the patient's envelope; the copies would be collected by a central registry, direct from hospitals, and at regular intervals from health centres. The registry, containing as it would birth-to-death records of all who use the service, would provide invaluable statistical data. But—more important—it would be a never-failing source of information about the previous health of patients. Local records are easily lost through patients moving or other causes. Any initial opposition to the registry would certainly subside when doctors found that it provided photostat copies of missing records.

At all costs copying of notes must be taboo, except by the very skilled, who are likely to be few. The doctor's writing is sometimes not easily read; and the uninitiated when they cannot decipher often guess. Better a record which, if illegible, is correct, than one which is readable but wrong.

Prescriptions will, no doubt, for everyone's convenience be based on the successor to the present *National Health Insurance Formulary*, with the same freedom for the doctor to order whatever is suited to his patient's condition. Should the health centre have its own dispensary, the procedure of obtaining medicines will be relatively simple; if not, a prescription in due form, signed (not stamped) by the doctor (desirable always and essential in the case of dangerous drugs), will be needed.

Otherwise, practitioners should have virtually no clerical work. Certificates should be standardised, and certified copies granted by a lay clerk. Any other information required centrally should be got by lay examination of the record cards.

SECRETARY, NURSES, AND SOCIAL SERVICE

To make sure that the doctor is relieved of clerical and other non-essential work will be one of the tasks of the centre secretary, who must be an able person. As the senior lay officer on the staff, she (or possibly he) is selected with care for experience and tact in dealing with the great variety of questions that come to her. The title "secretary" is deliberately chosen, because, apart from its original suggestion of a person who can keep confidences, it avoids the "illness atmosphere" of any title associated primarily with a hospital. For this latter reason it is important that the secretary should not be a nurse; a qualification in social service might be an advantage but would not be essential. According to the size of the centre, the secretary would have on her staff additional lay workers qualified to deal with various aspects of the work—e.g., reception, shorthand-typing, filing, and so on. Her room should be readily accessible, but not necessarily beside the waiting-room.

The question of how much nursing service will be required and how it should be provided has already been briefly discussed: a good deal of experiment may be needed before the answer—or answers—become clear. On these answers may depend the amount of service required from trained social workers or almoners. Inevitably there will be patients for whom the services of a medical-social worker are needed, and these will be sent by the doctor to the almoner for the area. Whether she is on the staff of the local hospital, or directly available for a group of health centres, will depend on circumstances.

Outpatient and kindred appointments will be made through the centre secretary, who will also be able to give information about local health services which people may need to use.

HEALTH CENTRE AND HOSPITAL

At present the hospitals undertake a good deal of minor treatment that comes within the province of the family doctor. With a properly equipped health centre, having a nurse always on duty, much of the unnecessary

1. We owe this ingenious suggestion to Mr. Austen Spearing. If it is found in practice that patients cannot be prevented from taking the ivory tablets home, paper tickets might serve the same purpose.

hospital attendance could be obviated. The patient's time would thus be saved, while the hospitals, confining themselves to consultation and the treatment of major illness, could give the practitioner a better service.

When every patient has a family doctor, the aim should be for nearly all patients to reach hospital through their practitioner. When the facilities for treatment at the health centre are known to the hospital, the patient could often be referred straight back to the practitioner for treatment instead of continuing to attend hospital.

It is highly desirable that in all difficult cases the practitioner should himself go with the patient to the specialist, and take part in a consultation at the hospital just as today he takes part in consultations at the specialist's private house. In an ideal service he would also visit the patients who have been admitted to hospital, and continue to hold a watching brief for them. A growing habit of consultation, in the consulting-room or at the bedside, is necessary to the salvation of general practice.

Not all consultations, however, need be held at hospital. Six doctors practising in co-operation will probably accumulate enough non-urgent cases requiring a consultant opinion to justify fortnightly medical, surgical, and gynaecological sessions at the centre itself. This would be a great convenience to both patient and practitioner, and if the other doctors working in the centre could find time to attend the session they would enjoy on their own premises the equivalent of a ward round or outpatient attendance.

There would probably be no need for a special consulting-room, since at any given time there is sure to be either a vacant surgery, a minor-ailment room, or an infant-welfare room which could easily be put at the consultant's disposal. On the other hand every centre ought to possess a common-room, supplied with books and journals, where the doctors and their specialist guests can talk in armchairs round the fire. On a long view this is perhaps the most important room in the place.

Should the general practitioner be further encouraged by giving him beds at the health centre? That seems to depend on circumstances. In rural areas they would often be invaluable; but in towns a hospital is more appropriate for the patient who cannot be nursed at home—even for the accident case which has had first-aid at a centre.

In emphasising the value of ready access to hospital resources, both physical and intellectual, we must not minimise the need for frequent informal consultation between the health-centre practitioners themselves. Most of these will have a bent towards a particular branch of medicine, and some may indeed be aiming at a specialist qualification later. So long as a man is working at a health centre rather than a hospital, he must continue to undertake general practice: the kind of health centre we are trying to develop is not a group of specialists—a minor Mayo Clinic. But if he is particularly keen on ears, or eyes, or children, or anaesthetics he should be encouraged to attach himself in some way to the appropriate department of the local hospital, and his colleagues should make use of any special skill he may possess or attain. So far as the specialty is concerned, he would have to be content to regard himself as junior to the hospital specialist, who would have to take all major decisions; but he might come to be considered the specialist's representative on the health-centre staff.

One of the great errors to be guarded against in the new service is the error of rigidity. It would be disastrous, for example, if the qualifications demanded for specialist practice were such as to prevent suitable men and women transferring from general practice to a specialty: nor should a specialist feel that he would lose face by deciding to change to general practice. People do not

necessarily find their proper work early in their career, and the system should not only allow them, but positively encourage them, to do what they can do best.

Medicine and the Law

What Constitutes Live Birth?

A PERIPATETIC correspondent in our issue of Dec. 21 told the story of a five months' foetus which, according to the midwife present at the delivery, cried feebly for a moment or so after the cord was cut. The coroner's officer advised the doctor that no birth, death, or burial certificate was necessary and that he could do what he liked with the foetus. It has since been suggested that the officer was wrong—that if a child is born, and after complete birth shows signs of life and subsequently dies, both the birth and the death must be registered, irrespective of the duration of pregnancy.

The law on the registration of births is governed by the Births and Deaths Registration Acts, 1874–1926, which place primarily on the parents, and in default of them on certain others, including persons present at the birth, the duty of registering, within 42 days (21 days in Scotland), the birth of every child born alive. Stillbirths must be similarly registered, and at the time of such registration the registrar must be handed a certificate signed by a doctor or midwife stating that the child was not born alive, or in default of a certificate a statutory declaration to the same effect in the prescribed form. It is unlawful to have a stillborn child buried without the written sanction of a coroner or registrar.

The Acts do not give us a definition of "born alive." They do, however, define "stillborn" as any child which has issued forth from its mother after the twenty-eighth week of pregnancy and which did not breathe or show any other signs of life. It is clear, therefore, that there is no obligation to register a foetus born dead before the twenty-ninth week. Is there an obligation to register a foetus born before the twenty-ninth week which has shown signs of life?

Registration, as we have seen, depends on live birth. At common law, to be born alive the child must have (1) been fully extruded and (2) achieved an independent living existence. It is not necessary that it should have breathed, or that the cord should have been cut; but it must have given some active evidence of life. Under the Infant Life Preservation Act, 1929, evidence that the mother had been pregnant for 28 weeks is prima-facie evidence that the child is capable of being born alive. The presumption is therefore implicit in both this Act and the Registration Acts that a child is only capable of being born alive after the twenty-eighth week. This does not mean that if, by some freak of nature, a healthy living child were to be born at, say, 24 weeks the law would refuse to recognise its existence (though this may have been in the mind of the sapient coroner's jury, quoted by Professor Kenny, who returned a verdict on "a child found dead, aged about three months; but no evidence as to whether or not it had been born alive").

The true position is that live birth is a question of fact, and that up to the beginning of the twenty-ninth week there is probably a presumption against viability. If the doctor is of the opinion that a child was born alive the presumption is rebutted and the birth must be registered. But the law says that, for registration to be required, "a child" must be born alive—not merely that living tissue must have been extruded. It is common knowledge that long before the period of viability newborn foetuses may make feeble cries and movements, and it would be absurd to suggest that every abortion or miscarriage in which these phenomena are observed must be registered as a live birth. The dividing line is indefinite, but for the purposes of the law the arbitrary line is drawn at 28 weeks. Above that line the foetus is "a child," and the common-law rules given above will apply. Below that line it is not "a child" unless exceptional circumstances justify the doctor in calling it such. Except in such circumstances there will be no need for registration, even if the foetus has exhibited such transient signs of life as would satisfy the common-law conditions.

In England Now

A Running Commentary by Peripatetic Correspondents

It's all very well when these people come back from the States with new ideas to stimulate us, but there are limits to stimulation. We don't mind when they sit around at supper and discuss whether the Alpha Zunc blood-levels should be done hourly in all patients or only in diabetics. We don't mind when they put up an intravenous infusion in 48 seconds while taking a history from the patient in the next bed. (As far as I can make out, in the States they put up a drip in every patient before breakfast each morning, and if the nurses, who are all honeys, have not taken down the previous one they just go into the other arm.) But when it comes to Tannoy—to loudspeakers in all the rooms—well, really, stimulation has become excessive. There are loudspeakers in our billiards-room, in the dining-room, in the corridors; even in the lavatory—is nothing sacred? They are not yet in action, but the front-door porters are working up an American accent: "Calling Ducter Kil-da-er! Calling Ducter Kil-da-er!" We are not yet sure who will do the broadcasting. Perhaps orders for the day will be read by the house-governor. The effect of the first pronouncement will be terrific: there will be a great leaping of startled housemen out of armchairs, a great ripping of the cloth on the billiards-table, and then, no doubt, a great volley of missiles at the loudspeaker. Would the Editor like me to interview the recipient of the first message? "Handsome twenty-five-year-old Peter Widger had breakfasted lightly on sausages and toast, little guessing that before the day was out. . . ."

I suppose that Progress will triumph after a time and we shall accept the system with joy at increased efficiency. We may even get outside phone calls before the caller has given up waiting. The most serious opposition will come from a more advanced brain than the "let's pull 'em all down" reactionary. He proposes to loop his own transmitter into the circuit somewhere and set up a Freedom Radio. This will open up great possibilities; a wandering microphone (or one which purports to be) could pick up the most extraordinary remarks. However, by the time this appears in print we shall know the worst. For the time being we watch the loudspeakers anxiously as we slink past, waiting for the first words from the Porter With the Golden Voice. Oh, for the good old days: "There's an urgent note for you, sir; I've been looking for you since Tuesday."

* * *

When the time comes round for it, getting out of the Army is easier than going in. Going in, dignified by the name of "initial training," takes three weeks, whereas becoming to all outside appearance a civilian takes less than three hours, including the last meal on Army rations. I was demobbed at York, and found myself wondering whether Shakespeare's astonishing prevision had extended to the demob centre there when he wrote: "Now is the winter of our discontent made glorious summer by this sun of York."

It soon becomes clear, however, that simple transit from the Army to civil life cannot be equated with complete civilian rehabilitation. Technical courses are very well in their way, and sometimes surprisingly adequate—I met a plumber who said he was on a six months' refresher course, and assured me that of course this didn't cover the whole art of plumbing, but only what we would call "recent advances." But no technical course teaches us how to handle ration-books and clothing-coupons, and the art of finding somewhere to stay.

I had to find rooms in a northern industrial city which I hadn't visited before, and I spent a very informative afternoon in doing so. All the landladies looked like outpatients, and some more so than others. My first prospective hausfrau fixed me firmly with the eye that didn't squint (the other was engaged in an innocuous flirtation with some sparrows outside the window), and said that she hoped I wouldn't want any cooking. I took it she meant the food, and said I was, it so happened, rather fond of a hot breakfast and supper.

This drew forth a sigh, and the statement that "My last young man just helped himself to bread and cheese from the cupboard." For this privilege he had been paying £3 10s. a week, and I decided I was not sufficient for these things, and passed on. The next on my list, Mrs. Guildencrantz, said she only had anyone because her attacks prevented her from living alone; just now she had a student, but would I pay her half a crown more, in which case I could have the room. I didn't like this much, for I foresaw that some really affluent person like a poultry-farmer might come along, with five shillings jingling in his pockets, and I would be out on the streets. I went away quietly, for I thought that any discussion of the quantitative relationship between living alone and the 2s. 6d. doctor-student difference might bring on an attack. After some trials of this kind I did find a place where I am being well done for; the only snare which has appeared so far has been a tendency to monologues on the weather. I am gradually bringing this under control with a persistent attitude of no-enthusiasm; the weather itself is proving a big help in the campaign, for it is quite lacking in that variation which is the spice of pseudo-conversation.

* * *

Those with innocent-looking numbers tattooed on the extensor surface of their forearms were the worst offenders. I suppose that anyone with such a permanent souvenir from Auschwitz would be bound to show possessive traits which are irritating to us who have never been dispossessed or suffered the constant threat of losing everything that is near and dear. But with mothers and their newborn babies these traits are not only irritating but dangerous. "This is my baby," said the ex-Auschwitz mother. "Mine to play with at all hours, mine to disturb when asleep, my baby." And because of this the baby was to be constantly picked up, continually given the breast when the whim arose. At Belsen there was Samuel, aged four months, whose three brothers had all died long before that age in the concentration camp, and who spent a whole afternoon, with the rest of the clinic waiting, in being powdered and dressed by a pathetic over-anxious mother, assisted by father, aunt, and grandmother, all getting in each other's way. Here, also, the convalescence was still too short for us to expect a normal maternal instinct, tempered by a maternal sense as to the welfare of her offspring. So I had to go on explaining in French, to a mother who understood Greek but spoke Polish, that breast-feeding every four hours was quite sufficient; and that it was a good thing for baby to sleep between times.

* * *

Cautionary Tale.—You still read about clinical trials of new drugs in which it is cheerfully assumed that every drop, tablet, or capsule written up on the bed-letter must have reached the patient's tum-tum—I have even seen it assumed with outpatients—so my first and last bit of research may (as they say) be of interest.

When I was H.P. at St. Ethel's Hospital for Men, Women, and Children (no dogs admitted) my physician suggested I should try a certain barbiturate in the chorea ward. It had been successful abroad but had not been used before for chorea in England. We had about a dozen cases, so I wrote the stuff up on the bed-letter and stood back for results. Roughly they came to this: in severe chorea the drug had absolutely no effect; in the rest it produced a drug fever with morbilliform rash after 5-10 days, and as the rash cleared the chorea went too. One or two of the children looked pretty dicky at the height of their reaction; but all was well. So the complete failure in the severe cases was disappointing—and quite inexplicable. Somebody else published a full-dress article on the subject soon afterwards, and I remember thinking it odd that he hadn't noticed any lack of response in severe cases.

I learnt the explanation ten years later, but only by the drastic method of marrying the junior pro in the chorea ward. Sister had heard about this drug from the physician over a cup of tea in her room, and thought it dangerous stuff, so she gave it herself—full doses to the slight and moderate cases, and none at all to the severe.

Letters to the Editor

GENERAL PRACTICE

SIR,—May I comment on two statements in your leader of Jan. 4? They read, "The standard [of general practice] on the whole is none too high," and "To be a first-class G.P. is harder than to be a competent specialist."

It seems to me that the root of these truisms lies in the prevailing system of our medical education; although most students are destined for general practice, this aspect of learning is unrepresented either on the teaching staffs or as a subject for examination. The situation is analogous to that of a would-be architect spending a succession of training periods under the tutorship of plumbers, slaters, joiners, bricklayers, and electricians before being let loose in the field of architecture, there to find a living as best he may.

Is it surprising that many aspiring disciples of Hippocrates are discouraged by their inability to understand or mediate so much of illness as met in their world and fail to rise above the mediocrity of bottle-peddling? The masters have taught them to believe that the patient is ill because he has a disease, and that the means to cure lies in the application of the *materia medica*. Now they find that many of their patients have no textbook pathology and the *materia medica* is rather a farce, with as little power to retard the onset of lesions as to remove most of them when they appear.

With the passage of time most general practitioners gain wisdom from association with their patients and colleagues, and largely revert to the laws laid down by the Greeks 2500 years ago: "Man was not an isolated body; and his disease was no mysterious possession of the body by an evil spirit, but an event in the order of nature, to be followed patiently and to be rectified, not by a single remedy, but by every means that is available for producing health." The practitioner gradually comes to look on ill health as an expression of a noxious environment, and may even discern the nature of the stress factor in the mode of physical breakdown. Unfortunately his wisdom, laboriously acquired, usually dies with him.

The evolution of general practice should not lead towards one of the existing specialties but to a fuller appreciation of man in relation to his environment, particularly as this affects the development of chronic diseases. Why does one person suffer from asthma-bronchitis, another from one or other of the dyspeptic syndromes, another from rheumatism, and yet another from one of the hypertensive diseases? A comparison of the life situation and emotions of one group with that of another may do much to make these disorders comprehensible. For example, does anyone ever get rheumatism if what he is doing is accompanied by joy, excitement, or interest? How often is the "doing part" of our bodies driven to perform monotonous tasks to attain a goal, to fulfil an ambition, or merely to earn a livelihood? The tally of this stress may well turn out to be the measure of our rheumatism. There must be a radical change in the teaching curriculum to enable the fruits of these observations to be garnered, sorted out, and passed on.

Today the medical ships lack captains. There is no shortage of experts in technical departments—first-class engineers, painters, caulkers, carpenters, and the like—but it is difficult to conceive the emergence of a captain from their ranks. Experience in divers offices is a prerequisite of the premiership.

Finally, we practitioners are frequently exhorted to take refresher and postgraduate courses. Who is there to teach us what we need to learn? We want to know how to modify the earliest indications of the common forms of ill health: why are we at times prone to colds in the nose, to boils, or to digestive disorders? How often is the senior practitioner asked to lecture to the junior? Let there be abundant interchange of viewpoints among all sections of our ancient profession, but let us be consistent. Perhaps the brain surgeons would appreciate an intensive refresher course from the dermatologists!

Glasgow.

G. GLADSTONE ROBERTSON.

THE B.M.A.'s DECISION

SIR,—When the present Government came into power many of its members, not excluding the Minister of Health, expressed themselves in a manner calculated to give offence to medical men as well as to others. The Minister of Health had also a past to live down, or live up to, which was not such as to assure former political opponents that they could expect a fair deal. In these circumstances negotiations commenced.

Negotiations involve the meeting together of individuals who are interested in the same subject although from different points of view. These individuals have often mutual suspicions and conflicting political ideals, and there is always a danger that negotiations may break down because the public interest has been subordinated to the clash of personalities. This particular danger threatened negotiations with Mr. Bevan from the very first; and now, for that or some other reason, they are at a standstill and are menaced with complete failure at a very critical moment for the profession.

When we have finished blaming Mr. Bevan for all the difficulties which beset us, is there not still room to inquire whether we ourselves have not sometimes been at fault? According to the Minister of Health, who has expressed his views publicly and courageously, our representatives were so obstinate and so devoted to argument by slogans that real negotiation became impossible. Mr. Souttar, president of the British Medical Association, took the same view and ceased to be a member of the Negotiating Committee. We have therefore grounds for thinking that the personal relationships between some at least of the B.M.A. leaders and the Minister of Health have become such that useful discussions would be difficult. These same members have proclaimed that it is the Minister who is altogether at fault and that a breakdown in negotiations is actually desirable.

I am no more than an onlooker where the B.M.A. is concerned; but it is said that onlookers see most of the game. I should like to suggest that a change in leadership before it is too late might well save a professional debacle.

GORDON WARD

Sevenoaks, Kent.

Vice-president,
Medical Practitioners Union.

SIR,—In his letter of Jan. 11 Mr. T. B. Layton accuses the B.M.A. of herding the profession. I am not a member of the B.M.A. (though I now intend to join—of my own free will) and except for an occasional circular asking my support they have made no attempt to herd me!

Can the same be said of the Labour Party and the trade unions? Is the Labour M.P. allowed the very slightest freedom of vote without incurring the displeasure of his party chiefs and possible disciplinary action? Will the workman soon be allowed even the elementary right to work without bending the knee to his trade-union bosses? I think not. Mr. Layton's cap will, I think, be found a better fit on other heads than that of the B.M.A.

Chigwell, Essex.

A. J. FRASER-SIMSON.

THE PLEBISCITE AND AFTER

SIR,—Whatever the plebiscite may or may not have done, it has shown that most of us are in medicine to get the best living we can out of it. The majority of the consultants vote Yes because they see private practice remaining in statu quo, and a chance of getting paid in the future for doing what they now do for nothing. Those employed in public-health work and municipal hospitals vote Yes because they don't see how they can be any worse off, and they might possibly gain something. The G.P., seeing before him the swings of decreased income, and control increased to potential tyranny—but no compensatory roundabouts—votes No. Then he shrugs his shoulders, grabs his bag, and trots off to his branch surgery.

Let the Minister realise that we are a body of professional craftsmen ready and anxious to do a decent job for decent pay and decent conditions of service: let him now put forth some definite and positive offer in respect of (a) remuneration, (b) compensation, and (c) working hours, instead of this hideous blackmail of "If you don't sign on the dotted line on the proper day you get nothing"! Failing this, let him huff and puff and threaten to blow our house down as much as he likes,

whilst we will continue our work as in the past, fortified by the knowledge that no service can be implemented without coöperation from the poor G.P.

Kent.

F. M. S.

IMPENDING DEATH UNDER ANÆSTHESIA

SIR,—I read with great interest Mr. Hamilton Bailey's excellent article of Jan. 4. I would support wholeheartedly his plea for early cardiac massage.

There is one sign which I have found invaluable and which has led to complete recovery in my last three cases of collapse on the table: it is that of a silent heart. The moment I see the anaesthetist anxious or in difficulties I put my ear over the patient's apex-beat. If the heart is beating, the surgeon need do no more than give the anaesthetist any help and encouragement he may require. If, on the other hand, no sounds are audible, I thrust a needle into the heart and listen again; and if no beat is heard I massage the heart immediately. In this way it is possible to be off the mark within a minute of the alarm being raised.

In so serious an emergency palpation of the radial or carotid pulse is, I submit, not certain enough; this is an occasion when we must go to the fountain-head. The method also has the advantage of keeping the surgeon sterile. The cardiac area has to be cleared in any case, and this direct access leaves no doubt whatever as to the heart's action.

London, W.1.

HAROLD DODD.

SIR,—I consider it unfortunate, at least, that Mr. Hamilton Bailey should so publicise cardiac massage—a procedure which in 25 years of major surgery I have never found necessary. I should indeed be most irate with my anaesthetist if it were necessary.

I can visualise excited surgeons all over the world hurriedly opening the thorax because of a temporary asphyxia due to a light anaesthesia, maltreating a perfectly good heart, and triumphantly publishing so many lives saved because of Mr. Bailey's teaching. Yet I fear that the number of lives saved by this technique will by no means balance the number of lives lost through its unnecessary performance. Were I to shock my patients to such a degree that "cardiac massage" were required, I should give up surgery. If my anaesthetists produced such a state, I should give up my anaesthetists.

London, W.1.

MORTIMER REDDINGTON.

LAY OR MEDICAL ADMINISTRATORS?

SIR,—Your correspondent of Jan. 4 (p. 36) in his logical though biased dissertation on hospital administration discloses, I suggest, a lack of practical experience.

In my turn I should like, admittedly also with considerable bias engendered from long experience in voluntary and municipal hospitals, to set out my reasons for pressing for a medical rather than a lay administrator. Though I have known house-governors in voluntary hospitals who could not have been advantageously replaced by a medical man, I have also known many others who could not be so extolled.

Hospitals exist to relieve or cure the sick as expeditiously as possible, and not for the benefit of the staff or of any particular department of the hospital, although these of course do enter into efficient administration. As all matters of policy eventually concern the welfare of the patient, in every discussion one question should always be asked: "Is it in the interest of the patients?" I suggest that the only people who can answer this question with all its implications are medical men, experienced in hospital administration and in constant contact with the wards of the hospital and its needs. Policy should therefore be presented to the managing committee by the medical staff through its medical committee, of which the medical superintendent may or may not be a member. I think that he should be, as no medical man knows better what is required than a full-time medical superintendent who is on the spot and in touch with all that transpires in the hospital.

A full-time medical superintendent supported by a deputy is, I suggest, desirable to deal with inquiries from general practitioners, members of the committee of management, patients, their relatives, interested visitors and outside official bodies; to consider suggestions from the staff and others; and to investigate complaints promptly.

Again a medical superintendent is better fitted than a lay administrator to guard against specialist blocs becoming real "blocks" to the efficiency of the hospital; to coördinate the departments of the hospital to prevent the formation of watertight compartments, not only in medical and nursing matters but also in the clerical, catering, and cleansing departments; to prevent policy being recommended to the committee of management by heads of these departments without previous consultation with the medical staff committee. His duties should also include the admission of patients and their allocation to appropriate beds and specialists. He should be able to allocate patients to any vacant beds in emergency. There should be only one waiting-list, and this he should carefully scrutinise from time to time, for only a medical man can adjudicate upon the urgency of admission without fear or favour.

The medical superintendent should be acquainted with everything that goes on in the hospital—even if there is a lay administrator, to which I am not entirely opposed, provided there are efficient safeguards to prevent untoward clashes. What this medical administrator is called is immaterial, provided the name makes it clear that he is the internal administrator and medical man in control of the hospital and avoids confusion with the medical officer of health, who is often called medical superintendent, though usually without exercising any internal administrative control.

Under the National Health Service, it must also be remembered, one of the functions of the lay administrators of voluntary hospitals will disappear, for there will no longer be the same need to secure funds from the public.

Leicester.

ERNEST C. HADLEY.

SIR,—The internal management of hospitals in the new health service is to be vested in responsible committees: such is the intention of the Act. It is nevertheless of paramount importance that the daily routine of the busy hospital shall be ever present in the minds of the planners; for, though committees may control finance, direct policy, maintain proper relations with other bodies, and generally superintend the activities of the hospital, they will not themselves do the work!

Efficient service depends on the willing discharge of the daily duty by every member of the hospital staff, from the junior ward orderly to the visiting consultant, and to that end all hospitals, of whatever type, have so far found it necessary to have at least three executive officers to provide for, direct, control, supervise, reprove, advise, report—what you will—the activities of the hospital staff. One of these officers, a layman, is house-governor, secretary, secretary-superintendent, steward, or adjutant. The second is the matron, or lady superintendent of nurses. And the third—and not least—is the senior resident medical officer, medical director or superintendent, medical officer in charge, commanding officer, or (as your correspondent of Jan. 4 suggests) "dean."

In practice it is usually to be observed that unless there is close understanding between these officers, their respective committees, and their colleagues and subordinates there will not be a good morale, and without a "happy-ship atmosphere" there will not be complete efficiency. It should also be remembered that the reputation of the hospital depends not only upon efficiency within but on good liaison with all those individuals who may knock at its doors; and the busier the hospital the greater the need for close attention to all its gates.

The very essence of hospital tradition is team service, and good team-work depends upon the skilful blending of the autocrat, the democrat, and—yes—the bureaucrat. For what is a hospital without its bureau? Or its surgeon or ward sister, who when needful will insist on being more than a "bedside adviser"? Or the rest, mostly good democrats (when their own toes are not being trodden on)?

There will be room to spare in our future hospitals for a medical man who can exercise that fatherly care with the tact and dignity upon which your correspondent so rightly insists. Is it not time, then, that hair-splitting over his title, designation, or "status" should stop? And likewise the attempt to deny him that measure of authority which his office requires, and will continue to require?

London, W.1.

H. W. BREESE.

AMPHETAMINE

SIR,—May I suggest that Dr. Howard's case (Jan. 4), in which the possibility of a coincidental remission of symptoms on withdrawal of amphetamine cannot be ruled out, does not provide grounds for his opinion that more cases of idiosyncrasy are observed with amphetamine than with other drugs? In fact, I submit, the literature inclines the other way. There have been remarkably few published reports of idiosyncrasy to this drug, and in a recent survey Bett¹ states that "the great preponderance of competent clinical opinion favours the view that the incidence of undesirable reactions complicating 'Benzedrine' therapy in normal dosage range is negligible and that the few cases reported in the literature are usually traceable to indiscriminate or unsupervised use."

Menley & James Ltd., London, S.E.5.

T. C. BLACK.

PERITONEAL DIALYSIS

SIR,—I was interested to read of the use of peritoneal dialysis by Mr. Reid and his colleagues (Nov. 23, p. 749) in a case of anuria treated by renal decapsulation. You will note the recovery of 7 g. of urea from the peritoneal efflux. (It should be emphasised that measurement of urea excretion is only a convenient way of measuring the excretion of all diffusible retention products.) Although more urea escaped in the unrecovered fluid which leaked out, it is not likely that the total extracted during the three days of saline drip exceeded the 20–24 g. per day which continuous peritoneal irrigation achieves. Even at this rate, the uræmic patient must be treated for not less than three or four days before substantial clinical improvement is manifest. Had the urea excretion via the kidney after decapsulation been measured, a valid estimate of the comparative benefits of decapsulation versus dialysis would have been possible. The evidence as far as it goes leaves little doubt that dialysis contributed only a very small benefit and that decapsulation brought about recovery.

We are apprehensive that peritoneal dialysis will be discredited unless the precautions we have lately described¹ with respect to the correct formula and the control of peritonitis—an ever-present danger—are adopted. In a number of cases the method has failed because of incorrect technique, neglect of the principles of fluid balance, or poor choice of case. Our published reports consider the type of tube and the fluid formulas to be used as well as the diffusion processes involved in peritoneal dialysis, the problem of œdema, &c. We believe these problems are not insurmountable, whereas that of peritonitis may well prove to be. We are now improving the method so as to eliminate, or at least reduce to a minimum, the possibility of infection from extraperitoneal sources. Once this has been achieved the occurrence of peritonitis will be traceable to invasion from the gut, and if this proves to be the case the method may well have to be discarded. The usual invader is *Bact. coli* when penicillin, alone or with sulphonamides, is used. We had hoped that when streptomycin became available in sufficient quantity to maintain a bacteriostatic concentration throughout the period of irrigation this organism would come under control. But we have now learnt that streptomycin prophylactically has the disadvantage of inducing increasing resistance in *Bact. coli*. Chemotherapy alone, even including streptomycin, will not prevent or cure *Bact. coli* peritonitis.

A number of otherwise salvageable patients will be lost from pulmonary œdema due to using too much fluid intravenously or to errors in the make-up of the formula or failure to alter it as the circumstances in the individual case require. Some patients will be waterlogged as a result of useless efforts at forcing diuresis before the start of peritoneal irrigation. The depth of acidosis and its variations require alterations of the formula. Much work remains to be done before the method becomes sufficiently standardised to permit its general use.

Kolff's "artificial kidney" method deserves to be explored at the same time, for it avoids the complication

of peritonitis and presumably is as capable of establishing fluid balance as our method. It has the obvious disadvantages of complicated apparatus, the need of total heparinisation, the establishment of an arteriovenous anastomosis, and the possibility of leakage from injury to the 'Cellophane' coil.

Department of Surgery, Harvard University, Boston, Mass.

JACOB FINE.

HEALTH CENTRES OF TOMORROW

SIR,—Your new series of articles should be of considerable value, for the subject can do with a great deal of public discussion. I thought I had made my own views fairly clear, but a note on p. 46 of your issue of Jan. 4 suggests that I advocate an "enormous, elaborate, all-purpose centre." I certainly advocate an all-purpose centre so far as general practice is concerned, and agree with your own definition of a "centre in which general practitioners undertake all work ordinarily coming within their scope, and where they assist each other, with ample aid from technicians." I include among those technicians the specialists of the medical profession.

It is, however (among other reasons), because I do not advocate elaborate health centres that I disagree with your suggestions about laboratory provision in the centres. I do not believe that the finest service for patients and for general practitioners, which is what we are aiming at, can be given by multiplying the number of small laboratory units and placing them in charge of technicians however well trained. There is, as you say, "undoubtedly a very wide undisclosed demand" for laboratory help; but can you produce figures to justify the multiplication of laboratories and the employment of full-time technicians at every one of them? I have already tried to give such figures.¹

My experience in a laboratory which has made a special point of providing every possible facility for every general practitioner in its area indicates that, even when saturation-point is reached, a health centre for ten general practitioners or less will still not have enough work—that can be done unaided on the spot by one technician—to justify the inclusion of a laboratory. General practitioners with experience of a service in which a central laboratory handles the whole of the clinical pathology of an area cheaply, rapidly, and willingly, will not easily be convinced that any other method is preferable. From those who believe that each centre should have its laboratory it would be helpful to have estimates of the volume of work likely to be done there.

Richmond, Surrey.

D. STARK MURRAY.

SIR,—It seems pretty obvious that in the new health centres for some time to come we shall have neither enough X-ray plants nor the trained staff to work them. It may take several years until "the ideal arrangement for the future," as visualised by the more progressive advocates of well-equipped health centres, will become a reality. Surely something could and should be done in the meantime to provide a sort of "basic X-ray service" for the patients attending their doctors at these centres.

So far 19 local authorities in England and Wales have been equipped with mass-radiography units; and it can, I believe, be assumed that all major local authorities in the country will have a mobile mass-radiography unit, adequately staffed, at their disposal in the near future. It has already been demonstrated that voluntary mass radiography of the supposedly healthy, working-fit population in single surveys gives a relatively poor return. The time has now come to shift these mobile units from the fit to the sick people. The experimental stage of mass surveys of cross-sections of the working population could now be followed by the more promising enterprise of employing mass radiography as a routine examination of contacts and as an unrivalled aid to the early diagnosis of clinical chest diseases.

Our clinical experience in chest clinics as well as in sanatoria shows every day the disturbing fact that too many cases of tuberculosis, as well as of bronchial carcinoma, severe bronchiectasis, and other clinical chest diseases, are being missed because of inadequate examination. Present-day knowledge, however, tells us that no chest examination can be considered "adequate"

1. Clinical Pathology in the National Health Service. *Med. Pr.* 1944, 211, 166.

1. Bett, W. R. *Post-grad. med. J.* 1946, 22, 205.1. Fine, J., Frank, H. A., Soligman, A. M. *Ann. Surg.* 1946, 124, 857.

without "early"—and, if inconclusive, repeated—X-ray examination. Apart from periodical (and compulsory) mass surveys in hazardous industries it is the Health Centres of Tomorrow which ought to be the Target for Tomorrow of mass routine radiography.

E. G. W. HOFFSTAEDT.

Hollywood Hall Sanatorium, Wolsingham.

PREVENTION OF EPIDEMIC NEONATAL DIARRHOEA

SIR.—Mr. Stern (Jan. 11), in indicating the film which forms inside feeding-bottles, may well have found one of the causal factors of otherwise baffling epidemics of neonatal diarrhoea. Removal of this very adherent film is difficult but desirable even though the bottles are sterilised after use. Mr. Stern does not recommend a method by which the bottles may be "thoroughly cleansed of film." I have found the best cleansing agent to be one of the sulphonated alcohols or soapless detergents called 'Teepol' (Technical Products Ltd.). A small quantity of this in the washing-up water and the use of a bottle brush will quickly remove film.

London, N.14.

C. ALLAN BIRCH.

PSYCHOTHERAPY OF ULCERATIVE COLITIS

SIR.—Dr. West (Dec. 21) remarks on the disregard in the 1920's of the emotional element in the causation of colitis.

It may be of historical interest to record that in the summer of 1921, after a preliminary psychological investigation to prove the need, I referred a patient to Dr. Millais Culpin for psychotherapy. She was a musically talented woman with aspirations to become a professional, who for 23 years, from the age of 15, had been virtually a prisoner confined to the vicinity of a w.c. The treatment was completely successful. Before long I was successfully treating colonic spasm in the same way.

Those were the days when the appendix was stitched to the abdominal wall and used as a channel through which to wash out the colon in an attempt to rid it of an irritant existing, as Groddeck had shown long before, only in the mind. Neither Culpin nor I had heard of Groddeck then.

Portsmouth.

W. S. INMAN.

A MORAL PROBLEM

SIR.—Leaving out of consideration the sense of degradation which most of your readers would feel on reading details of experiments on innocent outraged human victims, the argument against the German medical atrocities is that any small step forward in medical knowledge is at the expense of an immense step backward in civilisation. I realised from the beginning that someone would put the entirely hypothetical question whether such atrocities would be justified if they produced a major medical advance such as a cure for tuberculosis, and my answer would still be No; for even the hurrying by some years of such great relief of human suffering would be too dearly purchased by the immeasurably greater harm done to the respect for the human personality on which civilised human life depends. It is better to be a Keats or a Stevenson with tuberculosis than a Himmler or a Goebbels without it.

The publication of medical knowledge obtained by the treatment of war wounds or Belsen starvation is not at all analogous, because that was obtained in the proper medical function of rendering aid to the sick and wounded, and not in its perversion in experimental atrocity. There is all the difference.

The point to consider therefore, apart from the sense of degradation and shame which editors, secretaries, printers, and readers would feel in dealing with such stuff (which some would discount as mere sentiment), is whether the consummation of such "research" by its publication and use would make us accessories after the crime. I personally feel that they would, and that they would make it considerably easier for some future would-be human vivisectionists to give way to their inhuman instincts.

The records should be destroyed—the sooner the better. They should never be published.

London, S.W.15.

A. NELSON-JONES.

Obituary

WILLIAM HAROLD WHITE

M.R.C.S.

FOR the past 25 years Dr. W. H. White put into practice in his maternity home at Blackheath his theories on the advantages of a vegetarian diet and suitable exercises for expectant mothers. Born in 1882, the son of the Rev. Samuel White, vicar of Marley Hill, near Durham, he was educated at the Clergy Orphanage School at Canterbury, and at first worked in an insurance office. But the conditions of midwifery at the time of the birth of his first child so shocked him that he determined to become a doctor. In 1917 he took the Conjoint qualification at St. Thomas's Hospital, later serving with the R.A.M.C. in India. But he had not forgotten why he had joined his new profession, and on demobilisation, after holding a house-appointment at the General Lying-in Hospital in York Road, he opened Stonefield Maternity Home with Dr. Cyril Pink in 1920. "Perhaps the most valuable contribution Dr. White made to obstetrics," writes a colleague, "was his encouragement of the use of exercise during pregnancy and the puerperium, and through his enthusiasm many patients received great benefits. He tried to plan antenatal care so as to secure a small child, and so was an experimental observer in one of the most complex biochemical fields."

Dr. White died at Hindhead on Dec. 29. His wife, Miss Ethel Hutchings, whom he married in 1907, survives him with three sons and two daughters.

CHARLES GRANT PUGH

M.D., B.S.C. LOND., D.P.H.

Dr. C. Grant Pugh, for 32 years medical officer of health for Southend-on-Sea, died on Dec. 19. Of Scottish and Welsh descent, he came of a family with a medical bent, for his elder brother, the late W. T. Gordon Pugh, was for many years medical superintendent of Queen Mary's Hospital for Children, Carshalton, his sister was formerly a senior member of the London County Council nursing staff, and his surviving brother is a dental surgeon in practice in Streattham.

He was educated at Aberystwyth and at the Middlesex Hospital, which characteristically he chose as his medical school because the house-appointments were made on the examination results. He had already graduated B.Sc. Lond. in 1894, and in 1899, after winning the senior Broderip and Murray scholarships, he took his M.B. Lond. with honours in medicine. The following year he was awarded the gold medal for his M.D. At that period it seemed unlikely that he could expect promotion to the honorary staff of the Middlesex for a considerable time, and Pugh accordingly relinquished the project of setting up in consultant practice. In 1902 he took the D.P.H. at Cambridge, and after some fruitful years with the Metropolitan Asylums Board and experience as deputy medical superintendent at Bethnal Green Infirmary he became one of J. C. Thresh's assistants in Essex, and Thresh was for him a formative influence of the first importance.

In 1908 Pugh was appointed M.O.H. for Southend, and there he found ample scope both as physician and administrator, for, in those days when the area was less well served by consultants, his opinion was often sought by his colleagues in difficult medical cases. The health services of this rapidly growing population were developed by him on sound lines till the outbreak of the first world war temporarily arrested progress. After serving in the Balkans with the rank of captain, R.A.M.C., he returned to Southend where he was foremost in calling attention to the urgent needs for better hospital provision, and within a few years the generosity of Lord Iveagh and a spirited local initiative had created the new Southend General Hospital.

The Local Government Act of 1929 offered a great opportunity of which, on Pugh's advice, the corporation took full advantage. The sick wards of the poor-law institution at Rochford were transferred from the board of guardians and appropriated for hospital purposes, and, when the extensions begun by the guardians were completed, Pugh set himself the task of modernising the hospital. In 1940, a few weeks before his retirement,

he had the satisfaction of seeing the completion, at a cost of £400,000, of new buildings of the most modern design.

An arresting figure in any company, Pugh was distinguished in appearance, courtly in manner, and deadly in argument. There were few gatherings which he failed to dominate through sheer personality, and his committees invariably found him a shrewd, far-sighted, and courageous adviser. To his staff he set an example of all that is best in the public service, and with his

colleagues he was invariably helpful, considerate, and popular. Children liked and trusted him, and some of his happiest hours were spent in their company in the wards of his infectious-diseases hospital.

He faced the inevitable end with all the stoic courage and lack of complaint which were characteristic of the man. His staff retained their affectionate admiration for him, undimmed by his absence in retirement, and his passing is felt acutely by all who knew and worked with him.

J. S. L.

Appointments

HAYES, D. S., M.R.C.S.: asst. M.O.H. for tuberculosis, St. Helens.
HILDICK-SMITH, GAVIN, M.B. Camb.: Wander scholar and registrar, children's department, Westminster Hospital.
KENNISH, P. F., M.R.C.S.: resident M.O., Hertford British Hospital, Perret (Seine), France.
SWIET, JOHN DE, M.D. Lond., M.R.C.P.: consulting physician, Llanelly and district medical service.

London County Council:

BARKER, G. B., M.A. Camb., M.R.C.S.: asst. M.O., Tooting Bee Hospital.
BOYD, A. M., M.B.: asst. M.O., Long Grove Hospital.
BULLMORE, G. H. L., B.M. Oxid.: asst. M.O., St. Ebba's Hospital.
DUDDINGTON, A. J. E., M.B. Lond.: asst. M.O., Friern Hospital.
DUGGAN-KEEN, G. E., M.R.C.S.: asst. M.O., St. Bernard's Hospital.
GILMOUR, HELEN M., M.B. Glasg.: asst. M.O., St. Bernard's Hospital.
IVES, E. L., M.R.C.S.: asst. M.O., Claybury Hospital.
JOHNSTON, J.: asst. M.O., Claybury Hospital.
KAY, D. W., B.M. Oxid.: asst. M.O., West Park Hospital.
LIVINGSTON, W. V., M.R.C.S.: asst. M.O., Manor Hospital.
MURRAY, NEVILLE, M.B. St. And.: asst. M.O., Cane Hill Hospital.
PALMER, MARION E. F.: asst. M.O., Banstead Hospital.
RICHMOND, HUGH, M.B. Glasg.: asst. M.O., Bexley Hospital.

Middlesex County Council:

BARNES, C. G., M.D. Lond., F.R.C.P.: physician, Hillingdon County Hospital.
DAVIES, J. V., M.D. Lond., M.R.C.P.: tuberculosis M.O., Edmonton Chest Clinic.
DYNKIE-KLEIN, MARTHA, M.D. Prague, M.R.C.S., D.C.H.: pædiatrician, West Middlesex County Hospital.
EDEN, JOHN, M.B. Durh.: senior pathologist, West Middlesex County Hospital.
EDWARDS, PHYLLIS M., B.Sc. West Australia, M.B. Lond., D.A.: senior anaesthetist, West Middlesex County Hospital.
EDWARDS, T. A. W., M.B. Camb., M.R.C.P.: chief assistant, Clare Hall County Hospital.
EWEN, J. B., M.D. Aberd., D.P.H.: principal asst. M.O., Public Health Department.
HARTSTON, W. L., M.D. Lond., M.R.C.P., D.P.H.: principal asst. M.O., Public Health Department.
HOUSLOW, A. G., M.D. Lond.: physician, Clare Hall County Hospital.
MCKELVIE, I. L., M.R.C.S.: asst. radiologist, North Middlesex County Hospital.
RANKIN, A. C. R., M.B. Belf., D.A.: senior anaesthetist, Central Middlesex County Hospital.
ROBERTS, J. C., M.D. Lond., M.R.C.P.: physician, Harefield County Hospital.
SIMPSON, THOMAS, M.Sc. Chicago, M.D. Leeds, M.R.C.P.: physician, Chase Farm Hospital.
STEPHEN, GEORGE, M.B. Aberd., F.R.C.S.E.: medical director, Ashford County Hospital.
TELLING, MAXWELL, D.M. Oxid., M.R.C.P.: physician, Clare Hall County Hospital.
WHITTAKER, NORMAN, M.D. Camb., M.R.C.P.: physician, North Middlesex County Hospital.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED JAN. 4

Notifications.—Smallpox, 0; scarlet fever, 1161; whooping-cough, 2030; diphtheria, 242; paratyphoid, 3; typhoid, 5; measles (excluding rubella), 10,823; pneumonia (primary or influenzal), 1264; cerebrospinal fever, 61; poliomyelitis, 9; polioencephalitis, 1; encephalitis lethargica, 2; dysentery, 65; puerperal pyrexia, 120; ophthalmia neonatorum, 67. No case of cholera, plague, or typhus was notified during the week.

Deaths.—In 126 great towns there were no deaths from enteric fever or scarlet fever, 4 (0) from diphtheria, 10 (0) from measles, 17 (2) from whooping-cough, 76 (9) from diarrhoea and enteritis under two years, and 36 (5) from influenza. The figures in parentheses are those for London itself.

Liverpool had 4 deaths from whooping-cough. Birmingham had 5 deaths from influenza. Sheffield and Birmingham each had 7 fatal cases of diarrhoea and enteritis.

The number of stillbirths notified during the week was 336 (corresponding to a rate of 28 per thousand total births), including 41 in London.

Diary of the Week

JAN. 19 TO 25

Monday, 20th

HUNTERIAN SOCIETY
8.30 P.M. (Mansion House.) Prof. G. Debaisieux (Louvain): Hypotension in Intracranial Injuries. (Hunterian lecture.)

Tuesday, 21st

UNIVERSITY COLLEGE, Gower Street, W.C.1
5.15 P.M. Mr. F. Bergel, Ph.D.: Aspects of Pharmacological Chemistry—(1) Relationship between Pharmacology and Organic Chemistry.
ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.1
5 P.M. Prof. F. C. Bartlett, F.R.S.: Measurement of Human Skill. (First Oliver-Sharpay lecture.)
ROYAL SOCIETY OF MEDICINE
4 P.M. (Inoculation Department, St. Mary's Hospital, W.2.) Pathology. Demonstrations.
EUGENICS SOCIETY
5.30 P.M. (Burlington House, Piccadilly, W.1.) Sir Alexander Carr-Saunders, Sir Cyril Burt, Dr. J. A. Fraser Roberts: Relation of Intelligence to Fertility.
SOCIETY FOR THE STUDY OF ADDICTION
4 P.M. (11, Chandos Street, W.1.) Dr. A. P. Rossiter Lewis: Alcohol and Abnormal Behaviour in Head Injury Cases.
CHELSEA CLINICAL SOCIETY
6.30 P.M. (South Kensington Hotel, 41, Queens Gate Terrace, S.W.7.) Dr. G. A. MacDonald, Dr. G. Beauchamp: Osteopathy.

Wednesday, 22nd

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5 P.M. *Endocrinology and Obstetrics and Gynaecology.* Mr. A. S. Parkes, F.R.S., Mr. Aleck Bourne, Miss Meave Kenny, Dr. P. M. F. Bishop: Use of Oestrogens in Gynaecology.
BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck Street, W.1
5 P.M. Prof. W. V. Mayneord, D.Sc.: Applications of Atomic Physics in Medicine. (Fourth of six lectures.)

Thursday, 23rd

ROYAL COLLEGE OF PHYSICIANS
5 P.M. Prof. F. C. Bartlett, F.R.S.: Measurement of Human Skill. (Second Oliver-Sharpay lecture.)
ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
5 P.M. Mr. H. A. Haxton: Regeneration after Sympathectomy, and its Effects in Raynaud's Disease. (Hunterian lecture.)
ROYAL SOCIETY OF MEDICINE
8 P.M. *Urology.* Clinico-pathological meeting.

Friday, 24th

ROYAL SOCIETY OF MEDICINE
2.30 P.M. *Epidemiology and State Medicine.* Lieut.-Colonel William Butler: Whooping-cough and Measles—an Epidemiological Concurrence and Contrast.
5 P.M. *Pædiatrics.* Mr. Denis Browne: Tuberculous and Streptococcal Infections of the Cervical Lymph-glands.
ASSOCIATION OF INDUSTRIAL MEDICAL OFFICERS
5 P.M. (London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1.) Joint meeting with the school medical service group of the Society of Medical Officers of Health. Dr. A. A. E. Newth, Dr. T. A. Lloyd Davies: Change from School to Industry.
ASSOCIATION OF CLINICAL PATHOLOGISTS
9.45 A.M. (National Hospital, Queen Square, W.C.1.) 37th scientific meeting.
WEST LONDON MEDICO-CHIRURGICAL SOCIETY
8.30 P.M. (West London Hospital.) Ciné meeting:
LONDON CHEST HOSPITAL, Victoria Park, E.2
5 P.M. Mr. D. S. M. Barlow: Malignant Diseases of the Lung.
ROYAL MEDICAL SOCIETY, 7, Melbourn Place, Edinburgh
8 P.M. Mr. A. H. McIndoe: Surgery of Congenital Defects.

Saturday, 25th

ROYAL SANITARY INSTITUTE
10.15 A.M. (Town Hall, South Shields.) Dr. T. Lloyd Hughes: Future Public Health Responsibilities of Local Authorities. Lieut.-Colonel John Reid: Present Trend of Local Government Administration from an Engineer's Point of View.
ASSOCIATION OF INDUSTRIAL MEDICAL OFFICERS
10.30 A.M. Mr. R. H. Young: Diagnosis, Pathology, and Treatment of Intervertebral Disks.
BIOCHEMICAL SOCIETY
11 A.M. (British Postgraduate Medical School, Hammersmith, W.12.) Papers and demonstrations.
ASSOCIATION OF CLINICAL PATHOLOGISTS
12 NOON. 37th scientific meeting, continued.

Notes and News

CONTROL OF HOSPITAL ESTABLISHMENTS

In recent months, owing to the diminishing needs of the Services for new recruits for general medical duty, the Central Medical War Committee has been able to deal more generously with hospital authorities seeking permission to increase their establishments of resident medical officers. In fact so many additional appointments have been approved that it is thought that there are now few hospitals with a serious shortage of resident medical staff, and that the removal of control would not result in any great increase in the rate at which establishments are being enlarged. It has therefore been decided, as an experiment, to discontinue for six months the control of establishments exercised by the committee (and, in London, by the Committee of Reference). But it is emphasised that too rapid an increase should be avoided because it would not only have a serious effect on recruitment to the Forces but would also add greatly to the difficulty experienced by some of the smaller and more remote hospitals in attracting house-officers.

A moderate increase in the number of B1 posts would be of advantage; for the chief difficulty confronting the committee is to secure enough recruits of specialist and graded specialist status, and men who have occupied B1 posts must in future form the great bulk of the new specialist recruits. Hospitals are urged to regard any new posts in this category as training posts for men destined for service as specialists or graded specialists in the Forces, and to restrict them to men known to be liable and medically fit for military service later.

It remains necessary for hospitals to inform the committee promptly of all modifications of establishments and to notify the names of all practitioners appointed or vacating appointments. In connexion with its recruitment activities the committee must continue to maintain accurate records of the appointments and their occupants.

No change is proposed in the wording of advertisements of vacant A, B2, and B1 posts or in the present regulations relating to the periods of tenure of such posts by practitioners liable to military service. A and B2 posts will continue to be held for six months and B1 posts for not less than twelve months. Recruitment will be initiated automatically after a two years' tenure of a B1 post if it has not taken place earlier.

DENTAL DISCORD

No settlement has yet been reached in the controversy between dentists and the Ministers of National Insurance and Health on the scale of fees for work done for insured persons. Of the three dental societies, the British Dental Association has rejected the scale approved by the Joint Advisory Council, and the Public Dental Services Association has accepted it. The head council of the Incorporated Dental Society has voted for acceptance, but the Metropolitan and Southern Counties branch of the society, by a majority of 150 votes to 6, decided on Jan. 12 to reject this decision and called for an inquiry into the council's actions.

ASSISTANT NURSES

In the 1943 Nurses Act for Scotland it was laid down that no-one who began a course of training after August, 1948, could be admitted to the roll of assistant nurses. This provision will be repealed under clause 76 of the National Health Service (Scotland) Bill. There is no such restriction in England and it was incorporated in the Scottish Act in deference to the views of several Scottish organisations at that time opposed to the permanent establishment of the assistant nurses' roll. There are now nearly 3000 assistant nurses in Scotland and the recently approved rules of the General Nursing Council for Scotland have made it possible for hospitals to become assistant-nurse training schools. The repeal of the restriction will enable the recruitment and training of this grade of nurse to proceed without interruption.

In moving the second reading of the National Health Service (Scotland) Bill, Mr. Joseph Westwood, Secretary of State for Scotland, said: "The new service will make increased demands upon the services of nurses of all types, and we consider it essential that all channels of recruitment to the profession should be kept open. The position will, however, be kept under review and if in say ten years' time it should be considered undesirable to continue the recruitment of assistant nurses, the Government of the day will, of course, be free to come to Parliament for further legislation."

OLD FRIEND IN NEW GUISE

THE *British Dental Journal* appears this year in a new form. The pages have been widened by an inch, which makes it possible to print the text in double columns. A return has been made to the pre-war practice of publishing B.D.A. intelligence in a separate supplement, circulated to members only. More space can thus be given to scientific papers and to correspondence. In a foreword Mrs. Lilian Lindsay, president of the B.D.A., describes the birth of the journal 67 years ago. The new format foreshadows a progressive and prosperous old age, and every reader will reciprocate her good wishes.

University of Oxford

The following degrees were conferred on Dec. 14:

B.M.—J. B. Loudon, H. D. Leggatt, M. G. D. Davys, Alison M. Miles.

The following have been successful in examinations for the diploma in ophthalmology:

R. W. Carey, K. J. L. de Silva, R. G. S. Ferguson, S. A. H. Firdosi, G. C. Laszlo, D. G. Mody, Vincent Tabone, H. J. R. Thorue, A. R. Wear.

University of London

Mr. Leslie Young, PH.D., is returning from the University of Toronto to fill the new readership in biochemistry at University College.

University of Edinburgh

Mr. C. H. Waddington, sc.d., of the National Animal Breeding Research Station, Edinburgh, has been appointed to the chair of animal genetics.

University of St. Andrews

Mr. A. D. Hitchin, M.D.S., has been appointed to the chair of dental surgery.

Royal College of Surgeons of England

At a meeting of the council of the college held on Jan. 9, with Sir Alfred Webb-Johnson, the president, in the chair, the honorary fellowship was conferred on Dr. Louis Bazy, formerly president of the Académie de Chirurgie, and consulting surgeon to the French Army, and Dr. Leopold Mayer, president of the International Society of Surgery.

Prof. G. Grey Turner was appointed as honorary curator of the instrument collection in the college. It was agreed that Dr. James Craigie, formerly of Toronto, should give an Imperial Cancer Research Fund lecture in the college in place of Prof. W. E. Gye.

The council reiterated their opinion that a statutory register of specialists is neither necessary nor desirable.

The post of r.s.o. at the Princess Beatrice Hospital, London, and the additional post of r.s.o. at the Victoria Hospital, Blackpool, were recognised for the final fellowship examination.

On April 10 the council will elect a member of the court of examiners. The retiring member, Mr. E. A. Crook, is applying for re-election. Fellows who wish to become candidates must apply in writing to the assistant secretary on or before Monday, Feb. 3.

A diploma of fellowship was granted to J. G. Coxon, and diplomas of membership to Harry Rawlings and Michael Redfern.

The following diplomas were granted, jointly with the Royal College of Physicians:

D.C.H.—N. F. E. Burrows.

D.P.M.—H. S. Capooore, Margaret T. Collins, John Cowen, G. R. Debenham, John Farr, T. C. N. Gibbens, J. R. Hawkins, R. M. M. Hunter, Ali Kamal, P. W. W. Leach, L. F. E. Lewis, D. O. Lloyd, N. J. de V. Mather, P. R. A. May, A. R. Norton, Gerald O'Gorman, M. A. Partridge, Mildred I. Pott, David Rice, R. A. B. Rorie, David Rumney, F. T. Shadforth, K. C. P. Smith, K. R. Stallworthy, K. R. Thomas, M. G. Valentine, G. A. van Someren.

D.L.O.—A. D. Bateman, Prem Chandra, J. V. De Sa, P. R. B. Grimaldi, A. R. Harper, Stephen Kavanagh, D. G. Lloyd-Davies, W. McO. Macgregor, John Magill, T. A. Narayanan, H. N. Perkins, H. C. Purser Smith, S. N. Sarma, C. J. Scott, J. B. Scott, E. M. Sowell, H. J. M. Stratton, A. S. Walker, H. A. Ware.

D.I.II.—A. L. L. Silver.

Royal College of Surgeons in Ireland

Applications are invited, on or before April 22, for the professorship of anatomy at the college. Terms of appointment can be had from the registrar, and the election will be made by the council on May 8.

University College, London

A course of four public lectures on Some Aspects of Pharmacological Chemistry is to be delivered by Mr. F. Bergel, Ph.D., in the physiology theatre at University College, Gower Street, W.C.1, on Tuesdays, Jan. 21, Feb. 4, Feb. 18, and March 4. The lectures will be at 5.15 P.M. on each day.

Edinburgh Postgraduate Lectures

The following lectures will be given at the Royal Infirmary on Thursdays at 4.30 P.M.: Jan. 30, Dr. Ninian Bruce, Limitations of Personality; Feb. 13, Mr. A. Logan, Prognosis in Empyema Thoracis; Feb. 20, Prof. R. W. B. Ellis, Growth and Maturity in Relation to Age; and Feb. 27, Mr. A. G. Ross Lowdon, Gastrojejunal Ulceration.

Medical Art Society

The activities of this society are to be revived, and it is hoped to hold an exhibition of members' work in the summer. Doctors who paint or sketch are asked to write to the secretary, Dr. Henry Wilson, 142, Harley Street, London, W.1.

Lectureship in Industrial Health

Boots Pure Drug Company have endowed for seven years a lectureship at Roffey Park Rehabilitation Centre, Horsham, Sussex, at a salary of £1200 per annum. Dr. R. F. Tredgold has been appointed the first lecturer.

Inoculation against Yellow Fever

The Ministry of Health has arranged for intending travellers to have yellow-fever inoculations without charge at centres in Newcastle, Leeds, Oxford, Bristol, Cardiff, and Birmingham; centres are also to be established at Liverpool and in the London area, where at the present time the Wellcome Foundation, Euston Road, N.W.1, meets requests for inoculation. Similar arrangements for Scotland were announced in our columns last week (p. 88).

National Collection of Type Cultures

The Medical Research Council has appointed Dr. S. T. Cowan curator of the collection, which is at present housed at the Lister Institute, Elstree.

Dr. Cowan studied medicine at Manchester University, where he qualified M.B. in 1930. At Manchester Royal Infirmary he held resident posts as house-physician, assistant medical officer, and clinical pathologist. In 1932 he was awarded a Dickinson medical research scholarship, and in the following year graduated M.D., with commendation. In 1934 he became research assistant in the university department of bacteriology and preventive medicine. He went to London in 1935 as first assistant in bacteriology at the British Postgraduate Medical School, Hammersmith, and in 1936 was appointed to a Freedom research fellowship at the London Hospital. In 1938 he returned to Manchester as university lecturer in bacteriology. During the late war he served, from 1940 to 1945, with the rank of major, as specialist in pathology to Army hospitals; he was also in charge of a mobile bacteriological laboratory in the Middle East. His publications include papers on the classification of staphylococci.

Blood-group Reference Laboratory

When the Galton Laboratory Serum Unit (Medical Research Council), formerly at Cambridge, closed last May, Dr. R. R. Race, the former director, took charge of the new blood-group research unit of the council at the Lister Institute, London. Dr. A. E. Mourant, his assistant at Cambridge, has become director of the new blood-group reference laboratory of the Ministry of Health, which will provide grouping serum and investigate clinical blood-group problems. The laboratory is also housed at the Lister Institute and its juxtaposition with the M.R.C. research unit will ensure the close association of theory and practice. Hospitals and doctors who need grouping serum should, in the first instance, apply to their local regional transfusion centre, through which it will be issued.

Congress of Legal and Social Medicine

The International Academy of Legal and Social Medicine are holding their first post-war congress in Belgium at Brussels and Liège from June 25 to 28, immediately after the Journées Médicales de Bruxelles. The work of the congress will be divided into the following sections: legal medicine in its applications to crime; social medicine; industrial medicine; medicolegal and social psychiatry; and scientific police. The official languages will be English and French, and those who wish to read papers should notify without delay the president of the congress, Prof. M. De Laet, Faculté de Médecine, 7, Rue de la Gendarmerie, Brussels, or one of the general secretaries, Prof. P. Moureau, 7, Rue Villette, Liège, or Prof. F. Thomas, 23, Kluyskensstraat, Ghent.

King Edward's Hospital Fund for London

The King has sent his annual subscription of £1000 for 1947 to the Fund.

Kaiser-i-Hind Medal

In the New Year honours the Kaiser-i-Hind medal for public services in India was awarded to Dr. Margaret McMillan, who is in charge of the Women's Mission Hospital at Ajmer.

London School of Dermatology

A course of lectures in skin diseases will be given at St. John's Hospital, Leicester Square, London, W.C.2, on Tuesdays and Thursdays at 5 P.M., from Feb. 4 to March 27 (except on the third Thursday in each month).

American Research into High Blood-pressure

A group of Cleveland business men have decided, according to a B.U.P. message, to establish an organisation to be known as the American Foundation for High Blood Pressure, which will raise funds to assist research into the causes and cure of arteriosclerosis and high blood-pressure.

Special Diets for Patients

In view of the instances recently reported by doctors in which their recommendations for additional food allowances for patients have either been rejected or tardily and partially granted by the Ministry of Food, the British Medical Association has asked the Ministry to supply details of how these applications, especially those submitted under clause 19 of Med. 2, are dealt with, "both within the Ministry and within the Food Rationing (Special Diets) Advisory Committee of the Medical Research Council."

A New Approach to Nurses

At a nurses' prize-giving at Lewisham Hospital on Jan. 9 Mr. Charles Key, parliamentary secretary to the Ministry of Health, announced that a working party was drawing up a report on the recruitment of nurses which would shortly be submitted to the Minister. The working party had collected all their facts by personal investigations and contacts through a cross-section of hospitals and members of different groups of the profession, and Mr. Key was sure that this new method of approach would lead to a series of important recommendations.

Return to Practice

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

Mr. M. GORDON, F.R.C.S., 55, Harley Street, W.1.
Mr. H. OSMOND CLARKE, F.R.C.S., 80, Harley Street, W.1.

DETECTION OF TUBERCLE BACILLI IN C.S.F.—Mr. B. S. N. Shamyeh writes that in his method (*Lancet*, 1946, ii, 810) 10 c.cm. of normal saline should be substituted for the distilled water (see paragraph 4), since saline has proved "to be of far greater value in finding the bacilli on staining."

Births, Marriages, and Deaths**BIRTHS**

HALLIDAY.—On Jan. 1, in London, the wife of Dr. J. H. G. Halliday—a daughter.
ISMAY.—On Dec. 27, at Johannesburg, the wife of Dr. D. G. Ismay—a daughter.
PAGE.—On Jan. 7, in London, the wife of Mr. B. H. Page, F.R.C.S.—a daughter.
SCOTT.—On Jan. 7, the wife of Dr. H. C. Scott—a daughter.
TAIT.—On Jan. 6, at Windsor, the wife of Dr. Charles Tait—a daughter.
WAYCOTT.—On Jan. 3, at Horsham, the wife of Dr. J. A. Waycott—twin daughters.

MARRIAGES

COUNIHAN—BEDWORTH.—On Jan. 11, in London, Francis Harold Counihan, M.B., to Patricia Maureen Bedworth.
FALLOWS—BONE.—On Jan. 7, at Coatham, Redcar, Harold Fallows, M.B., to Isabel Bone.

DEATHS

CASSIDY.—On Jan. 8, Matthew Ignatius Thornton Cassidy, M.B. Glasg.
HOLFORD.—On Jan. 4, Christopher Tredwell Holford, F.R.C.S.E., aged 69.
MARTYN.—On Jan. 7, Sir Henry Linnington Martyn, K.C.V.O., M.B. Lond., F.R.C.S.
MILL.—On Jan. 5, at Lyme Regis, William Mill, M.R.C.S., aged 89.
REDWOOD.—On Jan. 3, at Crickhowell, Breconshire, Robert Vaohell de Acton Redwood, F.R.C.S.E., aged 67.
WILLIAMS.—On Jan. 10, at Thornbury, Glos, Lionel Henry Williams, M.D. Durh., aged 84.

PSYCHOSOMATIC APPROACH TO ORTHOPÆDIC SURGERY

A. DAVID LE VAY
M.S. Lond., F.R.C.S.

ORTHOPÆDIC SURGEON, WOOLWICH MEMORIAL HOSPITAL;
SURGICAL REGISTRAR, ROYAL NATIONAL ORTHOPÆDIC
HOSPITAL

"All good and evil, whether in the body or in human nature, originates in the soul and overflows from thence . . . therefore if the . . . body is to be well, you must begin by curing the soul . . . and the cure has to be effected by the use of certain charms, and these charms are fair words, and by them temperance is implanted in the soul; and, when temperance is there, health is steadily imparted to the whole body. . . . Let no one persuade you to cure him until he has first given you his soul to be cured, for this is the great error of our day in the treatment of the human body, that physicians separate the soul from the body."
—Socrates.

THOUGH the "great error" of Socrates' day is dying under the impact of modern civilisation on our mental and physical organisms, it may still be necessary to demonstrate to orthopædic surgeons the need for considering other things in their patients than the fit of a bone-graft or the snugness of a plaster.

It is unfortunate that the rapid development of the psychosomatic approach has led not to all-embracing and catholic clinicians but to psychiatrists interested in the genesis of certain physical phenomena or to philosophically minded physicians and surgeons. The concept of the essential unity of mind and body has not led to a synthesis of physician and psychiatrist at a higher level, and its adherents are unavoidably psychological in attitude and jargon and bracketed with the psychiatrists by the orthodox bulk of the profession.

Nevertheless, the mental aspect of orthopædic work has gained considerable attention in the treatment and rehabilitation of injured men in the late war, and emphasis has been laid on the emotional factor in recovery. But there are two dangers in adhering to the Platonic aphorism that "there are physicians for the soul and physicians for the body, and yet the two are one and indivisible." One is of paying it only lip service and believing that the mind will look after itself if the body is put right. The other is of accepting it on a negative basis: emphasising, rightly, the prevention of neurosis by reassurance and active rehabilitation from the outset and, wrongly, the exclusion of the neurotic from the charmed circle for fear of contagion. Doubtless no more emphasis on the emotional aspect is usually needed than is given by a positive impetus to recovery at every stage, by group encouragement of patients, and by the stimulus of outstanding surgical personalities; and doubtless some segregation is necessary, and treatment is available for those excluded. But they have been excluded, often an irretrievable downward step we should try to avoid.

The magnificent results in the Royal Air Force were achieved with such first-class material that it was possible to separate the sheep from the goats without being wasteful, and for a specific end. Civilian colleagues know they cannot apply the same methods, or only in limited industrial sectors, because the goats might soon come to outnumber the sheep. In civil life patients must obtain their own security; there is risk of unemployment; retention of State direction implies some chronic frustration; and living standards are lower than before the war. These factors contribute to subjective difficulties which may or may not amount to frank neurosis but which will affect industrial collaboration, accident proneness, and illness in general.

All this is of prime importance to the orthopædic surgeon; for to the concept of an industrial army needed to revive our export trade must be added that of an

expanded industrial medical service; and of this the orthopædic section will be a major, perhaps the major, part. Including the increasing scope of traumatic surgery and possibly of burns, and overlapping into plastic repair, it must comprise, besides routine orthopædic practice, preventive work on posture and the feet in adolescents and young factory workers. The orthopædic department of any medical general staff planning the prevention and treatment of illness in the new industrial Britain must therefore possess considerable autonomy, and may find it increasingly useful to adopt the psychosomatic approach to problems formerly regarded as purely physical.

PRACTICAL RÔLE OF THE ORTHOPÆDIC SURGEON

Let us assess the duties of the orthopædic surgeon conscious of these wider responsibilities, which, if ignored, may sterilise his activities and produce the futile waste of time and treatment familiar in our outpatient departments. It is not desirable or possible for him to develop a psychological approach to those patients in whom physical disability is obviously not the sole factor. But he must expand his horizon so as to recognise the need for psychiatric assistance; and this may mean having a psychiatric social worker at the other side of his outpatient table to take up the thread where he leaves off. He must abandon the classical and obtuse distinction between "organic" and "functional" disorder which jettisons the luckless patient assigned to the latter group, and reserve "functional" for its proper description of physical performance.

There is no longer the query whether there is an "organic" lesion or not, but what are the relative proportions of the physical and psychological factors in each case, to answer the question: "Does this patient need surgery only, or personal adjustment alone, or both; and, if the latter, how much of each?" For patients will fall in three main groups: (1) those in need of orthopædic care alone; (2) those needing both orthopædic and psychiatric attention, even if the latter is confined to simple readjustment of personal attitudes, family tensions, and work situations; and (3) those where the orthopædic complaint merely masks a serious mental derangement which is the real condition for treatment.

In all cases we should aim at treating patients to a conclusion as far as possible, and the American system of a social service pursuing its investigations outside the walls of the institution is admirable for this purpose. Admittedly there is a hard road to travel to this goal.

"Psychoneurotics are persona non grata in medical practice. They tire and exhaust the general practitioner and are the stumbling-block of all specialists. When all ordinary methods of investigation fail to disclose definite lesions, and when special laboratory tests and clinical studies do not reveal abnormal function, the cases are generally dumped into the garbage pail labelled 'psychoneurosis' where they are supposed to rot" (Yaskin 1935).

In considering disposal and treatment it is important to consider, as the best surgeons have always done, the total social position of the patient. The cardinal question with the many chronic orthopædic lesions, such as pes cavus or osteoarthritis of the knees, is: "Why have you come up now for treatment, at this particular moment?" These patients attend because their threshold to discomfort has been lowered by some alteration in working conditions or by a shift of family relations setting up an altered emotional state. Time spent on eliciting the answer to this question may be revealing, but we should be prepared to follow up the answers. The intimate relation of immediate environment to orthopædic disability, and the infrequent need for surgery, once the circumstances could be fitted to the individual, were made clear to orthopædic surgeons in the Services during the late war.

The development of a wider awareness in orthopædic work will be worked out empirically in the next few years; the needs of industry and the stresses of the age will ensure it. Experiment in the design of outpatient departments, a system of clinical conferences with social workers and employers, and an increasing availability of psychiatric assistance are important factors. But the orthopædist's education in these matters must start a little earlier, and there is substance in Rees's (1945) suggestion that psychiatric postgraduate education might become an essential facet of his training. And in human terms let us remember that we should aim at restoring to our patients the dignity to which they are entitled and of which modern civilisation increasingly tends to deprive them.

PSYCHOLOGICAL MECHANISMS

The general purpose of this essay is to show that psychological factors are often the cause of what is usually regarded as gross physical orthopædic disease; that emotion may greatly modify muscular tension, posture, and even osseous structure; that these end-results may completely obscure the prime causes; and that the physical outcome is often of symbolic value to the patient.

A preliminary review of the basic emotional mechanisms operating in orthopædic patients is not meant to conceal their working in all disease groups, and for that matter in all individuals. Handicapped orthopædic patients must choose their limited activities by substituting for the original response to a desire one more possible in the circumstances, a process of sublimation common in normal life. This acceptance of the reality of physical disability is their basic and most difficult adjustment, and in helping them, particularly children, we must recognise their real need for love and affection, especially in emotionally labile spastics, at the same time avoiding the harmful effects of overprotection. The cripple unable to make this adjustment may escape into a fantasy world, particularly in adolescence, a reaction calling for energetic treatment by social activity and occupational therapy. At any age an aggrieved person confronted with unexpected disability may regress to an infantile state or to an insidious general helplessness, which must be firmly discouraged. The advantages of illness for the helpless invalid are obvious; he is the focus of attention and served by the whole family. There is some analogy between this and the "secondary gain" of any psychoneurosis (though a fearful price may have to be paid for it); and an unwillingness to lose these real advantages by recovering leads to rationalisation of the unconscious wishes as logical objections or assertions of incapacity. In accident cases there may be added delay in rehabilitation due to an associated phobia, a fear of repetition based on some childhood trauma.

Analysis reveals that accident proneness in industry is often due to an unconscious wish for punishment, an instance of the guilt mechanisms which operate in relation to disease and injury, depicting them as retribution for some childhood fantasy. Identification is frequent in hospital patients, who incorporate in their own ego desirable facets of other personalities. This may operate between patient and surgeon (hence it is important for the surgeon to be regarded as a good as well as a powerful father-figure) or between patient and patient. Thus a victim of senile kyphosis may identify himself with a superficially similar case of spinal curvature from metastases and be correspondingly affected emotionally in his own progress. Appliances and plasters are also regarded as part of the patient and so rendered tolerable. Orthopædic patients blaming the surgeon for inadequate and delayed treatment, and the nurses for neglect, exhibit the reverse of identification, the projection of one's own inadequacy and guilt on others.

Throughout the guidance of his patient's destiny the orthopædic surgeon must be prepared to be receptive, to listen to all the patient has to say, a mental catharsis which relieves anxiety. Many clinicians allow for these considerations, often unconsciously; no wiser statement of the patient's needs in this respect could be found than that of Girdlestone (1945) in his address at Oxford. Others do harm by futile reassurance of the neurotic and by unwitting implantation of hypochondriasis; and these reject the psychological approach on the grounds that common sense is adequate. Since, unfortunately, both these types may adhere to the common-sense argument, this is a good reason for discarding it.

PERSONAL SIGNIFICANCE OF THE SURGEON

A valuable part of dealing with orthopædic patients, particularly in long-term cases, is the winning of their affection and respect. The patient identifies himself with the surgeon, wants to please him by getting well, in other words "gives him his soul to be cured." Psychoanalysts are familiar with this as a positive transference which inevitably alternates in their work with a negative transference of hatred and delay in recovery. Though these forces are unconscious and uncontrollable they may be set off by the most trivial errors in handling, and it is worth while for the orthopædist to aim at achieving a strong positive transference at the outset of treatment and maintaining it as long as possible. He should also scrutinise his own reactions to troublesome and irritating patients, for to respond in the same vein is to encourage the growth of neurosis. Indeed, the psychological considerations affecting the behaviour of the surgeon offer an attractive and almost unexplored field, ranging from an ill-judged readiness to operate, which is the projection of an inner search for perfection, to a nihilism in treatment, which reflects a personal despair.

All these factors, and the element of sadism potential in all patient relationships, apply with only less force to the nursing staff. The ward sister is a mother-substitute, and it is essential for the two new parents to be in agreement about progress and treatment both overtly and covertly. In fact, the simile between becoming a ward patient and returning to childish dependence in the original family situation is apparent to observation.

PSYCHOSOMATIC VIEWPOINT

Every disease must have a psychic as well as a physical component, if only because of the mental reactions to bodily disease and the somatic manifestations of neurosis and psychosis. But the psychosomatic concept is of the deeper integral unity of mind and body, with the primitive emotional drives manifested equally in the mind and in the physical organs; and the pathology of disease is that of the organism and not merely of cells and tissues.

The physical manifestations are called organ neuroses, and the site is determined by an unconscious "organ inferiority," which is the product of infantile fantasies about the body, or by previous physical disease or injury, or its symbolic value. Primitive symbolism is important in the manifest end-result; it may be crudely obvious, as in a rheumatic stiff neck marking a refusal to accept an adverse situation, or may remain obscure until analytic probing reveals its origin in infantile experience.

Though all very well in general terms, this often leads in practice to what appears a fantastic theory of disease; but one point may be made to explain the over-hostile reception of the approach. We do not differ essentially from our patients and are equally neurotic in potential; hence these explanations, aimed at the intellect, hit us below the belt; ridicule them and rationalise as we may, we complain because they threaten our own integrity.

It must also be emphasised that we are not dealing with the relatively simple matter of the psychic overlay and perpetuation of physical symptoms. At the same time it is too little realised how much added and often

rapidly curable hysterical disability may complicate such diseases as tabes and disseminated sclerosis. A classic instance of the interlocking between the latter illness and neurosis is found in Barbellion's *Diary of a Disappointed Man*, which also shows a peculiarly recurrent feature in crippling disease, the fact that a person may be prepared for disability by the whole course of his life-history.

CLINICAL EVOLUTION OF PSYCHOSOMATIC DISORDER

It will be shown in a moment that the thought of an action causes the actual contraction of muscle-fibres. Now, the mind is thronged with ideas of all kinds: memories, fantasies, and projected actions. Though the current of daily life thrusts these to the fringes of consciousness or beyond, psychoanalysis has shown that the content of the unconscious mind and, in masked form, of conscious ideation also, is the working out of a pattern of childhood origin of which violent actions of aggression and flight may be essential parts. These break through to objective observation in the defensive or aggressive movements occurring in sleep, the tics and gestures of conscious life, and the repetitive movements of schizophrenics; but, while they are still minimal and not open to observation, they are affecting the appropriate muscles. As John Hunter put it in his *Essays and Observations*, "... the mind, which is awake while we are asleep, can and does put a muscle in motion. . . . Those insensible actions arising from the state of the mind . . . may take place whether we be asleep or awake; for as an idea can be formed when asleep, and as the mind can carry that idea into ideal action, so the real action often takes place on these occasions. . . . State of mind produces action of voluntary parts prior to volition and indeed prior to sensation."

This is a channel for the impact of the instinctual drives on the locomotor system, and an analogy is needed to suggest its rôle in the aetiology of disease. Everyone as a child has seen the films in which the growth of plants is speeded up by the camera. The plant is normally caught by the eye at any moment in real life in a fixed and meaningless pose, perhaps with some distortion as an end-result whose significance is not clear. Here it is seen as an active and *purposeful* organism, growing and twisting in an inevitable response to stimulation, and altogether animal-like. The obvious animal behaviour of man should not obscure his slower vegetative responses of bone and muscle, which would be clearer if we could speed up our time-scale as observers. The orthopædic surgeon is pre-eminently concerned with the evolutionary aspect of disease; and, if he could reel off his patients' life-histories in a few minutes, he might be struck by the way in which deformity has, if not purpose, at any rate meaning. If, for instance, he could see the fingers in Dupuytren's contracture snap shut on the palm in a moment of time instead of over several years he might feel disposed to regard that process as akin to the ordinary purposive grasping of the hand, and less likely to reject Jelliffe's (1931) views on the unconscious origin of the contracture. He regards it as the result, in a tenacious grasping person, of unconscious muscular activity in the palmaris longus, which sets up a chronic slight tension along the fibres of the palmar fascia, causing reactive hypertrophy. Analysis of his own case of severe bilateral contracture beginning in adolescence clearly showed its relation to primitive greed and acquisitive tendencies.

This serves as a text for an interpretation of deforming disease, in which the essential features are the unconscious fantasy, the symbolic action, and the physical effects of chronic local spasm. This does not affect the need to treat the physical end-results as such. The position is comparable to the visceral neuroses, in which first the motility and behaviour of an organ are affected, but in which final structural alterations appear, a gastric ulcer

or ulcerative colitis requiring treatment in their own right. And it cannot be expected that the patient's conscious attitude to such an end-result will be other than the normal wish to be cured.

But there is a gradation of time-scale among the locomotor disorders of psychogenic origin. At one end of the scale the unconscious mind produces a long-drawn-out modification of structure whose symbolic origin is deeply buried, a deformity distressing the sufferer which we accept as physical disease. At the other end of the scale a rapid onset of disability protects from an immediately unbearable situation but only crudely simulates ordinary disease; these are the conversion hysterias, with changes equally unconscious but the motive now apparent—e.g., a paralysis of the hand in a soldier who has had enough of the battle. And the subjective reaction to the latter is more like the classical "belle indifférence" of Charcot. Between these extremes come intermediate speeds of clinical evolution, until in the longest cases the "functional element" appears to be minimal, though in fact it may be fundamental. In these there is no obvious gain, the crippling is severe, but a need for self-punishment and mutilation has been satisfied.

It will be of value for the orthopædic surgeon provisionally to accept that a disease may have a symbolic meaning for a patient, and a particular end-result its significance. If this be allowed, progress would lie in demonstrating the way in which the mind obtains these results, and the core of this essay is the attempt to present this pathogenesis as it affects the muscular and skeletal systems.

MUSCLES

Observation and introspection both confirm the intimate reflection of the emotional state of the mind in the tonus of skeletal and visceral muscle. Anxiety is particularly responsible for hypertonicity, and it is not untrue, if facile, to equate mental and muscular tension. Jacobson's (1929) concept of a reciprocal relation, so that trained muscular relaxation lessens anxiety, is less easy to accept; the painfully acute hallucinosis and ideation of severe anxiety cannot be relieved in this way. But a vicious circle may exist; psychoneurotic fatigue may be due to prolonged hypertonicity, and much self-maintained tonus is relieved by deliberate relaxation; and Ellman et al. (1942) have shown the relation of "fibrositis" and local tension in neurotic states. There is a familiar suprascapular "fibrositis" common in the depressive, with habitual elevation of the shoulders, and due to local spasm of trapezius fibres, reminiscent of the focal myalgias of the buttock typical of a prolapsed intervertebral disk. Elliott (1944) has shown electromyographically that these focal myalgias are associated with a central excitatory state of the appropriate cord segment due to root-irritation by the disk. If some analogous central (psychic) excitatory state were shown to maintain spasm similarly in voluntary muscle, it would largely solve the problem of myalgia and fibrositis.

Jacobson (1930) made this advance sixteen years ago, though his work has escaped attention: Investigating the effects of an *imagined* contraction, he measured the action currents in the muscle with skin electrodes and a string galvanometer, and obtained unequivocal results. The deliberate mental conception of such an action as clenching the fist invariably produced action currents in the forearm flexors, whereas no currents were noted without the idea of the movement being in the mind. It is unnecessary to speculate on the reason for some fibres undergoing isometric contraction; the practical point emerging is *the impossibility of conceiving an activity without causing fine contractions in all those muscles which produce that activity in reality*. Quantitatively, the "imagined" action currents are much smaller than

the actual, and those accompanying recollected activities are smaller still; when the imagined act is rhythmic, the electrical record is rhythmic also.

This concept of a movement is what Keller (1921) calls its kinæsthetic equivalent, the remembered experience of using these muscles which is an indispensable preliminary to the movement in reality. Thus it is that in paralysis in small children their small store of past experience exposes them to avoidable crippling from disuse, especially if they cannot see the affected part, without energetic play therapy.

These results, incidentally confirmed in electromyographic work during the late war, open a bridge between mental and physical activity and make disease due to muscular disturbance amenable to psychological interpretation based on the symbolic value of the actions concerned. Thus tennis-elbow is a chronic strain of the forearm extensors of indefinite pathology and notoriously unresponsive to treatment. It is as useful an approach as any to regard it as a long-continued spasm associated with the mental concept of clenching the fist, with which there is synergist extensor action in reality. And, if we are in fact dealing with the finer order of response measured by Jacobson, we must discover why the patient's mind is occupied by this image, what it means to her, and against whom she feels compelled to struggle.

The scope of such a hypothesis is immense. Certain orthopædic complaints must be explicable on the same basis, such as spasmodic flat-foot in children, which is analogous to hysterical torticollis and equally resistant to physical treatment. Krout (1931) suggests that postural tonus is the end-result of the individual's struggle with repressed emotion—i.e., his conflict with society—hence normal erect posture may be symbolically modified. Stooping and submissive postures are derived from feelings of abasement and abandonment associated with infantile regression; and other postures may resemble gestures of defence and defiance. The leading symptom in neurosis is so often locomotor: a shoulder-shrugging tic, the neurosis of the ocular muscles which is miners' nystagmus, or some mimetic response. Though the facial and branchial musculature are pre-eminently involved, the whole body may be regarded as an organ of expression which can be deformed by the inner current of emotion, as a tree is distorted by the prevailing wind. So many postural disorders begin in adolescence that there must be a relation to the mental stress of this time, when the individual has to face away from home to the outer world. A scoliosis may represent an inability to shoulder the burden of adult responsibility; a kyphosis may symbolise a cringing before parental and social authority.

RHEUMATISM

It is convenient to discuss here this problem which, as Halliday (1945) says, is largely a problem of psychoneurosis. At least three-quarters of rheumatic disease is non-articular, producing aches and pains many of which are psychogenic. Fibrositis as an explanation for these has no pathological basis and is discredited as a clinical entity. But I have mentioned focal muscular spasm as a possible cause, maintained by psychic activity in chronic anxiety, and such foci are traditionally sensitive to cold and wet and temporarily dispelled by the relaxation of general anaesthesia.

Rheumatic symptoms are generally advantageous, relieving the sufferer of responsibilities and exciting sympathy, and are also a manifestation of inner tension; soreness and stiffness express a resentment against circumstance. Unfortunately these patients enjoy physiotherapy, but we need not deny them this passive agent, used precisely for its suggestive value. Backache is a good example to elaborate, and is much commoner in industrial practice. A labourer with back muscles sore from hard work, troubled by insecurity and an

unhappy home life, accumulates resentment against society and employer that will crystallise round an injury to his back which he uses to gain sympathy (Fetterman 1940). This is as effective in escaping an intolerable situation as is a gastric neurosis, the other major partner in the subjective illnesses of those subject to frustration in industrial and military organisations. "I can't carry on, my load is too back-breaking" is equivalent in its symbolism to the "I can't stomach this situation" of the dyspeptic (Alvarez 1929).

It is less easy to fit rheumatoid polyarthritis into the psychosomatic pattern. In general, the disease seems to fit certain personality situations, notably in some cases of ankylosing spondylitis, and the time of onset and recurrences is often related to stress or frustration in daily life. There is a common type, the person whose dammed-up emotions leave a placid exterior, with strong feelings of duty and obsessional tendencies. The crippling here may be the price paid for the mastery of violent aggression; and the frequency of the disease in certain families, as distinct from its rarity in the general population, may be due to tensions within the family unit, apart from any physical diathesis. Perhaps a physical predisposition is set off by some failure to externalise emotion, and the predominance of women sufferers may be due to their smaller opportunities for externalising aggression in work. Dunbar (1944) has shown the value of psychotherapy in preventing relapses in cases with a subacute course.

OSSEOUS NEUROSIS

Everyone recognises the concept of visceral neurosis; emotional influences upset the autonomic regulation of plain muscle and glandular secretion, an initially reversible disturbance of function leading to eventual structural change. There are the pre-ulcerative nervous dyspepsias, the neuroses of colon and bladder, asthmatic bronchial spasm, some dysmenorrhœas, angina, and coronary disease. And there are the vasospasms of the skin, and the numerous dermatoses which have led Rees (1945) to bracket dermatology with orthopædics as prime instances where emotional factors play an obvious part in the causation of disease.

If a similar concept has not been applied to bone, plastic as we know it to be in the long view, this may be because its rigidity is opposed in our minds to the softer labile viscera. But the blood-vessels of bone cannot be immune from the influences affecting vessels elsewhere, and there is no reason to deny an osseous neurosis in which functional ischæmia and hyperæmia are reflected, as always, in sclerosis or rarefaction. Such a concept is valuable in explaining the many ill-defined and so far meaningless syndromes of osteoporosis and sclerosis occurring in the skeleton. On this view the osseous neurosis differs from the visceral neuroses only, and precisely, in virtue of the tissues involved. In the labile viscera physiological upset is soon clinically reflected in disordered function; and, because of this very lability, structural change is late. In the silent rigid framework of bone the early phase of vascular dysfunction must be occult, and only the final fixed changes symptomatic, if clinical features appear at all.

Thus, heretical as it may be to apply these views to Paget's disease, they are as reasonable as the older ideas on aetiology. For osteitis deformans begins as an acute transitory rarefaction followed by sclerosis, changes due to hyperæmia and ischæmia and possibly reversible until fixed by reactive fibrosis, with permanent strangling of vessels and sclerosis in the classic pathology. And can it be that the modern delay in fracture union is due to the anxious economic consequences of injury in our time, an anxiety causing a vasospasm which limits the blood-supply to the bone ends and delays repair?

One final word on the inclusion here of those systemic skeletal changes produced by changes in parathyroid

activity. Graves's disease is often clearly psychogenic; after some stress the autonomic control of the thyroid is modified to produce the most glaring demonstration of the physical effects of fear and alarm. If the parathyroids were subject to similar influences the whole skeleton would be open to changes of emotional origin. Perhaps it is a pointer in this direction that Shannon (1929) has shown the relation of neurosis and psychosis in children to parathyroid hypofunction, and the beneficial effects of parathormone in these cases; and that cases of minor behaviour disorder are often associated with tetany or subtetanic irritability.

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RESIDUAL DEFECTS AFTER SPRUE

A REVIEW OF 26 CASES

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The clinical, biochemical, and radiological aspects of acute sprue are well known, but it is important to know which of them persist, and how to detect cases likely to relapse.

In the investigation reported here the patients were convalescent. We tried to find out whether radiological and biochemical abnormalities persisted and, if so, their relation to the degree of clinical activity of sprue. As previous biochemical estimations of absorptive powers of the bowel in sprue lacked radiological control they are of doubtful value, since it is uncertain whether the test-meals reached the absorbing surfaces of the small intestine or were held up in the stomach by abnormal gastric delay, which is a feature of sprue. For these reasons we have largely used radiologically controlled intestinal intubation for giving test-meals to estimate the absorptive power of the bowel. This method has also proved of great value in studying radiologically the pattern and motility of the bowel. The clinical condition of each patient was assessed and compared with biochemical and radiographic findings.

The work has thus consisted of a combined clinical, radiological, and biochemical examination of convalescent patients, with healthy volunteers as controls.

Clinical Observations

The generally accepted difficulty of diagnosing sprue with certainty made it imperative that special care should be taken in the selection of patients. From a large number of convalescents available 26 men were chosen whose early hospital records conformed to classical sprue (Fairley 1936, Manson-Bahr 1943) with characteristic fatty diarrhoea, meteorism, sore tongue, and progressive emaciation; 25 of these had lately returned from South-

East India and 1 from North Africa (an unusual sprue area). In 2 patients symptoms developed only after their return to the United Kingdom, but in the other 24 sprue developed abroad. As regards previous illnesses, 8 gave a history of amoebiasis, 2 of bacillary dysentery, 6 of malaria, 1 of roundworm, 1 of hookworm, and 1 of pellagra; but no evidence of any of these diseases was found in this investigation.

As soon as the original diagnosis of sprue was made, all but case 23 were treated with sprue diet and parenteral liver injections. At this stage all showed a high total faecal fat-content, and in 12 blood examination revealed a mild anaemia. Table I shows the clinical evidence of sprue at the time of this study. The body-weight, anaemia, and appearance of the tongue, together with the number and fat-content of the stools, formed the basis for assessing the activity of the disease.

On these criteria 12 patients were considered to have completely recovered, and 9 showed mild, 4 moderate, and 1 severe signs of sprue (table 1). The results of clinical, radiological, and biochemical assessment are shown in table II.

Biochemical Observations

METHODS

Administration of Test-meals.—Fluid meals containing butter-fat, glucose, and barium sulphate were fed by Miller-Abbott tube into the small intestine of the fasting subject.* The position of the meal and its progress in the bowel were checked by radiography. Before the meal was injected, the site of the tube in the bowel was determined by careful screening, and the desired position was obtained by retraction or further swallowing of the tube. This technique permitted delivery of the meal to any required portion of the small intestine and ensured that lack of absorption was not the result of delay in gastric motility or of inefficient pyloric relaxation. Such gastric delay, which is especially likely with fatty meals, may explain lack of absorption of fatty meals given by mouth under certain conditions. In a few cases meals were given by mouth, but these were usually followed by a second meal containing radio-opaque material to ascertain when the contents of the stomach passed into the duodenum.

Nature of Test-meals.—Three types of meal were used:

Meal 1: butter 75 g., glucose 50 g., barium sulphate 100 g., and water 150 ml. The ingredients were made into an emulsion and warmed to body temperature. This meal was generally given by intestinal tube.

Meal 2: butter 31 g., toast 2 oz., milk 2 oz., and a cup of tea. This meal (as used by Frazer and Stewart 1939) was given by mouth and was followed in four hours by meal 3.

Meal 3: glucose 50 g., glycine 25 g., barium sulphate 50 g., and water 100 ml., given by mouth four hours after meal 2.

Meal 1 was given to most patients investigated. It allowed the rate of absorption of fat and carbohydrate to be studied. The high fat-content of meal 1, together with its unpalatable nature, would cause long gastric delay if fed by mouth; so meal 2 was used when the meals were given by mouth. Meal 3 allowed the rate of absorption of glucose and amino-acid to be studied in patients who had been already examined with meal 2. The composition of other meals used on rare occasions is described below.

Blood Samples Examined.—The test-meals were given after an overnight fast. On the morning of the meal samples of both venous and capillary blood were taken; the meal was then given. Venous samples were then taken at two and three hours after the meal as a routine and occasionally at one and four hours. Capillary samples were taken at half-hourly intervals up to four hours after the meal. † Serum, separated from the various

* Meals containing glycine also were given by mouth (see below).

† In cases where meals 2 and 3 were given, samples were taken up to six hours.

samples of blood, was used for estimation of lipid and chylomicron count, and oxalated blood was used for determinations of glucose and amino-acid.

Biochemical Estimations.—Special attention was given to correlation between the serum-lipid fractions (estimated chemically) and the number of particles (chylomicra) seen with dark-ground illumination. The degree of opalescence of the serum was also recorded qualitatively. Increase in serum opalescence was of equal value to the chylomicron count as a criterion of lipid absorption. Glucose and amino-acid nitrogen were also estimated. The estimations made and the method of expressing the results are enumerated below:

(1) **Total fatty acid** was determined after saponification of an alcohol-ether extract of serum by a titrimetric method developed in the laboratory with the helpful collaboration of Sergeant S. J. Weiner, R.A.M.C., who carried out these estimations. Serum 2 ml. was extracted with 25 ml. of alcohol-ether mixture (3 : 1) under reflux for 30 min. The extract was made up to 50 ml. with more alcohol-ether. An aliquot part (generally 30 ml.) of this extract was used for the estimation of total fatty acid. After saponification and acidification to pH 1 the fatty acids were extracted with petroleum ether. The extract was then washed free of water-soluble acid and evaporated to dryness. The residue was dissolved in alcohol and titrated with N/50 CO₂-free soda in a stream of nitrogen. The results are expressed in milli-equivalents of fatty acid per litre of serum. This method gives reproducible results and quantitative recovery. For the sake of brevity protocols have been omitted. Serum 2 ml. was sufficient for estimation of all the lipid fractions.

(2) **Lipoid phosphorus** was estimated after incineration of a 10 ml. sample of the original alcohol-ether extract (see Man 1937). The incineration was carried out with 60% perchloric acid 1 ml., as kindly suggested by Prof. E. J. King, and the

TABLE I—CLINICAL EVIDENCE OF ACTIVITY OF SPRUE

Case	Gloss-itis	Daily no. of stools	Appearance of stool	Total faecal fat (%)	Body-weight (approx.)	Anæmia	Clinical assessment
1	Absent	2	Normal	18	Normal	Absent	Recovered
2	Present	4	Normal	19	Subnormal	Absent	Mild
3	Present	3	Sprue-like	14	Subnormal	Absent	Mild
4	Present	1	Sprue-like	47	Normal	Absent	Moderate
5	Present	1	Normal	28	Normal	Absent	Mild
6	Absent	2	Normal	17	Normal	Absent	Recovered
7	Present	6	Sprue-like	17	Normal	Absent	Mild
8	Absent	3	Normal	19	Subnormal	Present	Recovered
9	Absent	1	Normal	14	Normal	Absent	Recovered
10	Absent	1	Normal	18	Normal	Absent	Recovered
11	Absent	1	Normal	14	Normal	Absent	Recovered
12	Absent	1	Normal	24	Normal	Absent	Recovered
13	Absent	2	Normal	10	Normal	Absent	Recovered
14	Absent	2	Normal	12	Normal	Absent	Recovered
15	Absent	1	Normal	12	Normal	Absent	Recovered
16	Present	3	Normal	22	Subnormal	Absent	Mild
17	Absent	2	Normal	33	Normal	Present	Recovered
18	Absent	2	Normal	20	Normal	Absent	Recovered
19	Present	2	Normal	21	Subnormal	Absent	Mild
20	Present	2	Normal	31	Subnormal	Present	Mild
21	Present	4	Normal	10	Subnormal	Absent	Mild
22	Present	1	Sprue-like	24	Subnormal	Present	Moderate
23	Present	4	Sprue-like	34	Subnormal	Present	Severe
24	Present	8	Sprue-like	34	Subnormal	Present	Moderate
25	Present	3	Sprue-like	38	Subnormal	Absent	Moderate
26	Present	2	Normal	18	Subnormal	Absent	Mild

TABLE II—CLINICAL, RADIOLOGICAL, AND BIOCHEMICAL ASSESSMENT

Case	Clinical assessment	Radiological assessment	Biochemical findings		
			Fat-absorption*	Lipæmia	Chylomicron count
1	Recovered	Mild changes	..	..	..
2	Mild	Normal	..	..	..
3	Mild	Mild changes	..	..	..
4	Moderate	Severe changes	..	..	..
5	Mild	Mild changes	..	..	..
6	Recovered	Normal	..	..	..
7	Mild	Normal	..	..	..
8	Recovered	Normal	..	..	..
9	Recovered	Normal	..	..	..
10	Recovered	Normal	..	..	..
11	Recovered	Normal	..	..	..
12	Recovered	Normal	..	..	..
13	Recovered	Normal	+	+	+
14	Recovered	Normal	+	±	±
15	Recovered	Normal	+	..	+
16	Mild	Normal	+	±	+
17	Recovered	Normal	+	+	±
18	Recovered	Mild changes	+	+	+
19	Mild	Mild changes	±	+	+
20	Mild	Moderate changes	+	+	+
21	Mild	Mild changes	+	+	+
22	Moderate	Moderate changes	±	+	+
23	Severe	Severe changes	-	-	-
24	Moderate	Moderate changes	+	+	±
25	Moderate	Moderate changes	-	-	-
26	Mild	Mild changes	+	+	+

+ = significant increase. - = no increase.
± = increase within experimental error. * Measured chemically.

inorganic phosphorus was estimated by the method of Fiske and SubbaRow (1925). The results are expressed in mg. per 100 ml. of serum. To obtain phospholipid fatty acid in milli-equivalents, this value was divided by 15.5 (31 mg. of lipid phosphorus = 2 milli-equivalents of fatty acid).

(3) **Non-phospholipid fatty acid** was obtained by subtracting the phospholipid fatty acid in milli-equivalents from the sum of the total fatty acid added to 18% of the phospholipid in milli-equivalents (Man and Gildea 1932). This procedure allows for the fact that only 82% of the phospholipid fatty acids appear to be estimated by microtitration following saponification. The main amount of non-phospholipid fatty acid is present as neutral fat, and we have calculated the neutral fat from this figure. Man and Gildea used non-phospholipid fatty acid as a means of assessing fat-content of serum. Peters and Man (1943) have computed the fatty acid of the neutral fat in a different way, assuming a certain proportion of free cholesterol in the total cholesterol. We have not adopted this procedure but realise that our "neutral fat" values may be slightly high, including a small amount of cholesterol ester.

(4) **Neutral fat** was evaluated as glyceryl trioleate corresponding to the non-phospholipid fatty acid. Results were expressed in mg. per 100 ml. of serum.

(5) **Total cholesterol** was determined colorimetrically on an aliquot of the original alcohol-ether extract after evaporation to dryness and dissolving the residue in chloroform. Results are expressed in mg. per 100 ml.

(6) **Particle counts** were made with dark-ground examination of both venous and capillary specimens of serum. The method of Frazer and Stewart (1939) was used.

(7) **Opalescence of serum** was recorded on a qualitative basis. In general the fasting serum was crystal clear (recorded below

as —), whereas the serum after fatty meals was either opalescent (+) or highly opalescent (++) . These observations generally agreed with chylomicron counts and were a simple and rapid guide to whether fat was being absorbed.

(8) *Blood-sugar* was estimated half-hourly in capillary specimens by the method of Folin and Wu.

(9) *Amino-acid nitrogen* was estimated only after the meals containing glycine. Folin's (1922) method was used.

We are very grateful to Sgts. S. J. Weiner and W. Garvey, L/Cpl. L. Croton, and Pte. P. Lawrence for performing these estimations.

ABSORPTION OF MEALS

Table III summarises preliminary results of feeding meals at various levels to normal controls. Meals fed into the jejunum were followed by variable and inconstant absorption of fat. Glucose, however, was satisfactorily absorbed from all parts of the small intestine investigated. Meals fed into the first and second parts of the duodenum gave satisfactory fat-absorption. When meals were fed by tube at lower levels, fat-absorption appeared to depend on the extent of regurgitation into the second part of the duodenum. Accordingly, meals were in general fed into the first and second parts of the duodenum and not into the jejunum.

Meals fed by mouth were followed by fat-absorption, but this was delayed if large amounts of fat were fed (case N), and even when a light fatty meal (Frazer and Stewart 1939) was given, fat-absorption following meals by mouth was sometimes delayed. The advantages of giving fatty meals by duodenal tube to obtain early and constant fat-absorption are thus evident. Meals fed by mouth were used chiefly for studying amino-acid absorption, as satisfactory rises in amino-acid N follow such meals, and we have not studied to any great extent the absorption of amino-acids following meals given by tube.

TABLE III—RESULTS OF MEALS GIVEN AT VARIOUS LEVELS

Case	Meal	Site of meal	Extent of regurgitation into second part of duodenum	Rise in capillary chylomicron count	Rise in blood-sugar	Rise in blood-amino-acid N
A	1	D1	..	+	+	..
B	1	D2	..	+	+	..
C	1	D2	..	+	+	..
D	1	D3	Slight	+	+	..
E	1	D3	Gross	+	+	..
F	1	J	Nil	-	..	..
G	1	J	Slight	+ late	+	..
H	1	J	Fair	+ late	+	..
I	1	J	Slight	+ late	+	..
J	1	J	Gross	+	+	..
K	1	J	Gross	+	..	..
L	Olive oil, glucose	J	Slight	-	+	..
M	Olive oil, glucose	D2	..	+	+	..
N	1+ glycine	M	..	+ late	..	+
O	2 and 3	M	..	+	+	+
P	2 and 3	M	..	+ late	+	+
Q	2	M	..	+	..	..

* A rise in total fatty acid was observed in this case.

D1, D2, D3, J, and M indicate meals fed into first, second, and third parts of duodenum, jejunum, and mouth respectively. Extent of regurgitation into second part of duodenum is recorded when meals were fed below this level—i.e., into third part or into jejunum.

+ indicates rise in chylomicron count, glucose, or amino-acid N within 2 hours of feeding. + late, in case of chylomicron counts, indicates rise later than 2 hours.

TABLE IV—ABSORPTION OF FAT IN NORMAL CONTROLS

Case	Meal	Site of meal	Time (hrs. after meal)	Neutral fat*	Capillary serum particle count	Venous serum particle count	Opalescence of venous serum	Total fatty acid†	Phospho-lipoid P*	Cholesterol*	Non-phospho-lipoid fatty acid†
A	1	D1	0	180	16	14	-	9.7	7.1	169	6.0
			2	270	54	75	++	13.5	7.9	188	9.3
			3	320	60	65	++	14.9	7.8	188	10.8
B	1	D2	0	140	3	6	-	8.2	6.4	144	4.8
			2	140	20	23	+	8.8	7.5	154	4.9
			3	180	24	18	+	9.6	6.9	167	6.0
C	1	D2	0	130	5	5	-	8.5	7.5	209	4.5
			2	180	107	84	++	10.6	8.3	224	6.2
			3	300	99	90	++	14.9	8.5	211	10.4
N	1	M	0	..	3	..	-	8.5	..	..	..
			4	..	14	..	-	9.4	..	..	..
			6	..	47	..	++	14.8	..	..	..
O	2	M	0	190	1	1	-	11.9	10.4	308	6.4
			2	250	31	37	++	13.8	10.0	250	8.5
			4	230	16	14	+	13.3	10.4	250	7.8
P	2	M	0	80	2	1	-	6.7	7.5	246	2.7
			2	120	11	12	-	7.8	7.2	223	4.0
			4	150	17	14	±	8.6	6.6	230	5.1

D1 = first part of duodenum. D2 = second part of duodenum. M = mouth. * Mg. per 100 ml. † Milli-equivalents per l.

Accordingly the absorption of fat and glucose were mainly investigated by meals introduced into the duodenum (first and second parts). Test-meals were, however, given by mouth in the few experiments where amino-acid absorption was also studied.

ABSORPTION OF FAT

This was studied in sprue patients and in controls (normal subjects) after the introduction of test-meals into the first and second parts of the duodenum and in a few cases by mouth. Meals introduced into the jejunum or the third part of the duodenum may be followed by failure of absorption due to physiological causes and not to any pathological lesion. Hence only results with meals fed into the first and second parts of the duodenum (and a few by mouth) are considered below.

Table IV shows the changes in serum-fat, particle counts, serum opalescence, and the changes in the various lipid fractions of the serum, following fatty test-meals given both by duodenal tube and by mouth to normal subjects.

These meals fed into the duodenum (first and second parts) and by mouth to normal subjects were followed (table IV) by increase in neutral fat, particle counts, and opalescence of the serum. The figures for neutral fat given in table IV are calculated from the values for non-phospholipoid fatty acid. It is evident that this is the only serum-lipid fraction which shows consistent increase accompanying fat-absorption, and that the increase observed in total titratable fatty acid is due to the increase in this fraction. No significant alterations in the other fractions (lipoid phosphorus and cholesterol) were observed. Increases in particle count and opalescence of serum thus accompany increase in neutral fat and are convenient indications of fat-absorption. The opalescence of serum is a particularly useful clinical guide.

Table V records results obtained in 14 cases of sprue. Cases 23 and 25 show no increase in fat, particle count, or serum opalescence. Cases 19 and 22 show no significant increase in fat but do show increased particle count and opalescence. Cases 14, 16, and 24 show no significant increase in particle count or opalescence, but do show increase in fat. The remaining 7 cases show increases in fat, particle count, and opalescence † after the fatty meals.

† In case 15 opalescence was not recorded.

TABLE V—ABSORPTION OF FAT IN 14 SPRUE CASES

Case	Meal	Site of meal	Time (hrs. after meal)	Neutral fat*	Capillary serum particle count	Venous serum particle count	Opalescence of venous serum	Total fatty acid†	Phospho-lipoid p.	Cholesterol*	Non-phospho-lipoid fatty acid†
25	1	D2	0	290	6	2	—	13.5	6.8	156	9.9
			2	270	4	4	—	12.6	6.2	143	9.3
			3	290	3	3	—	12.8	5.8	145	9.8
23	1	D2	0	190	6	2	—	9.5	5.8	94	6.5
			2	190	4	3	—	9.7	6.4	103	6.3
			3	180	12	5	—	9.5	6.6	112	6.0
22	1	D2	0	300	6	3	—	14.5	8.4	..	10.1
			2	300	6	2	—	14.2	7.8	..	10.1
			3	320	20	30	+	15.6	9.0	..	10.8
16	1	D2	0	130	4	..	—	8.6	8.1	186	4.3
			2	120	..	..	—	8.6	8.3	183	4.2
			4	170	16	..	+	9.6	7.4	173	5.7
24	1	D2	0	120	19	12	—	7.2	5.6	100	4.2
			2	130	22	28	—	7.4	5.7	103	4.4
			3	190	20	28	+	9.2	5.4	111	6.3
17	1	D2	0	180	15	5	—	10.4	8.2	154	6.1
			2	240	26	23	+	11.8	7.2	161	8.0
			3	220	18	20	+	12.1	8.5	175	7.6
26	1	D2	0	20	2	2	—	4.4	7.0	175	0.7
			2	140	27	25	+	8.8	7.5	181	4.9
			3	40	31	32	++	5.1	7.2	175	1.3
18	1	D1	0	140	6	3	—	8.8	7.4	178	4.9
			2	180	57	67	++	9.9	7.3	172	6.0
			3	210	62	84	++	10.9	7.1	173	7.1
20	1	D2	0	190	17	18	—	10.0	6.5	164	6.6
			2	190	85	76	+	10.0	6.9	154	6.3
			3	230	76	80	++	11.8	7.7	152	7.7
19	1	D2	0	350	13	19	—	17.3	10.5	208	11.7
			2	350	90	82	+	17.3	10.1	211	12.0
			3	370	76	89	++	18.2	10.9	223	12.5
21	1	D2	0	180	10	7	—	10.6	8.3	218	6.2
			2	250	32	39	++	13.2	8.6	196	8.6
			3	290	46	39	++	15.3	9.6	231	9.7
21	2	M	0	180	1	2	—	10.4	8.3	163	6.0
			2	230	27	25	++	12.3	8.4	193	7.8
			4	240	31	28	++	13.3	8.9	184	8.3
14	2	M	0	110	1	1	—	7.5	7.5	104	3.6
			2	120	2	4	—	7.9	7.2	102	4.1
			4	150	8	12	±	8.9	7.0	113	5.2
13	2	M	0	140	6	5	—	7.3	4.7	120	4.8
			2	180	15	20	+	8.7	4.7	117	6.2
			4	200	27	19	++	9.3	5.0	122	6.7
15	2	M	0	230	5	4	..	11.0	6.2	154	7.7
			2	320	34	32	..	14.0	5.6	156	11.0
			4	240	21	17	..	11.3	5.8	156	8.3

D1, D2, and M have same connotation as in table iv.
* Mg. per 100 ml. † Milli-equivalents per l.

The findings on fat-absorption in the sprue patients may be summarised as follows:

(1) 10 of the 14 sprue cases investigated (5 judged clinically and radiologically to be convalescent, and 9 showing various degrees of activity) showed significant increases in blood-fat content after fatty test-meals. In 7 of these, significant increases in chylomicron count were simultaneously observed.

(2) In the 4 remaining patients no significant rise in blood-fat was observed, and in 2 of these neither visible lipæmia nor increase in chylomicron count was observed. In these 2 patients, at any rate, fat-absorption was deranged. The faecal fat-content in these 2 cases was 34% and 39% of dry weight.

(3) Thus deficiency of fat-absorption was not detected in most of the patients investigated. However, in 2 clinically and radiologically severe cases fat-absorption was defective, and in 2 others (judged to be active) no increase in blood-fat was observed after test-meals, though increases in particle count and lipæmia were observed.

ABSORPTION OF GLUCOSE

Glucose 50 g. was included in the aqueous phase of the emulsions of butter-fat, water, and barium sulphate given by intestinal tube. Specimens of capillary blood were taken at half-hourly intervals after the meal, and the

glucose content of these specimens was measured by the method of Folin and Wu. Table vi shows the results obtained with normal subjects, and table vii with patients with, or convalescent from, sprue.

The findings recorded in tables vi and vii may be summarised as follows:

(1) In general the blood-sugar level rose abruptly after these meals given by intestinal tube. This rise was followed by a sharp fall. Absorption was rapid, and (unlike fat) was seen to follow equally meals fed into the duodenum and into the jejunum.

(2) Occasionally (3 out of 10 cases) a flattened type of blood-sugar curve was obtained, even in normal subjects.

(3) Most of the sprue patients (9 out of 13 cases) showed similar rapid absorption of glucose. In 4 cases only were flattened curves observed.

(4) Since a few of the normal controls also showed flattening of blood-sugar curve with this technique, we cannot conclude that the occasional flattening seen in the sprue patients was due to any abnormality.

ABSORPTION OF AMINO-ACIDS

Glycine was included in a few cases in the test-meals fed to normal subjects and sprue patients. The amino-acid nitrogen in the venous blood was estimated before the meal and at one hour and two hours after the meal by the method of Folin (1922). The glycine was generally given as a separate test-meal by mouth (meal 3) four hours after the small fatty test-meal (meal 2) also given by mouth. This technique was adopted so that the large quantities of glycine fed (25 g.) could not interfere with the absorption of the fat, which was fed first.

Tables viii and ix show the results obtained on amino-acid absorption after these glycine test-meals fed to

TABLE VI—ABSORPTION OF GLUCOSE IN NORMAL SUBJECTS

Case	Meal	Site of meal	Blood-glucose (mg. per 100 ml.) at various times after meal (hrs.)				
			0	1/2	1	1 1/2	2
A	1	D1	100	120	125	90	100
B	1	D2	100	175	90	75	95
D	1	D3	105	175	110	85	100
E	1	D3	105	160	100	80	100
J	1	J	120	155	80	90	110
R	1	J	110	135	120	110	110
H	1	J	100	210	180	150	90
G	1	J	105	160	115	95	100
C	1	D2	130	150	140	125	135

TABLE VII—ABSORPTION OF GLUCOSE IN SPRUE CASES

17	1	D1	105	145	120	135	135
16	1	D2	120	215	125	110	115
26	1	D2	100	85	85	100	95
24	1	D2	115	125	135	145	110
18	1	D2	100	135	105	95	105
22	1	D2	110	125	95	100	100
20	1	D2-3	115	145	125	105	110
23	1	D2	100	115	115	110	105
21	1	D2	110	130	90	95	110
1	1	J	95	140	115	100	110
4	1	J	110	155	130	105	110
12	1	J	95	190	155	105	100
25	1	D2	120	195	210	165	115

D1, D2, D3, J, indicate meals fed into first, second, and third parts of duodenum and jejunum respectively.

TABLE VIII—ABSORPTION OF AMINO-ACIDS IN NORMAL SUBJECTS

Case	Nature of meal	Site of meal	Amino-acid N (mg. per 100 ml.) at various times (hrs.) after meal		
			0	1	2
L	Meal 3, four hours after meal 2	M	6.8	7.0	7.3
P	Meal 3, four hours after meal 2	M	6.5	8.4	9.1
O	Meal 3, four hours after meal 2	M	6.4	8.2	7.6
N	25 g. glycine, 50 g. glucose, 75 g. butter, 50 g. Ba.SO ₄ , 100 ml. water	M	4.8	..	6.9
S	25 g. glycine, 50 g. glucose, 20 g. butter, 50 g. Ba.SO ₄ , 100 ml. water	J	5.4	7.0	5.9

TABLE IX—ABSORPTION OF AMINO-ACIDS IN SPRUE CASES

13	Meal 3, four hours after meal 2	M	7.1	8.8	8.8
14	Meal 3, four hours after meal 2	M	6.6	7.4	8.0
21	Meal 3, four hours after meal 2	M	7.0	8.6	8.6
15	Meal 3, four hours after meal 2	M	7.0	7.9	..
15	25 g. glycine, 100 ml. water	M	8.2	10.5	10.3

M=by mouth. J=by jejunal tube.

normal subjects and to sprue patients. In all the 4 sprue patients investigated, satisfactory absorption of amino-acids was observed, as in the normal controls. These patients were, however, convalescent, and only 1 of them still showed radiological lesions.

Radiological Appearances
TECHNIQUE

The technical difficulties of passing a Miller-Abbott tube may be considerable in a normal subject and are certainly even greater in a patient with sprue. It was, however, found that 1-2 c.cm. of metallic mercury introduced into the balloon of the tube with the subject lying on his right side considerably assisted the tube in its negotiation of the pylorus. One of the types of meal described above was then introduced through the tube (fig. 1).

FINDINGS

The following unexpected findings were noted:

- (1) A large fatty meal directly introduced into the normal small bowel did not produce radiological appearances similar to those seen in sprue. This finding appears to invalidate the hypothesis put forward by Kantor (1939) and Stannus (1942) that the radiological changes in sprue are secondary to the abnormal fatty contents of the small bowel.
- (2) A large fatty meal introduced directly into the small bowel did not lead to a slow sluggish passage as seen in

established sprue, but rather the rate of transit of such a meal tended to be increased. The mucosal pattern in the jejunum was coarser than normal, the changes being probably secondary to the hypertonicity of the muscularis mucosae. This finding is akin to the changes seen in the jejunum in early cases of sprue and suggests that these changes are probably secondary to reflex stimulation.

The radiological appearances in the small bowel in sprue have received considerable attention in the last decade (Golden 1941, Feldman 1941, Rhoads and Miller 1934, Mackie et al. 1935, Snell and Camp 1934, Kantor 1939, and Brailsford 1943). It has been conclusively proved by Golden that the appearances, though characteristic, are not specific for sprue. He has described similar appearances in such widely divergent conditions as chronic nephritis, post-irradiation enteritis, and worm infestation. It has been maintained by Stannus (1942) that these appearances produced by sprue are secondary to a large fatty meal in the bowel. We have proved that this is not so, as the administration of a large fatty meal to normal subjects did not produce a "deficiency pattern." Golden (1941) is of the opinion that the radiological appearances are due to a deficiency factor causing an atrophy of the autonomic nervous plexus in the wall of the small bowel; such changes have been noted in vitamin-B deficiency.

Examination of the small bowel by the fractional barium meal described by Pansdorf (1937) is not entirely satisfactory, as the sphincteric action of the pylorus prevents adequate filling of the small bowel. With such incomplete filling it is extremely difficult to assess minor changes in the small bowel. This fractional barium meal is certainly not sufficiently critical to investigate the return to normal after sprue. For this reason, and for the reasons described in the biochemical section, contrast media delivered by intestinal intubation through a Miller-Abbott tube were used for radiological assessment.

The radiological changes in sprue are of four types: (1) changes in motility; (2) changes in tonicity; (3) changes in mucosa; and (4) changes in colon.

(1) *Changes in Motility.*—In the early stages the meal passes through the small bowel more quickly, but

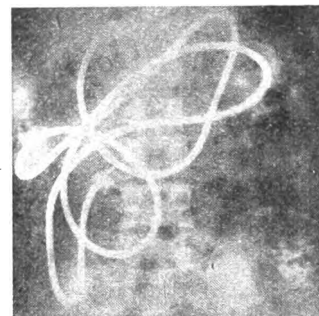


Fig. 1—Radiogram showing Miller-Abbott tube in position for investigating mucosal pattern. Before test-meal was administered, tube was withdrawn to 2nd part of duodenum.



Fig. 2—Case 24, a long-standing case of sprue with several relapses. On examination patient had no symptoms, but radiography 40 min. after meal shows dilatation of middle third of small bowel, with hypotonic segments.

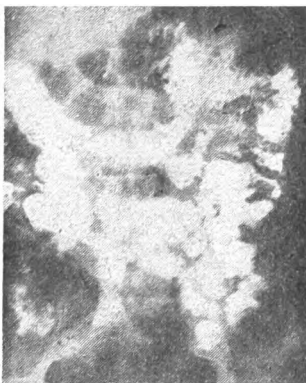


Fig. 3—Case 4, active sprue. Radiography at 10 min. after meal shows coarsening of mucosal pattern in jejunum, with widening and exaggeration of rugae, and segmentation in bowel.



Fig. 4—Case 4, at 30 min. after meal, showing changes in midpart of small bowel, with segmentation (areas of hypomotility alternating with areas of hypertonicity).

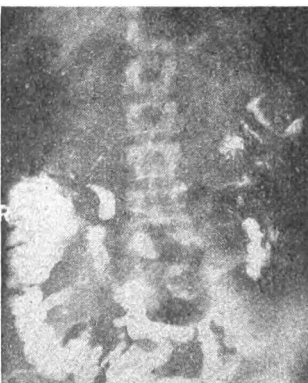


Fig. 5—Case 4, at 60 min., showing tendency to segmentation in middle third of jejunum.

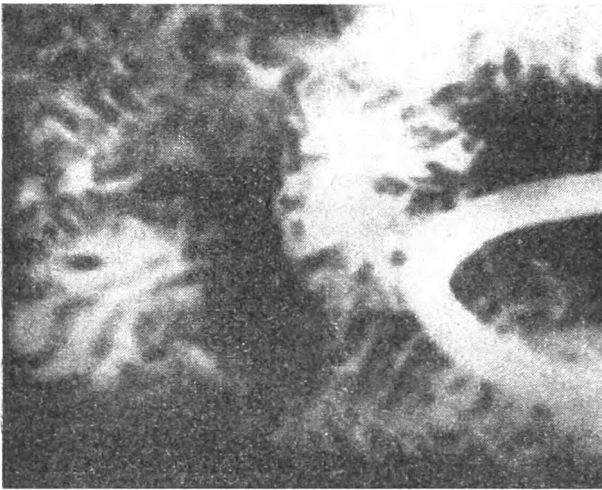


Fig. 6—Case 3, recovered from sprue. Radiography shows restitution of normal feathery mucosal pattern in upper ileum.

in a well-developed case delay is the outstanding feature. If the meal is given by mouth, there is gastric retention. The appearance of the meal in the small bowel is so unchanging that films taken at intervals give the impression that the meal has been cast in wax, and the term "moulage pattern" has been applied to this unchanging radiological picture (fig. 2).

(2) *Changes in Tonicity.*—Areas of hypertonicity (segmentation) alternate with areas of hypotonicity (dilatation). These changes are most obvious in the middle third of the ileum. The terminal ileum is generally not involved to the same degree, and the jejunum as a rule does not show well-marked changes.

The tonicity of the muscularis mucosæ is greater in the early stages of sprue and may be responsible for the exaggeration of the jejunal mucosal pattern seen then (figs. 3, 4, and 5). Later, hypotonicity of this structure is probably partly responsible for the flattening, thinning, and loss of the haustral markings.

(3) *Pattern Changes in Mucosa.*—These are most clearly seen in the mid-third of the small bowel and are best demonstrated by spot mucosal-relief pictures after simple barium-sulphate solution has been delivered through a Miller-Abbott tube (fig. 6):

(a) *Coarsening of Folds.*—The normal feathery mucosal pattern is replaced by a coarse irregular pattern. The valvulæ conniventes are widened, coarser, further apart, and consequently few. These changes are most marked in the upper jejunum (fig. 7).

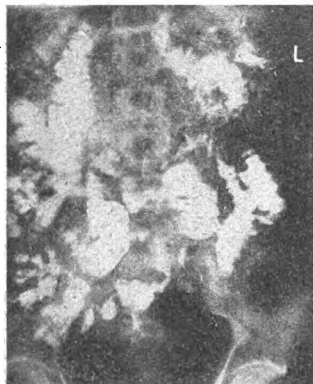


Fig. 7—Case 4, on July 27, three weeks later than figs. 3, 4, and 5. Radiography at 15 min. shows meal in upper jejunum, with coarsening and exaggeration of mucosal pattern.

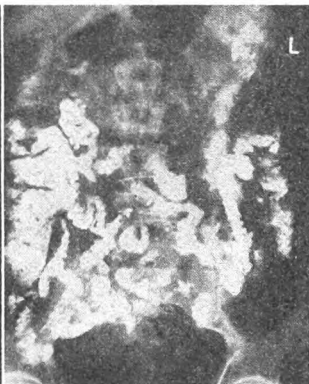


Fig. 8—Case 4, on July 27, at 90 min., showing segmentation in middle third of ileum and flocculation of meal.

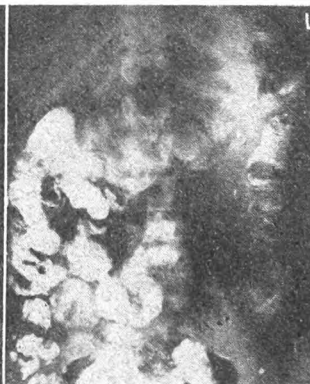


Fig. 9—Case 4, on July 27, at 150 min., showing segmentation and dilatation of colon with fatty contents.



Fig. 10—Case 4, on July 27 at 200 min., showing colon distended with large faecal barium-filled stools.

Figs. 7, 8, 9, and 10 show typical deficiency pattern of sprue.

(b) *Irregularities of Folds.*—The valvulæ conniventes cease to have the fine delicate appearance and are very irregular in outline and widely spaced.

(c) *Flocculation of Meal.*—The barium meal loses its smooth uniform consistence and becomes aggregated into floccules. The barium may also have a granular appearance (figs. 8 and 9).

(d) *Obliteration of Folds.*—The mucosal folds of the bowel ultimately become obliterated in the terminal phases (fig. 2).

(4) *Changes in Colon.*—Some enlargement of the colon (fig. 10) was seen in most of the cases investigated. The dilatation appears to be secondary to the large bulk of the faeces. Barium enemata were not performed to gauge the dilatation accurately, but it appears to be only moderate.

It is doubtful if the presence of megacolon can be used, as has been suggested, to differentiate between sprue and cœliac disease. A moderate degree of dilatation appears to be often present in sprue.

The radiological findings in 26 cases of sprue are compared with the clinical and biochemical findings in table II.

SUMMARY

A group of 26 patients with sprue, who had been invalided to this country, were investigated by clinical, radiological, and biochemical means.

Of these, 12 were clinically well, 9 showed mild, 4 moderate, and 1 severe signs of sprue.

Radiologically 13 showed no abnormality, 7 showed mild, 4 moderate, and 2 severe changes in the bowel pattern.

Of the 14 patients investigated biochemically, only 2 showed definitely deficient fat-absorption.

In the small series investigated, clinical and radiological estimations persisted for the same length of time and were of equal value in assessing degree of recovery.

Deficiency in fat-absorption was detectable only in patients showing little recovery.

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THE USE OF CALCIFEROL IN TUBERCULOUS CONDITIONS*

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THE calciferol treatment of lupus vulgaris (Charpy 1943, 1944a and b, Dowling and Thomas 1945, 1946, Dowling et al. 1946, Dowling 1946) is an outstanding advance in the treatment of tuberculosis, and should do a great deal towards the elimination of perhaps the most pathetic class of tuberculous patients. Our main work so far with calciferol has been in the treatment of this condition, but I propose also to discuss the results we have so far obtained with other types of surgical tuberculosis.

In March, 1946, there were at Morland Clinics 20 cases of lupus vulgaris, probably some of the worst in the country, since they were not sent for institutional treatment until various methods of local therapy had been tried elsewhere without success. This is shown by the facts that the average age of the patients was 38, and the average number of years they had had the disease before coming to Morland Clinics for treatment was 19.

To give calciferol a fair and thorough trial all other methods of treatment were abolished for the first four months, and all the patients had regular pathological investigations, quantitative fortnightly tuberculin skin tests, records of weights and blood-pressure, biopsies, abdominal radiography, and constant medical supervision. Calciferol was dealt out each morning by a sister and its consumption noted on a chart, to prevent patients from omitting to take it because of its unpleasant effects.

The preparation used was 'Ostelin,' kindly supplied by Glaxo Laboratories Ltd., and I first divided the original cases into three groups, 7 patients being given intramuscular injections of an oily solution and receiving 600,000 units twice weekly, 7 an oily solution in capsules, and 6 an emulsion, both latter groups having 150,000 units a day by mouth.

PROGRESS

Under calciferol treatment progress has been by no means straightforward. The intense gloom and despondency among all the lupus patients during the first two or three weeks bore out very strongly the fact that practically every one of them looked decidedly worse. The patches of lupus looked more angry and swollen, the isolated nodules more scarlet, and spontaneous ulcers developed in some.

Improvement began after three weeks in most cases, but in some of the worst not until after five or six weeks, by which time improvement was noted in every patient. Gradually the redness faded, the lupus became flatter, and the patients volunteered the information that the lesion felt easier: "the skin did not appear so tight"; "the lip was not so swollen"; "the mouth could be moved more easily," &c. White patches appeared in what had previously been uniformly red, and the isolated nodules appeared paler.

During this more acute phase pathological and other investigations gave some idea of what was going on. For example, the average initial diameter of redness produced by 1/1000 tuberculin in three days was 16.4 mm., and in two weeks it had risen to 19.5 mm., after which it gradually fell to slightly below its original level and remained there.

At the same time the sedimentation-rate rose in almost every case. The average initial figure was 8.4 mm. in

the first hour. This rose to 16 mm. at the end of a month, and 18 mm. at the end of two months; then it gradually fell to normal, except in patients showing toxic or other ill effects.

The differential blood-count was also interesting: the initial polymorph percentage averaged 61, rose to 67 in five or six weeks, and then gradually returned to its previous level at the end of thirteen weeks. Similarly, the lymphocyte count fell from 32.2% to 28% and then rose again. These figures may not be striking, but experimental error can surely be excluded when practically every case followed the same pattern, including those added to the series at a later date.

The blood-calcium levels showed nothing of importance. The average level was high at the beginning, 11 mg. per 100 c.cm., probably owing to previous general treatment; after four months it was 11.1 mg. per 100 c.cm. Though a trivial increase was found in a few cases, on the whole the figures were unchanged, and, if anything, patients receiving their ostelin by injection showed a decrease. One patient only showed a figure of 15 mg. per 100 c.cm. but felt well. It was strange that most of the patients with high initial sedimentation-rates had on the whole the lower blood-calcium levels.

LOCAL REACTIONS

One can assume from these facts, both clinical and pathological, that calciferol acts by promoting a more acute reaction in the lupus tissue, increasing the vascularity of the part, producing a slight polymorph response to the infection, and liberating more toxins into the system, as shown by the increased tuberculin reaction and raised sedimentation-rate; they also point to some of the possible dangers of calciferol.

The initial reaction is followed by fibrosis in the lupus tissue, literally squeezing it to death and causing pallor and shrinkage of the lesion, while the various blood and other figures gradually return to more or less their previous levels. The different responses of different types of lupus bear this out. I arbitrarily graded the cases into six separate but often overlapping categories:

(1) Profuse soft granulations, easily removed by scraping, responded very poorly in the absence of local treatment, suggesting that the lesion was too superficial, and that the secondarily infected granulations were not affected by the calciferol in the same way.

(2) Raised firm plaques of lupus, not easily removed by scraping, and difficult to treat by old methods, fared extremely well, the patch of lupus shrinking and in many cases disappearing altogether.

(3) More deep-seated lesions responded well, as one would imagine from the theory of calciferol action.

(4) Isolated nodules fared badly. Already, in many cases, caught up in fibrous tissue as a result of old disease, they mostly showed very little alteration even after long treatment, perhaps because their blood-supply was poor and the essential reaction was therefore not produced. Nodules that became bright scarlet in the first few weeks of treatment and those of recent origin in a more normal area of skin gave the best results.

(5) Lesions of mouth, nose, and larynx at first seemed to give excellent results, but some were disappointing, though in 3 cases they completely disappeared. In 2 cases there was no response, and in another case there was also a tuberculous conjunctivitis which showed practically no alteration after six months' treatment.

(6) Multiple lesions in various parts of the body responded more or less according to their extent, those cases with the largest areas of skin affected being the slowest to respond.

In no case of lupus was there any evidence of calcification in the diseased area, calcium deposits were not found on biopsy, and calcium metabolism appeared to be in no way responsible for the results.

* Abridged from a paper read to the Tuberculosis Association on Sept. 20, 1946.

LOCAL TREATMENT

After four months' experience of calciferol alone I began to combine it with local therapy, and have been much impressed by the improved results. Though many cases progressed extremely well on calciferol alone, the addition of local measures greatly hastened the progress. I have used mainly a combination of Kromayer and brass paste, and with these the soreness and breaking down of the lupus was not nearly so severe as it used to be, and the resulting ulcers healed much more quickly. A thorough scraping away of any loose granulations, after calciferol has been administered for a while, also seems of great importance; in 3 cases this was followed by sensational results.

In some patients treated with calciferol much pigment was deposited in the lupus site, making the patients unsightly. Local therapy in many cases breaks down the pigment, giving the skin a much better appearance. Acid nitrate of mercury or Finsen light should be used to get rid of the non-reacting and potentially dangerous nodule.

OTHER CONDITIONS TREATED

At the end of April I started using calciferol on other cases of surgical tuberculosis and allied conditions. So far the results, though not conclusive, are suggestive.

In 2 very obstinate cases of *cervical adenitis* the results were very pleasing. The reactions were the same as in lupus; for example, in 1 case the fortnightly tuberculin reactions measured 12, 17, 16, 14, 15, and 15 mm.; the sedimentation-rates for the first hour were 5, 10, 6, 6, 3, and 3 mm., and the polymorph percentage rose from 59 to 70, and later fell to 67.

A word of caution is necessary, because there was a more acute flare-up in the first month, with the formation of pus in one case and a more profuse discharge in the other. It is more than probable that calciferol may cause softening and pus formation in some glands which might otherwise resolve under conservative treatment. This flare-up later subsided, and I was much struck with the way the matting and swelling decreased, leaving mobile small glands which may not need surgical intervention or at any rate should make this procedure much easier.

Two cases of *tuberculous tenosynovitis* were treated with calciferol. One of these was active, and the sedimentation-rate rose from 6 to 50 mm. in 6 weeks, coming down to 2 mm. at the end of three months, and there is now no activity apparent. The other appeared to be quiescent, and calciferol produced no increase in the tuberculin skin reaction and no rise in sedimentation-rate.

In 2 cases of *Bazin's disease* treated ulcers appeared after a week or so, followed by improvement, but one patient then suddenly died of hæmoptysis and the other became so toxæmic that treatment had to be stopped.

The only cases of *tuberculosis of bone* so far tested were a case of bilateral advanced tuberculosis of wrists and a case of multiple tuberculous dactylitis. The first patient had seven sinuses on both wrists on admission, and her condition improved more on calciferol than one would have expected in view of the severity of the condition. Calciferol in this case has been used for only three months, but already there is radiographic evidence of recalcification, and the clinical progress is satisfactory. The patient with multiple dactylitis also had advanced lupus of the face, and in addition to very great improvement in the face, the hands have progressed more quickly than one expected. She has also had calciferol for three months, and the amount of recalcification so far in one phalanx is especially pronounced.

Other cases treated with calciferol were 1 of *tuberculous peritonitis* and 1 of *tuberculous cystitis*. These patients were admitted only a month ago, so nothing definite

can be said yet, but both have improved, and in the latter the frequency has decreased.

In a case of *lupus erythematosus* treated with calciferol the patient says the condition feels much easier and looks better, but there is so far, after nearly three months, no noticeable change.

These cases of surgical tuberculosis also had all other forms of treatment possible, in the way of splintage, rest, &c., which are expected to lead to improvement. All we can say is that in many of them the improvement was more satisfactory than in the average case of the sort.

ADVANTAGES

The advantages of calciferol are great. Every one of our lupus patients improved. Even though local treatment in addition to calciferol still makes them unsightly, their treatment is not so painful as before, and the time taken is much shorter. Plastic surgery, if needed, is possible at an earlier date, and we hope to avoid that most difficult of all old tasks, the treatment of active lupus in a skin-graft. One of our patients, with proliferative lupus, started calciferol treatment in March and became steadily worse until the end of April, when local treatment was instituted, particularly scraping and brass. His progress was then so spectacular that in three months there was no evidence of active disease, and a plastic operation was performed in August.

Of our first 20 patients, 14 were discharged clear of active lupus, but in 1 of these some nodules were still visible, which must be regarded as potentially dangerous. Three other patients are practically ready for discharge.

DISADVANTAGES

These include nausea, epigastric discomfort, depression, and weakness, and can be serious. Of the 30 lupus patients treated under constant observation 15 at some time mentioned some of these ill effects, but none of those on injection therapy did so. Nearly half of the surgical tuberculosis cases had similar trouble, but for the most part symptoms were mild and later passed off, even when treatment was continued. In 7 lupus patients treatment had to be stopped, and 2 very nearly died, both with almost identical symptoms. These 2 patients started with running of the eyes and nose, headache, abdominal discomfort, anorexia, and constipation. Treatment was stopped, but they went downhill for the next fortnight, becoming drowsy and eventually comatose, with peripheral neuritis and optic atrophy, a low systolic blood-pressure, and in one case even Cheyne-Stokes respiration. Both, however, recovered, with the help of intravenous therapy in the worst case, but during this very toxic phase the lupus disappeared. Often, but not invariably, the greatest improvement in the lupus took place while the patients were feeling at their worst.

The flare-up in the early stages of treatment might lead to dissemination of lupus. This happened in one of our patients, and I saw, at the annual meeting of the British Association of Dermatology, a man who had developed multiple lupus patches all over his trunk during a course of calciferol treatment for a small area of long-standing lupus on the face.

It is also possible that calciferol may light up some other site of quiescent disease. One of our patients died of a sudden hæmoptysis; there was previously no clinical evidence of lung disease, but necropsy showed three cavities, each the size of a pea, in the right lung. Another patient developed signs of active disease in the right lung, with an evening rise of temperature, a slight cough, and a sedimentation-rate of 98 mm. in 1 hr. After cessation of treatment all symptoms and signs subsided.

Published reports have emphasised the danger to the kidneys, with the possibility of renal calculi and renal

damage, and hypervitaminosis. No evidence of renal damage was found in our patients, even in their most toxic states, and abdominal radiography showed no calcification; but it is always a possibility, and I feel that it is most unwise to use calciferol in such doses on completely recumbent patients. I would also hesitate to use it in cases of active lung disease.

One suggestion is that the toxic symptoms may be due to mobilisation of lead from the bones by vitamin D, it having been stored there during life through the domestic hazards of soft water, lead pipes, &c. This would account for most of the symptoms found in our cases, and the peripheral neuritis, optic atrophy, &c., reported in the more severe ones.

The patient who is consuming large doses of vitamin D rarely feels fit. Every one of our patients lost weight, ranging from about 3 lb. to a stone in two or three months.

DISCUSSION

Lupus vulgaris is best treated institutionally, and patients receiving calciferol should be kept under very strict observation, particularly if they are elderly and if local treatment can be administered at the same time. The sedimentation-rate should be measured at least once a month, and treatment stopped if an unusual rise is found. Our cases giving difficulty gave sedimentation-rates between 60 and 98 mm., and no serious symptoms were ever found in a patient with a normal figure. The blood-calcium level should also be estimated, and patients with a very high level should be given a rest, but there is no relation whatever between this figure and progress. A raised blood-calcium level must be regarded as a coincidence, if a dangerous one.

I have found no difference in the results obtained by different methods of administration. Charpy and other French workers have at times attributed no effective action to an oily solution of calciferol, but in my experience, apart from one or two clinical differences, the progress of the lupus has been the same with all methods.

SUMMARY

Calciferol is of the greatest value in the treatment of lupus vulgaris.

Local treatment still has a place, both in speeding cure and for cases responding poorly or not at all to calciferol.

Calciferol has so far given promising results in other forms of surgical tuberculosis.

Toxicity is present to some extent in 50% of cases and, though usually mild, can cause anxiety.

Other disadvantages include the occasional dissemination of tuberculosis and flaring up of a quiescent site elsewhere.

Constant supervision is necessary, particularly in the elderly.

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"... There are occasions on which doctors, as doctors, have the duty to make medical opinion plain to politicians and on which it is an advantage to have medical spokesmen in a legislative assembly. The rôle of the expert is not to stand aside and watch society fall into pits which he has foreseen, only coming to its aid when he is invited after the catastrophe, but to make his warnings heard before any harm is done. But to cry out in warning is a very different thing from leaping in to give well-intentioned but fruitless aid. Politics has its own specialised technique and the outsider who attempts to halt the political machine to avoid an obstacle may accidentally tread upon the accelerator as easily as upon the brake. . . ."—
 Dr. J. D. KERSHAW, in *An Approach to Social Medicine*, London, 1946, p. 318.

ASCITES FOLLOWING INFECTIVE HEPATITIS

A CASE TREATED WITH CONCENTRATED PLASMA

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HEPATIC cirrhosis is recognised as an occasional sequela of infective hepatitis and homologous serum jaundice.

Dible et al. (1943) found by hepatic puncture 2 cases of cirrhosis, one in a patient with arspenamine hepatitis, the other in an elderly woman with epidemic hepatitis. In 9 other instances mild residual fibrosis with little periportal scarring was noted 21–51 days from the onset of the jaundice.

Droller (1945) mentions 4 cases of cirrhosis following an outbreak of hepatitis in a diabetic clinic. Of these 1 was confirmed at laparotomy and 1 at necropsy; 2 of these patients died, 300 and 110 days after the onset of the jaundice.

Cullinan (1936) described 20 cases of subacute hepatic necrosis; post mortem the livers showed multiple nodular hyperplasia. The condition was characterised by attacks of jaundice lasting for weeks or months. If the attack was not fatal it was often followed by a period of good health, lasting from a few weeks to many years, before the jaundice recurred. Ascites could develop in cases of long standing. About the aetiology of the condition he came to no definite conclusion, but mentioned catarrhal jaundice as a predisposing factor or even a cause.

In the following case the liver showed a multiple nodular hyperplasia similar to that of Cullinan's cases of subacute necrosis, though clinical findings and course were those of portal cirrhosis.

CASE-RECORD

A private, aged 21, was admitted to an Army hospital on Sept. 14, 1944, with a year's history of swelling of his abdomen. When aged 16 he had an attack of jaundice lasting five weeks and diagnosed as "catarrhal jaundice." As his doctor had told him that there were several cases in the neighbourhood, it may be assumed that the condition was infective hepatitis. The jaundice subsided completely, and the patient enjoyed excellent health for the next four years, being accepted A1 for the Army in 1943.

For a year before reporting sick he noticed a gradual increase in the size of his abdomen, which he attributed to fat; during the three weeks before admission his abdomen enlarged rapidly, and he began to have dyspnoea. On admission he had gross ascites and slight icterus of his sclerae. The urine contained bile and a trace of albumin. On the 18th paracentesis abdominis, yielding 14 pints of straw-coloured fluid, gave him considerable relief; but eight days later he was again fully distended, and a further tapping produced 22 pints. On the 22nd he was transferred to this hospital:

On Examination.—Ill-looking, well built, quiet, and apathetic. Temperature 99° F, pulse-rate 72 respirations 20 per min. Complexion clear. Definite icterus of sclerae. No abnormality in cardiovascular system. Blood-pressure 122/70. Dullness at bases of both lungs due to high position of diaphragm. Slight oedema of ankles. Abdomen grossly distended with fluid, with eversion of umbilicus and devarication of recti.

Investigations.—Urine: albumin +, bile present, no casts. Blood-count: red cells 4,440,000 per c.mm., Hb 90%, white cells 5050 (polymorphs 58%, lymphocytes 36%, mononuclears 4%, eosinophils 2%). Icteric index 19. Van den Bergh: direct delayed reaction. Hippuric acid synthesis: 100%. Blood Wassermann reaction negative. Blood-urea 28 mg. per 100 c.cm. Serum proteins (total) 5.9 g. per 100 c.cm. Radiography of chest: normal, except for high diaphragm. Paracentesis on Oct. 2: 27 pints of straw-coloured fluid (occasional lymphocytes, protein 900 mg. per 100 c.cm.). After paracentesis a hard irregular liver was palpable in the epigastrium.

RESPONSE TO TREATMENT

A diet was given containing 200 g. of protein, yeast, and a synthetic vitamin-B compound, fluid being restricted to two

pints. Intramuscular injections of 'Hepatex T' 4 c.cm. were given twice weekly. Mercurial diuretics were ineffective and were discontinued. On Oct. 4 he again required tapping, and 24 pints was withdrawn. Up to this point it had been necessary to take off fluid four times in three weeks (87 pints in all). His general condition was deteriorating rapidly, and his urinary output was 16-20 oz. a day. Although the serum proteins (5.9%) were not below the critical level, it was decided to try concentrated plasma as a diuretic. On the 8th a pint of twice-concentrated plasma was given intravenously without incident or reaction. After this his urinary output rose to 40-50 oz., at which level it remained for a week. On the day after the transfusion the serum proteins were 6.3 g. per 100 c.cm. (albumin 4.3, globulin 2.0).

This response being encouraging, he was given a pint of twice-concentrated plasma weekly until Jan. 17, 1945. During this time his general condition, appearance, and appetite improved considerably; his urinary output was 40-60 oz. a day, and the intervals between tapings became longer (1 week, 5 weeks, and 8 weeks). After the 17th he was given two pints of twice-concentrated plasma once a fortnight for four weeks, and then two pints once a month. The ascites was almost entirely absorbed, paracentesis being performed only once during the ensuing months (Feb. 14), when 6½ pints was removed. Repeated estimations of the serum proteins gave figures of 6.9-7.0 g. per 100 c.cm.

In March, 1945, the patient being up and about, his monthly plasma was discontinued. After three weeks—i.e., seven weeks since the last infusion—his urinary output fell, and his weight and abdominal girth began to increase. On examination there was obviously an increase in the ascites, a fluid thrill being obtainable. Two estimations of his serum proteins were made, both giving 7 g. per 100 c.cm. He was given two pints of plasma, and his urinary output went up. The day after the infusion the serum proteins were still 7 g. per 100 c.cm. A week later a further two pints of plasma was given, and by this time no fluid thrill was obtainable.

In May, 1945, he was up and about all day, feeling perfectly fit and capable of walking several miles without fatigue. He looked extremely well, apart from a faint scleral icterus, an abdominal wall lax from its previous stretching, and two herniæ controlled by an abdominal belt. No fluid thrill was

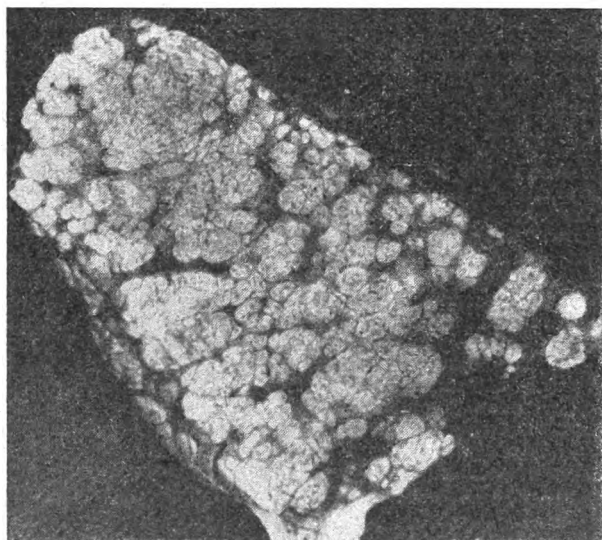


Fig. 1.—Section of liver showing adenomatous areas of regeneration.

obtainable, but slight shifting dullness indicated a few pints of fluid in the abdomen.

He was discharged home on a high-protein diet, with instructions to keep a weight record and to report once a month for plasma. All went well until May 26, when he was readmitted, having noticed an increase in the size of his abdomen during the preceding three days.

Final Admission.—Abdomen: moderate ascites, fluid thrill. Sclera more icteric than on discharge. On May 28 his serum proteins were 6.8%. On June 4 he had some abdominal discomfort, with melæna, and in the evening two large hæmatemeses. A slow drip transfusion was put up. Hæmatemesis

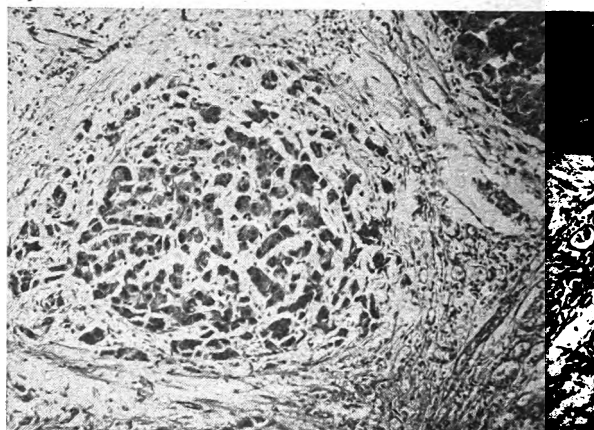


Fig. 2.—Section of liver showing degeneration and necrosis of liver-cells. (× 450.)

continued, and the patient became deeply jaundiced, dying in terminal cholæmia on the 6th.

POST-MORTEM FINDINGS

(DR. D. C. L. DERRY)

Necropsy.—Skin deeply jaundiced. Abdomen contained about 40 pints of free fluid. Liver small, irregular, with typical subacute necrosis. Spleen enlarged. Well-marked varicosity of the œsophageal veins. Both small and large bowels were full of blood. No macroscopic change in other organs.

Histologically the liver showed adenomatous areas of regeneration (fig. 1), in which the peripheral liver-cells were in all stages of degeneration and necrosis (fig. 2). Glisson's capsule showed well-marked fibrosis, with infiltration by many small round cells and containing the remains of many bile-ducts. The spleen showed congestion and fibrosis, with hyaline degeneration of the walls of the blood-vessels and thickening of the capsule.

DISCUSSION

The liver seems to respond to noxious agents according to their intensity and duration of action, with a varying histological picture. At the beginning is a hepatitis which may clear, progress rapidly to acute necrosis, or go through all stages of chronicity to cirrhosis.

This patient's liver showed a well-marked degree of regeneration, and this may explain the remarkable improvement in his general condition after the ascites had been dealt with, in that the liver metabolically was adequate to supply his needs, the ascites resulting from portal obstruction, as did the œsophageal varices which caused his death.

The rôle of portal obstruction as a cause of ascites has been disputed, more emphasis being laid on the low plasma-protein level found in cirrhosis as a cause. It is true that this patient's serum proteins were below normal, and that reduction of the ascites coincided with plasma transfusion; but fluid accumulated rapidly when plasma transfusion was suspended, in spite of a serum-protein level of 7 g. per 100 c.cm. Further transfusion turned the ascitic tide without raising the serum-protein level above this figure, and one is forced to the conclusion that the plasma acted as an excellent diuretic over and above its replacement value.

SUMMARY

Four years after an attack of what appears to have been infective hepatitis a young man developed ascites due to portal obstruction.

The post-mortem findings were those of subacute hepatic necrosis.

The benefit derived from the therapeutic use of twice-concentrated plasma is discussed.

I wish to thank Sir Henry Tidy for his interest and helpful criticism of this paper, Dr. D. C. L. Derry for the post-mortem report, and Dr. W. J. Griffiths for the biochemical investigations.

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ALLERGIC REACTIONS DURING DESENSITISATION TO SULPHONAMIDES

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DISTINCT types of sensitivity to sulphonamides in different patients have been described. Several distinct types of sensitivity appearing simultaneously in one person are recorded here.

Reports of allergic cutaneous reactions to sulphonamides have been numerous during the last few years; and Park (1944) has reported a case of agranulocytosis due to sulphapyridine which he considers to be allergic. The patient was successfully desensitised. Schnee (1943) described a case in a patient who reacted with a membranous inflammation of the oropharynx, nose, and conjunctivæ after having received 18 g. of sulphathiazole in five days. Organisms were not obtained on culture. Rapid recovery ensued on discontinuance of the chemotherapy. It therefore appears that allergic reactions to sulphonamides are not confined to the skin.

In the present case various allergic reactions were observed in a patient who became hypersensitive to sulphonamides after topical applications of sulphapyridine to a gunshot wound and was successfully desensitised.

CASE-RECORD

An officer, aged 24, was admitted to hospital on Oct. 12, 1944, with the following history. His father was subject to slight attacks of asthma all the year round. A brother had bronchitis and asthma. The patient had had asthma, without seasonal variations, up to the age of 16, followed later by bronchitis every winter, associated sometimes with wheezing. He had also had hay-fever regularly every year in the U.K. during the hay-making season.

After leaving the U.K. he had had neither asthma nor hay-fever. Between July, 1942, and March, 1943, he had had five attacks of benign tertian malaria in India. His health otherwise had been good.

In July, 1943, in Syria, he had sustained a gunshot wound of the left hand, which had been treated locally with sulphapyridine powder once daily for three weeks. The wound had healed but an irritating rash now appeared on the neighbouring skin. Sulphapyridine powder had been continued for another two weeks, and coincidentally the rash had spread gradually all over the wounded hand and appeared later on the other hand. This had cleared in September, 1943, after treatment with different pastes and ointments.

In October, 1944, he had been admitted to hospital with gonococcal urethritis, for which internal treatment with sulphathiazole had been started but had had to be given up immediately because of the appearance of œdema and eruption of the upper limbs. After completion of treatment for the urethritis with penicillin he had been transferred to the skin department for desensitisation.

On Admission.—Considerable œdema, erythema, and vesiculation on hands and forearms. Nothing else abnormal detected. Blood-count: red cells 5,200,000 per c.mm., Hb 17.2 g. per 100 c.cm. (100%); white cells 7400 per c.mm. (polymorphs 68%, eosinophils 1%, lymphocytes 27%, monocytes 4%). Blood-pressure 130/90 mm. Hg. Urine normal.

On Oct. 13 desensitisation was started with 0.125 g. of sulphapyridine by mouth twice daily. Eleven hours later, when 0.250 g. had been taken in all, the patient had severe rhinorrhœa and pain on micturition, while simultaneously the swelling, erythema, and blistering of the upper limbs

increased. His face swelled and was covered with a small vesicular eruption.

Sulphapyridine was continued, and next day there was oozing from the areas usually exposed to the sun, and the patient was much distressed by dyspnoea, cough, and a copious watery nasal discharge, lacrimation, sneezing, and sore throat. The dysuria increased.

On the 16th the patient's temperature was 100° F, his oropharynx was red but without exudate, and the conjunctivæ much injected. Coarse râles, rhonchi, and wheezing were heard in both lungs. A mixed papular and scarlatini-form rash appeared on chest and back. White cells 11,600 per c.mm. (polymorphs 66%, lymphocytes 30%, monocytes 4%).

On the 17th, under the same dosage of sulphapyridine, his temperature rose to 103° F, and his physical distress was more severe. White cells 7400 per c.mm. (polymorphs 50%, lymphocytes 32%, monocytes 7%, eosinophils 2%).

On the 18th, the sixth day of desensitisation, the white cells were 4200 per c.mm. (polymorphs 50%, lymphocytes 44%, monocytes 6%). His general state remained distressed. Pneumococci predominated in his sputum. Urine normal.

Sulphapyridine was then stopped. Next day his temperature dropped to 101.6° F, the bladder distress and sore throat disappeared, and the chest improved.

The white-cell count, taken two days after discontinuation of the drug—i.e., on the 20th—was 12,600 per c.mm. (polymorphs 75%). On this day the sore throat, dysuria, dyspnoea, tightness of the chest, and hay-fever symptoms had disappeared completely, leaving only a mild cough for a few days longer.

The condition of the skin gradually improved, and the temperature returned to normal. On the 25th the patient was well enough to get up.

On the 27th sulphapyridine was resumed, but the dose was reduced to 0.0625 g. daily. White cells 7000 per c.mm. (polymorphs 56%, lymphocytes 36%, monocytes 8%).

A few hours later all the symptoms enumerated above—painful micturition, sore throat, rhinorrhœa, lacrimation, and dyspnoea—reappeared, and the skin condition flared up. His white-cell count first increased to 9000 per c.mm. (polymorphs 68%), then again decreased, and was maintained afterwards throughout the course of desensitisation between 5500 and 7800 per c.mm. (polymorphs 58–68%, eosinophils 2%).

The daily dose of sulphapyridine was gradually increased as the symptoms decreased in intensity in the following way: 0.0625 g., 0.125 g., 0.187 g., 0.250 g., and finally 0.5 g. daily. The last dose was repeated until all the allergic symptoms had disappeared and for ten days after, the final dose being given on Dec. 1, 1944.

The chest and hay-fever symptoms had been at times very alarming during the process of desensitisation, and the advice of Lieut.-Colonel G. L. S. Konstam, o.c. medical division, was sought, who on Nov. 3, 1944, reported that there was no clubbing, no cardiac abnormality, but thoraco-abdominal breathing, with sibili and prolonged wheezing on expiration in both lungs. He concluded that the skin sensitivity reaction had evidently produced a return of old manifestations—bronchitic asthma and hay-fever—and suggested treatment with ephedrine gr. 1 and the use of a backrest.

Ephedrine, however, was of little benefit so long as the patient remained sensitive to the antigen. The allergic symptoms gradually disappeared in the following order: (1) the tendency to progressive agranulocytosis; (2) urinary symptoms on Nov. 1; (3) the inflammation of the mucosa of the oropharynx on Nov. 5; (4) the asthma on Nov. 15; and (5) the rhinorrhœa on Nov. 22.

A few days before completion of treatment, the patient being symptomless on a daily dose of 0.5 g. of sulphapyridine, he was again seen, with a special inquiry concerning his category as a soldier, by Lieut.-Colonel Konstam, who reported: "Few sibili only were heard over the lung bases. From the chest point of view he should be fit for category A, after suitable convalescence—suggest 3 weeks."

As a final test, sulphapyridine 1.5 g. was given at the end of the treatment. It produced only a mild transient increase of nasal secretion.

COMMENT

In the published work on hypersensitivity to sulphonamides we have not been able, working under Service conditions, to find any report of a case with so diverse allergic manifestations, which are probably due to the functional state of the patient, the so-called habitus, determined by his hereditary constitution.

In the numerous cases of skin sensitivity which we have seen up to now we have not before found a hereditary factor, either in direct or in collateral family lines. In other cases the sensitivity was limited to the skin (Tate and Klorfajn 1944a). In the present case several structures—mucosa of oropharynx, nose, and respiratory system, skin cells, and bone-marrow (allergic leucopenia)—were involved at the same time. This is in agreement with the opinion of Balyeat and Bowen (1936): that the stronger the inheritance factor the greater the tendency to multiple sensitisation, and that all human beings can be sensitised, but to a varying degree.

The low rate of eosinophilia which preceded the subsequent progressive drop in the white-cell count is noteworthy; this low eosinophil-count was present while the patient reacted explosively to the administration of the antigen.

Though it is known that eosinophilia is a frequent but not constant accompaniment of allergic states, Tate and Klorfajn (1944b) saw in all their cases of skin sensitisation to sulphonamide a pronounced eosinophilia, and in the severe cases a high eosinophilia in the course of desensitisation. A lack of eosinophils in patients reacting violently to the antigen should, we suggest, be a warning of sensitisation of the bone-marrow and impending agranulocytosis.

It is noteworthy that in the course of desensitisation the benefit of this therapy was shown over the whole range of the patient's varied allergic symptoms.

The technique of desensitisation in this case followed the principles of skin sensitisation published by Tate and Klorfajn (1944b), except that, owing to the severity of the reaction, the initial doses had to be smaller. The course of desensitisation lasted forty-two days, excluding the interval when administration of the antigen had to be stopped.

Concerning the permanency and completeness of desensitisation in the present case, we can only judge from experience in those cases of skin desensitisation which we have been able to keep under observation. For example, one patient with a high degree of skin sensitisation was desensitised by us at the end of 1943. About a year later he was admitted to the medical ward of the same hospital with a diaphragmatic pleurisy. He did not mention to his attendants his previous sensitivity to sulphonamides, and he was given sulphathiazole at the rate of 7 g. a day for nearly four days, without the slightest discomfort to him. We observed these facts when he paid the skin department a friendly call. Three months later—i.e., fifteen months after completion of desensitisation—he was admitted to the skin ward with a septic leg due to an abrasion, and was given sulphonamide tablets 3 g. daily for three days, without experiencing any discomfort and without developing any eruption.

SUMMARY

A case of multiform sensitivity reactions to sulphonamides in a patient with an inherited allergic constitution is described.

Desensitisation was achieved with accompanying severe symptoms.

In another patient, desensitised in 1943, there have been no untoward reactions to sulphonamide therapy on two subsequent occasions, a year and fifteen months after desensitisation.

We wish to thank Colonel W. B. Stevenson, A.M.S., officer commanding the hospital, for permission to publish the case, and Major A. Kirshner, pathologist of the hospital, for the many laboratory investigations.

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Medical Societies

DEVON AND EXETER MEDICO-CHIRURGICAL SOCIETY

At a meeting on Dec. 19 Mr. PATRICK RUSSELL discussed

Trichomonas Infections

The clinical characteristics, he said, are a watery, offensive, bubbling, vaginal discharge often accompanied by œdema and congestion of the vulva. The disease is primarily one of the vaginal walls—a granular vaginitis—and the trichomonas is quite definitely a pathogen; it often coexists with chronic cervicitis, or gonococcal infection. Diagnosis depends on identification of the parasite. Smears, taken by inserting a glass pipette or 'Bakelite' spoon into the vagina, should be examined directly in a wet film; neither a speculum nor a finger should be passed into the vagina beforehand.

The parasite has been found in the prostate, the bladder, and (doubtfully) the fallopian tubes. The trichomonas recovered from the vagina is possibly identical with that harboured in the intestine, which may account for recurrences. Although the condition occurs in virgins it should be regarded as a venereal disease. The parasite may also be found in the male; in bulls it gives rise to an apparently incurable condition, so that infected animals have to be slaughtered.

Local treatment with such preparations as 'Devegan' and 's.v.c.' tablets is fairly satisfactory; it is better, however, to swab the vagina dry and insufflate it under direct vision with the chosen medicament in powder form. Two treatments a week without intervening douching should be carried out. Estrogens may have an adjuvant action. Virgins are best treated by irrigation with weak acriflavine solution. Great care must be taken not to insufflate under pressure because of the very real risk of fatal air-embolism. Three negative wet films in the postmenstrual phase may be regarded as proof of cure, but recurrence is common.

SOCIETY OF MEDICAL OFFICERS OF HEALTH

At a meeting of the fever group on Dec. 13, with Dr. WILLIAM GUNN, the president, in the chair, a discussion on

Oiling of Floors and Fabrics

was opened by Dr. J. P. KENNEDY. After the first application the ward should, he said, be kept empty until the oil has been absorbed; afterwards the oil is thinly and evenly applied at intervals of 4-6 weeks. The floor is treated with commercial spindle-oil, which is spread with a coarse sprinkler and brushed in. The application of oil to fabrics tends to make them clammy and, in dirty atmospheres, dingy; but new substances under trial by the British Launderers' Research Association are reported to be free from these objections. Dermatitis from contact with impregnated materials is rare; of 200 patients, 1 had mild and short-lived erythema with irritation, while 4 had fleeting erythema.

Two other methods might be considered. One is the use of a light movable inter-bed screen, fitting flush to floor and wall; this should effectively reduce air movement about the bed. The second is the anticipation of laundry oiling by the addition during manufacture of a wash-resistant oil to the natural wool content of materials.

Mr. C. L. F. HUNTER, B.S.C., of the British Launderers' Research Association, emphasised the importance of preliminary washing in soft, neutral, water; thorough rinsing is essential to remove the last traces of soap, whose persistence reduces the deposition of oil. Choice of a suitable emulsifying agent is important; but the procedure of oiling is simple and, if properly carried out, effective. The air-count of bacteria is greatly reduced, though the total number of organisms on the fabrics remains consistently high. The association is conducting a further investigation in conjunction with the North Western Hospital. A new technique, still in its infancy, employing a new cationic emulsion requiring much less of the active emulsifying agent, offers hopes of a cheaper process.

New Inventions

THE TRAP-JAW PRINCIPLE IN SURGICAL FORCEPS

FORCEPS intended to take a firm hold of tissue, whether dissecting forceps, hæmostats, holding forceps of the Ochsner type, or gall-bladder forceps, depend for their security on the forcible apposition of two parallel surfaces. Since the blades are hinged, the surfaces of the jaws are parallel in one position only, usually the completely shut one, when they are not in use; when they are applied,

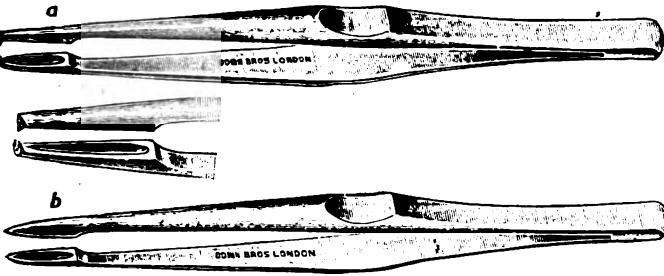


Fig. 1a and b—Dissecting forceps (1/2 sc.).

the blades are forced apart to the extent of the tissue compressed between them in a gap which is wedge-shaped, holding the gripped tissue firmly at the hinge end, less firmly towards the points.

Many mechanical devices have been introduced to prevent slipping: the surface of the jaws are roughened, usually by a transverse ridge and furrow pattern; the blades are arched to provide a spring pressure throughout

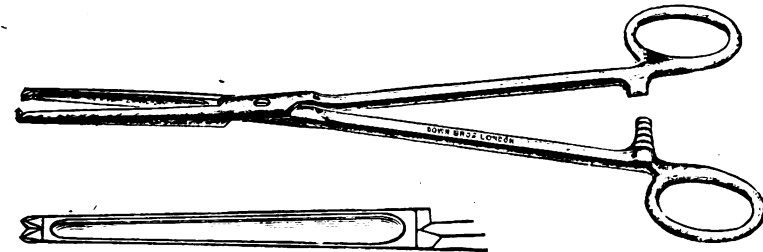


Fig. 2—Mayo-Ochsner forceps (1/2 sc.).

their length or in-toed to make contact at their points first; or they occlude at the tip only, as in the Joll hæmostat. All these devices fail to hold a tube, such as a large vessel, the duodenum, the appendix, the ureter, the cystic duct, or the colon, if it is cut across flush with the blades; only when a flange of uncrushed tissue is left protruding beyond them is the hold safe.

The instruments I am describing have hollow blades with a narrow rounded rim. The rim holds a strip of tissue in compression, while the hollow accommodates an uncompressed part that prevents slipping in the same way as does a projecting flange of tissue in the usual design. This pattern has four advantages over the usual compression type: the blades can be made narrower while giving equal security; the tissues held can safely be cut flush with the blade (an advantage in the case of infected portions of the alimentary canal); the hold of the tissue, even when cut flush, is more secure; and less devitalised tissue is included in a ligature.

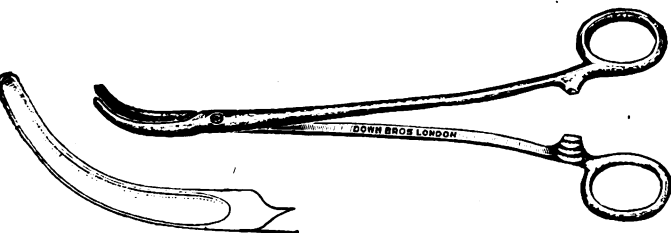


Fig. 3—Gall-bladder forceps (1/2 sc.).

Of the instruments illustrated, the dissecting forceps (fig. 1a and b) and the Mayo-Ochsner forceps (fig. 2) differ from their normal prototypes in the design of the jaws only.

The gall-bladder forceps (fig. 3) have been modified in three particulars: they are 1/2 in. longer; they are lighter; and they are narrower in the blade than the standard Moynihan pattern. I use these forceps in

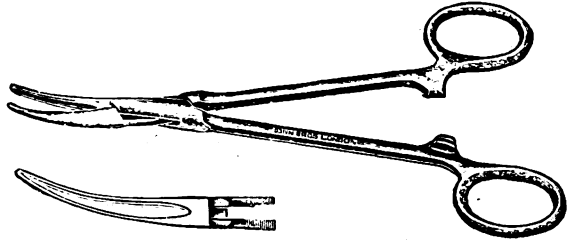


Fig. 4—Hæmostat (1/2 sc.).

operations of every type when working in the depths of a wound, both for blunt dissection round a corner, as when clearing the ureter, the lateral attachments of the rectum, the biliary ducts, the left gastric artery, and the œsophagus, and for catching any deeply placed vessel previous to ligature. The added length gives better access, the narrow blades improve them as dissectors, and the hollow jaws give that security so essential in situations where a second grab at a cut vessel or duct is an experience to be avoided.

The hæmostats (fig. 4) have hollow blades, and the narrow bite and added security these allow. They have two further advantages over any other pattern I know. First, they have a 30° curve on the blade to fit them for the two uses of a hæmostat: a picker-up of small bleeding points, or a compressor of wide oozing surfaces. The first task requires the application of the points only at right angles to a surface; the second uses the blade applied parallel to a surface. Straight hæmostats are wrong for both purposes, as illogical as any straight tool. Man naturally uses precision tools in front of his body and below his eyes—that is,

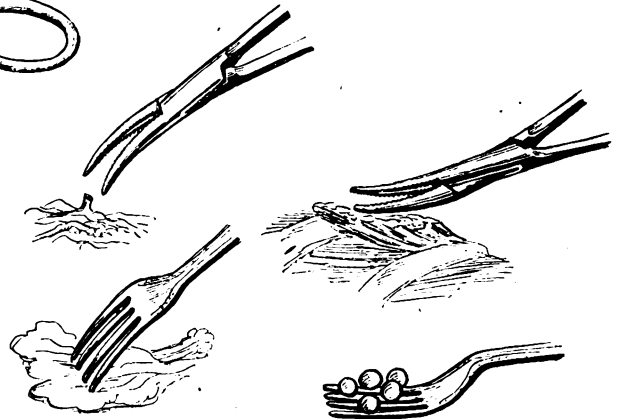


Fig. 5—A hæmostat, like a fork, should be inclined so that it can be used at right angles to a surface or parallel to it.

at a point about 30° in front of and below his elbow. Tools meant to work in the horizontal plane, such as golf-clubs, hockey sticks, and spoons, are therefore curved to allow their working surfaces to lie horizontally; those used either horizontally or vertically, such as forks (fig. 5) or ink-erasers, are similarly sloped and used either way. The only straight tools are those driven by a hammer or by the weight of the foot, the sternum, or the shoulder. These hæmostats, like forks, are right in either plane. A second advantage is that their whole construction is flat and light, to allow up to two dozen to be stacked on one peg of an instrument rack.

These instruments are made by Messrs. Down Bros. Ltd.

W. H. OGILVIE
M.CH. OXF'D, F.R.C.S.

Reviews of Books

Principles and Practice of Surgery

Editor: W. WAYNE BABCOCK, M.D., emeritus professor of surgery, Temple University; acting consultant, Philadelphia General Hospital. London: H. Kimpton. Pp. 1331. 60s.

THE last decade has seen a great change in the student's textbook: pictures and more pictures now fill the pages, and the written word he may scan—if he cares to. This new textbook is edited by a distinguished and able American surgeon, whose previous writings and books have made their mark in this country. His field is now all surgery, and he includes "common and rare surgical conditions occurring not only in the United States, but throughout the world." But every teacher knows that the absorptive capacity of the medical student or even the doctor is limited; he must have the facts winnowed for him, for common things are somehow hard to keep in mind, and rarities cling like burs. It matters little if he fails to diagnose xiphogous twins; but it is a tragedy if he misses a carcinoma of the rectum (the symptoms of which are described in three lines) or an intestinal obstruction (five lines). In this book even appendicitis has its symptomatology relegated to small print, and in general there is, for students, too little emphasis on symptoms and on orderly methods of examination, while the vast area to be covered prevents the editor from providing the exhaustive analyses which the surgeon needs. The surgical management of hypertension for example—an important subject these days—is worth more than a page, and might well have been illustrated by pictures of the operations at present employed. Volvulus of the large bowel is dismissed with no hint as to the surgical measures indicated. In discussing the diagnosis of embolus of the peripheral vessel, pain is described, but not a word warns the student that numbness and coldness and loss of power may be the presenting symptoms.

The book is one which surgeons will like to possess; but it is a pity that Professor Babcock has tried to do so much: the best section—on the abdomen—shows what he might have achieved had he attempted less. Another excellent section is the bibliographic appendix.

Acetanilid

A Critical Bibliographic Review. MARTIN GROSS, M.D., research assistant (assistant professor), Laboratory of Applied Physiology, Yale University. New Haven: Hillhouse Press. Pp. 155. \$3.

MEN rightly take pains to protect themselves against the ridicule of posterity, and in the practice of therapeutics as in everything else it is wise to marshal such evidence as can be found in support of our opinions. Dr. Martin Gross has done us a kindness by writing this exhaustive monograph on the literature of acetanilide. In little more than 150 pages he has written a readable survey of 763 references. In retrospect we may be astonished not so much that we abandoned acetanilide, but that it ever established itself in medical practice. Nevertheless, the information carefully sifted and set out here should be invaluable to those working on the synthesis of analgesic compounds. In the introduction, Dr. Howard W. Haggard promises us similar volumes on the salicylates, phenacetin, bromides, and antipyrin, which is welcome news.

Lehrbuch der gynäkologischen Diagnostik

W. NEUWEILER, professor of obstetrics and gynaecology, University of Berne. Berne: Hans Huber. Pp. 474. Sw. fr. 58.

THIS textbook of gynaecological diagnosis is comparable in distinction to Winter's famous book. Neuweiler has selected and emphasised the cardinal features of the subject while giving free play to his erudition. In the first section methods of interrogation and examination are described, and in the second the diseases of each part of the female generative system are considered in turn. Diseases of the vulva are well illustrated, with particularly good examples of lymphogranuloma, mycosis, and Bowen's disease. Much attention is paid to Hinselmann's technique and to his Rubrik classification, which is not yet well known in this country.

Like most Continental and American authors, Neuweiler attaches little importance to chronic subinvolution and chronic metritis. Chronic subinvolution is not mentioned, and chronic metritis is regarded as a rare sequel of a chronic uterine infection. Anovular menstruation, too, receives scant notice, though it is regarded as the cause of one form of polymenorrhoea. He gives a good classification of the different types of uterine bleeding, quite different from that adopted by recent American authors. The section on the clinical aspect of ovarian tumours is exceptionally good, and the chapter on endometriosis is well written, mention being made of the areas sometimes found in the lungs. The chapter on sterility is, perhaps, the least satisfactory. The book is stimulating and scholarly.

Studies on *Acarus scabiei* and Scabies

B. HEILESEN. Copenhagen: Rosenkilde and Bagger. London: H. K. Lewis. Pp. 370. 20s.

DURING the war interest in scabies in this country increased greatly, though the epidemic of the disease seems to have been well under way before 1939, and was largely independent of bombing, evacuation, and other suggested causes.¹ Scabies incidence was high in many countries outside Britain, and even in Scandinavia it proved a troublesome problem. This book is an account of researches which were carried out in Copenhagen and Stockholm between 1942 and 1945. The investigations in occupied Denmark were interrupted when the author, like so many scientific workers in that country, fell foul of the Gestapo; he was fortunately able to escape to Sweden and continue his research.

His account of the life-history of the sarcoptes is particularly clear and complete, and is the first satisfactory description which has been published for the human parasite. It fully agrees with an account published by Gordon, Unsworth, and Seaton² dealing with the related mite *notoedres*, parasitic on rodents. Some experiments on possible sensitisation during infection gave indefinite results, but experiments on transmission supported the findings of K. Mellanby³ that intimate personal contact is the normal means of infection, and that the fertilised adult female mite is the stage of the parasite usually responsible for the transference of the disease.

Modern Management in Clinical Medicine

F. KENNETH ALBRECHT, M.D., S.A. surgeon, U.S. Public Health Service, Kansas State tuberculosis consultant. London: Baillière. Pp. 1238. 55s.

Dr. Albrecht's claim for his book is that, laying emphasis upon therapy, he has tried to provide the practitioner with a clear picture of the rationale of therapy, combined with concise practical descriptions of how treatment should be applied. On the whole he has been successful, particularly in his efforts to incorporate into his scheme of treatment new methods of therapy. Thus in his discussion of peptic ulcers full reference is made to the possible rôle of urogastrone and entero-gastrone, while his chapter on chemotherapy includes a section on streptomycin. He recommends D.D.T. for the treatment of pediculosis, but it is surprising to find so little reference to benzyl benzoate in the treatment of scabies. Although the practitioner may appreciate his efforts to make things easier by referring to drugs by their trade names, this at times is overdue. It is refreshing in these days to find stress laid upon the importance of insulin in the treatment of diabetic coma; and the note on the value of intravenous strophanthin in heart-failure is welcome. The section on the treatment of hypertension, however, is disappointing.

The general scheme of the book is sound, but it is difficult to account for the omission of any reference to vitamins E and K in the chapter on vitamin deficiencies, or to explain why obesity is included in this particular chapter. There are useful chapters on geriatrics, the care of the ambulatory patient, clinical laboratory medicine, and routine procedures, which even includes a section on "lifting and turning patients."

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2. Gordon, R. M., Unsworth, K., Seaton, D. R. *Ann. trop. Med. Parasit.* 1943, 37, 174.
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SEVERE BURN

(area 162 square inches)

A treatment using tulle gras pressure dressings and plaster fixation

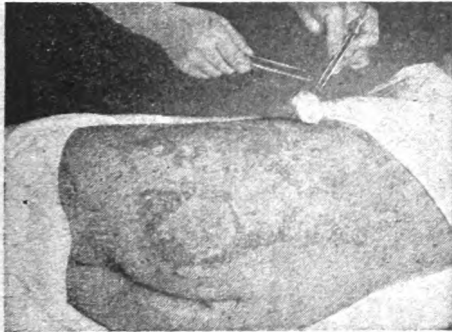


Fig. 1

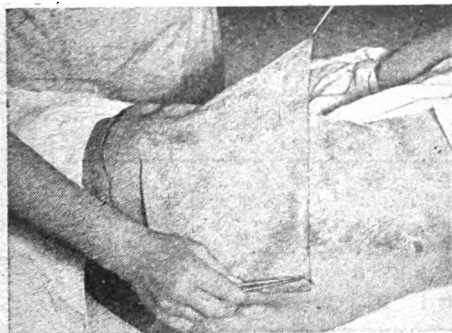


Fig. 2

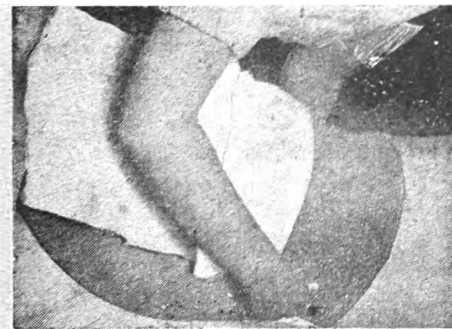


Fig. 3

CASE-HISTORY—The patient, a young man, was admitted to hospital, having been burnt by an electric blanket. The raw area measured 162 square inches. Excision of the burnt area was performed on the same day. Tulle gras (Jelonet) was applied. Fixation by Gypsona plaster of Paris bandages applied over the whole area, abdomen and thigh. The patient was given a blood transfusion.

Seven days later, the affected part was covered with thin razor grafts from both thighs and a pressure dressing of Elastocrepe applied. Fixation was again secured with Gypsona plaster of Paris.

The patient was discharged to duty 7 weeks later.

The details and illustrations above are of an actual case. T. J. Smith & Nephew Ltd., manufacturers of Elastoplast, are privileged to publish this instance, typical of many, in which their products have been used with success in the belief that such authentic records will be of general interest.

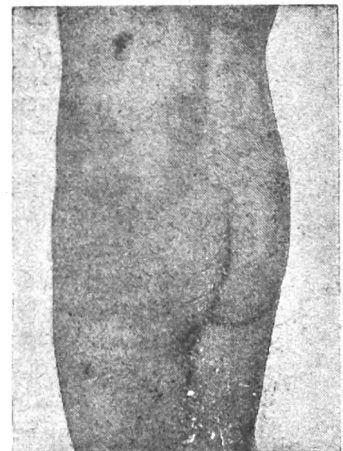


Fig. 4



ELASTOCREPE is a non-adhesive elastic cloth bandage possessing the same unique stretch and regain properties as Elastoplast. Elastocrepe bandages should be applied firmly and evenly to secure the exact degree of compression or support. They permit free ventilation and do not restrict circulation. Bandages are supplied 2", 2½", 3" and 4" wide × 5/6

yards long when stretched—washing renews their elasticity.

JELONET (tulle gras) is an open mesh gauze thoroughly and evenly impregnated with petroleum jelly and balsam of Peru 1%. It is supplied sterilised ready for use, in tins of 8 yards continuous strip or in cut pieces. Elastocrepe, Jelonet, Elastoplast and Gypsona are products of T. J. SMITH & NEPHEW Ltd., HULL.



Vitamin Therapy—its uses and limitations

B-COMPLEX: RESIDUAL DEFICIENCIES

Recent clinical reports show that it is frequently impossible to clear up all symptoms of specific vitamin deficiency diseases by the use of a single indicated vitamin preparation, but that residual symptoms are left which require the administration of one or more other factors of the vitamin B-complex. Such considerations are found to apply in beri-beri, pellagra, the "burning feet" syndrome and the dermatological conditions associated with ariboflavinosis. Bearing this in mind two points should be noticed :

1—the inclusion in Befortiss B-complex of pyridoxin (vitamin B₆) and 2—the presence of *adequate* amounts of all four factors.

BEFORTISS B-complex capsules

Each capsule contains	{	Aneurin hydrochloride	1 mg.
		Riboflavin	1 mg.
		Nicotinamide	15 mg.
		Pyridoxin	0.5 mg.

DIET AND DENTAL HEALTH

While the control of dental caries still lies in the future, certain nutrients will help to promote the health of teeth, gums and mucous membranes, more especially for the rising generation, but also for adults, for example :

Calcium in a diet containing sufficient protein to promote absorption. Best given as milk or cheese.

Vitamin D whose distribution in foods is restricted.

Vitamin C to promote good dentine formation and soundness of the gums.

Vitamin A for its effect on the enamel-forming organs.

For routine prophylaxis, the best all-round preparation is

COMPLEVITE

**A single supplement for
multiple deficiencies**

The recommended adult daily dose provides:

vitamin A	4,000 i.u.	calcium	160 mg.
vitamin D	300 i.u.	iron	68 mg.
vitamin B ₁	0.6 mg.	iodine	not less
vitamin C	20 mg.	manganese	than 10
		copper	p.p.m
			each.

References:—Shortage of space precludes list of references, but full documentation may be obtained on application to Clinical Research, Dept. 2/4.B.



Products of Vitamins Limited

Upper Mall, London, W.6

THE LANCET

LONDON: SATURDAY, JAN. 25, 1947

"The Crux"

Mr. BEVAN's reassuring reply to the presidents of the Royal Colleges has enabled the council of the British Medical Association to reconsider its opinion on negotiation with his Ministry. At their meeting next Tuesday the representative body of the association will be asked to agree with the council—

"That the British Medical Association, having considered the final results of the plebiscite and the Minister's letter of Jan. 6, and desiring to secure for the people the best possible health service, is willing that discussions be entered into with the Minister to that end, provided that such discussions are comprehensive in their scope and that the possibility that they may lead to further legislation is not excluded, and that after the conclusion of these discussions a second plebiscite of the profession be taken on the issue of entering the service."

If this resolution is carried without substantial amendment, the B.M.A. will again occupy a strong position and can expect a careful review of the many issues on which agreement is possible. Willingness to negotiate now, however, does not denote willingness to participate in the National Health Service next year; and even if all misapprehensions were removed a large proportion of the profession would still be unhappy about the scheme as it stands. If we believe that their willing participation can be achieved, it is because we note that most of the reasonable opposition is in one particular field—namely, the conditions of general practice proposed under the Act. The specialist has grounds for satisfaction with the considerate treatment he has received: while he is to be paid, if he wishes, for his hospital and domiciliary work within the service, he can look forward to a considerable demand for his private attention for many years to come; and in any case neither principle nor experience reveals any fundamental objection to the remuneration of specialists by salary—provided the salary is large enough. The general practitioner, on the other hand, must from the first entrust the bulk of his fortunes to an unproved service. He cannot know how some future Parliament may decide to treat him; yet he is asked to begin by surrendering his familiar guarantees of personal and professional independence.

Under the Government's scheme the position of the general practitioner will be in most respects the same as it was under National Health Insurance; and, as Dr. DAIN has put it, "those of us who have been in national health insurance practice have been quite unconscious of any restriction on our freedom."¹ From the professional standpoint, the local executive council, with which the doctor makes his contract, is an improvement on the present insurance committee;

the disciplinary procedure is an improvement on that in use under N.H.I.; and (except that there may have to be more watchful supervision of certification) there is no reason to think that official interference with the practitioner's work will be any greater in the new service than it was in the old. There will, however, be two important background differences: (1) since the service is universal, anyone debarred from it may soon have difficulty in earning a living; and (2) the doctor becomes a tenant of his practice instead of a freeholder. These two features of the new service mean that the practitioner can no longer afford to get into serious trouble with "the Minister"; and if he is to have any sense of security he must be assured that so long as he does his duty reasonably well, according to his lights, he will run no risk of discharge. Similarly, the profession as a whole must be assured that the awkward man, the original man, the unconventional man, the reformer, and the exposé of abuses cannot possibly be penalised because his views or behaviour are inconvenient to officials. Failing such an assurance, doctors would be right in refusing to join the service; and we cannot feel that it has yet been fully provided.

Mr. BEVAN takes the line that (as under N.H.I.) the Minister responsible to Parliament must in the last resort be the person to decide whether continuance of a doctor's name on the list is "prejudicial to the efficiency of the service": this, he holds, is not a legal but a practical question, and he rejects the suggestion that it should be referred to the law-courts—though the doctor may, like any other citizen, apply to these if a contract has been broken or powers have been exceeded. Recognising that in the changed circumstances practitioners will need better safeguards than those existing under N.H.I., Mr. BEVAN has secured that in the National Health Service disciplinary cases referred by the local executive councils "or any other person" should not go straight to the Minister but should be heard by an "independent tribunal," which in medical cases will consist of a medical practitioner (drawn from a panel of six appointed by the Minister after consultation with the profession), a person appointed by the Minister after consultation with bodies representing the local executive councils, and, as chairman, an experienced barrister or solicitor appointed by the Lord Chancellor. The interposition of this tribunal represents an advance on N.H.I. disciplinary machinery, with which panel practitioners have had little fault to find. But however well it would work in practice, the system does not meet the demands of abstract justice; it does not afford the doctor that certainty of impartial dealing to which he is entitled before he surrenders his private security to a Minister of State. The three presidents put part of the objection clearly when they pointed out that "if the tribunal recommend the expulsion of a practitioner from the service, his appeal is to be judged by the Minister who has appointed two of the three members of the tribunal."

In some ways, as a correspondent says this week, this question of justice for the doctor is the crux of the present situation; and those of us who wish the new service to succeed must somehow remove all colour from the idea that in that service the complaints of officials will be settled by officials for officials. Mr.

1. Dain, H. G. *Brit. med. J.* 1946, ii, 747.

BEVAN has already done well in declaring his readiness to discuss the procedure to be followed on appeal from the tribunal "with a view to providing any additional protection possible within the framework of the Act." In Scotland critics have proposed that the independence of the tribunal should be enhanced by appointing a judge to be its chairman; while the English presidents have suggested that the appeals might go before the General Medical Council. Whether on these or other lines, a satisfactory solution must be found. If the practitioner is to give up his private security he should be compensated by public security of the most complete kind: he should be perfectly sure of fair play as he understands it. For only in countries where men can rely on justice do they cease to make their private house a fortress.

Streptomycin in Tuberculosis

AFTER the encouraging reports on the use of streptomycin in experimental tuberculosis clinical findings have seemed slow in coming; but it is clearly a long job to assess the value of any treatment in tuberculosis, and even now, when the first trials are gradually appearing, it is too soon to say what the final verdict will be. In the last two years HINSHAW and colleagues¹ have treated 100 cases of various forms of tuberculosis at the Mayo Clinic, the usual dosage being 1-3 g. of streptomycin, dissolved in sterile water, in the 24 hours. The solution is given intramuscularly in divided doses every 4 to 6 hours for three to six months. This has sometimes been supplemented by intrathecal injections.

The most eagerly awaited results have been in tuberculous meningitis, in which streptomycin seemed at last to offer a hope of cure. The Mayo Clinic series included 12 cases of generalised miliary tuberculosis, 9 of which showed clinical meningitis. Six of these patients have died, and 1 has been under treatment for a month only. The remaining 5 have survived for from two to ten months, and these include 4 cases of meningitis. The 4 survivors in the meningitis group were the only cases to receive intrathecal streptomycin—100-200 mg. in 1-5 c.cm. of cerebrospinal fluid every 24-48 hours for two to six weeks—in addition to intramuscular therapy. Thus no case receiving this combined therapy had died up to the time of the report. This is good news indeed, but it would be premature to speak of cure in any of these patients. The cerebrospinal fluid has returned to almost normal in only 2 cases; while in 1 patient given a six months' course the infection flared up again after an interval of a month, showing how the infection can persist in spite of striking clinical improvement. Enthusiasm must be still further tempered by the fact that of the 4 patients with arrested tuberculous meningitis, 1 is blind, 1 is deaf, and a third has a profound disturbance of cerebellar function; the remaining patient is symptom-free but is still receiving treatment after five months. Such distressing sequelæ to streptomycin therapy are not exceptional. Thus COOKE and colleagues² reported 2 cases of tuberculous meningitis in year-old

children treated with streptomycin, both of whom were left with mental and nervous changes. KRAFCHIK,³ on the other hand, gave 24,000,000 units intramuscularly and 2,800,000 units intrathecally in the course of 57 days to a child of fifteen months with tuberculous meningitis, and five months later the patient seemed completely well.

The cause of these serious neurological complications is not clear. There are three possibilities. First, they may be sequelæ of the disease itself; and to tuberculous retrobulbar neuritis HINSHAW and his colleagues attribute the blindness. They are uncertain of the cause of the deafness, but the National Research Council,⁴ in their report on 1000 cases of a variety of infections treated with streptomycin, maintain that the deafness noted after the treatment of tuberculous meningitis and typhoid is due to the disease process. The other possibilities are that either the pure drug or its impurities are responsible; it is clear that, in contrast to the harmlessness of penicillin, some preparations of streptomycin have proved highly toxic. HINSHAW,⁴ using a preparation containing 50% of inert material, and McDERMOTT,⁴ using crystalline streptomycin sulphate, have both noted vertigo in their patients after intramuscular administration. In this country, however, MADIGAN and colleagues,⁵ using seventeen different preparations of the drug, have lately reported in these columns an investigation in which 4 patients received streptomycin in a daily dosage of 200 mg. intrathecally and 1 g. intramuscularly with trivial toxic manifestations; they showed that streptomycin may be contaminated by a highly toxic substance whose variable presence in different batches may account for the contrasting experience of different observers: the alarming report of CAIRNS and his colleagues⁶ at Oxford, in which 4 out of 8 patients with meningitis reacted unfavourably to the first intrathecal injection of streptomycin, illustrated the risks of injecting some batches of streptomycin into the theca. Until the reasons for this variability have been thoroughly worked out there seems to be a strong argument for the biological standardisation of individual batches.

HINSHAW and his colleagues¹ further report on 15 cases of genito-urinary tuberculosis treated with streptomycin and conclude that the drug is of palliative value in tuberculous cystitis. An apparently favourable response was noted in 4 out of 5 cases of tuberculosis of bones and joints, and 15 cases of tuberculous cutaneous fistulæ from various sources all showed temporary improvement in four to six weeks, while with further therapy 10 out of 15 remained healed for four to twelve months. In their trial of the drug in pulmonary tuberculosis they chose 32 cases in which rapid spontaneous improvement would not normally be expected, and in which collapse therapy was not indicated. Of these, 21 were far advanced and only 2 showed minimal lesions. The patients were given 1-3 g. of streptomycin daily intramuscularly. Radiological improvement was noted in 25 cases after courses ranging from two to six months. Cavity closure was noted in 12 cases, and the sputum became negative in 13. Including the cases in which there was no improve-

1. Hinshaw, H. C., Feldman, W. H., Ptuetzko, K. H. *J. Amer. med. Ass.* 1946, **132**, 778.

2. Cooke, R. E., Dunphy, D. L., Blake, F. G. *Yale J. biol. Med.* 1946, **18**, 221; quoted by Krafczik (below).

3. Krafczik, L. L. *J. Amer. med. Ass.* 1946, **132**, 375.

4. National Research Council, *Ibid.*, pp. 4 and 70.

5. Madigan, D. G., Swift, P. N., Brownlee, G. *Lancet*, Jan. 4, p. 9.

6. Cairns, H., Duthie, E. S., Smith, H. V. *Ibid.*, 1946, **ii**, 153.

ment, progression under treatment was seen in only 1 case, and here a resistant strain of *Myco. tuberculosis* was present. Reactivation of disease after cessation of streptomycin was seen in 6 cases. From such a short series no definite conclusions can be drawn, but, as HINSHAW suggests, it seems likely that streptomycin will be a valuable palliative remedy in pulmonary tuberculosis when used in conjunction with other accepted forms of therapy; there is some experimental evidence, too, that better results will be obtained with a combination of streptomycin and 'Promin.' Of 7 cases of tuberculous empyema only 1 improved, and in this case streptomycin was directly applied through a fistula in addition to intramuscular dosage. Ulcerating tuberculous lesions of the larynx, trachea, and bronchi were treated with streptomycin intramuscularly and ten aerosol inhalations a day, at hourly intervals, using 2 c.cm. of a solution containing 0.5 g. in 20 c.cm. of isotonic sodium chloride: there was rapid improvement in 5 out of 7 cases.

In spite of transient and permanent toxic effects, uncertainty regarding the development of drug-resistance by tubercle bacilli, and difficulties of purification and production of streptomycin, these early reports give great hope for the future. One fact, however, stands out clearly—chemotherapy in tuberculosis is no short cut to cure. Indeed, the need for expert pathological facilities, frequent intramuscular injections, and long-continued treatment—all these in addition to present-day forms of therapy—make it evident that our already overburdened tuberculosis hospitals and sanatoria will have to develop to meet these new requirements.

Health of the Indian Worker

THE war gave a fillip to the industrial development of India, and India already has seven or eight million industrial workers. Every realistic programme for raising the standard of living of the country anticipates a great and rapid expansion of this number. The famous Bombay "Plan of Economic Development"¹ stands or falls by its estimate that the income from industry can be increased fivefold in the next fifteen years. It is in this context that two recent reports on industrial health should be studied.^{2 3}

The present situation is bad. Protective laws are inadequate and their enforcement lax. The factory inspecting staff is too small, and inspection is too often perfunctory and uninformed:

"At one [pottery] factory I saw women scouring cups with sandpaper. There was no provision for the removal of dust, and the women blew the dust from the ware into the atmosphere. One woman had a small child aged about 2 years sitting beside her and each time the mother blew . . . her baby inhaled silica dust. . . . The factory inspector's only reaction was that the child was too young to be in a factory . . . the factory was too small to provide a creche. . . . The inspector smilingly conveyed the information to me, and he was evidently perfectly satisfied."³

Trade-unionism is weak. Hours of work are excessive for the subtropics, particularly for women and young persons. Welfare and canteen services have hardly

made a beginning. Modern knowledge on the physiology of working conditions is rarely applied:

"In the majority of factories . . . roofs have been of a single layer of corrugated iron. Of all the roof materials that could have been chosen this is the worst. Its thermal insulating value is practically zero. It is dirty. Its outer surface absorbs virtually all the solar radiation which strikes it . . ."⁴

The Bhoire Committee accepted the principles laid down by the Royal College of Physicians⁴ and recommended the establishment of industrial health services as an integral part of provincial health organisations. The committee also urged early action on other matters—for instance, reducing hours of work to 45 per week; raising the age-limit for young persons from 12 to 15 years in factories and to 13 in "plantations and public works"; prohibiting the employment of women underground in coalmines; maternity benefits for 12 weeks. It also suggested the setting up of departments of industrial medicine in certain medical schools.

BEDFORD, who spent three months in India at the invitation of the government, draws on his experience with the Industrial Health Research Board in making a series of recommendations on factory hygiene and working conditions and includes a comprehensive programme for research. He discusses frankly and helpfully the crucial problem how to raise the productivity of the Indian worker from its present level of a quarter or half that of the worker in the West to at least the two-thirds which has already been achieved in a few exceptional cases. Primitive organisation and methods of work, owing to lack of capital on the one hand and the chronic ill health and poor education of the workers on the other, are mainly responsible for the low output. Many other factors are also involved, as BEDFORD shows: the high temperature of factories, insufficient lighting, over-staffing, and the high turnover of labour. The low output per man-hour, moreover, is a cause of low wages; it raises prices and lowers purchasing power, thus further depressing the health of the working population.

Both reports recognise the futility of improving factory conditions while ignoring the even more pressing needs of housing and nutrition. Present housing standards are abysmally low, and the slums of Bombay, Calcutta, Cawnpore, and other cities are a negation of all that is meant by health. The future may well lie with the new methods of building being perfected in Britain and America. The beautiful plan for Jamshedpur, the Tata steel town, which was recently published,⁵ contains, for example, proposals for a prefabricated, 460 sq. ft. super, 3-room bungalow, reasonably insulated and with indoor water and sanitation, costing £60 ex works, which could be let at less than 10s. a month. Such a development on a generous scale could revolutionise Indian urban life.

India's industry has made an unhappy start. There may yet be time to avoid some of the errors that accompanied industrialisation and the growth of towns in England in the 19th century. Repeated in subtropical circumstances the industrial revolution is likely to have special horrors of its own.

1. A Plan of Economic Development for India. London, 1944.
2. Report of the Health Survey and Development Committee (Bhoire Committee). Delhi, 1946. Vol. I, p. 71; vol. II, p. 122.
3. Bedford, T. The Health of the Industrial Worker in India. Simla, 1946.

4. Royal College of Physicians of London, Second Interim Report of Social and Preventive Medicine Committee, 1945.
5. Koenigsberger, O. Jamshedpur Development Plan. Bombay, 1946. (Circulated privately.)

Annotations

PILLARS OF SALT

THOSE who work on the latest vitamin, exhilarated by feeling that they are hunting the elixir of life, and accelerated by knowing that priority of a few weeks makes all the difference to a publication, may look on the study of water or salt as a slow job. Yet salt has a cultural and economic record going back to prehistoric times; Prout and O'Shaughnessy were making discoveries about the medical value of salt a hundred years before the vitamins were thought of; and the correct use of salt water in therapeutics is one of the basic medical problems of today. More babies die of dehydration every day than all the patients folic acid (for example) is likely to cure in a month.

Between the two wars great strides were made in the study of salt metabolism in America, England, and many European countries; among others, Gamble, Peters, Glatzel, Blum, Kerpel-Fronius, Mach, McCance, and Borst all made contributions to the subject. The fluid compartments of the body were recognised, the clinical and experimental effects of salt deficiency were defined and studied, and the importance of maintaining the osmotic balance of the body began to be appreciated. After the late war had begun active workers in England and America concentrated on problems of salt metabolism in infancy or turned their attention to dehydration as it affected shipwrecked mariners or desert warfare. The French clinicians were so occupied with undernutrition and with the Germans that they seem to have made few fundamental observations on salt. Men like Borst of Amsterdam were too busy in their resistance movements to continue the research which had won them their international reputation. Others, like Gömöri of Budapest, found their scientific work interrupted for other reasons and are only now seeking to make a fresh start. The Swiss, however, could continue their chosen and accustomed work, and Mach of Geneva has now published a monograph¹ on the metabolism of salt and water in health and disease—a valuable and timely review of the problems, old and new, in which papers in the English language have been fully considered.

GRADUATE TRAINING IN EDINBURGH

ONE of the most favourable developments in the medical profession is the increasing recognition of the obligation that rests on medical schools to provide organised postgraduate education both for intending specialists and for general practitioners—in brief to give what a well-known advertisement calls "Service after Sales." The Edinburgh medical school has long been in the forefront of graduate as well as undergraduate education. Arrangements there are under the general supervision of a board representing equally the University, the Royal College of Physicians, and the Royal College of Surgeons. This body is under the able chairmanship of Professor-Emeritus R. W. Johnstone. Activities were naturally in abeyance during the war, but in the first post-war year much has been done to revive and to extend graduate training facilities. Some two hundred and fifty practitioners, mostly ex-Servicemen, have attended refresher courses of a fortnight's duration; and about three hundred graduates have attended one or other of the three ten-week courses in internal medicine. The biggest numbers, however, have favoured the classes in surgery, some of which have been attended by as many as two hundred. In addition to these formal classes the board has assisted Prof. Sidney Smith, the dean, in placing over four hundred demobilised officers in appointments of the registrar and houseman type. Every effort is being made

either to set aside a hospital for the teaching of graduates or at least to devote sections of hospitals to their exclusive instruction. Another high-priority project is the provision of hostels and the promotion of communal life among graduate students. To supervise the work of this important and expanding organisation the board has just appointed Major-General Sir Alexander Biggam, until recently consulting physician to the Army and himself a distinguished Edinburgh graduate, to the post of director of postgraduate studies. It is hard to imagine a more suitable occupant of this office, to which Sir Alexander brings a record of high achievement both as a soldier-physician and a clinician. The principle that a medical school, to be well balanced, must rest on the tripod of undergraduate education, research, and graduate training has been fully grasped in Edinburgh.

BONE-MARROW IN INFANTS

THERE have been few studies of the normal bone-marrow picture during infancy and early childhood. Kato¹ found that it was possible to carry out sternal puncture at a very early age, if care was taken to hit a centre of ossification; and after 8 months the centre of the manubrium could always be used. He gave normal figures, based on a few patients in each age-group, from 1 month to 11 years. There was a gradual increase in the ratio of myeloid (granular) cells to erythroblasts; lymphocytes progressively diminished; and no megaloblasts were found even in the earliest marrows. Blackfan and Diamond, in their atlas, say that immature forms are commoner in infants' marrow, but they give no figures and unfortunately use an out-of-date classification for the erythroblasts.

It is therefore interesting to find a careful investigation reported from Chile by Eberhard and colleagues,² who succeeded in obtaining sternal marrow from fifty subjects aged 8 hours to 2 years. Particular care was taken to ensure that the infants really were normal. They were all white, and had to conform to the following conditions: (1) no family history of tuberculosis or syphilis; (2) born at term, with normal labour, and breast-fed or artificially fed under supervision; (3) no history of illness, no rickets, Wassermann and Kahn tests negative, tuberculin test negative, chest radiogram normal; (4) weight and height normal for age; and (5) blood picture normal for age. They found that the cell-count of the marrow varied from 90,000 to 800,000 per c.mm., with an average of 400,000 per c.mm.; this is considerably more cellular than adult marrow in which 100,000 per c.mm. is about the upper limit of normal. The predominant type of cell changed with the age. In the first week erythroblasts were the most numerous, and they were normoblasts, never megaloblasts, which corresponds to the finding of Lichtenstein and Nordenson³ that normoblasts were specially numerous in the marrow of premature infants. In the second week granulocytes had first place. From then up to the second year lymphocytes were notably numerous, reaching a maximum of 50%, and sometimes definite lymphocytic nests were found. This lymphocytosis, which has not been previously reported, is probably connected with the known tendency of children of this age-group to develop lymphocytosis rather than granulocytosis in response to infection. One other finding is worth noting: that plasma cells—normal constituents of bone-marrow—may be more numerous than in adults and may sometimes have a relatively pale cytoplasm and indefinite outline like the "myeloma" cells seen in diffuse myelomatosis. It is clear that the marrow of infants differs from that of the adult mainly in the total cellularity and the relative distribution of the main classes of marrow cells; no

1. Mach, R. S. Les troubles du métabolisme du sel et de l'eau. Lausanne: Roth et Cie. Paris: Masson et Cie. Pp. 247.

1. Kato, K. *Amer. J. Dis. Child.* 1937, 54, 209.

2. Eberhard, R., Etohevery, R., Hille, A. *Rev. chil. Pediat.* 1946, 17, 439.

3. Lichtenstein, A., Nordenson, N. G. *Folia hæmat., Lps.* 1939, 63, 155.

special immaturity in infants' marrow cells was noted by Kato or the Chilean workers, except that hæmoglobinisation of the normoblasts tended to be relatively incomplete.

Information on the changes in disease is scanty, but it is likely that several workers are assembling information. It will help if they use a uniform nomenclature, especially for erythroblasts.

RUBBER VERSUS ANTIBIOTICS

The experiments of Cowan¹ two years ago showed that up to 50% of antibiotic activity may be lost during the passage of aqueous solutions of penicillin through the rubber tubing of a continuous-drip apparatus. This inactivating effect of rubber varies widely in different samples and is not confined to the synthetic products used in this country, for American workers² have found that 4 of 11 samples of synthetic rubber and 1 of 5 samples of natural rubber completely destroyed penicillin in solution within 24 hours. Inactivation cannot be correlated with the colour of the tubing, so the pigmenting substances cannot be held responsible. The suitability of a given type of rubber for use with penicillin can therefore be forecast only by experiment.

All materials—rubber, glass, or metal—that are to come in contact with antibiotics should clearly be tested for any inactivating effect. As a rule glass has hardly any action on penicillin, but cheap soda glass may give off enough alkali to raise the pH and reduce the stability of penicillin solutions. Rubber tubing can, and should, be tested before it is used; the simple tests described vary from one in which an inch of tubing is placed in 10 ml. of penicillin solution in a screw-capped bottle—this assumes that the glass is inert—to one in which 3-foot lengths of tubing are filled with solution; after contact for some hours the solutions are reassayed and the percentage loss in activity is determined. These tests have proved reliable with penicillin, and similar ones should be applied to materials used with other antibiotics. Preliminary tests² indicate that neither natural nor synthetic rubber has any deleterious effect on solutions of streptomycin.

P.L.A. IN ARTHRITIS

THE lay press¹ has lately discovered "a wonder substance which is helping thousands of helpless cripples . . . back to normal activity" and which was "first tried out on a racehorse condemned to be shot because it had broken down with arthritis." The method referred to was described by Waugh² in 1938 as "the treatment of certain joint lesions by injections of lactic acid," and he has since³ been responsible for the injection of 10,000 cases.

After investigating the reaction of the synovial fluid in cases of traumatic effusion Waugh argued that the development of acidity is a physiological response to trauma, designed to excite local leucocytosis and repair. He therefore set out to imitate this reaction in the treatment of traumatised joints which had failed to respond to ordinary therapeutic measures, using at first a solution of lactic acid alone. This, however, caused considerable pain, so a solution of procaine acidified to pH 5 with lactic acid was later adopted. This solution, known as P.L.A., is injected within the capsule of the joint, which is then moved to its full range in all directions. Orthopaedic exercises are next employed, if necessary with the addition of a plaster-of-paris support and/or elastic plaster strapping and rest. This procedure was successful in 24 out of 26 cases of mixed forms of arthritis reported by Mawson,⁴ but no large classified series of cases

has yet been followed up and published. Active disease, in which the joint fluid is already acid, is a contra-indication. Other workers⁵ have used slightly different solutions, chief among which is 1% acid potassium phosphate, a buffered salt, in isotonic saline, the object being to prolong the effect. Waugh himself has reported chiefly on injections into the larger joints, such as the hip, shoulder, knee, and wrist, but it has been claimed that nearly all joints are accessible.

Intra-articular injection, unless done in conditions of surgical asepsis, is dangerous; so this form of treatment, however promising it may be in selected cases, should not be embarked on light-heartedly.

HYPNOSIS AND TELEVISION

HYPNOSIS, though sometimes useful in psychiatry, has not proved the good servant of medicine that John Elliotson, in the last century, hoped to make it. He foresaw its use, among other things, as the perfect anaesthetic; and, since his day, reports of successful major operations on hypnotised patients have appeared from time to time. Elliotson's credulity and lack of exact method helped to bring the practice into disrepute; and it has since acquired so many frivolous connexions in fiction and vaudeville that serious inquirers are driven off.

The mechanism of the process remains obscure, and is not made much clearer by describing the hypnotic sleep as a state of increased suggestibility. In current terms, hypnosis is thought to be an artificially produced state of dissociation, akin to that found in hysteria. The hysteric accepts suggestions about the presence or absence of symptoms in much the same way as the subject under hypnosis, and hysterics are specially easy to hypnotise; but it is likely that most people willing to coöperate would respond to hypnotic suggestion. For the rest, the legend of the powerful hypnotist disastrously guiding his victim has long been threadbare; it is well known that the sleeper will not obey a command which infringes his moral principles or even offends or embarrasses him. Offered such a command, he wakes up. Spectacular hypnotic effects are uncommon—they are more often seen on the music-hall stage than in the consulting-room—and though, on request, irrational deeds will be done on waking, they are probably carried out in the same spirit as the obsessional and compulsive acts of some psychoneurotics, who realise well enough on the intellectual plane that their rituals are futile and ridiculous. The hypnotised subject is in a state of somnambulism in which his behaviour is governed by the suggestions of the hypnotist instead of by the incidents of his dream. Left alone, he wakes spontaneously when refreshed or disturbed; slothful types, however, are always ready to oversleep on any pretext and may need waking.

Recently the British Broadcasting Corporation thought of having a television programme on hypnosis, conducted by Mr. Peter Casson, a successful music-hall hypnotist; but an experiment conducted on a closed circuit in the television studios at Alexandra Palace convinced them that there was "danger of hypnotising viewers who might not have anyone at hand to wake them." In the first test about a dozen people had volunteered to be hypnotised in the studio, and five went to sleep; moreover, a person in a party watching the television screen in a darkened room across the corridor also fell asleep. In a second experiment Mr. Casson deliberately attempted to hypnotise an audience of six watching the television in another room; four fell asleep, and two of them needed waking. The B.B.C. therefore decided that a television broadcast on hypnotism would not be advisable; and they are probably wise to avoid the chance of some susceptible person taking action for

1. Cowan, S. T. *Lancet*, 1945, i, 178.

2. Huelebusch, J. B., Foter, M. J., Gibby, I. W. *Science*, 1946, 104, 479.

3. *Brit. med. J.* 1946, ii, 876.

2. Waugh, G. *Lancet*, 1938, i, 487.

4. Mawson, R. *Ibid.*, p. 691.

5. Crowe, H. W. *Lancet*, 1944, i, 563.

alleged harmful effects of hypnotic sleep, or even for missing an appointment. We commiserate Mr. Casson on his embarrassing success.

INSECTICIDES IN THE BLOOD-STREAM

MAN has shown considerable ingenuity in attempting to protect himself and his possessions from noxious insects. Solids, liquids, and gases, with many kinds of apparatus, have been used to poison them in their various stages. A simple way of destroying blood-sucking pests would be by feeding the insecticide to the host and so poisoning the insect through the blood it swallows. Some progress has been made towards making this a practical proposition.

The first quantitative experiments with this method seem to have been made with D.D.T. and the pyrethrins.¹ Bed-bugs fed on rabbits 3-5 hours after these had been given either D.D.T. or pyrethrins at the rate of 230-400 mg. per kg. body-weight died a few hours afterwards. Pyrethrins were more rapidly effective than D.D.T., causing prompt paralysis of the stable-flies (*Stomoxys calcitrans*) which fed on the rabbits. Recently it has been shown that 'Gammexane' is very effective when used in this way.² Rabbits were given 50 mg. of pure gammexane per kg. body-weight daily; after 4-5 days bed-bugs were fed on the rabbits and were paralysed, some dying later. Mosquitoes which fed on the rabbits were rapidly stupefied and all died; the tick *Ornithodoros* was temporarily intoxicated.

These experiments cannot yet be directly applied in practice, because the insecticides used, especially the synthetic ones, are definitely toxic to mammals. To render the blood-stream insecticidal for reasonably long periods it is necessary to give fairly large doses, bordering on the limits of safety for mammals. The effects of D.D.T. or gammexane on mammals are known to be cumulative; but the subject has not been so fully studied that the safety-limits can be precisely defined. Pyrethrum would, no doubt, be safer; but repeated doses, as well as being expensive, might give rise to allergic reactions.

THE AMERICAN HOSPITAL

THE changes taking place in our own hospital system have whetted our interest in what is happening in other parts of the world, and especially in America. But too often this interest is concentrated upon buildings and equipment. We know what the skyscraper hospitals on the other side of the Atlantic look like, but we are less familiar with their background and the principles on which they are based. Many American books with their enthusiasm for the latest techniques have not helped us to understand where their practice meets and where it diverges from our own, and it is a relief to find in Dr. Corwin's able monograph¹ a readable account of the basic conceptions which animate the hospital world of the United States.

In America, as in this country, there has been in the last fifty years an unprecedented development of hospital provision, and the need is recognised for a more generous use of public money. The Hill-Burton Bill recently passed by the United States senate provides for a federal subsidy of 75 million dollars a year for the next five years for the construction of public and other non-profit hospitals in accordance with plans approved by the surgeon-general of the U.S. public-health service. Yet American opinion remains set against nationalisation of the hospitals with the implication it carries of a hospital service free to all.

How is this possible? Voluntary provision has been supplemented, Dr. Corwin explains, not only by hospitals maintained at the public expense, as in this country, but also by greater development of private and semi-private accommodation, and by payments by public bodies for indigent patients in non-profit hospitals. The income from these paying patients is the mainstay of voluntary-hospital finance in America, and the system has gone far to enable voluntary finances to weather periods of depression.

The system arose because in Colonial days no American hospital had an endowment of any kind, voluntary income was considerable but inadequate, and "an American has little if any sympathy with pauperism." Thus the hospital managers determined to establish paying wards, and in the last dozen years or so the phenomenal development of Blue Cross plans have enabled the middle classes to take advantage of the extensive provision of private and semi-private accommodation. The American hospital's sensible preoccupation with diet may be due in part to the presence of these paying patients. Whatever the reason, in 1943 they employed 6482 full-time dietitians, whereas there are only about 300 qualified dietitians in the whole of this country today, of whom only a small proportion are employed in hospitals. But Dr. Corwin has little to say about the problem of the chronic sick which looms so large to us, and here perhaps at least we may be more awake than our friends in America to reality. Nevertheless Dr. Corwin considers that the paying system has great merit, for it has saved "the voluntary hospitals in the U.S. from a pauper or poor-law system." Our own National Health Service adopts a different outlook. Our hospital service is to be free to all, with private beds as a mere adjunct and concession to private practice. Which is the right approach, and which system is, in the long run, least likely to succumb to the temptation to lower the standard of provision available for the bulk of the community?

MULTUM IN PARVO

THE two new monthly abstracting journals, sponsored by the British Medical Association and edited by Dr. G. M. Findlay under the direction of the editor of the *British Medical Journal*, have now been successfully launched. By their general plan and form *Abstracts of World Medicine* and *Abstracts of World Surgery, Obstetrics, and Gynaecology* reveal their literary descent from the Medical Research Council's *Bulletin of War Medicine*, which ceased publication last August; but they are also first cousins to the *British Medical Bulletin*, now issued by the British Council but originally the work of the *B.M.J.* editorial department.

The abstracts are signed, and sufficient comment is added, in parentheses, at the end of most of them to put the work into its proper perspective and to explain doubtful points. With as fine a team as Dr. Findlay has collected these comments are a valuable feature. Together the two journals cover over a thousand periodicals. It is presumably impracticable to include a detailed subject index, but the subject matter is divided into fairly small categories, and there is an index of authors. It is to be hoped that it will be possible later to reduce the present 4-6 months' gestation period, at any rate for the British journals and those others which reach this country fairly quickly.

The annual subscription rates are 3 guineas for the medical and 2 guineas for the surgical journal, to be sent to the British Medical Association, Tavistock Square, W.C.1.

Sir ARNOLD LAWSON, consulting ophthalmic surgeon to the Middlesex Hospital, who died on Jan. 19 at the age of 79, was one of the founders of St. Dunstan's. He was president of the Royal Medical Benevolent Fund.

1. Lindquist, A. W., Knipling, E. F., Jones, H. A., Madden, A. H. *J. econ. Ent.* 1944, 37, 128.
2. De Meillon, B. *Nature*, Lond. 1946, 158, 839.

1. *The American Hospital*. By E. H. L. Corwin, PH.D. New York: Commonwealth Fund. London: Oxford University Press. Pp. 241. 8s. 6d.

Special Articles

ANTIBODIES *

THEIR NATURE AND FORMATION

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ANTIGENS have been defined as "substances which, on introduction into the tissue of an animal, give rise to the development of antibodies," and antibodies as "substances developed in the living body in response to the presence of antigens" (Browning 1931). It is obvious that these definitions are far from satisfactory.

The first attempt to explain the nature of antibodies was made by Ehrlich in his well-known side-chain theory. The main point of Ehrlich's theory, the complementary structure of antigen and antibody, has been confirmed by recent investigations. But the assumption that antibodies are formed by the regeneration of receptors preformed in the living organism cannot be reconciled with our present knowledge. This assumption was reasonable so long as only natural antigens, such as bacteria, blood corpuscles, toxins, and proteins, were known. Later, Landsteiner and his co-workers demonstrated that the specificity of natural antigens was altered by the introduction of certain chemical groups into the antigen molecule. These groups have been called "determinant groups" (Doerr), because they determine the specificity of the antigen and the corresponding antibody. Landsteiner provoked the formation of antibodies against nitro groups, arsonic groups, and other synthetic organic groups. The existence of preformed receptors for such artificial products of the chemical industry is inconceivable. Therefore this part of Ehrlich's theory has had to be abandoned and replaced by other theories. My object is to examine whether these theories are reconcilable with recent experimental results and to review our present knowledge of the nature of antibodies.

ISOLATION OF ANTIBODIES

If immune sera are precipitated by the fractional addition of ammonium sulphate or of concentrated phosphate buffer solutions, the antibodies pass into the globulin precipitate. Their bulk is found in the γ -globulin fraction. Further fractionation is achieved by dialysis. Most of the antibodies, chiefly the precipitins, remain in the soluble pseudoglobulin fraction, while agglutinins and several other antibodies have been found in the euglobulin fraction (Haurowitz and Tanasoglu 1944).

The specific separation of antibodies from other serum-globulins can be achieved by their combination with the homologous antigens. Cellular antigens, such as bacteria and blood corpuscles, are not very suitable, because their cells absorb only a thin monomolecular layer of antibody molecules (Mudd et al. 1930). On the other hand, relatively large quantities of antibody are carried down from immune sera by soluble antigens, such as proteins and the specific polysaccharides of bacteria.

If natural proteins are used as antigens, the precipitate contains a mixture of two proteins: the antigen-protein, and the antibody-globulin. It is hardly possible to separate these two proteins by chemical or physical methods. To overcome this difficulty, use has been made of chemically marked antigens—e.g., hæmoglobin, coloured azoproteins, and proteins containing foreign tracer elements, such as iodine, bromine, and phosphorus. Since the antibodies are colourless and free from these elements, the amount of antigen in the precipitate can

easily be determined by chemical analysis. It is evident that the accuracy of such analyses is far higher than that of the customary precipitin test. It is shown, moreover, by such analyses that the substance precipitated with the antigen forms the bulk of the precipitates. Its amount in a given volume of immune serum is almost constant, and it is independent of the sequence and the composition of the added test-antigens, provided that an excess of antigen is avoided (Haurowitz 1943). There is no doubt, therefore, that this substance consists mainly of antibodies.

The isolation of purified antibodies has been achieved by the action of calcium hydroxide (Felton and Bailey 1926) or of concentrated salt solution (Heidelberger et al. 1936) on the precipitate of specific polysaccharides from pneumococci. Recently we have extracted antibodies to azoproteins from their precipitates by means of cold *N*/10 hydrochloric acid containing 5% of NaCl (Haurowitz and Tekman 1946).

PROPERTIES OF PURIFIED ANTIBODIES

The composition of the antibody—its content of carbon, nitrogen, hydrogen, and certain amino-acids—can be calculated indirectly from determinations of the respective elements or amino-acids in the pure antigen on the one hand, and in the precipitate on the other, if the antigen/antibody ratio of the precipitate is determined at the same time. Such indirect analyses show that the elementary composition and the percentage of amino-acids in antibodies and in normal serum-globulins of the rabbit is approximately the same (Breinl and Haurowitz 1930). Also the molecular weight (Heidelberger and Pedersen 1937), the electrophoretic behaviour, and other physicochemical properties of purified antibodies are very similar to, or identical with, those of normal serum-globulins. All these observations support the view that antibodies are proteins very similar to the serum-globulins.

The alleged preparation of protein-free antibody solutions is based on the fact that the chemical protein reactions are much less sensitive than the usual serological reactions (Marrack 1938, Haurowitz 1939). Another argument against the protein nature of the antibodies—namely, their resistance to the action of trypsin—is explained by the resistance of native serum-globulins to the action of this enzyme (Breinl and Haurowitz 1930). Larger quantities of trypsin or its protracted action bring about the hydrolysis of normal serum-globulins as well as the inactivation of antibodies (Rosenheim 1937).

STRUCTURE AND FORMATION OF ANTIBODIES

To explain the differences between antibodies and normal serum-globulins, the structure of protein molecules has to be discussed briefly. The molecular weight of the serum-globulins is not far from 175,000 (Burk 1937). This giant molecule is formed by a long chain of more than 1000 amino-acids. On the other hand, it has been established by chemical and physical measurements that the molecules of the serum-globulins are more or less spherical molecules, whose diameter does not exceed the length of 10–20 amino-acids. It is accepted, therefore, that the peptide chain of the globulin molecules is folded, so that the molecules acquire a spherical shape (Haurowitz 1935). The specificity of proteins is apparently due to the specific sequence of the amino-acids in the peptide chain and/or to a specific folding or branching of this chain. An endless number of specific proteins can be brought about by variations of the sequence or of the manner of folding.

The formation of protein molecules from simple amino-acids takes place apparently in each cell and is most probably catalysed by enzymes. Since the effect of proteases and other enzymes *in vitro* is never species-specific, the existence of a chemical organiser within the cell has been postulated (Bergmann and Niemann

* Abstract of an address delivered to the Turkish Medical Society.

1937, Haurowitz 1939). This organiser directs the catalysed synthesis of proteins in such a way that species-specific and cell-specific proteins are formed. But it is not yet clear whether this organiser forms a part of the enzyme molecule or is identical with insoluble parts of the cell, such as its membrane, stroma, or structural elements of its nucleus—e.g., chromosomes and genes. It has been assumed that polar groups of the organiser—e.g., carboxyl and amino groups—attract, by means of their electrostatic forces, the opposite poles of the amino-acid molecules and keep these molecules in a fixed position during the synthesis of the protein molecule, so that the amino-acids combine with each other in a specific sequence and the peptide-thread folds or branches off in a definite specified manner (Breinl and Haurowitz 1930, Haurowitz 1939).

Investigation of the fate of arsanil-azoproteins in the organism of the injected animals had shown that the bulk of the injected antigen was deposited, within an hour, in the liver and in the bone-marrow—i.e., in the sites of globulin-formation (Haurowitz and Breinl 1932). On the other hand, azogelatin, which is devoid of antigenic properties, passes into the urine, no appreciable amount being deposited in the liver (Haurowitz et al. 1943). It has been shown, moreover, that the most powerful determinant groups of the antigen are acid groups, such as sulphonic, arsonic, or carboxylic groups (Landsteiner and van der Scheer 1927). If introduced into the protein molecule they suppress the original species-specificity of these proteins and give rise to a new chemospecificity. Neutral groups—e.g., methyl and ester groups—are much less effective or quite ineffective. On the basis of these observations the theory has been advanced that antigens, after their deposition in the cells of the reticulo-endothelial system, disturb the synthesis of normal globulins, so that abnormal globulins (antibodies) are formed whose molecular shape is complementary to polar groups on the surface of the antigen molecule (Breinl and Haurowitz 1930, Haurowitz 1939, 1942, Mudd 1932).

If the specificity of the antigen molecule is due to its polar groups, one would expect the effect of positively charged alkaline groups to be equal to that of the negatively charged acid groups mentioned above. This has been confirmed more recently by means of azoproteins containing positively charged quaternary ammonium groups (Haurowitz 1942). Hence it follows that the "determinant" property of certain chemical groups is not due to their acidic or alkaline character but to the inductive forces of their different polar groups.

Since the molecules of the antigen and the antibody are spherical or ellipsoidal, only small parts of their surfaces can approach each other. It is to be expected, therefore, that the inductive effect of a determinant group of the antigen molecule is restricted to a limited area on the surface of the antibody molecule. This view is supported by experiments performed with antigens which possess two different determinant groups A (arsanil-azo-group) and I (iodo-group). Antibodies of the type anti-A and anti-I were formed, but no anti-AI (Haurowitz and Schwerin 1943). This experiment proves, moreover, that a single antigen can give rise to the formation of several types of antibody, each of them being adjusted to a certain determinant group of the antigen molecule (Haurowitz 1942).

The structural adaptation of the antibody to the determinant groups of the antigen molecule will not, in general, be perfect, because the peptide chain, which forms the scaffold of the antibody molecule, is flexible only to a limited degree. Each immune serum, accordingly, contains a whole series of antibodies differing from each other by the degree of adjustment to a certain determinant group of the antigen (Landsteiner and van der Scheer 1936, 1938). Whereas antibodies whose

adjustment is fairly good combine irreversibly with the antigen molecules, "low-grade" antibodies (Heidelberger and Kendall 1935) form loose reversible compounds with the antigen, no precipitate being carried down in the latter case.

Whereas the theory of complementary antibodies is in good agreement with the results of immunological experiments, other theories cannot be reconciled with the experimental facts. Jordan (1939), starting from general physical considerations, has assumed that antibodies are formed by the reproduction in vivo of the determinant groups of the injected antigen. According to Jordan, antibodies contain the determinant groups of the homologous antigen or similar groups if identical groups cannot be produced in the organism. Jordan's theory has been disproved by the observation that antibodies to iodoproteins, bromoproteins, and phosphoproteins are devoid of iodine, bromine, and phosphorus respectively (Haurowitz et al. 1942).

According to Pauling and Campbell (1942), antigens do not interfere with the synthesis of antibodies from amino-acids but can convert normal globulins into antibodies. This view is based on the formation of antibodies in vitro, if serum-globulins are denatured cautiously in the presence of suitable haptens—e.g., arsanil-azoresorcin and methyl-blue. Similar experiments carried out in our laboratory indicate that the precipitates obtained in such experiments are not due to the effect of antibodies but are brought about by the non-specific flocculation of globulins charged positively at pH 5.0–5.5, by negatively charged azoproteins (Haurowitz et al. 1946).

It has been assumed (Burnet et al. 1941) that the alteration brought about by the action of antigens on cells is hereditary, so that later generations of the cell would be able to produce antibodies in the absence of antigens. This would explain the fact that the immunity to some diseases, such as yellow fever, lasts for many years or even for a lifetime. But neither the absence of antigens in such organisms nor the formation of antibodies in the absence of antigens has been proved hitherto.

COMBINATION BETWEEN ANTIGEN AND ANTIBODY

The combination of antigen molecules with molecules of the antibody is due to the electrostatic inductive forces of their polar groups (carboxyl group, hydroxyl group, amino group). These forces lead primarily to such an orientation of the polar molecules that groups of the same charge are repelled from each other, while opposite groups approach each other closely. The intensity of the inductive forces, effective between two polar groups, is inversely proportional to the fifth power of their distance. This means that these forces are negligibly small, unless both polar groups approach each other very closely. Since opposite poles, owing to the primary orienting effect, are much closer to each other than poles of the same charge, the attractive forces must always surpass the repulsive forces, and polar molecules will, in general, attract each other, forming more or less loose compounds. The hydration of proteins, their combination with water molecules, is brought about by such forces.

The fact that no aggregation takes place between the molecules of normal serum proteins, in spite of their polar groups, is explained by their hydration. The polar groups of a protein molecule are saturated much more easily by the small water molecules than by polar groups of large protein molecules, the latter not being able to approach very closely, for sterical reasons. If however, the shape of the antibody molecule is adapted spatially to the polar groups of the antigen molecule, large parts of the surface of both particles will be able to come very close to each other. In such cases the inductive forces may become so strong that the molecules of the antigen and antibody remain attached to each other (Haurowitz 1939).

This combination of antigen and antibody particles is the first stage of all serological reactions. It is followed by various secondary phenomena. If the antigen is a soluble protein or polysaccharide, each determinant

group on the surface of its molecule will be occupied by an antibody molecule, and the large antigen-antibody aggregates will be precipitated (Haurowitz et al. 1936, Haurowitz and Schwerin 1942). It has been assumed by Marrack (1938), Heidelberger and Kendall (1935), and Pauling (1940) that antibody molecules are multi-valent—i.e., that each antibody molecule has several specifically adapted groups—and that the precipitation of soluble antigens is due to the formation of a framework of antigen and antibody molecules. Cellular antigens are covered with a layer of antibody molecules and thus lose the negative surface potential necessary for the stability of their suspensions (McCutcheon et al. 1930). This leads to an agglutination of the cells. Also in hæmolysis, cytolysis, phagocytosis, and other serological reactions the primary combination of the antibody with the antigen is a prerequisite for secondary reactions brought about by the presence of the complement or other factors. The ratio of the precipitating, agglutinating, opsonic, and complement-fixing titres in immune sera to pneumococci and in purified preparations of their antibody is the same; it may be inferred, therefore, that all these reactions are caused by one and the same antibody (Felton and Bailey 1926).

CELLULAR ALLERGY

Whereas humoral allergy has been ascribed to the passage of altered globulins (antibodies) into the blood, cellular allergy is apparently due to the presence, in the cells, of abnormal proteins structurally adjusted to the antigen molecules. The reaction taking place between specifically altered cellular proteins and the injected antigen has not yet been proved experimentally. But it is most probable that the primary reaction is the same—i.e., the combination of the determinant groups of the antigen molecule with specifically adapted areas on the surface of the newly formed cellular proteins. It is not yet known why this primary reaction provokes a hypersensitivity of the smooth muscles and other classical symptoms of anaphylaxis.

SUMMARY

Experiments made with antigens chemically labelled by the introduction of foreign tracer elements have shown that, contrary to what is the case with the natural antigens, such labelled antigens can be determined quantitatively by chemical analysis.

This procedure gives us a deeper insight into the nature of antibodies.

Results obtained with these artificial antigens are also valid for antibodies to natural antigens—e.g., the pathogenic bacteria.

Since most bacteria contain a multiplicity of different antigens, each of them may lead to the formation of several antibodies.

Our present knowledge of the nature of antibodies and their relation to antigens can be summarised as follows:

(1) Antigens are substances which disturb the normal process of protein synthesis *in vivo*, with the result that abnormal proteins are formed whose molecular surface is adapted complementarily to polar groups on the surface of the antigen molecule.

(2) If the altered proteins pass into the blood-serum they act as antibodies. If they remain within the cells they are responsible for the phenomena of cellular allergy and of anaphylaxis.

(3) The combination of antibody molecules with molecules of the antigen is a consequence of their complementary structures, which enable them to approach each other so closely that the inductive forces of the mutual polar groups become effective, and strong attraction between antigen and antibody molecules results.

References at foot of next column

HEALTH IN THE FACTORIES

REPORT FOR 1945

THE report for 1945 by the Chief Inspector of Factories,¹ to which we have already referred briefly,² records a general trend towards shorter working hours; a 44- or 45-hour week is now quite common, and in places a 5-day week has been tried without loss of output. During the year the hours of employment of women and young persons were greatly reduced; this journal has consistently maintained that youngsters should work no more than 40 hours a week.

The report draws attention to the awakening of interest in colour schemes, which many firms are introducing during renovations; light colours are usually chosen and pastel shades of light green, buff, and blue are especially popular. In some schemes brighter splashes are provided by painting roof trusses, stanchions, and pillars in a contrasting colour such as blue, red, or yellow. It is pointed out, however, that the haphazard use of colour is unlikely to be successful.

ELECTRIC SHOCKS

The Senior Electrical Inspector reports 13 cases of electric shock with unconsciousness successfully resuscitated by artificial respiration applied for up to half an hour. These potential fatalities represent only a proportion of the accidents in which artificial respiration could and should have been attempted. The majority of "unconscious" shocks occur at pressures below 250 volts, and because of the nature of the apparatus handled the patient is usually "held" by the live contact. Records suggest that the chances of recovery are slightly greater with higher voltages because contact is seldom maintained; but serious burning is common. Most of those who are going to recover with artificial respiration do so in the first 10 minutes; a good proportion recover in the second 10 minutes, but fewer after that. Unfortunately attempts at resuscitation are often abandoned within a quarter of an hour. It is not widely enough known among doctors that lumbar puncture is a useful adjunct; removal of the excess cerebrospinal fluid produced by electric shock enables the stunned respiratory centre to respond better to artificial respiration.

GENERAL AND SPECIFIC RISKS

The Senior Medical Inspector meets the criticism that his branch pays too much attention to occupational

1. Annual Report of the Chief Inspector of Factories for the Year 1945. Cmd. 6992. H.M. Stationery Office. Pp. 104. 2s.
2. *Lancet*, Jan. 4, p. 30.

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risks, and too little to the common cold and other general illnesses, by referring to the work against dirt, overcrowding, and bad ventilation, and the attempts to obtain good washing facilities and factory canteens. "The number of chills and colds prevented, and indeed the amount of positive health secured by such means, are statistically immeasurable, but surely vast." Further, he says, the shrinking numbers of specific industrial diseases are a measure of the effectiveness of preventive measures. As an instance of uncontrolled risk he cites a rayon factory in an occupied country. When the factory was liberated over 80 cases of carbon bisulphide poisoning were found, many of them in a nearby mental hospital. In this country there have only been 3 cases of poisoning by carbon bisulphide during the last six years.

TOXICOLOGY

D.N.O.C.—One of the most interesting passages in the section on industrial toxicology is that on di-nitro-ortho-cresol (D.N.O.C.). Two deaths (one in a factory) have occurred recently as a result of making and using this chemical which is now in demand as a fungicide and insecticide. It has a toxic action on the body not only when taken by mouth but also when inhaled as a dust or fume or absorbed through the skin. The main symptoms are excessive sweating, thirst, fatigue, anorexia, and loss of weight—symptoms comparable with those of poisoning by dinitrophenol. One of the fatal cases developed these symptoms following a month's exposure to fumes from molten D.N.O.C. The second, who was exposed for a month to an agricultural D.N.O.C. spray (0.5%), was taken ill suddenly and died 35 minutes after admission to hospital in coma, with cyanosis of the lips and ears and increased respiration-rate. The department has records of 10 non-fatal cases within the last three years. Of these 7 occurred in a factory where for two years D.N.O.C. had been made in the form of a paste without any trouble. Latterly it had been dried, ground, and mixed as a powder; and inhalation of dust from the dry powder appears to have caused the illness in these 7 cases. Preventive measures include the control of dust by exhaust ventilation, good washing accommodation, and medical supervision. The body-weight of workers should be recorded every fortnight.

Dangers of Soot.—The soot in oil-fired furnaces has often been shown to contain about 13% vanadium. The acute irritation of eyes, nose, throat, and chest experienced by men engaged in cleaning oil-fired furnaces may be caused by this substance, which is known to produce these symptoms when inhaled as a dust. Similar effects were noted in 1930-31 among a small group of men exposed to oil-fuel soot in their work of cleaning boiler flues of oil-burning ships. The Government chemists found that this soot contained 40% water-soluble iron sulphate derived from the sulphur of the oil fuel. In contact with water the soot was highly acid, which was thought to account for its irritant effect on mucous membranes.

Methyl Bromide.—From methyl bromide 9 cases of gassing, with 3 deaths, were reported. The first fatality was in a man of 58 who had been employed in its manufacture for a year. After complaining of headache at work in the early hours of the morning he collapsed, and died later in "status epilepticus" with extreme cyanosis. The second death was in a boy of 14: entering an aeroplane he came into contact with an accidental discharge of methyl bromide from fire-extinguishers. He was dead when found, and the post-mortem findings were those of asphyxia. The third case was a man of 32 who for three days had been engaged in the open air on emptying methyl-bromide fire-extinguishers. At the end of the third day he collapsed, went into coma with convulsions, and died; the blood contained 34 mg. of bromide per 1000 c.cm. of blood.

Nitrous Fumes.—There were 20 cases of gassing by nitrous fumes; but for the first time in any year with a double-figure incidence none was fatal. All but 8 cases arose in connexion with nitration processes; 3 occurred through exposure to fumes from the treatment of metal with nitric acid, alone or with sulphuric acid; while 2, 1 severe, arose during oxyacetylene welding or cutting in poorly ventilated spaces. After exposure to nitrous

fumes the initial symptoms of coughing and irritation are often transitory, and, as in gassing by phosgene, a period of quiescence precedes the onset of acute symptoms. "These facts are not always appreciated at the time and when this is so a typical report states that after a short rest and treatment in the ambulance room a return to work or home was permitted; subsequent physical exertion may precipitate the onset some hours later of acute symptoms such as painful cough, a sense of constriction in the chest and distressing breathlessness."

Carbon Monoxide.—There were 218 cases of gassing by carbon monoxide, of which 18 were fatal. These figures maintain the average for the past six years; there is as yet no sign of a return to the much lower pre-war level when for six years (1933-38) the average was 81 cases with 9 fatalities.

DERMATITIS

The cases of dermatitis reported voluntarily decreased by over 2000. There were fewer from industries connected with the making of munitions of war; and the shift of employment towards a more normal pattern was further reflected in a higher incidence among workers making synthetic resins, pottery, and metal plating and those engaged in printing. Of the 98 cases amongst dockers 17 were caused by handling, in a high wind, a cargo of arsenic trioxide in barrels, some of which were broken. There was a similar incident in 1943 when 39 dockers were affected, some severely. "Copra itch," which has been associated with dockers in the past, affected 8 young women engaged in cleaning and repairing sacks which had been used for copra and previously for grain; the lesions were mainly on the face and neck, the sacks having been carried by the girls in bundles on their shoulders. Mites have been held responsible for "copra itch" and also for cheese and grain "itches." In this outbreak two varieties of mites, brown and bright blue, were found in the sacks; the brown mites survived heating for two hours at about 120° F, but the blue mites succumbed.

ALUMINIUM FOR PNEUMOCONIOSIS

The report gives a warning about the use of aluminium and alumina in the prevention and treatment of the pneumoconioses. Even if aluminium dust is ultimately proved to inhibit silicosis in man, in practice it can never supplant the proved methods of dust suppression and control: "At the best it can only become an ancillary aid in the prevention of silicosis." The department has records of at least 1 death ascribed to the inhalation of particles of aluminium; observations on the Continent have also pointed to harmful effects from its inhalation.

HEALTH CENTRES

MEETING AT ROYAL SANITARY INSTITUTE

ADDRESSING the Royal Sanitary Institute on Jan. 15, Prof. R. H. PARRY, medical officer of health for Bristol, said that the health centre originated in the United States of America as a substation of health departments—"a neighbourhood office in the city-wide organisation of civil government." American experts, though agreeing that the activities of large health departments should be decentralised, are not unanimous on the other activities that should be concentrated on the district health centre. Prof. Ira Hiscock¹ has referred to one activity which most would agree should be prominent in all real health centres:

"The best service to the patient renders it desirable to coördinate records of the different clinics and services, and to associate with these, as closely as possible, all nursing and social records pertaining to the same person or family. Economy and convenience are promoted by having the files in a record room, from which records may be distributed to the divisions as needed. This ensures more expert filing and better statistical control. Family folders are frequently used. A central alphabetical index is essential if the relation of the services rendered to the population

1. Hiscock, I. V. *District Health Administration: A Study of Organization and Planning*, Lancaster, Pa, 1936.

of a district, as well as the interrelations of services to individuals, is to be known. Without a good central index, a major health center is seriously handicapped."

The National Health Service Act will decide the national policy regarding health centres for some years to come. In Bristol the question of health centres has long been under consideration. These have been pictured as supplying a field service which would be brought into close contact with hospital diagnostic departments through divisional health centres attached to hospitals.² Development on these lines may be possible if the local authorities are allowed to administer their health centres—the regional hospital board supplying the consultant service required by local authorities. It is still thought that district centres must be under the exclusive control of the medical officer of health, so that the environmental and social aspects of public-health problems may be properly studied; and it is to be hoped that the general practitioner will be a member of the health-centre team. The combination of health centre and medical-care centre would promote coördination between the two.

Dr. D. BROWN (Bootle) said that in health centres the general practitioner requires (1) the promotion of intimate contact with patients, (2) suitable equipment, (3) improved clerical assistance, and (4) radiological and other diagnostic facilities. The patient needs (1) a centre within a mile of his home, (2) treatment by a single doctor, without which confidence cannot develop, and (3) education in health matters. For the first 2-3 years experimental centres of various types should be tried; only when the results have been studied should centres be built throughout the country.

Dr. R. C. WEBSTER (Barnes) said that experience of the Darwen centre³ has convinced him of the advantages of centres having non-slip floors and being cheerfully decorated, with tiles on the lower parts of the walls to prevent defacement by children.

Dr. J. D. KERSHAW (Colchester) suggested that in areas where principal health centres are constructed on expensive land it would be wasteful to include suites of rooms for each of the clinics which are held less often than daily. At the same time it would be wrong to construct multi-purpose suites to be shared by several clinics; these tend to be satisfactory for none. Those clinics which are not held daily might be conducted in other buildings near the principal centre.

SPECIALISTS AND THE ACT

In a letter issued before the council decided to recommend negotiation, the consultants and specialists committee of the British Medical Association urged specialists "not to take any appointments on Regional Boards or in any way to compromise the position of the general body of the profession, pending the decision of the Special Representative Meeting of the Association . . . and subsequently if the final decision is against . . . negotiation."

The features in the Act to which the committee objects are: (1) consultants and specialists will be employed by regional hospital boards or boards of governors and will undertake all their hospital work in hospitals owned by the State; (2) the appointment and removal of the chairmen of regional hospital boards and local executive councils is vested in the Minister; (3) there is no right of appeal to the civil courts against dismissal from the service; (4) all hospitals are to be transferred to the Minister, the provision of private accommodation being subject to the Minister's control, and only those on the staff within the service being permitted to undertake treatment of private patients in pay-bed accommodation; (5) the Act empowers the Minister to acquire nursing-homes and medical institutions, and thereby to deprive consultants and specialists of any alternative form of institutional practice; and (6) the general effect will be to deprive the public of an independent consultant service.

Reconstruction

INFORMATION AND ADMISSION AN OFFICE FOR EACH HOSPITAL REGION

R. E. PEERS

SECRETARY, EMERGENCY BED SERVICE, LONDON

THE medical organisation of a region under the National Health Service may be likened to a pyramid, with general practice forming its base and a teaching hospital at its apex. This pyramid will contain almost everything that the region can reasonably require. But there will still be certain services which cannot or need not be provided in every region.

Patients are not to be confined within regional boundaries, and all facilities throughout the country will be accessible to everyone. But how is the doctor, be he general practitioner or on the staff of a hospital, to know, first, where each item of this abundance is to be found, and, secondly, how his patient can get the benefit of it? It seems that he will have to be assisted by information and admission offices possessing all the information he may need. The nearest approach to such an office which we have in this country is the London Emergency Bed Service, which deals, however, only with urgent admissions and (more or less unofficially) with inquiries for unusual equipment. Several similar but smaller organisations operate in other large centres; and county medical officers of health control admissions to infectious-diseases hospitals.

What is now wanted in each region, and possibly in the sub-regions too, is an organisation to deal with the admission of any type of case, whatever the illness. To this organisation the doctor in difficulties must be able to turn in the certainty that he will receive intelligent help.

ARRANGING ADMISSIONS

Most patients are normally admitted to the nearest hospital; and there should be no interference with the doctor's right to send the patient to the hospital of his choice. Clearly the doctor should be able to approach the local hospital direct, rather than through an office which may be some distance away. (A compulsory admissions office, as discussed in the Hetherington report on hospital policy in Scotland, would look very neat on paper, but would not perhaps work so well in practice.) The duties of the office will be to arrange admission when requested by a doctor, if possible to the hospital he considers most suitable. It will also have to arrange the transfer of patients between hospitals. With non-urgent cases, such as the chronic sick and convalescents, speed is less important than the selection of the right place; and the choice may be made best with the assistance of people familiar with all the institutions. The regional office would also cater for patients who must go to other regions for treatment—for example, those needing plastic surgery, and diabetics to be trained at one of the few centres where these patients are taught to lead a full and active life. Lastly, the use of these offices for the collection of cases of any particular type for the benefit of medical research or training is well worth considering.

The regional office would have to accept responsibility for getting any doctor's case admitted to hospital; and its powers as regards the hospitals would have to be defined. If it had the right to claim admission to any hospital, its authority would have to be used with discretion. The office must be the servant of both doctor and hospital, and it must accept the doctor's diagnosis. This does not mean that the doctor may not be questioned in order to ensure a full understanding of the patient's condition; but the whole object should be to assist the doctor in his difficulties, and the office must not fall into the habit of telling the doctor what is good for him or of hindering him with regulations. On the other hand,

2. See Parry, R. H. *Lancet*, 1946, 1, 471.

3. See Webster, R. C. *Ibid.*, p. 515.

ease of access should not cause the doctor to claim admission needlessly.

The office should also be prepared to advise both doctors and hospitals where special treatment can be obtained, and possibly where apparatus or other requirements are available; and it must be able to transport these items. It should also be closely linked with the ambulance service, which under the Act is to be controlled by counties and county boroughs.

PUBLIC RELATIONS

So much for the doctor. But what of the public? Will they not require, and have a right to, direct contact with the National Health Service? Many will have questions to ask with which they need not and should not trouble their doctor, and they must be able to get advice as to the working and scope of the service from their personal angle. The press, too, must know where it can go for information. All this suggests the necessity for a public-relations section of the information office, with a separate staff but with access to all relevant facts.

A regional office dealing with all sorts of inquiry, whether medical or not and from whatsoever source, would have a formidable task. But this task will have to be performed if the public's demand for a satisfactory service is to be satisfied.

Public Health

A Pioneer Looks Back

THE public-health system as we know it today has been evolved during the past thirty or forty years. The lead has come from Parliament; but much of its legislation has been permissive rather than mandatory, so that the moulding of the service has been left largely to local conscience and initiative, the less enterprising areas trailing in the wake of others which have made the most of their powers. Among the authorities which have set the pace is Willesden, whose public-health affairs have for the past thirty-four years been controlled by Dr. George F. Buchan. On his retirement, Dr. Buchan has written a review of his work,¹ which reflects in microcosm the improvements in the whole nation's health during the present century. When he took office in 1912 the birth-rate was 25.6 per 1000 and the death-rate 11.8 per 1000; the infant-mortality rate was 124 per 1000 live births and the maternal-mortality rate 4.5 per 1000 births. A generation later the death-rate was 8.3 and the infantile and maternal mortality-rates had been reduced by more than a half, while the average age at death had been extended by 26 years. And the mortality in children aged 1-5 years had decreased from 1.5 to 0.08 per 1000 per annum. Dr. Buchan belongs to the generation of hygienists that has helped to achieve these remarkable improvements; his account, though impersonal, suggests how ability and resourcefulness have contributed to their attainment.

Infectious Disease in England and Wales

WEEK ENDED JAN. 11

Notifications.—Smallpox, 0; scarlet fever, 1058; whooping-cough, 1928; diphtheria, 232; paratyphoid, 4; typhoid, 4; measles (excluding rubella), 10,223; pneumonia (primary or influenzal), 1264; cerebrospinal fever, 56; poliomyelitis, 14; polioencephalitis, 2; encephalitis lethargica, 3; dysentery, 87; puerperal pyrexia, 142; ophthalmia neonatorum, 74. No case of cholera, plague, or typhus was notified during the week.

Deaths.—In 126 great towns there were no deaths from enteric fever, 1 (0) from scarlet fever, 2 (0) from diphtheria, 10 (2) from measles, 9 (0) from whooping-cough, 79 (8) from diarrhoea and enteritis under two years, and 74 (14) from influenza. The figures in parentheses are those for London itself.

Liverpool and Manchester each reported 10 deaths from diarrhoea and enteritis.

The number of stillbirths notified during the week was 272 (corresponding to a rate of 26 per thousand total births), including 47 in London.

1. The Health of Willesden. By George F. Buchan, M.D., F.R.C.P., D.P.H., Willesden Borough Council, Health Department, 54, Winchester Avenue, N.W.6.

Health Centres of Tomorrow

IV—ADMINISTRATION AND REMUNERATION

How, and by whom, is the centre to be run? It would be wrong to try to answer this question categorically now. Many schemes are theoretically possible, and only experience can show which is the best for varying types of health centre. Nevertheless, something must be said if we are to paint an understandable picture of the health centre of tomorrow.

Clearly there can be no simple, obvious, and universal administrative pattern. At least three administrative units of the new health service will be concerned with the health centre. The local health authority (i.e., the county or county-borough council) will build and equip it, and supply the auxiliary staff of nurses, midwives, secretaries, and health visitors. The local executive council (covering the same area) will recruit, appoint, and pay the general practitioners and the dentists. The specialist services provided (pathology, radiology, or visits by consultants or specialists for consultation at the centre) will ultimately be the responsibility of the regional hospital board. The divided responsibility of these administrative units, and sometimes their remoteness from the actual centre, will make it very hard for any one of them to undertake full and proper administrative charge. There will therefore have to be a management committee for each centre, and this committee ought to be given a good deal of autonomy in meeting its day-to-day requirements. The doctors and other health workers in the centre should feel that they have a full democratic voice in the running of their own centre, and they should have ample representation on this management committee.

Such a committee will need to have executive officers, and in the absence of experience it is not yet apparent who they would best be. The doctors and dentists would probably choose one among themselves who would be the chairman of the medical committee, and their regular spokesman in any discussions with the local authority or the executive council; but he should be one of the clinical team, *primus inter pares*, in no way acting as a medical superintendent of his colleagues. Though he would be consulted on matters of principle and policy, he could not be expected to undertake the detailed daily routine administration of the centre, and the larger centres will need an executive officer or officers answerable to the management committee for this detailed administrative work. According to our previous proposals this executive officer would be the lay secretary of the centre.

So far as the doctors themselves are concerned, each centre must have its own medical committee consisting at least of all the doctors and dentists working as principals in the centre. This committee would be the arbiter on all matters touching the work and co-operation of the doctors in the centre. It would allocate accommodation and ancillary staff among the doctors; it would decide upon the engagements, employment, and instruction of assistants; it would agree, when necessary, rotas of duty, and make arrangements for holidays and study-leave; and it would inaugurate schemes for the health education of the patients at the centre. Probably, too, the medical staff would have to give careful thought to the means of ensuring that the group of doctors working in the centre worked in true partnership, and not in perpetual competition.

COMPETITION FOR FEES?

Before they can achieve this happy state of affairs many factors will need to be considered, not least the thorny subject of remuneration. Through all the years of discussion on the new health service the Ministry of Health have consistently contended that a method of payment depending solely on the allocation of capitation fees to the centre doctors, in proportion to the numbers of

patients on their individual lists, would destroy all hope of amicable coöperation among them and would jeopardise the whole experiment from the start. This contention has been borne out by recent experience of group practice in the United States, where it has been found essential to make some partnership arrangement if the group is to be kept together.

If perpetual competition remains, most of the advantages expected from group practice will be endangered. Holidays and study-leave will be hard to arrange. The sharing of work during a temporary illness will not be easy. It will be impossible to encourage practitioners to interest themselves in specialties if this means that the other members of the centre have to refer their patients to a competitor rather than a partner. Even education for the people attending the centre will be hard to arrange, for the doctor able and willing to give instruction will hesitate to do so lest he be accused of doing it to enlarge his personal list. Moreover, it will be difficult if not impossible to allocate fairly the ancillary help which the centre will provide for the doctors working in it. As the Coalition white-paper pointed out:

"It seems fundamental that inside a Centre the grouped doctors should not be in financial competition for patients. All the practical advantages of the Centre—the use of nursing and secretarial staff, record keeping, equipment, the availability of young assistant doctors in particular—will be, under a system of a salaried team, at the disposal of the group in whatever way they like collectively to arrange; it is the whole idea that they should arrange their own affairs together in this way. But if individual remuneration is based on mutual competition for patients, complication will enter into any attempt of the group to allocate and share these services—for the more any one individual is able to draw on the ancillary helps of the Centre (and particularly on medical assistants) the more he will gain and his fellows lose in the contest for patient lists. There is therefore a strong case for basing future practice in a Health Centre on a salaried remuneration or on some similar alternative which will not involve mutual competition within the Centre." (Cmd. 6502, pp. 31-32.)

In view of the determined opposition of the majority of practitioners to remuneration by salary, it is unlikely that the method of payment which the Coalition Government had in mind will be adopted. We do not yet know whether Mr. Bevan will persist in his proposal to include a basic salary in the remuneration of all general practitioners in the service; but a case can certainly be made in favour of its application to some of the doctors at the health centre. This applies particularly to those working as assistants. For the rest it might be better if some method were devised of sharing the remuneration accruing to the centre in a way comparable to present-day partnership arrangements.

PARTNERSHIP

This will not be easy. Most of our present partnerships have originated from the necessity of the new entrant to general practice finding by purchase a place in which to work, and his share of the practice receipts has largely depended on the proportion of the practice he has been able to buy, either on entry or later. Many of the most important clauses in the partnership deed set out these financial arrangements, and it is round them that the contract between the partners is built and continues. Now that the sale and purchase of practices is to be abolished, and penalties discourage any subsequent hidden sale of goodwill, many believe that the bonds of not a few existing partnerships will be dissolved, and that the Act, far from encouraging, as it intended, a greater resort to group practice, may in its early days reduce the number of partnerships and increase the proportion of doctors in individual practice.

Yet the advantages of group practice are such that in the end we shall certainly have to find ways of establishing it on a satisfactory basis. Probably the health centre

will become the focal point for the renaissance of partnership practice, and it is essential that the financial arrangements shall be such as to foster the best principles of practice in partnership.

Different methods will have to be tried; but in the main it may be best to arrange some relatively loose contract readily adjustable by mutual consent at agreed intervals. In assessing the shares to be allotted to the different doctors working in the centre, numerous factors will need attention. For instance, part of the remuneration of general practitioners undertaking regular graded specialist work, or administrative responsibility, might be paid in respect of these extra duties. This, however, should not necessarily mean that their total remuneration is substantially higher than that of their colleagues in the centre. It would be better if, in view of their special aptitude and the time they gave to these particular tasks, they were relieved of some of the more routine duties of the centre; though, as we said in a previous article, they should not cease to be genuinely general practitioners. Their extra emoluments for their special work would then compensate for the fact that they had fewer ordinary patients on their lists.

ASSISTANTS

It is important that assistants should work at health centres whenever the size and activity of the centre justify their employment. There is probably no better way of instructing, and enlarging the outlook of, the newly qualified doctor—whatever his ultimate aim—than by enabling him to spend a period of apprenticeship in general practice under the helpful supervision of a group of established and experienced practitioners. If the assistant intends himself to become a principal in general practice, optimally he should spend at least two years as an assistant to a health centre. During this time he should be paid a salary, and not attempt to acquire a list of capitation fees of his own. Only in this way will it be possible for him to take the fullest advantage of working for, and with, all his colleagues in the centre, and so gain the most varied experience.

Ordinarily, when he has completed this period of tutelage, he would look for a vacancy in a group practice. This might be in the centre where he has served as assistant, but more probably would be elsewhere. A centre employing six principal practitioners could well employ two assistants. In some of the less popular areas it might be found desirable to raise this proportion to three assistants to six principals. (One of the best expedients for attracting doctors to underdoctored areas might well be the early establishment there of health centres, offering good working conditions and satisfactory commencing remuneration.)

During his apprenticeship the assistant should be given the widest opportunity of practising, first under supervision but later independently, all the techniques of general practice. He should feel himself a junior colleague of his fellow-practitioners, and in no way be restricted to the less skilled or more menial tasks. As he becomes experienced he should quickly take a full place in the economy of the centre. He should take his turn on the rota for emergency duty, and be able to deputise for a principal who is ill, off duty, on holiday, or on study-leave.

It is not intended that doctors in health centres shall work strict and exact hours and not be available to their patients except during their tour of duty. Most doctors would agree that exclusive hours are neither desirable nor practicable. Nevertheless, there will have to be someone available night and day to cope with emergency calls, and if we are to allow the doctors proper leisure and proper sleep this can probably best be attained by arranging for each to take his turn to be on call for night and emergency duty. At the larger centres sleeping quarters will be provided for the doctor on duty. Where this is not done, the resident caretaker must be in a position to summon medical assistance at all hours.

PRIVATE PRACTICE

Under the National Health Service Act doctors in the public service are still allowed to continue in private practice. It is therefore probable that when health centres are established some, if not all, of the doctors who elect to serve in them will simultaneously have in their charge private patients. The question will then arise as to whether they should be allowed or encouraged to use the facilities of the health centre for the examination and treatment of their private patients. For many reasons it seems preferable that private practice should not be conducted from the health centre but only from the doctor's own consulting-room. Any services which could not be provided there would be obtained from the appropriate consultant—privately or at hospital, as the patient elects.

TRY THE EXPERIMENT

These are but tentative suggestions, and the conditions of work in, and administration of, the centres, when we set them up, must remain malleable. Nobody knows the answer to some of the questions raised, and extensive experiment is needed to test all the ways of work and of reward which offer a reasonable hope of providing a satisfactory *modus vivendi*. Ideas and guidance from central authority will have their place, but the staff of each health centre should be encouraged to find out for themselves how best they can serve their neighbourhood. For authority to say that a particular thing must be wrong because it has not been done before should be considered a crime.

It is in administration particularly that we shall meet the difficulty of preserving the best in private practice when it is grafted on to a larger tree. The new stock should give better support, better nourishment, and perhaps larger fruit. But great care will be needed to prevent loss of the finer flavours.

Medicine and the Law

Death from X-ray Apparatus

A RADIOGRAPHER lost his life in the performance of his duties at the Derby Borough Health Department's chest centre last November. At the subsequent inquest the coroner is reported to have observed: "I think the corporation has failed in its duty to its employees and everybody else by having a machine like this, unless efforts have been made unsuccessfully to get a shock-proof apparatus." According to the report, the tuberculosis officer at the centre, after screening a patient, told the radiographer that it would be necessary to make some adjustments to the apparatus. Apparently during this work of readjustment a brilliant white flash occurred and the radiographer was electrocuted, efforts to save his life being unavailing. The coroner asked why a town like Derby could not provide shock-proof apparatus, and was told that they are very difficult to acquire.

It will surprise many to hear of the difficulty of obtaining shock-proof X-ray apparatus. The international and British recommendations for X-ray protection as long ago as 1934 were expressed in these terms:

"Wherever possible, earthed guards or earthed sheaths should be provided to shield the more adjacent parts of the high-tension system. Unsheathed leads to the X-ray tube should be in positions as remote as possible from the operator and the patient. The use of 'shock-proof' X-ray equipment, in which the high-tension circuit is completely enclosed in earthed conductors, is recommended. In all cases, however, indiscriminate handling of X-ray tubes during operation should be forbidden. Unless there are reasons to the contrary, metal parts of the apparatus and room should be efficiently earthed."

Manufacturers were not slow in putting such apparatus on the market, yet in 1940 a highly dangerous non shock-proof X-ray apparatus installed in 1936 was still in use by one of our borough health departments. It is well to note that this apparatus was not part of the equipment of an ordinary hospital diagnostic department. The question immediately arises as to where advice is sought by the corporation on the acquisition, use, and

upkeep of such specialised gear as modern X-ray plant. In this country no considerable hospital diagnostic or radiotherapeutic department is under anyone but a qualified radiologist, and if borough or other health departments set up special clinics for the X-ray examination of patients they should surely be put in charge of a qualified radiologist. Accidents may happen in spite of all the precautions we know, but the lesson of Derby must be taken seriously to heart.

Overdose of Nепenthe

At an inquest at Kingston on a 15-month baby it was suggested that the doctor attending the child had prescribed a teaspoonful dose of 'Nepenthe.' In her evidence the doctor stated that she wrote "Query half a teaspoonful," expecting the chemist to check the proper amount. She had not previously prescribed the drug and did not know for certain the usual dose. A representative of the parents pressed the witness with the fact that there were 60 drops to a teaspoonful and that only two or three drops should be given to a child of that age. She replied that her prescription stated that the drug should be taken in water. Dr. D. Haler, pathologist, said that the cause of death was bilateral mastoiditis; in his opinion the overdose had accelerated death to only a minor extent. He agreed that a teaspoonful of nepenthe would undoubtedly be "a grossly improper overdose" for a child of 15 months. The parents' representative said they had the strongest possible desire for a second post-mortem examination. The coroner observed that he did not object if they were prepared to find another pathologist; he would not himself make any order for that purpose. He adjourned the inquest for a week. When it was concluded a week later, a verdict of death by misadventure was recorded.

The pathologist's evidence as to the cause of death seems not to have been displaced by any contrary opinion. Quite apart however from the possible danger to the patient, instances when careless or hurried prescription and inadvertent overdosing can be alleged are instructive for medical students. The profession is entrusted with statutory privileges in relation to dangerous drugs; the concession cannot be justified unless care and knowledge accompany the use of them. Nepenthe is a proprietary preparation of opium containing about gr. 1 in 130 minims. The dose for a 15-month child should not have exceeded two drops.

From The Lancet 100 Years Ago

Professor BIGELOW, of Boston, to Dr. FRANCIS BOOTT, of London.
Boston, Nov. 28, 1846.

MY DEAR BOOTT,—I send you an account of a new anodyne process lately introduced here, which promises to be one of the important discoveries of the present age. It has rendered many patients insensible to pain during surgical operations, and other causes of suffering. Limbs and breasts have been amputated, arteries tied, tumours extirpated, and many hundreds of teeth extracted, without any consciousness of the least pain on the part of the patient.

The inventor is Dr. Morton, a dentist of this city, and the process consists of the inhalation of the vapour of ether to the point of intoxication. . . .

I took my daughter Mary, last week, to Dr. Morton's rooms, to have a tooth extracted. She inhaled the ether about one minute, and fell asleep instantly in the chair. A molar tooth was then extracted, without the slightest movement of a muscle or fibre. In another minute she awoke, smiled, said the tooth was not out, had felt no pain, nor had the slightest knowledge of the extraction. It was an entire illusion.

Mr. ROBERT LISTON, of University College Hospital, to Dr. BOOTT.
Clifford Street, Dec. 21, 1846.

MY DEAR SIR,—I tried the ether inhalation to-day in a case of amputation of the thigh, and in another requiring evulsion of both sides of the great toe-nail, one of the most painful operations in surgery, and with the most perfect and satisfactory results.

It is a very great matter to be able thus to destroy sensibility to such an extent, and without, apparently, any bad result. It is a fine thing for operating surgeons, and I thank you most sincerely for the early information you were so kind as to give me of it.

In England Now

A Running Commentary by Peripatetic Correspondents

THE anonymous Whitehall medical advisers have been copping it hot in the press lately for their alleged refusal to sanction extra rations for exceptional cases. I met one in the flesh the other day and invited him in for a cup of black coffee with saccharine (grey market—i.e., through the hospital dispensary), chosen to avoid awkward questions over rationed food. I found him worried about his future. He at once dispelled the idea that he sits in an armchair all day long. In fact he is an active physician, with this advising business as a side-line. He gets telephoned by pals in the Ministry from time to time or sometimes even gets letters. All sorts of subjects crop up and he tries to give a judicial solution of the problem as stated. But he has a hunted look. The recent developments have startled him. At first in this job he felt he was serving the community in a big way, but now, it appears, he is the hidden hand, preventing doctors from giving their patients the treatment they think essential. He has even been accused of denying sick people the necessities of life. He cannot recollect ever having done this, but I suppose his answers may have been twisted by the administrators to suit their ends. Politics have come into it now. He never thought food was a political matter, but now he says that if it wasn't for the present Government none of the problems would arise. He is patiently looking for a means of breaking off his connexion with Whitehall. It will not be long, he hopes, before he is once more being called in as a proper consultant and giving the same advice for a substantial fee.

* * *

"Do your legs swell?" "Gee, yes, they *are* swell; they're the best part of me." "I see we don't speak the same language, but I get your idea and quite agree with you."

We don't meet many G.I. brides in reverse, so to speak, in our antenatal clinic, but this one was a good specimen, obstetrically and socially, and we got on just—swell.

* * *

One of the most unnerving features of being suddenly confined to bed is the light-hearted way in which you are expected to overcome the inhibitions of years and unceremoniously expel your excreta while between the sheets.

The ubiquitous bottle is an instrument badly designed for this purpose. Not only is it constructed liberally to spill its contents when placed horizontally on the floor, but its capacity is unflatteringly inadequate. In fact, it's a slight on British manhood. As an anatomy student I was never able to form a very accurate impression of the size of the human bladder, but now I have only to imagine a bottle upturned in the pelvis and the impression is stamped, staggeringly, on my mind. I find micturition progressively inhibited by the disquieting prospect of the thing overflowing into the bed. There seems no way to form an accurate estimation of the state of affairs down there apart from direct inspection, which is undignified. The most discreet guide, it appears to me, is to listen to the change of note as the rising tide enters the spout.

Like bridge, although the use of the bottle is simple enough to pick up, it's the finer points that distinguish the skilful performer from the common-or-garden. An experienced bottle-man can employ the receptacle without betraying by sight, sound, or expression his little secret. At the most, his face takes on a characteristic sort of inscrutability.

Of bed-pans enough has already been said in these columns; I will merely add that they defy the laws of elementary geometry by having length and breadth but no depth.

* * *

I used to get a bit tired of the raging controversy over "medical superintendents"—what's in a name anyway? And had I been a director (I was to the Frenchmen: M. le Directeur), or a "dean" (rural variety, subspecies temporarily detached), or what not, would it have made

much difference? Of course some people used to think that sitting in an office all day (part of) was a very soft thing—until a reprobate house-man had to be dealt with, when it was: "Glad I'm not in your shoes, old man."

But what *did* I do? Item: Dr. Blank of Little Mucham wants Mr. So-and-so admitted. ? Obstruction. Will you send ambulance? Item: Coroner's office on the phone (must remember to see young Dr. New—his first "quest"—get his evidence on paper—clearly written—not too many medical terms—coroner is a layman). Item: The engineer reports boiler defect; no steam in 2nd theatre tomorrow (see X about his list). Item: May Professor Scram (U.S.A. orthoped) visit next week? Item: Inconsolable relative in ward Z. Item: Matron reports Nurse Frill (weekend leave, 3rd-year nurse, children's ward) has wired ill at home with measles and will I please drop a hint to the second H.S. that it would be convenient if he starts his round at 10 o'clock rather than at 10.50? That urgent return for the Ministry had better wait till tomorrow. I expect So-and-so will scrub me, or try to, at the next medical staff meeting—what's my line? Minutes for the hospital committee must go tonight and those letters should be answered; got to be careful how I answer that one from the Isolation Hospital.

No, I suppose it was pretty cushy and a layman or one of my colleagues could have done it a darned sight better. Plenty of kicks and too few ha'pence. Pity I bothered. What's in a name anyway? I wonder.

* * *

On reading your leader on peritoneal dialysis I wondered whether, in uræmia, urea is present in the lacrimal secretion. If so, it should be easy to remove an appreciable quantity with the help of half an onion.

* * *

Cautionary Tale.—A man of 40, brother of a doctor, was admitted under my care for chronic abdominal pain. He had recently been discharged from one of the largest London hospitals where a physician with an international reputation in gastro-enterology had failed to discover any lesion; and to save unnecessary expense I accepted all the reports from the other institution. The X-ray results were said to be completely negative; a test-meal showed achlorhydria which my colleague had explained as familial (the brother had the same "peculiarity"); and there was a severe anaemia, regarded as due to some obscure tropical disease.

The patient was, to say the least, unprepossessing. He grumbled at every detail in his treatment; no anodyne relieved his pain. Further to his prejudice, he was perpetually pestering us for all sorts of certificates to support a claim to a pension to which he regarded himself as entitled after a short term of military service in West Africa (wherefore, no doubt, the tropical disease idea). He left my ward with a thoroughly reciprocated lack of affection but continued to call on me as an outpatient for a further three months during which his symptomatology increased in preposterous detail. He steadily lost weight, but as he said that he ate nothing and was living in the poorest circumstances this was hardly unexpected. Then one day he arrived deeply jaundiced and a large abdominal tumour was palpable.

I learnt a lot from this experience. That the worst neurotic may have a mortal illness. That it is wrong to accept the opinion of any authority when there is an opportunity to perform your own investigations. That, however easy it may be thus to salve one's conscience, it is wise to avoid prejudice and not overlook an underlying condition because a patient exaggerates or fabricates complaints that are transparently ridiculous. That one should always be uneasy over the existence of anaemia in any man and presume some malignant process if none of the recognised causes can be satisfactorily identified. And finally, that some physicians can persuade themselves they are never wrong. For when in penitence, sackcloth and ashes, and all the rest of it I went to tell my senior colleague of our inglorious performance he was only momentarily disconcerted. "I believe in the neurogenic factor in the aetiology of malignant disease," said he. "That chap worried himself into this."

Letters to the Editor

THE CRUX

SIR,—After negotiation—what? Suppose the Minister were to agree to good terms and conditions but refuse any modification of the Act, would you then advise doctors to renounce their fundamental right as citizens of this country—the protection of the courts?

Under the Act, a doctor may be charged by anonymous officials of the Ministry and deprived of his livelihood, without any right of appeal except to the same officials.

This, to me, is the crux. If doctor and patient, for both are involved in this, can rely on the ultimate appeal to justice in the courts, then one may count on British good sense to produce a fair service in spite of basic salary, nominated representation, controlled certification, and so on. If not, the stage is set for corruption, coercion, and apathy.

This is the point which has been reached by the sober and reasonable debate in your editorials. Standing, as you do, for justice as the basis of freedom and liberty, I hope THE LANCET will leave no doubt in the minds of the Minister and the negotiators that it entertains no difference from the B.M.A. on this fundamental issue, however much divergence there may be in details.

London, W.1.

HERMON TAYLOR.

* * * The subject of this letter is discussed in a leading article.—ED. L.

THE FRACTURED SPINE

SIR,—The development of civilian flying seems to be causing an increase in the number of fractured spines, and their treatment may now have to be undertaken by those inexperienced in the application of hyperextension-plasters.

Serious sores may be easily caused, and yet they can almost always be avoided if the two following precautions are taken:

(1) A strip of adhesive felt 6 in. wide and about 36 in. long is fixed down the centre of the back over the spinous processes, and smaller strips of the same material cover the iliac crests, symphysis, and manubrium. Stockinet or an old bathing costume may be put over this, but no cotton-wool should ever be used.

(2) The first plaster-of-paris applied to the back of the hyperextended patient must be a 6-in. longitudinal slab from the base of the neck to the sacrum. This is held in place by circular 6-in. plaster bandages supplemented, of course, by additional slabs and, in particular, by the all-important anterior strut which takes its bearing on the manubrium sterni and symphysis pubis. The common mistake is to start with circular bandages round the lumbar region (which is, of course, in marked lordosis) with the result that they tend to slip down into the lowest part of the hollow of the back and make a sharp transverse ridge which can and does cause disastrous plaster sores.

Every orthopaedic and fracture department has the necessary equipment, but it is my firm belief that even the smaller hospitals should always have a stock of 6-in. plaster bandages and adhesive felt. The latter can be obtained in convenient sheets 1 yd. by 19 in. and $\frac{5}{16}$ in. thick from Messrs. William Mather Ltd., Dyer Street, Chester Road, Manchester, 15.

London, W.1.

ERIC I. LLOYD.

GERMANY

SIR,—Scientists, particularly in the medical field, have generally held to the principle that the latest discoveries for saving life or mitigating suffering should be used for the benefit of all mankind. It is therefore with grave concern that we note that, owing to the completeness of the economic breakdown in Germany, the patients in the German hospitals are largely deprived of some of those remedies with which their lives might be saved or their sufferings lessened.

A few months ago we received a letter from Dr. Ruth Smatznig, of the children's hospital in Charlottenburg, in the British sector of Greater Berlin, asking if we could send her even a small amount of penicillin for those cases requiring it most urgently. At that time there was, as far as she knew, apart from those hospitals receiving children under treatment for venereal disease, no children's hospital in Berlin in which penicillin was

available for other infections amenable to penicillin. A little more penicillin has now been made available for other cases than venereal disease, but there is still far less than is required by all types of hospitals.

We have recently sent out from the Ecumenical Refugee Commission of the World Council of Churches, in conjunction with Save Europe Now, 2000 mega units of penicillin, which were flown across for us by the R.A.F. and which the public-health authorities of B.A.O.R. are distributing for us among the hospitals in the British zone and in Berlin. They would gladly receive a similar consignment from us monthly, if we can send it, and more is urgently required. Your readers are in a position to assess the seriousness of the situation and we would ask them to enable us to continue sending it. Donations can be sent to the chairman of the Ecumenical Refugee Commission, 21, Bloomsbury Street, London, W.C.1. This organisation is duly registered under the War Charities Act.

HENRY CARTER.
YOLANDE FRIEDL.

ELECTRICAL CONVULSIVE THERAPY

SIR,—I should like to support Dr. Paterson (Dec. 7), who quotes Fostig's experience in the treatment of animals by electrical currents without irreversible changes in the brain.

About eighteen months ago I conducted at a civilian mental hospital a small investigation on possible structural damage to the central nervous system from convulsive therapy. The cerebrospinal fluid (C.S.F.) of fifteen melancholics who received this therapy was examined before and after the completion of their series of convulsions (this varying from seven to twelve applications). In every case there was not the slightest change in the C.S.F. (cells, protein, globulin, chloride, or Lange curve). In the same way three very violent cases of mania who had had several hundred applications of convulsive therapy over a period of years had a completely normal C.S.F.

Although in itself this does not prove much, it helps to corroborate the results of the animal experiments.

Middlesbrough.

R. HIERONS.

HERPES VIRUS THERAPY OF WARTY NÆVI

SIR,—A patient of mine had three congenital warty nævi on his penis. Some days later herpes genitalis of the prepuce developed and was spontaneously cured in fifteen days. A month after the cure the herpes recurred near one of the nævi, and gradually invaded and destroyed it, leaving an inconspicuous scar. The same happened to the remaining nævi within two months.

This observation led me to study the action of the virus of herpes on hyperplastic growths in man. For this purpose I isolated the virus from a case of herpes labialis in a hare, cultured it on the chorio-allantoic membrane of the chick embryo, and inoculated it into a congenital warty nævus of the middle finger. Simultaneously some of the virus was inoculated, by scarification, into the lip of a hare, with a positive result, typical herpetic lesions being produced.

In the first four days no change in the nævus on the finger was noted, and the scarification did not heal. On the seventh day there was a small ulcer, and this increased daily, destroying the nævus. On the tenth day there was no trace of the growth and only a small ulcer, which healed spontaneously in four days. This was two years ago, and there has been no recurrence.

In another case I inoculated the virus into a rodent ulcer. After a week the margin of the ulcer became detached. Sections stained by Herzberg's contrast method showed the presence of minute bodies, suggesting that the virus can be cultivated in human carcinoma. The patient was not cured.

These observations suggest (1) that the virus of herpes labialis in the hare can be successfully and safely inoculated in man; (2) that the virus can be useful in the treatment of warty nævi; and (3) that the virus can be cultured in carcinomatous tissue in man.

Further work is in progress, notably on the treatment of cancer and other new growths. Meanwhile I wish to call the attention of research-workers to this field and ask for their coöperation.

Lisbon.

PUNDOLICA GAITONDÓ.

RESCUE OF GENERAL PRACTICE

SIR,—The medical profession has been built on the family doctor. No matter how we may embellish the superstructure, which is becoming florid, the edifice will subside if we weaken the base.

Specialism in particular organs and diseases increases every day, and new subdivisions of doctors deal with certain stages of life or occupations. Man is tending to be segmented for medical purposes. Meanwhile, shorn of one function after another, the general practitioner is fast losing the right to his title. Yet, among us all, it is his indispensable task to view the patient as a whole—body, mind, and spirit. He, if specialist is needed, chooses the appropriate one, and sees that the treatment proposed for a local disorder harmonises with the interests of the body generally and the mental make-up. He can protect the patient from misdirected intervention, and protect the consultant from wasting his time.

But this minor mediatory rôle of the practitioner, though it seems to fill the mind of our politicians, is a by-product of specialism and may be transient. It is as the friend of the whole community when illness befalls that the general practitioner has made history. Opening out before the coming generation is a sphere of influence still wider, which may be of even more moment. The doctor is to "guide his flock" in the general care and cultivation of their bodies that they may enjoy abounding health; he is to be aware of the constant insult to Nature which our present manner of life represents, and is to be resentful of the low general level of physique. Think what this would mean for a Britain in which disease prevails in teeth, tonsils, stomach, bowels, and feet. Is it asking more for human beings than the farmer gives the flocks and herds on which he prides himself? The more the practitioner attends to such work the fewer gross deviations from health will there be requiring specialists.

What is the way to this great goal? How can we reconcile increasing specialism with the preservation of the paramount importance of general practice? To the doctor should be restored undivided responsibility for his patients, for the "maintenance and repairs" of health. Features which increase the interest and competence of his practice should be jealously guarded: we must keep the cottage hospital and press for its urban equivalent, the general practitioner's hospital annexe, which is overdue.

The practitioner should be in charge of infant and school life. Impressive may sound the special facilities of an infant-welfare clinic, but ineffectual are the best efforts of the official doctor at a few minutes' interview once a week or month to instil into a mother the healthy upbringing of her child. Incomparably better chance has he whose eye is on the home conditions, who lives "on the spot" and is "in and out" of the patients' houses. Moreover, what he learns of the emerging personality enhances his prowess in handling the patient in maturity. Thanks to such association in those impressionable years a man or woman will be less secretive and more readily resort to his doctor for medical advice.

The number of his patients should be no more than the doctor can handle with due deliberation and visit at hospital, sharing their progress—seeing an interesting operation, or, alas, an occasional and enlightening post-mortem. Collaboration with the specialist for the patient's good results in an alert mind, knowledgeable, and informed. Beside these routine facilities, any scheme for intermittent refresher courses pales into insignificance.

In matters of personal everyday illness in the home, and emergencies requiring immediate recognition, the family doctor has to be expert. He should have good powers of intuition and be thoroughly conversant with common psychological disorders. The patient rightly consults him for every kind of disorder from tip to toe; so general competence must be his forte. The corollary is that he must have his wits about him and his armamentarium portable in a small bag. In sparsely populated areas he should be of above-average calibre, have some practical ability in the simpler uses of the microscope and X-ray machine as special aids to diagnosis, and receive a reward proportionate to higher responsibilities.

What a travesty of this ideal is the present state of general practice and its trend which the National Health Service Act accelerates. The doctor finds his patient

less and less *his*. This division of responsibility impairs keenness. He is being robbed of interesting aspects of practice, of the spur to effort that comes from competition, of outlets for initiative, enterprise, and originality born of independence. He is harassed by filling in forms. In working the Insurance Act he was underpaid by legislation that took advantage of the fine traditions of the family doctor. The "panel" has become a stigma on the profession and has inevitably led, as all have agreed, to deplorable two-grade practice. The Government virtually admit the incompetence of it by creating an increasing host of auxiliary services to atone for its deficiencies. The danger is that men of quality will refuse the present remnants of a noble calling which no longer give opportunity for the use of their faculties but require them vainly to try to reclaim the ill-health of family life. Hence the inadequate ranks of general practice are being further depleted by increasing emigration and the diversion of young doctors to public health or other special branches.

The glaring fault, of panel practice particularly, has been that not enough time is given to the patient. For efficient service we shall need twice as many general practitioners, and the medical schools must direct themselves to training them. The curriculum requires drastic revision if the student is to learn what he will need in the daily run of practice. The course itself should be shortened to five years, and nobody should become an independent practitioner until he has been qualified for three years, including one as an assistant. To achieve this numerical expansion more use should be made by undergraduates of the general hospitals in towns near university teaching centres.

The present scheme for a National Health Service rightly emphasises the desirability of doctors in urban areas working together—though for this the ordinary partnership suffices. But it neglects the primary need for reform in training and for the upgrading of the general practitioner through large responsibilities. At the birth of a new health service it is incumbent on the leaders of our profession to insist on the *conditions that make good work possible* in general practice.

Bristol.

A. WILFRID ADAMS.

SCIENCE AND PHILOSOPHY

SIR,—While fully supporting the plea in your leader of Nov. 30 for more conceptual thinking in scientific medicine, I am not sure that the barriers between science and philosophy are being broken down quite so readily as your comments suggest. It is a curious phenomenon—perhaps psychologists could supply the reason—that the mathematical physicists, Eddington and Jeans in particular, are always cited by theologians and others as examples of scientists becoming dissatisfied with their own arid materialistic pastures and wandering over the forbidden Cartesian barrier into the happy hunting-grounds of metaphysics. Judging from what an amateur like myself can understand of such high matters, the philosophers would probably agree in the use of the word "example" but in a considerably different and not unduly flattering sense. The case for the prosecution for such flagrant trespass is admirably summed up by the late Prof. Susan Stebbing in her fascinating book *Philosophy and the Physicists* and again in her remarks at the symposium of the Aristotelian Society (May 19, 1943).

Counsel for the prosecution called for the summary sentence of immediate expulsion from the metaphysical fold, while the brilliant counsel for the defence, Prof. E. T. Whittaker, made a brisk counter-attack comparing Professor Stebbing's book to a "commentary on some of the more mystical poems of Wordsworth by Mr. Bertrand Russell." The latter eminent philosopher had already conducted an independent campaign against such scientific intruders in his book *The Scientific Outlook*, employing rather the Voltairean rapier than the Swiftian battle-axe.

As far as Bertrand Russell and the school of logical empiricists are concerned, it would appear that a decidedly brisk engagement is in progress between them and many of their colleagues who seem to regard the empiricists as a deadly virus menacing the whole body philosophic; or if one may be allowed to mix metaphors—"one can scarcely avoid the conclusion that they have

allowed themselves to be diverted from the path of progress in philosophy, along which they began to march, into a profitless cul-de-sac" (Dingle, H. *Nature, Lond.* Oct. 9, 1943, p. 397).

With Homeric battles between such giants on the earth in these days, it is perhaps scarcely surprising that the humble "medicine man" is somewhat reluctant to enter the lists.

Khartoum.

E. S. HORGAN.

TREATMENT OF TUBERCULOSIS

SIR,—Recent correspondence prompts me to grind what, I fear, may be a somewhat blunted axe. I think that perhaps the answer to the problem is to be found in the address from which Dr. Simmonds writes, since I note that, like many other erstwhile sanatoria, his institution is now called a "hospital." Yet Dr. Simmonds writes of the "modern sanatorium," and a period of treatment "in a suitable sanatorium," and exhorts us to "take a reasonable view of the extent of apprehension and alarm in sanatorium patients."

For some years now surgical interference in the treatment of pulmonary tuberculosis has become increasingly fashionable. Is it too late to recall that up to, say, ten years ago sanatorium treatment was recognised as an entity, and that sanatoria existed as such (there are a few left)? There was no feeling of "apprehension and alarm" in these places. Patients could take months of complete physical and mental rest without interruption, and large numbers of them derived great and lasting benefit.

There is a place for both the hospital and the sanatorium, but let us not confuse the two types of institution nor the mental outlook of the patients therein. And let us not forget that the quiet and peaceful surroundings of the true sanatorium have as prominent a place in the treatment of the tuberculous as the noisy and restless environment of the surgical wards of the chest hospital.

Preston Hall, Maidstone.

F. TEMPLE CLIVE
Medical Superintendent.

LONDON AS INTERNATIONAL MEDICAL CENTRE

SIR,—You do well to point out that we in this country "rather shabby, rather tired, and rather poor . . . have come to think too meanly of ourselves." Although we may not forget it, we do fail to remind ourselves and to take pride that for two years we stood single-handed against the mightiest array of principalities and powers ever marshalled in battle, not only against our Western civilisation but against the whole Mind and Spirit of Man.

Others do not forget. Throughout the world, and more particularly on the continent of Europe, there are multitudes who remember, and remembering look to us for guidance. Some of these found refuge in this country during the war years; some either from force of circumstance or from choice passed under the totalitarian tyrannies in their own lands. Of those living in the occupied countries, some few never lost their faith in Great Britain; others despaired; but all were amazed and still wonder at the strength, immaterial even more than material, by which this country was enabled to make its stand, and all equally desire knowledge of those British institutions in which it had its source.

No matter how tired or how shabby, it is our duty as a nation to do all in our power to satisfy this craving and to make known and available to others the sources of such strength as did and does lie in us.

British Medicine is the one of our institutions in which we as doctors must be particularly interested; you, Sir, testify to American belief in the great possibilities inherent in present developments in British Medicine; I have ample evidence that throughout Western and Central Europe the medical communities look to Great Britain for guidance as never before.

The British Medical Association with great foresight has recognised this desire on the part of the doctors of continental Europe and has lately allocated the sum of £1000 for the purpose of sending British medical men and women to lecture on the Continent. This is a splendid gesture and I am greatly honoured at having had the privilege of giving in Czechoslovakia the first of these lectures. The British Council, so far as its somewhat

niggardly allowance permits, includes medicine within its activities; but there is vastly more to be done.

The disappearance of the great postgraduate medical school of Vienna, and the odium which now attaches to German medicine, has created a vacuum in Europe which can only be filled by the rise of another postgraduate medical centre. It awaits us in this country to fill this want; the opportunity offers for London to take in the world on a far greater and more ample scale the place occupied in succeeding ages by such great schools as Cos, Salerno, Bologna, and Vienna.

"Rather poor" indeed we are; but the prestige which accrues to us through our institutions is now our greatest asset. To fail to exploit it to the full will be poor economy indeed.

The time is ripe for the development of a great postgraduate medical centre in London; this might well evolve from the British Postgraduate Medical School, but never in its present remote site, among its uninspiring surroundings and in its utterly inadequate buildings. The centre would necessarily include a large general hospital, together with all the necessary laboratories and other facilities for research and teaching; its scope would be international, but it might also house the secretariat correlating postgraduate medical teaching throughout all the future university hospital regions.

The activities and the influence of the centre would be felt throughout the whole country; but for the complete fulfilment of its international purpose it is essential that it be housed in the heart of London itself and upon a site vivified by the millennial tradition upon which as a nation we build.

Wolverhampton.

CHILBLAINS

S. C. DYKE.

SIR,—The interesting article by Dr. Winner and Mr. Cooper-Willis on chilblains in Servicewomen (Nov. 9) leads me to mention some personal experiences with this distressing disorder.

The first 10 years of my life were spent in Montana, where winters are dry and intensely cold. The second 10 years were spent in Seattle, Washington, where winters are very wet, and mean temperatures are almost the same as in Oxford. I never even saw a chilblain until the winter of 1931-32, when I was residing at Oxford. During that winter and the next three my knuckles and heels were sorely troubled with chilblains.

My wife's history is somewhat different from mine. She grew up in New Zealand, where it is accepted that chilblains are an inevitable and unpleasant feature of life in winter, and she continued to have chilblains on the feet every winter for six years in England. We have now lived 11 years in Boston, Massachusetts, where winters are severe, and neither one of us has had any trace of chilblains during this time; nor have our two children, boys aged 4 and 6. Other familial controls are my brother, who has continued to live a chilblainless life in Seattle, and my wife's sister, who has continued to endure English winters plagued with chilblains.

After reading the article by Dr. Winner and Mr. Cooper-Willis I asked twelve young women who work in this laboratory the question: "What is a chilblain?" Eight of them answered, "I've heard the word, but I don't know what it means." After the meaning was explained, one of them said, "So that's what my father has every winter!" He is a sheet-metal worker on construction jobs outdoors. Every winter he suffers cruelly from itchy, painful, secondarily infected inflammatory areas around his knuckles, but the trouble always disappears in the spring. To my mind, the above experiences support the idea that chilblains are properly classified as disorders related to environmental stress and not to familial or degenerative factors.

War Department, Medical Nutrition
Laboratory, Chicago, 9.

ROBERT E. JOHNSON
Director.

SIR,—Dr. Dowling (Jan. 4) deprecates the use of large doses of vitamin D in the treatment of "such trivial complaints as chilblains." I am sure he would not use the same adjective to describe the annoyance and irritation of this malady or the inroads it makes on the time of a busy practitioner.

Following the work on chilblains by Tecoz, Lavril, Pelicier, and others, who successfully used calciferol

15 mg. (600,000 I.U.) administered in one single dose, I have myself tried, during the last two cold spells, 600,000 I.U. of vitamin D₂ ('Sterogyl 15') in 14 cases of chilblains (7 adults and 7 children). The children were given the preparation orally, the adults hypodermically. In 10 cases improvement was marked on the third day. They each received a second dose one week later. By the tenth day the position was:

cured	8 (5 adults, 3 children)
improved	3 (1 adult, 2 children)
no benefit	3 (1 adult, 2 children)

None of these patients has shown any reaction or intolerance.

In view of this I must, for the time being at any rate and with all respect, disagree with Dr. Dowling and continue to use vitamin D₂ as a potent curative agent in chilblains.

London, W.1.

J. J. PHELAN.

IMPENDING DEATH UNDER ANÆSTHESIA

SIR,—Even twenty-five years ago, when Mr. Reddington was commencing the practice of surgery, it was well known that cardiac arrest occurred just as often during minor procedures, such as reduction of a dislocated shoulder, extraction of a tooth, and dilatation and curettage, as during capital operations. I was therefore amazed that he should confuse cardiac arrest and shock.

As I pointed out in my article of Jan. 4, the expectation of death under an anæsthetic is 1 per 1000 under the favourable conditions of a teaching hospital. It is therefore only a matter of time and every surgical practitioner must come face to face with this ordeal. Even yet, Mr. Reddington's anæsthetist may report to him that the patient's heart has ceased to beat. If I understand Mr. Reddington correctly, this will be an occasion for him to give up his anæsthetist; or is it surgery that must sustain the loss?

In the meantime, I feel sure that Mr. Reddington's fears are unfounded, and that there is not a qualified surgeon in any part of the world who, after reading my paper, would become so excited as to open the thorax instead of the abdomen, and to massage a heart that was still beating.

London, W.1.

HAMILTON BAILEY.

SIR,—I would question Mr. Hamilton Bailey's statement (Jan. 4) that "manifestly, artificial respiration is futile if the heart is not beating." I have several times demonstrated to my own satisfaction that artificial respiration can maintain some carotid circulation and oxygenation in the corpse.

When the pupil has dilated immediately after death it can, in a reasonably intact body, be made to contract to a medium size by a short spell of artificial respiration; and when this is stopped it dilates again. The procedure can be repeated.

I conceive that, this being so, oxygenation sufficient to prolong cerebral viability might be expected by persisting with artificial respiration while more active measures are being instituted.

Shirley, Warwickshire.

W. BRIAN GOUGH.

PREVENTION OF PULMONARY TUBERCULOSIS

SIR,—Dr. J. F. Brailsford (Dec. 28) quotes this remark by Dr. George Day (Nov. 16) about patients with tuberculosis: "In all three the disease was diagnosed early and brought early to treatment without avail." Dr. Brailsford proceeds: "We know that healthy girls can enter sanatoria as nurses, contract the disease, and die of it in the institutions meant to cure, in spite of treatment from the earliest recognisable sign."

In my opinion, physicians and nurses who are to have charge of tuberculosis cases should, by breathing and physical exercises, fully develop their chests and lung capacity, for it seems to me that lungs which are thoroughly aerated must have a better chance of resisting the disease.

Man has lost the art of whole-lung breathing. Lower-costal or flank breathing is hardly ever seen. Time and again one sees upper-costal breathing or the pernicious belly-breathing, both of which leave the lungs underdeveloped.

Every nurse likely to be in contact with phthisis should have at least 6 weeks' treatment to develop her lung

capacity and general physique. The massage departments of nearly all the London teaching hospitals are, I believe, familiar with all details of my exercises. I have several reprints of an article in the *British Journal of Tuberculosis* (October, 1934) explaining these exercises, and I will send a copy to anyone who may desire one.

London, W.1.

CORTLANDT MACMAHON.

POTATOES AND WATER-BRASH

SIR,—When looking through some old medical pamphlets I recently came across one on water-brash, which appears to have been a disease caused by a kind of food deficiency which is not seen today. The author of the pamphlet, Dr. George Henning, who was physician to the Taunton and Somerset Hospital, was in practice from 1800 to 1831, when, because of the Napoleonic wars, a normal diet was beyond the reach of most people. Many of the poor, unable to buy bread, lived almost entirely on potatoes. These were the people who suffered from water-brash, and among them it was very common.

The pamphlet is entitled *Practical Observations on the painful affection of the stomach called Cardialgia Sputatoria or Water-Brash*, and the following quotation from Varro appears on the front page: "ut non solum quoad vivam, quid fieri oporteat necessarios meos moneam, sed etiam post mortem." The name "cardialgia sputatoria" was suggested by Dr. Henning because it indicates the condition's two essential symptoms—namely, a distressing pain at the pit of the stomach and repeated gushes of watery fluid into the mouth. The disease was commonly attributed to the diet, though Dr. Henning says there was some doubt about this explanation because many individuals escaped the trouble though living on the same miserable food. Henning's recommendations for treatment are of little consequence, but in these post-war days it seems worth while to remark upon his paper which calls attention to a widespread war-time disease caused by a dietary defect, and records the diet itself.

Marlborough.

HAROLD BURROWS.

R.M.B.F. CHRISTMAS FUND

SIR,—I would like through your columns to thank all who have generously subscribed to our Christmas gifts fund. It is a very great pleasure to be able to report that over £2200 has been received. On behalf of the committee I warmly thank all the contributors and also the many committees and societies who helped forward the fund by arranging special collections and by sending donations. We are very grateful to all.

C. LUTHER BATESON
Hon. Treasurer.

Royal Medical Benevolent Fund, 1, Balliol House,
Manor Fields, London, S.W.15.

POSTAL PILONIDAL SINUS

SIR,—The recent discussion¹ revealed some difference of opinion in regard to the origin of this condition.

A similar condition occurs in the Rhodesian ridgeback—a breed of dog which is uncommon in Britain. The name is derived from a characteristic well-defined ridge of hair running along the back from the mid-thoracic to the mid-lumbar region. The hair in this ridge forms a definite pattern, and each end of the ridge is whorled, the shape of the entire ridge being not unlike that of an attenuated violin.

Unfortunately the breed is subject to cysts; the commonest site is on the ligamentum nuchæ over the posterior cervical or anterior thoracic vertebræ, but many are situated just posterior to the occiput. The lesion takes the form of single or multiple tubes extending from the epidermis to the deep connective tissue; some are attached to the thoracic spines while others end blindly in the muscles or ligamentum nuchæ. They may lie dormant for months, but often they form fulminating abscesses. While dormant, no pain is felt; but in the active state considerable pain is evinced. Usually hair and inspissated pus is encountered on probing the cysts. Spontaneous recoveries are rare; a chronic suppurating sinus is formed, with hair deeply embedded in the epithelial lining at the base.

Radical operation is the only treatment. Each of the sinuses must be followed to its origin and dissected out.

1. *Lancet*, 1946, ii, 484, 582, 617.

If fully excised, resolution and healing is uneventful; but incomplete removal of the cyst invariably means a recurrence. Histologically the cysts are akin to the dermoid cysts and teratomata met with in other animals, and we regard those as congenital. Moreover, in view of their frequency we regard them also as hereditary.

Johannesburg.

CAMPBELL DICKSON.

Obituary

HERBERT JOHN GREEN

M.B. ABERD., F.R.C.S.E., M.R.C.O.G.

Mr. H. J. Green, who died at the Queen Mary Hospital, Roehampton, on Dec. 27, was born in 1906 at Boyndie, in Banffshire, where his father was a farmer. From Banff Academy he went to the University of Aberdeen, where he graduated, M.B. in 1930. After holding house-appointments at the Aberdeen Royal Infirmary and the Royal National Orthopædic Hospital, London, he settled in 1932 in practice in Banff and was appointed to the staff of the Chalmers Hospital. Here he carried out much surgical work of high quality, and in 1937 obtained the Edinburgh fellowship. His interest focused on obstetrics and gynaecology, and he gave up his practice on his appointment as house-surgeon at the Jessop Hospital for Women, Sheffield, in 1938. The following year he was appointed registrar to the hospital and tutor in the department of obstetrics and gynaecology of Sheffield University, and in 1940 he took the M.R.C.O.G. Two months after his appointment as registrar, Green was called on service as medical officer to the Banffshire R.A. Territorial unit, and he served throughout the war, for the greater part of his service holding appointments in India and Ceylon, where he was surgical specialist. He attained the rank of lieutenant-colonel.

"Just over a year ago," writes J. C., "Mr. Green was demobilised and took up again his appointment in Sheffield, where his interest in obstetrical and gynaecological work continued unabated. He was a careful and conscientious surgeon, and it seemed likely that he would worthily uphold the reputation of the Jessop Hospital in the future. But this was not to be. Tall and of a genial disposition, he had many friends both in Banff and Sheffield, and he was held in high esteem by the board and staff of the Jessop Hospital, and by the students, who profited much by his teaching."

Mr. Green leaves his wife with two sons.

Births, Marriages, and Deaths

BIRTHS

- BROMAGE.—On Jan. 16, in London, the wife of Dr. P. R. Bromage—a son.
 CHALMERS.—On Jan. 11, at Inverness, Dr. Mary Chalmers (née Evans), the wife of Dr. K. M. Chalmers—a son.
 DAVIES.—On Jan. 14, the wife of Dr. A. L. Davies—a son.
 FARQUHAR.—On Jan. 9, at Birmingham, the wife of Dr. John Farquhar—a son.
 HARRISON.—On Jan. 17, at Oxford, the wife of Major T. B. Harrison, R.A.M.C.—a son.
 KILGOUR.—On Jan. 8, the wife of Dr. D. R. Kilgour—a son.
 MACKICHAN.—On Jan. 4, at Kampala, Uganda, the wife of Dr. Ian MacKichan—a son.
 ROSE.—On Jan. 14, at Birmingham, the wife of Mr. G. K. Rose, F.R.C.S.—a son.
 SHARRARD.—On Jan. 8, at Sheffield, Dr. Ethel Sharrard (née Spedding), the wife of Dr. J. W. Sharrard—a daughter.
 STERNDALE.—On Jan. 16, at Portadown, the wife of Dr. Harold Sterndale—a daughter.
 STEWART.—On Jan. 14, at Henfield, Sussex, to Dr. Elizabeth Stewart (née Geach), wife of the Rev. David Stewart, R.N.—a son.

MARRIAGES

- BEGG—HEATH-STUBBS.—On Jan. 11, at Lynton, Hants, Francis John Henderson Begg, M.B. to Edith Heath-Stubbs.
 CALDER—BRYDONE.—On Jan. 11, in London, William Norman Calder, M.B., of Johnshaven, Montrose, to Barbara Brydone.
 HALLE—SAUNDERS.—On Jan. 11, at Cambridge, Helmut Max Halle, M.R.C.S., to Frances Mary Saunders.
 MCCARTHY—KNOX.—On Jan. 9, at Amritsar, Denis Arthur MacKauria McCarthy, M.B.E., Indian Police, to Eileen Muriel Dallas Knox, M.B.

DEATHS

- COLLYER.—On Jan. 12, at Croydon, Brice Collyer, M.D. Lond.
 HEWITT.—On Jan. 11, at Strete Raleigh, Exeter, Alfred James Hewitt, C.B., C.B.E., L.R.C.P.E., surgeon rear-admiral R.N.
 LAWSON.—On Jan. 19, Sir Arnold Lawson, K.B.E., F.R.C.S., aged 79.
 ROSE.—On Jan. 12, at Edinburgh, Alexander Rose, M.D. Aberd.
 SMITH.—On Jan. 14, George Melville Smith, M.R.C.S., of Broxbourne, Herts.

Notes and News

AN ACCIDENT SERVICE

THE committee of the Manchester, Salford, and Stretford Joint Hospitals Advisory Board, set up to consider what arrangements should be made for the treatment of accidents in their area, have accepted the British Orthopædic Association's recommendation that patients suffering from soft-tissue injuries should be treated by the same teams of specialists as those suffering from fractures. The committee therefore propose that accident centres with inpatient and outpatient facilities should be set up. Whether this arrangement would actually demand more staff is uncertain, for it would usually only mean that patients would be transferred from one department to another in the same hospital.

In Birmingham one hospital has been set aside for the treatment of accidents, but in Manchester it is unlikely that, for many years, any hospital could be spared for this single purpose. The committee therefore recommended that centres should be provided at the large general hospitals which already have fracture departments. To each a plastic surgeon should be attached, and there should also be facilities for reablement and occupational therapy. They suggest that central Manchester could best be served by a unit at the Royal Infirmary, and south Manchester by a unit at Withington Hospital. In north Manchester they feel that Ancoats Hospital and Crumpsall Hospital should combine to provide a joint centre, and they suggest a similar arrangement for Salford between the Royal Hospital and the Hope Hospital.

Burns should be treated, the committee believe, in special wards so constructed that infection from outside is excluded. The number of cases would be unlikely to warrant setting up such units at each accident centre, and one each for Manchester and Salford should suffice. They suggest that the hospital which should provide the burns service for Salford should be left for agreement between the Salford corporation and the Royal Hospital. In Manchester it is likely that Withington Hospital will be the home of the main plastic centre for the area, and the committee feel that the spare wards for the treatment of burns should naturally gravitate there also.

Once these specialised centres are set up, the other hospitals and ambulance services in the area should give only first-aid or first-stage treatment before sending the patients to the appropriate centre.

A PENICILLIN FILM

STARTING with a description of the physical, chemical, and pharmacological properties of the drug, the Ministry of Health film, *Penicillin in Medical Practice*, tells of methods of testing pathogen sensitivity, and the organisms and diseases against which penicillin is effective. The various vehicles used and the techniques for their administration are described, and the remainder of the film demonstrates a series of examples of its use in medical and surgical conditions, in the treatment of venereal diseases, and in ophthalmology. The film was intended to be generally available nine months ago, but difficulties with the colour process and other reasons have caused delay. Taken as a whole it is not up to the usual standard of the Realist Film Unit productions—it contains too little of broad principles and too many detailed examples, the captions are difficult to read, and the image on the screen is unsteady. Yet the practitioner, if he avoids assuming that by using penicillin he can now safely treat conditions which formerly he sent to a specialist, will obtain some useful information from the mass of detail.

Directed by Jane Massey for the Ministry of Health. Distributed by the Central Film Library in 16 mm. only, sound, colour, 35 minutes.

ELLA SACHS PLOTZ FOUNDATION

DURING the 23rd year of this foundation for the advancement of scientific investigation, 40 applications for grants were received, of which 29 came from the United States, and the remainder from seven different countries in Europe, Asia, and North and South America. Altogether 20 grants were made during the year. Grants are made to researches in medicine and surgery. They may be used for the purchase of apparatus and supplies for special investigations, and for the payment of unusual expenses incident to such investigations, including technical assistance, but not for providing apparatus or materials which are ordinarily a part of laboratory equipment. Stipends for the support of investigators are granted only

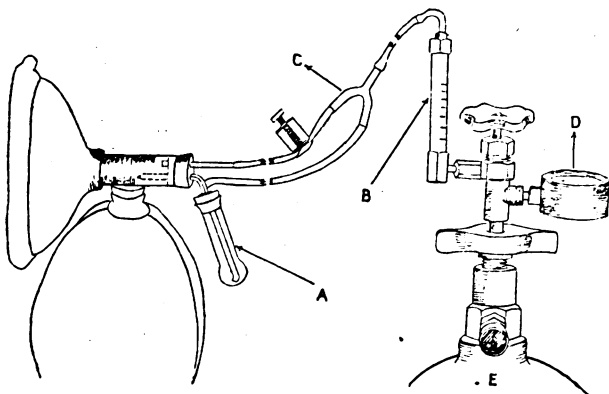
under exceptional circumstances. The maximum grant will usually be less than \$500, and applications for the year 1947-48 should be sent before April 15 to Dr. Joseph C. Aub, Massachusetts General Hospital, Fruit Street, Boston, 14, Mass., U.S.A.

INTERNATIONAL CENTRE OF RELIEF

The relationship of the League of Red Cross Societies (representing all national red-cross and red-crescent organisations) to the International Red Cross Committee (a Swiss body), which was one of the main subjects of discussion at the international conference at Oxford in July,¹ has now been decided. The League of Red Cross Societies will in future be responsible for the transmission of donations; and the International Red Cross Committee will continue, as hitherto, to give further help to civilian populations when needed, especially where it is necessary for the matter to be dealt with by a neutral body. In a statement signed by both organisations² the announcement is made of the creation of an international centre of relief for the purpose of helping people in war-devastated regions by buying for them food, clothing, and drugs. The centre will accept gifts from the national red-cross organisations through the League of Red Cross Societies and directly from bodies not connected with the red cross.

A SIMPLE PENICILLIN INHALER

Dr. L. V. Knutson, of Whittingham Emergency Hospital, Preston, writes: The penicillin inhaler shown in the figure has been in use at this hospital during the last 5 months and was improvised from materials available in the hospital. The results of its use have been satisfactory. The spray used is a Rogers's extra fine crystal spray intended for cocaineisation in



The inhaler assembled. A, Rogers's crystal spray; B, flow-meter; C, glass Y-tube; D, pressure-gauge; E, oxygen cylinder.

nasal operations, manufactured by Messrs. F. A. Rogers, 1, Beaumont Street, London. The penicillin is vaporised too quickly when all the oxygen passes through the spray, so most of the oxygen is passed through a tube in parallel, and the flow can be adjusted by means of a screw clip as shown; 25,000 units of penicillin in 1 c.cm. of water is placed in the spray four times a day and is sprayed out in 10-15 minutes. The oxygen is used at the rate of 2½ litres per minute, the patient filling the bag by exhaling into it after a deep inspiration. Patients learn to use the apparatus after a brief explanation and find it comfortable.

LIVER EXTRACT REGULATIONS

LIVER for therapeutic purposes now being more plentiful, the Liver Extract (Regulation of Use) Order, 1945, has been revoked; both injectable and oral preparations may therefore be freely manufactured and used in treatment.

University of Cambridge

Elmore medical research studentships are shortly to be awarded for work in the university department of medicine. The commencing salary will ordinarily be £400 per annum, and the appointment will be tenable in the first instance for two years. Applications should reach the regius professor of physic by Jan. 31.

1. See *Lancet*, 1946, ii, 172.
2. *Rev. int. Cr.-Rouge*, 1946, 28, 877.

University of Glasgow

The following degrees were conferred on Jan. 11:

M.D.—W. T. Walker, Henry Wapshaw, Hubert Wyers (all with commendation); G. A. Macgregor.

M.B., Ch.B.—R. A. Caldwell, Winifred E. Cameron, J. E. Carlyle, Eileen Carroll, A. A. Chazan, Joan R. Christison, J. I. Cohen, Anne L. Craig, K. B. M. Crawford, A. H. Dawes, H. B. Farrell, Alexander Forrester, D. A. Jack, R. R. Kennedy, K. B. Lazarus, J. B. Lister, John McLennan, M. C. Macleod, R. M. H. McMinn, William McNaught, W. C. MacPherson, A. M. Mathewson, Mary D. Milne, W. A. Mullen, Margaret E. Murison, F. S. Preston, W. H. D. Scotland, Allan Scott, A. L. G. Smith, D. D. Smith, D. H. Sproull, Lesley Stewart, A. A. Thomson, Wilfrid Waldie, Nathan Weiner, Agnes A. M. White.

University of St. Andrews

The following were successful in recent examinations:

M.D.—W. G. Davidson (with honours).

M.B., Ch.B.—Margaret J. Davies, Helen M. Dean, A. F. Fairlie, Mary Gibson, W. J. Halpin, Betty I. Lumsden, Helen L. W. Esplin, R. D. Mills, T. W. Roberts, Patricia A. Scott, J. A. Smith, Eileen Steel, J. M. L. Winton, Janet S. Young.

University of London

Mr. J. B. Hunter has been appointed dean of the faculty of medicine for the period 1946-48.

Mr. Geoffrey Bourne, D.Sc., has been appointed to the readership in histology, tenable at the London Hospital medical college, as from Jan. 1.

Society for Relief of Widows and Orphans of Medical Men

At a meeting of the directors on Jan. 8, with Dr. R. A. Young, the president, in the chair, £1815 was voted for half-yearly grants: widows aged 65 or over received £37 10s. and those under 65 received £25. Members now demobilised from H.M. Forces should notify the secretary of their address; membership is suspended while arrears of subscriptions remain unpaid. Membership is open to any registered medical man residing within 20 miles of Charing Cross, and relief is granted only to the necessitous widows or orphans of deceased members. Particulars may be had from the secretary of the society at 11, Chandos Street, London, W.1.

Harveian Society of London

At the annual general meeting on Jan. 15 the following officers were elected for 1947: president, Dr. Macdonald Critchley; vice-presidents, Mr. A. Wallis Kendall, Mr. J. H. Peel, Mr. John Hunter, and Mr. W. Eldon Tucker; hon. treasurer, Sir Cecil Wakeley; hon. secretaries, Dr. Peter Turtle and Mr. Rodney Smith.

British Institute of Philosophy

During Lent term the following lectures will be held at 5.15 P.M. at 14, Gordon Square, London, W.C.1: Jan. 27, Mr. D. G. C. Macnabb, On Being Reasonable; Feb. 27, Sir Edmund Whittaker, F.R.S., Philosophical Problems Relating to Science; March 21, Mr. W. A. Pickard-Cambridge, Morality—its Nature and Source; April 25, Prof. G. C. Field, D.LITT., On Understanding Plato. On Friday, March 14, at the eugenics theatre, University College, Gower Street, W.C.1, at 7.30 P.M., Prof. L. J. Russell, D.PHIL., will speak on Philosophy and Life.

A Pious Tribute

The centenary of W. H. Duncan's appointment as the first M.O.H. of Liverpool was the theme of Sir Allen Daley's recent presidential address to the Society of M.O.H.'s (*Lancet*, 1946, ii, 611). Later this year, to mark the centenary, Messrs. Hamish Hamilton will publish a monograph on Duncan's life and work by Prof. W. M. Frazer, the present M.O.H. of Liverpool.

Overseas Scholarships for British Graduates

Each year scholarships are awarded by the British Council to a number of overseas students, usually graduates. Since the end of the war scholarships have been offered in return to British graduates by Czechoslovakia, Sweden, the Netherlands, and Finland; and Dr. J. N. Mickerson has lately been awarded a scholarship for the study of diseases of the heart and chest in Sweden. Scholars will in future be selected during the Spring term.

Glasgow's Refuse

Uncollected refuse has been piling up in Glasgow owing to a strike of cleansing-department men which began nearly four weeks ago. The deputy medical officer of health is reported as saying last week that there is no immediate danger to public health. Most people, he said, were burning as much as they could.

Obstetrical Examinations in Australia

For the first time examinations for the M.R.C.O.G. are to be conducted in Australia. Sir William Fletcher Shaw will represent the college at examinations at Melbourne on Feb. 18 and 19, and at Sydney on Feb. 25-27.

Demonstrations of Contraceptive Technique

On Thursday, Feb. 6, at 2.30 P.M., a practical demonstration of the technique of the use of a variety of contraceptive methods will be given at the C.B.C. Clinic by Mrs. Marie Stopes, D.Sc. Medical practitioners should apply for tickets to the secretary, C.B.C., 108, Whitfield Street, London, W.1.

Wireless Calls for Medical Advice

Ships' surgeons are advised by the Ministry of Transport (notice no. M296) to consult the Merchant Shipping Medical Scales before prescribing treatment in response to a wireless call from a British ship with no surgeon on board. Surgeons can thus see what drugs, &c., are likely to be available.

Commonwealth and Empire Tuberculosis Conference

A health and tuberculosis conference, arranged by the National Association for the Prevention of Tuberculosis, will be held in London from July 8 to 10. There will be special reference to the problem as it affects the British Commonwealth, and representatives from all the Dominions and Colonies have been invited; but all aspects of tuberculosis will be dealt with, and it is hoped that many visitors from other countries will attend. On the first day Mr. Aneurin Bevan, Minister of Health, will speak on Tuberculosis and the National Health Service Act. Fuller particulars of the conference, which is open to doctors and laymen from this country and from overseas, may be had from the secretary-general, N.A.P.T., Tavistock House North, Tavistock Square, London, W.C.1.

Foreign Awards

The King has granted permission for the wearing of the following American and Belgian decorations conferred in recognition of distinguished services in the cause of the Allies:

LEGION OF MERIT**Commanders**

Major-General Sir ALEXANDER BIGGAM, K.B.E., C.B., M.D. Edin., F.R.C.P., K.H.P., late R.A.M.C.
Major-General D. C. MONRO, C.B.E., C.B., M.B. Edin., F.R.C.S., K.H.S., late R.A.M.C.

Officer

Brigadier E. R. BOLAND, C.B.E., F.R.C.P., R.A.M.C.

BRONZE STAR MEDAL

Brigadier Sir STEWART DUKE-ELDER, K.C.V.O., M.D. St. And., F.R.C.S., R.A.M.C.
Major P. M. TURQUET, M.R.C.S., R.A.M.C.

CHEVALIER OF THE ORDER OF LEOPOLD II WITH PALM, AND CROIX DE GUERRE 1940 WITH PALM

Captain A. R. TURNBULL, R.C.A.M.C.
Lieutenant A. N. WRIGHT, R.C.A.M.C.

Standards for Equipment

At a conference of hospital organisations held by the British Standards Institution on Jan. 14 in response to a suggestion from the British Hospitals Association, it was agreed to set up a hospital equipment committee with the following terms of reference:

To investigate the need and to make recommendations for the preparation of British Standards for articles of hospital equipment in common usage especially those requiring continual replacement and for such further equipment as may from time to time be considered desirable.

To make recommendations for any necessary action to develop the use of British Standards prepared on its recommendations.

The following organisations have been invited to nominate representatives:

British Medical Association; Royal College of Physicians of London; Royal College of Surgeons of England; Royal College of Obstetricians and Gynaecologists; Society of Medical Officers of Health; Association of County Medical Officers of Health; Mental Hospitals Association; Medical Officer of Health, L.C.C.; British Hospitals Association; Society of Medical Superintendents; Royal College of Nursing; College of Midwives; Association of Hospital Matrons; Association of Municipal Corporations; Ministry of Health; War Office; Air Ministry; Admiralty; Ministry of Supply; Department of Health for Scotland; County Councils' Association; Trades Union Congress; Institute of Hospital Administrators; Purchasing Officers Association; Central Council for the Care of Cripples; The Order of St. John; and British Red Cross Society.

The reduced prices for 'Penicillin Glaxo' announced in our advertisement columns on Jan. 11 (p. 9) came into effect on Jan. 1, and not from Feb. 1 as stated.

Diary of the Week

JAN. 26 TO FEB. 1

Monday, 27th

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5.30 P.M. *Odontology*. Prof. T. Pomfret Kilner: Restoration of Facial Contour—Graft or Prosthesis? Mr. Warren Harvey: Sterilisation of Dental Handpieces.

Tuesday, 28th

ROYAL SOCIETY OF MEDICINE
8 P.M. *Medicine and Physical Medicine*. Dr. W. S. O. Copeman, Dr. Philip Ellman, Dr. G. D. Kersley: Aetiology of Chronic Rheumatism.

EDINBURGH POSTGRADUATE BOARD FOR MEDICINE

5 P.M. (Royal Infirmary.) Dr. Douglas Guthrie: Is Medicine Still an Art?

Wednesday, 29th

BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck Street, W.1
5 P.M. Prof. W. V. Mayneord, D.Sc.: Applications of Atomic Physics in Medicine. (Fifth of six lectures.)

SOCIETY OF CHEMICAL INDUSTRY

6.30 P.M. (Burlington House, Piccadilly, W.1.) Prof. E. Capstick, M.Sc.: The Nation's Milk-supply and its Best Use.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW, 242, St. Vincent Street

4 P.M. Mr. P. H. Mitchiner: Surgery in Two Wars.

ST. MUNGO'S COLLEGE MEDICO-CHIRURGICAL SOCIETY, Glasgow
7.30 P.M. (Royal Infirmary.) Mr. P. H. Mitchiner: Surgical Experiences in the Middle East.

Thursday, 30th

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

5 P.M. Mr. John Hawkins: Movement of the Diaphragm after Operation. (Hunterian lecture.)

SOCIALIST MEDICAL ASSOCIATION

7.30 P.M. (296, Vauxhall Bridge Road, S.W.1.) Dr. H. Joules: Occupational Hazards of the Health Worker.

EDINBURGH POSTGRADUATE LECTURES

4.30 P.M. (Royal Infirmary.) Dr. Ninian Bruce: Limitations of Personality.

Friday, 31st**INTERNATIONAL LEAGUE AGAINST EPILEPSY**

10 A.M. (National Hospital, Queen Square, W.C.1.) Papers will be read.

LONDON CHEST HOSPITAL, Victoria Park, E.2

5 P.M. Dr. J. Smart: Congenital Abnormalities of the Lung.

LEEDS AND WEST RIDING MEDICO-CHIRURGICAL SOCIETY

7.30 P.M. Pathological meeting.

Appointments

ALSTEAD, STANLEY, M.D. Lpool, F.R.C.P.: joint medical consultant for the Highlands, Inverness.

BUCKWOLD, A. E., M.D., L.M.C.C., D.C.H.: deputy medical superintendent and resident M.O., Booth Hall Hospital, Manchester.

DAVIES, I. J., M.D. Wales, D.P.M.: deputy medical superintendent, Mapperley Hospital, Nottingham.

FISHER, HENRY, M.D. Berlin, L.R.C.P.E., D.P.M.: psychiatric specialist, Mapperley Hospital, Nottingham.

FOURMAN, PAUL, M.D. Lond., M.R.C.P.: graduate asst. to Nuffield professor of clinical medicine, the University, Oxford, at the Radcliffe Infirmary.

GILCHRIST, K. J., M.B. Lond., F.R.C.S.: surgeon specialist, Colonial War Memorial Hospital, Suva, Fiji. (Colonial Service.)

HOLMES, J. MACD., M.D. Leeds, M.R.C.P.: consulting physician, Crewe and District Memorial Hospital.

MCEVOY, N. R., L.R.C.P., D.C.H.: asst. M.O.H., Dudley.

MARTIN, J. F., M.B. N.U.I., D.P.H.: M.O.H. and school M.O., Dudley.

MILNER, K. O., M.D. Leeds, D.P.M.: superintendent, Ashton Hall Certified Institution, Nottingham.

MUNRO, T. A. H., M.D. Edin., F.R.C.P.E.: director, York Clinic, Guy's Hospital.

SCHNEIDER-GREEN, J. E., M.B. Lond.: M.O. i/c venereal diseases clinic, Royal East Sussex Hospital, Hastings.

Department of Health for Scotland:

*GRAHAM, H. A., M.D. St. And.: regional M.O.

*HENDERSON, W. K., M.D. Edin., M.R.C.P.E.: regional M.O.

Queen Elizabeth Hospital for Children, Hackney:

COWAN, H. A., F.R.C.S.E., D.L.O.: E.N.T. surgeon.

HAWORTH, ELIZABETH M., M.R.C.S., D.M.R.E.: radiologist.

HODSON, C. J., M.B. Lond., M.R.C.P., D.M.R.E.: radiologist.

British Legion Village:

CLIVE, F. T., M.B. Lond.: principal M.O., British Legion Village.

DAWKINS, VERONICA, M.D. Brist.: physician, British Legion Sanatorium, Nayland.

RINKEL, L. R. J., M.R.C.S.: superintendent, British Legion Sanatorium, Nayland.

* Subject to confirmation.

WARNER DIARIES.—A few of these diaries are still available free to doctors if they will apply to William R. Warner & Co. Ltd., Power Road, Chiswick, London, W.4.

SUPPLIES OF CURARE.—Referring to the shortage of curare mentioned in our leading article of Jan. 18 (p. 107), Messrs. Burroughs Wellcome & Co. inform us that the shortage existing up to the end of 1946 has now been overcome, and future supplies of *d*-tubocurarine chloride are now assured.

MEDICAL ASPECTS OF MARRIAGE GUIDANCE

EDWARD F. GRIFFITH
M.R.C.S.

CLINICAL ASSISTANT TO THE PSYCHOLOGICAL DEPARTMENT,
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Now that marriage-guidance councils are being established throughout the country, it is important to assess the contribution that the doctor may make to this branch of preventive medicine.

An analysis of the statistics of the Registrar-General's reports shows that there were about 42,000 applications for divorce or separation in 1944. A further rise may be expected in the post-war years; hence the marriage breakdown-rate, which was nearly 15% in 1944, may well reach 20% in the near future, where it is likely to remain until the evil effects of hasty marriage, long separation, overcrowding, and the disorganisation of war are removed. A leading article in the *Times* of March 27, 1946, called attention to the fact that there were 38,000 impending divorces in the Fighting Services alone. The number of divorces begun only reflects a fraction of the cases of known infidelity (Hawthorne 1946). War and the evils of war, however, are not the sole cause of the present unsatisfactory situation. Deeper and more serious causes can be found in the changing social mores, which give an entirely new interpretation to personal behaviour. To many people what is right is decided for them by what they themselves feel to be right after weighing up the pros and cons of their own particular problem.

The reports also show that in 1938-43 the average number of women who bore extramaritally conceived children was for each year almost exactly 80,000 (Mace 1945), which is equivalent to 1 in 3.3 of all first maternities. Though some allowance may still be made for the old custom of proving fertility before marriage, it may safely be presumed that in most of these cases the pregnancy was not intended, and that the couple "were too ignorant or too careless to take proper preventive measures or they did so without success" (Mace 1945). It may be safely estimated that 1 in 10 of all women have sex relationships outside marriage. This rate is higher in the lower age-groups. In 1938 40% of all girls marrying under the age of twenty were already pregnant; 30% of those aged twenty; and 20% of those aged twenty-one (Mace 1945).

In most of these "cover-up" marriages the seeds of emotional conflict are already sown, and ignorance of the basic principles of the sexual function, together with feelings of fear, guilt, or shame engendered in one or both partners, will soon produce a rich crop of disharmonies and encourage the development of such conditions as dyspareunia, frigidity, premature ejaculation, and impotence. These unsatisfactory relationships, occurring as they must in thousands of homes every year, cause much preventable unhappiness, anxiety, and ill health in the parents, and various forms of antisocial and delinquent behaviour in the children, who are likely to build the same unstable family pattern when they grow up and marry. Because of these cumulative effects, therefore, the situation is even more serious than may at first appear.

The increase in venereal disease, premarital relationships, abortion, and illegitimacy, to say nothing of the dysgenic tendencies in breeding, are additional pointers to a state of general moral instability, which is made no better by the paucity of houses, the crowding together of families, and the general economic disturbances of the present age.

Finally, there is evidence from the women's welfare centres and other sources, both here and in America, that it is still rare to find the marriage in which sufficient

orgasm is achieved. Of 100 married women attending a birth-control clinic, whose cases were analysed by me in 1933 and discussed at a conference of the National Birth Control Association in July of that year, 41 said that they had no satisfaction, 52 that their feelings were slight, 3 that they were satisfied, and 4, who had received premarital teaching, that they obtained a satisfactory mutual orgasm. A more recent and as yet unpublished analysis of a larger number of cases shows some improvement on these figures, especially among those who have had premarital instruction. Broadly speaking, however, the picture remains much the same. In more than a quarter of the cases reported by Dickinson and Beam (1932), the woman never experienced an orgasm, and an additional 14% experienced it but rarely. Out of 1133 couples investigated by Terman (1938) 1 woman in 3 rarely or never achieved an orgasm. Dickinson (1941) considers that premature ejaculation and inadequate orgasm are the commonest conditions to deal with, a conclusion well borne out by the experience of those working in this field in this country.

Though it may have been possible for people to shut their eyes to these facts in the past and persuade themselves that personal relationships were the concern of the individual alone, that position cannot be maintained today. There is, in fact, a serious breakdown in the pattern of monogamy. Thus, the manner in which each individual behaves must have a profound effect upon society as a whole; it is essential for him or her to equate personal behaviour with social responsibility. But if the individual has a duty to society in the matter of sexual behaviour, so has society a duty to the individual. If we demand a well-thought-out attitude to marriage, we must provide adequate facilities for positive expression.

The work of a marriage-guidance council (M.G.C.) can therefore be considered under two broad headings—remedial and preventive. Remedial work, though predominant at the moment, should become decreasingly important as and when the factors leading to marital disharmony are eliminated by preventive measures. Though a M.G.C. does not provide medical treatment, it does refer patients to suitable marriage consultants, or ensure the provision of clinic facilities for adequate examination and premarital guidance, which should include the necessary laboratory and gynaecological facilities. The active co-operation and support of the local practitioners should always be enlisted.

Remedial Work

The bulk of the work of a newly established M.G.C. is remedial and covers a large field which does not necessarily have any medical content. At the London centre applications for help come from all over the country and from every type of person, and cover every possible social, legal, religious, and medical problem. In the past three years the London M.G.C. has dealt with several hundred cases, apart from an extensive postal correspondence, which often involves several hundred letters a week. Misunderstandings about the nature and purpose of marriage, lack of creative outlets, boredom, and a lack of any real feeling of responsibility and trust, all contribute to the eventual upheaval. Understanding, sympathy, toleration, and, in particular, a sense of duty are noticeably absent from many of these cases. Lack of efficient housing accommodation; a too close relationship with parents, who often insist on interfering in the affairs of a newly married couple; arguments over money occasioned by one or both earning independent incomes and secretiveness about the family income; all are fruitful sources of friction which eventually affect the stability of the relationship and undermine that broad and sympathetic consideration for the needs of the other partner which are so essential to an adequate marriage relationship. Sex disharmony, lack of orgasm, inefficient technique, ignorance, and an inability or unwillingness

to have children are additional factors leading to emotional maladjustment. The relationship between many a couple is often so emotionally and spiritually sterile that all one can say about the marriage is that it is merely a licence for cohabitation. The basic requirements for establishing a constructive partnership are conspicuous by their absence.

If sexual maladjustments could be prevented, many marriages could be saved. The lack of knowledge exhibited by many otherwise well-informed people about the elementary principles of sexual hygiene is extraordinary.

The tendency to separate the individual into specialist compartments is most unsatisfactory. It by no means follows that frigidity can be cured by the psychologist, or inadequate orgasm by the gynaecologist; each may need the help of the other. Nor is it of much use to attempt reconciliation unless the other partner is willing to coöperate. Thus, every endeavour should be made to see both partners either together or separately; not until this has been done should a decision be made about treatment. In some cases the couple can be brought together by one person; in others it may be necessary to send husband and wife to different doctors. Man is a whole and should be viewed as a whole, in particular in regard to his sexual troubles, which so often are a mixture of technical ignorance, emotional misunderstanding, irrational fears and inhibitions, minor physical conditions, economic distress, and spiritual disharmonies.

It is probable that the marriage consultant of the future will and should be drawn from the ranks of the general practitioners, whose outlook and training often make them eminently suitable for this type of work. The fact of receiving a medical training by no means necessarily implies that the doctor has clarified his own thinking about sex problems, or that he will approach them with understanding, wisdom, and toleration. It is, however, essential to reach this state of maturity before attempting this type of work. The marriage consultant must have a good knowledge of general medicine; psychology, particularly the sexual psychology of both sexes; gynaecology, including contraception and sterility; and an understanding of the adolescent mind. The cases that will present themselves to him are almost always complicated and often require the wisdom of a Solomon and the patience of a Job. Some, in the light of our present limited knowledge, appear to be insoluble; others solve themselves with exceptional rapidity and a small amount of guidance.

Whereas it cannot be said that a marriage which is sexually adequate will be successful, though it may "favour happiness without guaranteeing it" (Terman 1938), it can be said with some confidence that a marriage which is not sexually adequate will be unsuccessful, however promising its start. The tragedy is that so many marriages which, at their onset, appear to be psychologically and temperamentally suitable, break down through preventable sexual maladjustments. If the fears, worries, anxieties, and taboos which lead up to these unsatisfactory conditions could be removed or avoided, and adequate preparation could be given before marriage, the whole pattern of the marriage relationship could be altered towards a positive and creative fulfilment, and the stability of the family unit strengthened in a generation.

There is urgent need for the establishment of more effective methods of marriage reconciliation. The divorce-court machinery should be amended in some way to make this possible, and there should be far greater coöperation between doctors and lawyers. Matrimonial courts should be extended, and the assistance of marriage consultants should be made available in the courts.

This is not the place to discuss in detail the various medical conditions (Griffith 1945) that are met in the investigation of marriage disharmony. A more fruitful

line of approach is to consider what may be done to prevent the conditions from ever arising, and to minimise their seriousness when they do arise.

Preventive Work

The essence of marriage-guidance work lies in prevention, which consists of preparation for marriage, premarital consultation, and sex education.

PREPARATION FOR MARRIAGE

Until recently most attempts at preparation for marriage on the Continent or in America have been directed towards the provision of a health certificate stating that the individual is free from venereal disease (Sheppe 1941) and the grosser forms of physical disability, such as tuberculosis, mental deficiency or feeble-mindedness, and other hereditary conditions (Kopp 1938). The more positive idea of adequate premarital instruction and clinical assistance, in both the physical and the psychological spheres, is a comparatively new conception and has been forced upon us both by increasing scientific knowledge of the human personality and by the distressing failure of the former policy of *laissez-faire*. Most of the original work in this field was done abroad, in Germany and Sweden before the war, and in America under the leadership of such doctors and sociologists as Dr. R. L. Dickinson in New York, Paul Popenoe in Los Angeles, Margaret Sanger, and Prof. Ernest Groves.

Any advance that has been made in this country is largely due to the pioneer work of the Eugenics Society and the activities of the Family Planning Association (formerly N.B.C.A.), in whose clinics the picture of sexual disharmony has been slowly unfolding itself during the past twenty years. Many other organisations have considered this problem from one angle or another. All are concerned with remedies rather than with prevention. Slowly but surely it is becoming apparent that the answer to many of their difficulties is only to be found in adequate preparation for marriage and the creation of a stable family background. No matter how good people's intentions may be, marriages will go wrong so long as we do not provide the elementary essentials; when their intentions are not so strong and the background not so stable, the result is disaster.

Certification.—Compulsory examination or certification is not likely to prove acceptable in this country, and it is probable that better results can be obtained by a constructive policy of education. The establishment of efficient and well-staffed marriage-guidance centres at which people could obtain expert help and guidance would probably have a most beneficial effect on the whole population. The London M.G.C., originally started in 1937 and re-established in 1943, was the first organisation in this country to attempt the provision of an adequate premarital service. It is staffed by doctors, lawyers, social workers, and ministers of religion, all expert in their own particular sphere of work and all ready to work together and pool their ideas. Similar centres are springing up all over the country.

Desirable Qualities.—One of the first considerations that must present itself to anyone dealing with the problems of marriage and the family is that of the quality of the stock which is reproducing itself. It is generally recognised now that we are breeding dysgenically; that those whose qualities are such that they should be increasing the population very considerably are not doing so, whereas those less suitably gifted are more prolific. It has been shown by various authorities that the least intelligent families have on the average some three times as many children as the most intelligent, fertility declining evenly from one extreme to the other. The reversal of this adverse trend should be one of our primary objectives (*Eugenics Review* 1945). Those concerning themselves with marriage-guidance work should have a clear idea of the most desirable qualities necessary for eugenics

breeding. The following five characteristics of excellence have recently been suggested (*Eugenics Review* 1945):

- (1) Sound physical and mental health and good physique.
- (2) Intelligence.
- (3) Social usefulness; the individual should be a valuable and coöperative member of his community, with moral qualities which make him a good citizen.
- (4) The individual should be free from genetic taints—i.e., unable to carry or transmit familial diseases and defects.
- (5) It is desirable that he should be a member of a big, united, and well-adjusted family, and that he should be fond of children.

To these I would add a sixth: that he should possess a sense of spiritual awareness which will give him a sense of personal integrity. These six qualities should, in a community which provides good prospects for the future welfare of children, create a couple who, by intention and design, produce "a family large enough for replacement and provide for it a happy and healthy home" (Blacker 1945).

Presuming, therefore, that the above criteria are fulfilled, and the couple—possessing, as they should, the same standards and cultural values—have reached agreement on such subjects as religion, education, and the place of children in the family unit, the way is open for effective premarital consultation.

PREMARITAL CONSULTATION

Before making any investigation or physical examination of the couple, it is necessary to reassure them and relieve any anxiety or nervousness which may be apparent. In no circumstances should matters be rushed, or the couple made to feel that the consultation is an ordeal. They should be encouraged to express their own views and desires regarding their marriage, so that an assessment can be made of their basic needs and psychological insight. Thus it may be wise to delay the physical examination until other matters which may be worrying them have been dealt with. Every case must be considered on its merits, and no hard and fast orders of procedure can be laid down.

Some couples come together, some separately. Some come six months before the wedding date, others the day before. Some want advice about a particular aspect of marriage, such as the genetic one or the state of their physical health, before deciding to become engaged. Some are timid, embarrassed, and woefully ignorant; others have the whole matter taped, even to deciding the best day on which conception should take place. Unless special circumstances exist; it is best for both partners to see the same doctor, both separately and together, in two or more sessions of about half an hour each. The most suitable time for the first visit is probably about a couple of months before the wedding, as this will allow plenty of time for the correction of any minor conditions.

Eugenic Background.—A full family history is essential if any attempt is to be made to assess genetic qualities. People are often seriously disturbed by the possibility of passing on inheritable diseases to their children, and often possess very inaccurate information about what is or is not transmissible. Others have not considered the possibility that there are dysgenic qualities in their family constitution which might debar them from having children; others occasionally under-estimate or ignore serious situations and even refrain from mentioning them to their future partner. The Eugenics Society has prepared a health schedule and a document on how to prepare a family pedigree, which will be found helpful in difficult cases.

Prediction Tests.—Many attempts have been made in America to devise machinery for the assessment of those qualities which make for stability in family life. According to Himes (1941), recent researches by sociologists, such as Burgess, Cottrell, and Terman, prove conclusively that success in marriage can be predicted within a modest

range of error, and various prediction tests have been devised to enable people to choose a satisfactory mate. These elaborate methods have not yet been tested in this country.

Though it may be difficult to assess those factors which make for happiness in marriage, it is perhaps easier to recognise those which contribute to unhappiness (Terman 1938). According to Baber (1939) it is not merely the presence of this or that trait, commonly supposed to be undesirable, that makes a marriage unhappy; rather does it depend upon whether this trait, possessed by one, happens to clash with the attitudes or actions of the other. "Personality patterns fail or succeed in marriage not because they are different or similar, but because they interfere or do not interfere with each other's basic wishes. Marital conflict is not a difference in traits, but a collision of wishes" (Folsom 1934).

Though my own experience leads me to agree with this statement, I am inclined to think that it is not so much the collision of wishes which causes the trouble as the desire to change the partner and fit him or her into a preconceived pattern of what that partner should be. The one is always striving, consciously or unconsciously, to dominate the other and prevent freedom of growth and expression which are the essence of comradeship and love.

Terman (1938) lists the following eight points as being most productive of marital happiness:

- (1) Superior happiness of parents.
- (2) Childhood happiness.
- (3) Lack of conflict with parents.
- (4) Home discipline that was firm, not harsh.
- (5) Strong attachment to parents.
- (6) Parental frankness about sex matters.
- (7) Infrequency and mildness of childhood punishment.
- (8) Premarital attitude towards sex that was free from disgust or aversion.

"The subject who 'passes' on all of these items is a distinctly better-than-average marital risk" (Terman 1938).

Terman considers that the two most important sex factors making for happiness are adequacy of orgasm in the wife and equality in sex drive between husband and wife. Even so, these factors are apparently less important than a happy parental background, childhood happiness, or the amount of conflict between the child and the mother (Terman 1938). In my experience parental fixations and passive domination on the part of one or both parents are a fruitful source of future unhappiness and, very often, of sexual inadequacy. Of all the psychological factors militating against successful marriage emotional instability is probably the most decisive.

Pessimism, obstinacy, oversensitiveness to criticism, a determination to get one's own way and override the feelings of the other, lack of consideration, and dogmatism are unsuitable traits likely to lead to unhappiness. Though self-confidence in the husband makes for adjustment in marriage, self-sufficiency has the opposite effect. Ability to make friends and show an adequate capacity for socialisation is valuable; excessive introversion and self-examination are not. A similarity of cultural levels and religious activities makes for adjustment. Love gradually developing out of companionship, congeniality, and mutual interests is likely to prove more stable than love based on mere personal beauty or sex attraction.

The value of bringing unsatisfactory situations to the surface cannot be over-emphasised. Should the psychological picture prove too unsatisfactory, it may be necessary for the consultant to suggest the postponement of the marriage until the couple have had time to take stock of the situation. Ideally, society should provide adequate educative and recreational facilities for young people to learn about each other more adequately before engagement. Many potential marriage breakdowns can

be prevented or minimised by a frank recognition and discussion of difficulties, by some simple psychotherapy, and, above all, by adequate instruction in sexual procedure, so that full emotional release is likely to be established at an early date. A broken engagement is better than a broken marriage.

In the sexual sphere four factors seem to be generally accepted as being of supreme importance (Burgess 1939):

- (1) Adequate sex instruction in childhood from parents, who should show a frank response to the child's questions and curiosity.
- (2) The wife should never have desired to be of the opposite sex; nor should the mother have strongly desired a child of one particular sex.
- (3) No sex shocks should have been experienced from the age of 10-15 years.
- (4) There should have been no excessive petting before marriage.

Inadequate sexual adjustment, combined with an unsatisfactory psychological pattern, will lead to trouble in later years. The investigations made in America therefore provide us with pointers which should enable us to plan our own future work more adequately.

Elimination of Inhibiting Factors.—One or more of the following conditions or ideas, more closely connected with the sexual function and usually ignored or glossed over in the past, are constantly arising as inhibiting factors to a healthy marital adjustment:

(1) A negative approach to sex, often originating in early infancy, and usually due to parental mismanagement which has produced a series of fears, inhibitions, and misunderstandings. The passive domination already mentioned, and so often found in so many "good" homes in which sex is never mentioned, is as bad or even worse than the type of family where sex is loosely discussed. The effects, however, can often be eliminated, and mutual harmony attained, by an appreciative understanding of the situation.

(2) The presumption that the sex act is a mere copulatory activity, mainly concerned with self-amusement outside marriage and with reproduction inside marriage, is usually combined with a refusal or inability to realise its social and spiritual value. This attitude inevitably leads to emotional tension, which encourages a hasty and clumsy approach on the part of the man and premature ejaculation. In women it leads to excessive diffidence, over-sensitiveness, fear, and minor degrees of vaginismus and frigidity.

(3) "Sex is a naughty mystery, both frightening and exciting." Such an attitude has usually produced excessive sexual excitement during engagement without adequate release, self-stimulation (masturbation), and misguided sexual adventures. Having experienced excitement on the one hand, and lack of fulfilment on the other, the individual is always seeking new adventures in the hope of finding positive and satisfying adjustment. This situation often leads to premarital relationships, which usually prove unsatisfactory and, by prematurely awakening the emotional life, encourage other adventures or an acceptance of marriage as an escape from an intolerable situation.

(4) "Sex activity is a fatiguing process leading to the loss of vital energy." This idea, more prevalent in men than in women, is usually the result of foolish teaching about self-stimulation during adolescence. The number of young people frightened by threats of punishment of "sin," even bodily mutilation, by the over-anxious parent is still considerable (Pullias 1937).

(5) Many young people, particularly men, are firmly convinced that the practice of self-stimulation has led to permanent injury to their sex organs and mental lassitude. This situation is not improved either by the nonsense still widely disseminated by much "sex literature" or by the admonitions of so-called moralists. The idea that sex is beautiful or refreshing and essentially positive is foreign to the minds of the great majority of the parent population.

(6) "Man is capable of erection at any moment, and once this is established it can and should be maintained indefinitely." Its temporary disappearance is viewed with the gravest concern and is a fruitful cause of temporary impotence in the sensitive type of male. Very few people appear to understand that a temporary loss of erection is common, especially at the beginning of marriage, and should

occasion no alarm. Fewer still seem to know how to deal with the condition when it does occur.

(7) "A man should be able to perform the sex act several times a night." This is a foolish and misinformed opinion which prevails in every section of youthful society.

(8) "Once penetration is effected, the woman should experience orgasm automatically or at least when ejaculation takes place, even if this takes only a couple of minutes." The couple do not realise that the achievement of mutual orgasm requires practice, patience, and consideration in surroundings which are emotionally and socially secure. This ignorance is largely due to the idea that the woman is a passive partner. Very few people realise that the vagina is a muscular organ possessing as positive a function as that of the penis.

(9) "Stimulation of the clitoris is an essential preliminary to coitus." Many men spend a considerable time trying to rouse the woman, who is probably perfectly ready for coitus in a few minutes (Griffith 1946). Many women do not distinguish between orgasm of the clitoris and vaginal orgasm. The one is a precursor to the other and may or may not be experienced. Petting, which usually includes stimulation of the clitoris, fixes the emotions at an immature level.

(10) "Penetration must not be attempted until there is sufficient vaginal lubrication and a considerable degree of sexual excitement." No hard and fast rule can be laid down about this, because couples vary considerably in their love patterns, but the use of a simple lubricant will usually be found useful. It by no means follows that natural lubrication always takes place or is sufficient, especially to begin with.

(11) "Provided the woman is willing for penetration to take place she has little further contribution to make." This common misconception is due to a negative parental attitude combined with the idea that sex is merely a reproductive process which must be put up with and that passion is "not quite nice." The distinction between the mating and the reproductive aspects of the sex instinct has never been understood. Such women often encourage the development of impotence in a sensitive man by this non-coöperative attitude.

(12) "The penis must not be withdrawn from the vagina once penetration has occurred, and little or no variation in position is either possible or advisable." The use of a sheath encourages this idea owing to difficulties arising over its management.

(13) "The whole sex act should be completed in about five minutes—delay leads to fatigue and is therefore physically dangerous."

(14) "The only time to carry out the sex act is at night, in the dark, and in the cold." The aesthetics of sexual intimacy have still to be learnt by 90% of the population.

(15) "The man needs sexual activity more than the woman." This I believe to be profoundly untrue.

(16) The idea that man is easily aroused and as easily put off by unsuitable surroundings, fear of interruption, criticism or indifference, and various other minor factors is foreign to many women.

(17) "A woman should pretend she gets an orgasm, whether she does so or not." This is the first step on the downward path to marital disharmony.

(18) "Sex and religion are antagonistic to one another; hence sexual enjoyment is neither 'right' nor 'nice'."

These and many other similar attitudes can usually be discovered by a little sympathetic questioning. Their persistence can only lead to unsatisfactory results. No sexual act can reach a mature fulfilment unless there is mutual coöperation and understanding.

The exhibition of passion appears to some people to be almost improper and, though they want it, they are frightened of it. The resulting tension causes much unhappiness, and many couples never reach a full orgasm, because they are afraid of releasing emotional energy. They are satisfied with the pleasure of ejaculation or the sensation derived from stimulation of the clitoris. Both, however, are expressions of an immature sexuality and cannot be compared with the maturity of a mutual orgasm (Reich 1942, Griffith 1946). To combat these negative ideas it is necessary to consider some of the principles necessary for adequate sexual adjustment.

Sexual Adjustment.—(1) Being in love is being in that state of mind in which one is concerned with the needs of the other person. Sexual activity, therefore, when it is

expressed on the copulatory level, is a self-seeking activity and can only lead to dissatisfaction and fatigue. As an expression of all that is highest and best in human nature it is a refreshing and creative activity of both body and soul which has nothing evil about it unless we make it so. Sex activity cannot function satisfactorily unless the couple are in spiritual accord.

(2) The sexual impulse has three complementary and mutually inclusive functions: the transference of sex energy into other creative channels, mating, and reproduction. The first is the channel through which sexual energy can be released in activities of social value and is the basis of vocational celibacy and the safety-valve which should prevent distortion or deviation. The second is one of the chief ways in which the emotional needs of man and woman can be fulfilled and is the more personal and intimate. The third, by creating children, is the fulfilment of the individual's biological and social needs and the way in which he perpetuates himself. All three must find expression both separately and together in the marriage relationship. There are times when sexual activity must be curtailed or forgone. There are times when the achievement of an emotional rhythm and orgasm is essential, and there are times when children must be brought into the world. Each has its own proper uses and provides its own rewards.

(3) Only recently, however, has the distinction between the mating and the reproductive functions been clearly recognised, and only still more recently—by the perfection of contraceptive methods—has it become possible to give effective expression to both in marriage. Now, for the first time in the history of mankind, is woman on an equality with man in this respect and able to regulate her sex life without the constant fear of unwanted pregnancies or abortion.

(4) Both the mating and the reproductive functions must be expressed if the married life of the couple is to be fully integrated. The tendency in the past has been to concentrate on the reproductive and to presume that the mating aspect will function automatically. But this is not so.

(5) The achievement of an adequate orgasm is of prime importance in the development of marriage harmony and should be established before the reproductive function is expressed. Once established, it is something to which the couple can return with confidence after the birth of each child. If the reproductive aspect is expressed first, it may take months before the mating aspect is fully established.

(6) It may take a week or six months to achieve this mutual orgasm. Failure to do so will produce an immature sexual pattern and is a fruitful source of marital disharmony (Reich 1942). Once it has been achieved, the couple should prove their fertility as soon as possible.

(7) Man and woman are complementary to each other; neither must possess or dominate the other. Each must learn to understand the needs of the other and respect his or her personality.

It will be seen, therefore, that the elimination of unnecessary fears and anxieties is one of the most important functions of preparation for marriage. Some couples will not present any such problems; others will be full of them. The time taken over this part of the interview, therefore, will vary considerably. When these fears have been eliminated, however, the physical examination can be undertaken by both doctor and patient with confidence, because a proper understanding will have been reached regarding its nature and purpose.

Physical Health.—The physical examination is best divided into that of general health and that of sexual functioning. A full physical examination should always be carried out, unless there is evidence of its having been done recently elsewhere. In some cases it should include radiography of chest, measurement of blood-

pressure, hæmatological investigations, and a serological examination for syphilis.

Sexual compatibility without psychological harmony is of little permanent value in marriage. Indeed it will soon disappear. On the other hand, psychological harmony by no means indicates that sexual compatibility will be achieved. The establishment of an adequate emotional rhythm between the partners is essential. Thus, not only must there be no psychological inhibiting factors and imperfect knowledge, but also there must be no bar to the effective performance of the sex act. Initiation should be painless and without fear. The achievement of mutual orgasm will take time, no matter how understanding, knowledgeable, and well-adjusted the couple may be.

In the man, the previous sex-history and experience, the degree of sexual development, the onset of puberty and night losses, sexual attitude and phantasy life, and the presence of any abnormality should be investigated. If the foreskin is tight, it can be gently eased by the patient or, if this proves unsatisfactory, removed by operation.

In the woman, the previous sex-history and experience, onset and nature of menstruation, and sexual attitude and approach should be investigated. An internal examination must always be made to determine the nature of the hymen and the condition of the sex organs, though an accurate assessment of the latter cannot always be made at this stage.

The hymen varies enormously in shape and consistence; it may be practically non-existent or so tight and rigid that it is impossible to introduce the tip of the index finger without causing pain. It is a mistake to think that coitus must always rupture the hymen; if the hymen is very resilient it may stretch easily without rupture. This is noted by Kerr (1944), who states that "penetration and actual conception can occur as a result of a stretching of the hymen merely." In such cases it is often extremely difficult to determine the degree of penetration or to assess the frequency of coitus. On the other hand, pregnancy can take place even when penetration is impossible, the sperms passing through the smallest orifice. Most hymens will permit the passage of the lubricated index finger to the first or second knuckle with ease; some will accept the whole finger. Most women can be taught to dilate their own hymens. Only in a small percentage (2-3%) will the hymen be found so rigid that it will require stretching or removal under light anaesthesia. In such cases careful dilatation with fingers and dilators is preferable to rapid stretching, which is inadvisable because it may lead to trauma and bleeding, and may produce hymenal tags which can become most troublesome later. Gentle dilatation under light 'Pentothal' anaesthesia, which produces excellent muscular relaxation, is sufficient for most cases, the vaginal orifice accepting two fingers to their full length. This can be done in the consulting-room, the patient returning home later in the day, or the patient can go into a nursing-home for the night. Only very occasionally does the hymen require surgical removal. In such cases, but not all, one finds a general resistance of the musculature, and some indication of immature sex development. Contraceptive technique can be taught after premarital dilatation if this is desirable. Occasionally the couple will decide to carry out the dilatation themselves after marriage, in which case the husband must be instructed in the necessary technique (Griffith 1946).

Technique.—Much has been written on technique, and yet there is still considerable ignorance of the simplest details, and much marital disharmony is caused through an inability to understand its principles. The first essential is to effect a full and painless penetration and to avoid premature ejaculation; the second is the achievement of mutual orgasm and the adequate release of

emotional tension; the third is the intentional achievement of pregnancy. In practice one so often finds that penetration is far from satisfactory—premature ejaculation persists or develops instead of diminishing, and pregnancy takes place unintentionally and without any adequate release of emotional tension. An adequate rhythm of emotional response should be established before pregnancy is attempted. Except in special cases, this cannot be achieved unless a suitable contraceptive technique has been acquired. Anxiety over an unintentional pregnancy encourages premature ejaculation and inhibits the free achievement of orgasm. A newly married couple are primarily concerned with themselves; they want each other both psychologically and physically, and they wish to express their mutual love in coitus. My experience leads me to believe that the establishment of adequate orgasm is an essential prerequisite to pregnancy and an adjusted sex life later. People vary, however, and it would be most unwise to lay down any hard and fast rule.

If a couple, having carefully considered all the pros and cons, are firmly convinced that they do not wish to employ contraceptive methods to start with, their wishes should be respected. After all, it by no means follows that the woman will necessarily become pregnant at once, and she certainly will not achieve an orgasm if she is doing something of which she disapproves. Most couples, however, usually wish to proceed as I have suggested. Should they wish to use the "safe-period" method, they should be taught how to determine it. The main purpose of all premarital advice is to ensure that whatever is done is done consciously, willingly, and with forethought.

The technique of penetration is discussed fully by various writers (Van de Velde 1928, Griffith 1946, Wright 1943). It should be explained carefully to the couple. No marriage consultant should undertake this work until he has mastered the various aspects of his subject and is prepared to discuss them fully and dispassionately. Two of the commonest mistakes a couple can make are to prolong the first stage of love-making until the man is tired, and to use a condom at first because they are told by their advisers, both medical and lay, that it is impossible or inadvisable to teach a woman a contraceptive method before marriage. I believe this to be quite inaccurate and have only on the rarest occasions failed to give a woman adequate contraceptive advice before marriage. The use of a condom merely accentuates the worries and anxieties that most men experience on their honeymoon and, apart from encouraging rapid ejaculation, restricts activity in that the fear of the condom being dislodged inhibits temporary withdrawal, re-entry, or change of position. Though it is contrary to the accepted teaching, I am convinced that a condom should only be used in the most exceptional circumstances. Most women find it aesthetically objectionable, and most men are thankful to discontinue its use. I invariably ask a man with impotence or premature ejaculation to give it up and teach the woman an adequate contraceptive method. Coitus interruptus is always contra-indicated.

Some women find it very difficult to accept the mating aspect of the sex instinct. Their previous education and family background have been such that they either regard sexual intercourse as definitely displeasing and painful or something that they must put up with for the sake of achieving pregnancy; their whole sexual outlook is conditioned by the reproductive factor. There must be a balance between the mating and the reproductive factors, but on no account must the first be omitted; it is in fact the precursor of the second.

Potency and Subfertility.—The investigations that are made at this time will enable the consultant to assess the potency and sexual attitude of the couple. If the

man is willing, a seminological examination should be made to determine the health and number of the sperms. Such an assessment should be encouraged by the profession because the procedure is so simple. The determination of the degree of development of the woman's sex organs is more difficult, but any evidence of subfertility should be noted, and the couple told to seek adequate help if pregnancy does not supervene after a suitable time.

Family Planning.—Children should be intentionally created and adequately spaced. Modern contraceptive methods, if used by the woman and effectively taught by the doctor, provide such a high degree of security that failure need scarcely be contemplated. Doctors who are not prepared to coöperate fully with their patients in the matter of contraception and premarital advice should refer couples to those who are capable of giving this advice. One cannot decide the type of contraceptive suitable for any particular woman simply by looking at her or sending her to the local chemist or nurse. No soluble is safe when used by itself. No woman should be fitted with a diaphragm or cervical cap unless she is taught how to use it and is convinced that she understands its use and application. Neither is the use of a douche desirable or necessary. Modern contraception is fully reliable and easy to learn, provided it is properly taught. Its use provides for the proper achievement of orgasm and the effective spacing of children. By no other means can these two purposes be adequately achieved. It is, however, but one part of preparation for marriage. Most birth-control clinics now provide a premarital service which is gradually improving.

SEX EDUCATION

The premarital consultation should be regarded as the terminal activity of a long preparatory period which should start in the home, continue in the school, and be developed in a series of lectures and discussions on every aspect of marriage and the family in all our universities, industrial centres where youth is congregated, and in our youth groups. The educational facilities for this sort of work are much further advanced in Sweden and in the universities of the U.S.A. than in this country. Greater facilities should be provided for young people to meet in suitable surroundings, and the period of courtship and mate selection should be encouraged and respected both by parents and authorities. Finally, it must never be forgotten that the family, once created, must be encouraged to grow and helped over the various hurdles which it will inevitably meet. One of the future functions of the marriage-guidance councils must be directed towards providing a follow-up service for young married people, especially after they have had their first baby. Every endeavour must be made to treat the family as a unit and to consider the difficulties of one member in relation to the whole.

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FENESTRATION OPERATION FOR OTOSCLEROSIS

INTERIM REPORT ON 136 CASES

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THE deaf are becoming increasingly aware that there is now an active form of treatment which offers some of them at least a measure of relief from their affliction. An increasing number of deaf people are seeking advice from medical practitioner and aurist, and it should be realised that 1% of the population show evidence of clinical otosclerosis at some time in their life, and half of all the deaf apparently suffer with otosclerosis.

In the absence of any proved aetiological factor, treatment of this disease is directed towards alleviating the symptom of deafness. Hormones, vitamins, and irradiation have all had their trial with disappointing results. Many years ago it was noticed that the creation of a new opening in the bony labyrinth immediately restored the patient's hearing and often stopped the tinnitus. Presumably the restoration of hearing was due to mobilisation of the perilymph and endolymph, for the deafness of otosclerosis is due to the functionally impeded oval window which has become occluded by the otosclerotic bone proliferation.

It has been established that the only way to relieve this condition is by surgery, and a variety of operations have been devised for this purpose. In 1876 Kessel reported the removal of the ankylosed foot-plate of the stapes; the result was a restoration of hearing, but this was rapidly lost owing to closure by bony growth. Passow in 1897 obtained a similar result by fenestrating the promontory. Bárány in 1910 suggested creating a fistula of the semicircular canal, and in 1914 Jenkins covered such a fistula with a Thiersch graft. Between the world wars Holmgren, of Stockholm, and Sourdille, of Nantes, performed much of the early work on the surgery of this condition, and in 1939 I published the results of 14 cases of clinical otosclerosis treated by fistula operations.

In 1926 Lempert had devised a one-stage fenestration operation and he subsequently tried many ingenious methods of inhibiting bone regeneration to keep the fistula patent. In 1941 he described a new "fenestra nov-ovalis" operation, and in 1945 he published the results of an extensive series of cases in which he had inserted into the new opening, which he now makes in the dome of the vestibule, an autogenous cartilaginous graft or stoppel.

Last year Shambaugh (1946), of Chicago, gave an account of 822 fenestrations performed under continuous irrigation, and reported that in 88% of cases of more than two years' duration a hearing improvement of ten decibels or over has been fully maintained. Shambaugh states that two years should elapse before considering the result "permanent"; up to this time bony closure of the window may still occur, though the proportion of closures occurring after the first six months is extremely small. In my own experience the percentage of closures in the first six months is higher in young adults (approximately 10%) than in those over fifty (approximately 5%). This may be due to the same factor that influences bony union of fractures in the young and the elderly.

I have been impressed by the high percentage of permanent results likely to be obtained from the fenestra nov-ovalis operation performed under continuous irrigation. I now employ it in all cases. The published work on the treatment of otosclerosis by measures other than surgical does not record a single case that has been

improved to the serviceable level, yet many otologists are still unwilling to advocate the operation.

CLINICAL DIAGNOSIS OF OTOSCLEROSIS

In the early stages the deafness of otosclerosis is essentially a lesion of the sound-conducting mechanism, but later secondary degeneration, or disuse atrophy of the organ of Corti, may further enhance the deafness. Since there are other lesions of the sound-conducting mechanism which give rise to deafness it would be necessary for a biopsy to be performed before an accurate scientific diagnosis of otosclerosis could be made. Histological proof of otosclerosis is, however, present in abundance in cases of deafness bearing a definite clinical form, and on this evidence deafness thought to be otosclerosis should be referred to as "clinical otosclerosis."

Diagnosis is based on an air-conduction deafness having the following characteristics:

1. It is insidious in onset, though its commencement may be associated with an accident, illness, pregnancy, or worry.
2. It is progressive, though the rate of progress varies considerably from a mild deafness increasing slowly over many years to almost total deafness in two or three years (case 1: fulminating otosclerosis).
3. Presumably owing to cessation of activity of the bony lesion there may be apparent periods of arrest of the deafness.
4. A family history of hereditary deafness is usually obtainable (case 2). All deaf members of a family have the same blood-group.
5. It is more common in females than in males.
6. The age of onset of the deafness is usually between 18 and 30, though I have known a case of advanced deafness due to otosclerosis in a boy of 9 years. A child at school may be backward and blamed for inattention when in reality the inattention is due to deafness.
7. Debilitating diseases, severe mental disturbances, and pregnancy often accelerate the progress of the deafness. I have noticed that pregnancy does not always cause a depression of the hearing however.
8. The speech of the early otosclerotic is often soft and modulated, whereas in deafness due to nerve involvement the voice may be loud and strident.
9. The patient usually says that he hears better in a background of noise, such as while travelling in a train or motor-car.
10. Tinnitus—either unilateral or bilateral—in varying degrees is often present.
11. If the degeneration process involves the labyrinth, nausea and disturbance of equilibrium may be complained of.

Clinical examination shows all or most of the following signs:

1. Translucent tympanic membranes which are freely mobile on Seigaliation.
2. A pinkish blush in the posterior half of the drumhead, due to congestion of the mucosa over the promontory of the cochlea—the so-called flamingo shimmer.
3. The meatus is free from wax, or nearly so.
4. Patent eustachian tubes; inflation of the tubes gives no improvement in hearing.
5. A negative Rinne—that is, hearing by bone-conduction is better than by air-conduction.
6. Audiometry, which produces a graph having the character of a lesion of the conductive apparatus, together with tuning-fork and monochord tests with masking are necessary for a proper evaluation of the cochlear nerve function.

It must be realised that otosclerosis can occur in ears which have been subject to previous middle-ear disease, with resulting perforated, thickened, scarred, retracted, and adherent drumheads.

SELECTION OF CASES FOR OPERATION

Not all cases of clinical otosclerosis can be improved by the fenestration operation. In determining suitability for operation, I find it convenient to divide the cases into three groups:

Group I.—Those in which clinical and audiometric examination for both pure tone and speech establish beyond doubt

that the reserve of cochlear nerve function is adequate. In this group I expect 75-85% success.

Group II.—Borderline cases in which the extent of cochlear nerve damage is such that it will be necessary for a maximum improvement to be obtained if serviceable hearing is to result. In this group success can be anticipated in only about 20%.

Group III.—Cases in which the cochlear nerve has apparently so far deteriorated that the chances of success by the fenestration operation is nil. The so-called fulminating clinical otosclerosis falls into this group also.

If the cochlear nerve-endings are not capable of receiving and transmitting the stimuli, it is useless to create a new window. On the other hand, serviceable hearing has been restored in cases which were apparently hopeless. This fact makes the prediction of success or failure before operation still an uncertainty for a small percentage.

Unless the hearing of a patient, deafened by otosclerosis, is restored to the practical level—i.e., to a degree of 30 decibels loss or above, within the conversational range of 512-2048 D.V.—then the operation cannot claim to be successful, for it is of little value to improve the hearing of a patient with an 80% deafness to 60% deafness since they are still deaf for all practical purposes.

Contrary to what one might expect, advanced age does not necessarily deny the patient the operation provided that the cochlear nerve still retains its function. My oldest case is 69; my youngest 14 years. Cases of otosclerosis in which a previous middle-ear infection was present followed by complete resolution may also be operated on successfully.

If the clinical otosclerosis is of long standing and during the later phase paracusis Willisii has entirely disappeared, then in my opinion the case is usually unlikely to benefit from the operation. The ideal case is one in which, irrespective of age or sex, the progress of the disease has been slow and of such a degree that the cochlear nerve still retains an adequate amount of function. This can only be determined by careful and repeated audiometry for tone and speech.

RISKS OF THE OPERATION

The same risks are present in this as in any other major operation. Cases have been reported of postoperative embolism and pneumonia. Happily these are rare. In my present series of 136 cases no serious complication has occurred.

Unless infection supervenes in the labyrinth, then a depreciation in hearing below the preoperative level is not likely to occur, but in approximately 5% of the patients the hearing is not improved at all. The most troublesome aftermath of the operation is a temporary giddiness. The patient is usually ambulatory on the fourth day and leaves the hospital on the twelfth day. No lasting constitutional upset is experienced with this operation.

Usually the worse ear for air-conduction is operated on first provided the cochlear function is satisfactory. If the operation proves successful in the one ear, then it may be performed in the other ear also. However, unless the patient is a musician or school-teacher the second operation is rarely necessary.

The patient must be warned not to expect perfectly normal hearing after the operation, for this is never obtained.

OPERATIVE TECHNIQUE

In this delicate operation, perhaps more than any other, perfection of technique is essential, and this perfection can only be obtained under competent instruction and by much preliminary work on the cadaver. In the hands of the incompetent surgeon the operation is certain to come into disrepute.

It is my practice (after careful preoperative preparation of the meatus with a solution of 'Cetavlon' and 'Phenox-

etol') to use the Lempert endaural approach. The mastoid antrum is opened, and sufficient mastoid cells exenterated. Working forwards the outer attic wall is removed to expose the incus and the incudostapedial joint. The incus is removed, together with the head of the malleus. The posterior bony meatal wall is taken down until the annulus forming the notch of Rivinus is removed. The cutaneous lining of part of the postero-superio-anterior meatal wall is then made into a flap which is accurately moulded over the vestibular dome.

Using a Zeiss binocular magnifying lens, the fenestra is now made by means of a series of fine burrs in the dome of the vestibule ampulla of the lateral semicircular canal. This part of the proceeding is performed under continuous irrigation, saline solution being run in at one side of the operation wound and out at the other, thus carrying away all bone fragments, &c. The edges of the fenestra are polished smooth with a gold burr and the endosteum opened. The last stages of fenestration are performed under a dissecting microscope.

Finally the tympanomeatal flap is carefully laid over the fenestra and maintained there by means of a wax and sponge dressing. The operation is performed under 'Pentothal sodium' after heavy premedication. The average duration of the operation is two hours. Asepsis of the cavity is assisted by preoperative and postoperative penicillin. The control of hæmorrhage is of the utmost importance throughout the operation, and to aid in this vitamin K and calcium lactate are administered pre-operatively, while during the operation diathermy and fibrin foam are employed if necessary.

The immediate postoperative sequela of giddiness is controlled, as far as possible, by 'Omnopon,' &c. In some cases an immediate improvement in hearing is obtained, even through the dressing. Frequently, however, this hearing subsides about the third or fourth day to return again during the third or fourth week, and from then on until the end of six months further improvement may take place. The first dressing is removed on the seventh day under pentothal sodium and further dressings carried out as required until the cavity is lined with firm epithelium.

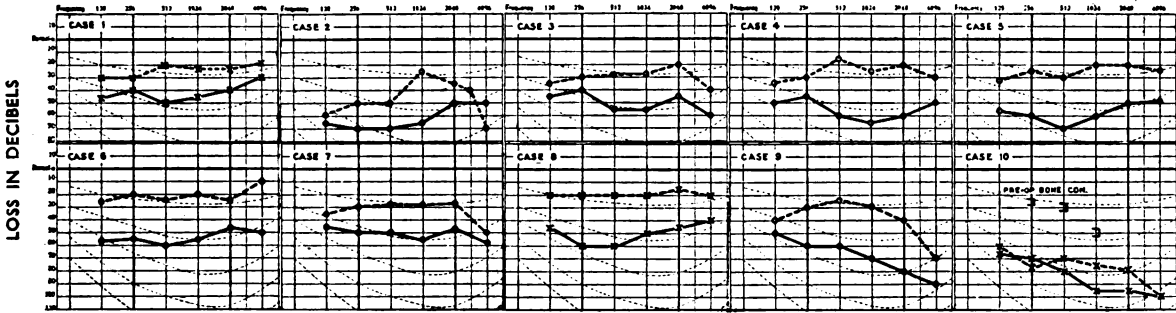
The patients are encouraged to get up immediately the acute vertigo subsides—usually the third or fourth day. They become fit to leave the hospital on the tenth to the twelfth day, and thereafter attend for dressings. By using the endaural approach a bandage is dispensed with on the seventh day, a dressing in the meatus being all that is required. The operation and dressing are entirely free from pain, and after the first few days free from discomfort also.

Usually the new hearing has a distinctly tinny or metallic timbre. This, however, passes off and a more normal tone supervenes. If the hearing remains improved for six months one seems to be justified in assuming that it will remain permanently, although in a small percentage of cases it is found that the hearing may deteriorate even up to two years. It may then be necessary to perform a revision of the case by lifting the cutaneous flap overlying the cartilage stopple or simple fenestra, according to the technique employed, and re-examining the fenestra with the stopple in situ. If necessary a new stopple may be fitted, with restoration of improvement in hearing, or if no stopple has been used the newly formed bone may be removed and the fenestra re-formed. A fenestra so reconstructed rarely closes a second time.

RESULTS

The 136 fenestration operations were performed in two series with the war between them.

(a) During 1936-39 36 cases were operated on by fenestration of the lateral semicircular canal. Various methods were employed to eburnate the edges of the fenestra to prevent osteogenesis. Immediate improve-



Audiometer charts of illustrative cases

The solid line shows the hearing loss before, and the broken line the loss after, fenestration. Right ear, crosses; left ear, circles.

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| Case 1 : operation Sept. 27, 1945 ; audiogram Oct. 15, 1946. | Case 6 : operation Dec. 18, 1945 ; audiogram Oct. 14, 1946. |
| Case 2 : " Nov. 27, 1945 ; " Oct. 10, 1946. | Case 7 : " June 6, 1938 ; " Oct. 11, 1946. |
| Case 3 : " Oct. 3, 1945 ; " Oct. 14, 1946. | Case 8 : " Dec. 23, 1945 ; " Oct. 14, 1946. |
| Case 4 : " Nov. 7, 1945 ; " Sept. 26, 1946. | Case 9 : " Jan. 27, 1945 ; " Oct. 12, 1946. |
| Case 5 : " Nov. 29, 1945 ; " Oct. 7, 1946. | Case 10 : " Sept. 8, 1945 ; " Sept. 10, 1946. |

ment in hearing was obtained in most cases, but in all except 2 hearing rapidly returned to the preoperative level or below. The improvement in hearing of these 2 cases has now been maintained eight years. The poorness of the results in the early cases was undoubtedly due to imperfect technique.

(b) Since August, 1945, I have performed a second series of 100 fenestrations for clinical otosclerosis using in every case the Lempert technique of the fenestra nov-ovalis, with or without insertion of the cartilage stopple.

The results in the second series are summarised in the table. To obtain a fairer evaluation of the results only

Selective group	Total no. of operations	Hearing never improved	Hearing improved but improvement was partly lost later	Hearing worse	Hearing improved and fully maintained
I	42	3	6	1	32 (76%)
II	9	5	2	0	2
III	4	4	0	0	None

cases of between six and twelve months' duration are included. It is my practice no longer to operate on cases which are classified in groups II and III.

ILLUSTRATIVE CASES
(See Audiometer Charts)

Group I

CASE 1.—Man, aged 41, deaf since the age of 23. Fenestration of right ear Sept. 27, 1945. Twelve months later the patient has no difficulty in hearing ordinary conversation. The tinnitus has subsided completely. Jacobson's nerve and accompanying blood-vessels were severed.

CASE 2.—Man, aged 50. Fenestration of left ear Nov. 27, 1945. This patient now hears ordinary conversation and without strain. Has put on over a stone in weight and developed an entirely new outlook on life.

CASE 3.—Woman, aged 37. Fenestration of left ear Oct. 3, 1945. This patient's hearing did not begin to return for six weeks after the operation, presumably because of traumatic labyrinthitis. Her hearing has now returned to the practical level.

CASE 4.—Man, aged 31. Fenestration of left ear Nov. 7, 1945. Audiogram 10½ months after operation shows that the postoperative hearing is up to the conversational level. This patient was discharged from the Army in 1943 on account of deafness, and has now returned to his former employment as an accountant.

CASE 5.—Woman school-teacher, aged 29. Fenestration of left ear Nov. 29, 1945. The patient has been enabled to return

to her occupation and no longer suffers from the nervous exhaustion and headaches at the end of a day's teaching which she experienced before the operation even though she wore a hearing-aid. Tinnitus has completely subsided. Jacobson's and sympathetic nerves denuded from promontory.

CASE 6.—Man, aged 34. Fenestration of right ear Dec. 18, 1945. His postoperative improvement after six months is well above the conversational level and he has no difficulty with ordinary conversation. He has been able to resume his musical interests with complete satisfaction.

CASE 7.—Man, aged 23. Left ear operated on by the Holmgren two-stage technique in June, 1938. Hearing improved to the conversational level and maintained for over eight years, while the hearing of the other ear has progressively worsened.

CASE 8.—Woman, aged 61. Deaf since age of 27 with severe tinnitus. Fenestration of right ear Dec. 23, 1945. Postoperative level ten months after operation is well above the conversational level. No difficulty in hearing experienced. Can now clearly hear the voices of her grandchildren for first time. Tinnitus now a low humming sound and does not bother her. Jacobson's and sympathetic nerves cut.

Group II

CASE 9.—Woman, aged 58. Severe tinnitus in the "head." Began to go deaf at the age of 17 and was considered to be a borderline case. Fenestration of left ear Jan. 27, 1945. Postoperative level shows that the hearing has risen above the conversational level. This case illustrates the result that may be obtained in a very small percentage of cases in this group. Severe tinnitus immediately followed the operation, but has now subsided completely. Jacobson's and sympathetic nerves cut.

Group III

CASE 10.—Man, aged 46. Fulminating clinical otosclerosis. Tinnitus severe. Fenestration of right ear Sept. 8, 1945. Thirteen months after operation the postoperative improvement of hearing is so slight as to be of no practical value. However the tinnitus was partially relieved. Jacobson's and sympathetic nerves cut.

SUMMARY AND CONCLUSIONS

An account is given of the clinical diagnosis of otosclerosis with a brief description of the procedure of the fenestra nov-ovalis operation and an interim evaluation of 136 cases with illustrations in each of three selective groups.

Of 55 cases followed for six to twelve months useful improvement in hearing has been fully maintained in 34. Complete assessment is not possible under two years.

The fenestration operation is now an established surgical procedure capable of restoring practical and lasting hearing in carefully selected cases.

This is an operation in which improvements and modifications will produce more and more gratifying

results, but only in the hands of those who take pains to perfect their operative technique. Those who "try" the operation without adequate training in the difficult technique are almost certain to fail.

I have little doubt that as in America and other parts of the world, clinics for the advancement of this work will soon be established in all the large cities of England.

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LIVER EXTRACT, FOLIC ACID, AND THYMINE IN PERNICIOUS ANÆMIA AND SUBACUTE COMBINED DEGENERATION

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LIVER extract has proved effective in producing a hæmopoietic response in various types of macrocytic anæmia in relapse, in maintaining the blood at satisfactory levels, and in preventing and treating the neurological manifestations which often develop in Addisonian pernicious anæmia. Many years' study of liver extracts has shown that the refined products administered parenterally produce much more dependable responses than do the crude products administered by mouth.

It is well known that liver extracts contain different members of the vitamin-B complex; and, in attempting to determine which, if any, of the B-complex vitamins were responsible for the anti-anæmic properties of liver extract, we have tested each of these vitamins as they were synthesised and became available for clinical use. Of the many which we have tested both singly and in combination over a period of years, folic acid was the first found to produce a definite hæmopoietic response in Addisonian pernicious anæmia, nutritional macrocytic anæmia, and the macrocytic anæmia of pellagra, pregnancy, and sprue.¹ Later it was demonstrated that 5-methyl uracil (thymine) likewise produced a response in these types of anæmia, though less than that which follows folic-acid or liver-extract therapy. We realised that only by intensive and continued study of folic acid and 5-methyl uracil as anti-anæmic agents could we determine whether or not they could be substituted safely for liver extract. This paper is concerned with only one phase of these studies—the comparative value of parenteral liver extract and of folic acid and thymine by mouth, not only in producing and maintaining satisfactory blood-levels in persons with Addisonian pernicious anæmia, but in relieving and protecting against the neurological disturbances which frequently occur in such cases.

It is extremely difficult and tedious to appraise the value of any therapeutic agent in subacute combined degeneration. For many years we have been studying the effectiveness of parenteral liver extract in maintaining satisfactory blood values and in preventing and treating subacute combined degeneration in Addisonian pernicious anæmia. These studies are being continued. Since folic acid and 5-methyl uracil have been found to produce a hæmopoietic response in Addisonian pernicious anæmia, we have been studying their value in preventing and treating subacute combined degeneration.

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FOLIC ACID

In association with Drs. C. F. and R. W. Vilter, a study to determine whether or not folic acid is as effective as liver extract in controlling Addisonian pernicious anæmia and in preventing the neurological disturbances was begun at the Cincinnati General Hospital in November, 1945. Twenty-one patients who had been maintained satisfactorily for 2–17 years on parenteral liver-extract therapy were selected for study. Liver extract was discontinued, and 70–105 mg. of synthetic folic acid weekly was substituted for 10–12 months. After 5–8 months of folic-acid therapy, paræsthesiæ in the extremities and an unsteady gait developed in four cases. Neurological signs gradually appeared and multiplied until there was unequivocal evidence of subacute combined degeneration. The dosage of folic acid was increased to 50–500 mg. daily for 10–40 days, but this increase was not followed by any subjective or objective improvement. When it was obvious that neurological improvement could not be effected with folic acid, or when the disease progressed rapidly, the folic acid was discontinued, and 5 c.cm. of refined liver extract was given daily by intramuscular injection. Within 10–12 days there was subjective and objective neurological improvement, and at the present time convalescence is progressing satisfactorily.

At our clinic in Birmingham, Alabama, folic acid was given to nine patients with subacute combined degeneration. Two of these patients seemed to be somewhat relieved, but we could not be certain. The other seven patients became worse on folic acid and were not relieved until after liver extract was given. The failure of folic acid to relieve the neurological disturbances and their subsequent response to liver extract are illustrated by the following representative case-record.

CASE 1.—A white woman, aged 76, was admitted to the Hillman Hospital in October, 1946, because of inability to walk unassisted, numbness of the legs and trunk below the costal margins and of the arms distal to the elbows, severe weakness, urinary incontinence, and moderate discomfort in the abdomen. These symptoms had begun in 1944 with coldness, numbness, and tingling, first in the hands and later in the feet, and had progressed slowly until 4 months before admission, when they had rapidly worsened. She had never received anti-anæmic therapy and apparently had never had severe anæmia.

The patient was well developed but poorly nourished, and physical examination revealed nothing remarkable. Neurological examination showed severe involvement of peripheral nerves and the posterior column, and less severe involvement of the lateral column.

Repeated gastric analyses showed no free hydrochloric acid even after histamine stimulation. Bone-marrow showed maturation arrest at megaloblastic level. Peripheral blood: red cells 2,940,000 per c.mm.; Hb 11 g. per 100 c.cm. (71%); reticulocytes 2.8%; hematocrit 38%; mean corpuscular volume 126 μ .

She was given folic acid 10 mg. by mouth for 22 days. The reticulocytes reached a peak of 10.2% on the seventh day of therapy, and on the final day the red-cell count was 3,810,000 per c.mm. and Hb 13.8 g. per 100 c.cm. (90%). Soon after folic-acid therapy was started she said she felt stronger than she had for several months. Urinary incontinence continued, however, and on the twentieth day of therapy she began complaining of failing appetite, abdominal discomfort, vertigo, and depression. Neurological examination at this time showed that there had been no improvement in nerve involvement, and, for the first time, hyperæsthesia of the legs, tenderness of the calf muscles, and a consistently positive Babinski on the left were found.

Folic acid was discontinued on the twenty-third day, and she was given 2 c.cm. of liver extract intramuscularly daily for 5 days, and then 1 c.cm. daily for 26 days. Within a week after liver-extract therapy was started considerable symptomatic improvement had taken place. By the seventeenth day she could walk with only the assistance of a cane, and the upper level of numbness had receded from the costal margins to the knees, and from the elbows to the wrists. During the

last fortnight of liver therapy she had urinary incontinence on only two occasions. There was no appreciable improvement in vibratory and position perception.

She was discharged from hospital on the fifty-eighth day, when the red-cell count was 4,370,000 per c.mm. and Hb 15 g. per 100 c.cm. (97%). She was advised to return for an injection of 1 c.cm. of liver extract weekly.

THYMINE

Four patients with Addisonian pernicious anæmia have been treated with synthetic thymine (5-methyl uracil). To these patients 5-7.5 g. of thymine was administered twice daily by mouth; this was followed by a satisfactory hæmopoietic response. Though the response was not so great as that which follows parenteral liver-extract therapy or folic-acid therapy, the increased blood values were maintained throughout the 8 months the patients were given a daily dose of 4.5 g. of thymine. In two of these patients, however, neurological manifestations developed and progressed rapidly. After the start of parenteral liver-extract therapy these manifestations promptly disappeared. The following case-record is typical of the response observed in these four patients.

CASE 2.—A white woman, aged 57, was admitted to hospital in February, 1946, complaining of weakness, dizziness, and "anæmia" of 42 months' duration. During this time she had been given intermittent liver-extract therapy by various physicians.

She was well developed and moderately well nourished, and did not appear to be acutely ill. Her skin was pale and slightly icteric; the mucosæ, conjunctivæ, and nail-beds were very pale. Otherwise the physical examination was negative, and neurological examination revealed nothing remarkable.

Repeated gastric analyses showed no free hydrochloric acid even after histamine stimulation. Bone-marrow showed maturation arrest at megaloblastic level. Peripheral blood: red cells 1,750,000 per c.mm.; Hb 6.8 g. per 100 c.cm. (43%); white cells 3000 per c.mm.; reticulocytes 1.6%; colour index 1.2; icteric index 14.0.

She was given 10 g. of synthetic thymine daily. On the sixth day of therapy the reticulocytes reached a peak of 19%. By the sixty-second day of therapy the red-cell count was 3,790,000 per c.mm. and Hb 12.9 g. per 100 c.cm. (84%). She was discharged at this time and given 4.5 g. thymine daily as maintenance therapy. Except for mild paræsthesiæ she felt well until July, 1946, when she developed acute neurological symptoms, which progressed rapidly. Within a few weeks she was confined to bed because of severe disturbance of locomotion, muscle weakness, poor coördination, impairment of sensation, constipation, and dysuria. Despite these neurological disturbances, satisfactory blood-levels were maintained during the 7 months she was on thymine.

In September, 1946, thymine was discontinued, and she was readmitted to hospital. Neurological examination revealed essentially normal reflexes; coördination was moderately disturbed; there was no position perception in the toes; vibratory sensations were absent below the mid-lumbar spine and moderately diminished in the hands; and there was moderate hypæsthesia in the lower limbs. Red cells 3,600,000 per c.mm.; Hb 10.7 g. per 100 c.cm. (70%); reticulocytes 2%; white cells 11,900 per c.mm.; icteric index 9.5.

She was given 1 c.cm. of 'Reticulogen' (refined liver extract) intramuscularly on alternate days until four doses had been given. A week without treatment elapsed; then four more doses of reticulogen 1 c.cm. were administered at the same intervals. Improvement was prompt and progressive. The paræsthesiæ subsided, coördination improved, and she was discharged 30 days after admission, able to walk with ease. Evidence of minor but definite mental aberrations, present before and during the early part of therapy, cleared entirely. Signs of moderate impairment of vibratory and position perception in the lower extremities and hypæsthesia of the hands, lower part of the legs, and feet persisted. On her discharge the red-cell count was 4,630,000 per c.mm.; Hb 14.2 g. per 100 c.cm. (92%); reticulocytes 0.8%; white cells 8300 per c.mm.

The following representative case-record shows that thymine does not protect against the neural degeneration

which often develops in persons with Addisonian pernicious anæmia, and that folic acid does not relieve the acute manifestations of subacute combined degeneration. Parenteral liver extract, on the other hand, was beneficial.

CASE 3.—A white man, aged 56, was admitted to the Hillman Hospital in March, 1946, complaining of extreme weakness. His illness had begun at least 4 years previously, with loss of weight and strength. Six months later he had had to discontinue his work as a preacher. By this time his appetite had become very poor, and he had developed flatulence and soreness of the tongue. He had grown progressively weaker and sought our medical aid in August, 1945.

After thorough laboratory and clinical studies, Addisonian pernicious anæmia in relapse was diagnosed, and he was treated successfully with parenteral liver extract. At that time there was no evidence of neural degeneration. On his discharge from hospital he was advised to return for treatment at regular short intervals, but he did not do so because he lives about a hundred miles from the clinic. He felt well until January, 1946, when he was forced to stop work because of weakness and diarrhoea. The diarrhoea ceased after a few days, but he grew progressively weaker until March, 1946, when he asked to be readmitted to hospital.

He was still fairly well nourished but looked chronically ill; his skin, conjunctivæ, and mucosæ were very pale; the scleræ were slightly icteric; and the tongue was large, with hypertrophic papillæ. Otherwise the physical findings were essentially normal. Neurological examination showed no vibratory sensation below the pelvis; the ankle-jerks were absent; the plantar reflexes were occasionally extensor on both sides; and the other reflexes, together with perception of pain and touch and position sensation, were normal.

Repeated gastric analyses showed no free hydrochloric acid even after histamine stimulation. Bone-marrow showed maturation arrest at the megaloblastic level. Red-cell count 1,470,000 per c.mm.; Hb 5.1 g. per 100 c.cm. (33%); white cells 3850 per c.mm.; reticulocytes 1%; hæmatocrit 18%; mean corpuscular volume 122.4 cu.

He was given 4 g. of synthetic thymine (5-methyl uracil) three times daily by mouth for 23 days. The reticulocytes reached a peak of 31.2% on the seventh day of therapy. His general condition improved greatly, and 24 days after the start of therapy the red-cell count was 3,380,000 per c.mm.; Hb 12.4 g. per 100 c.cm. (80%). He was discharged at this time, and a maintenance dose of 4.5 g. of thymine daily was prescribed.

When he was seen in the nutrition clinic two months after his discharge, he said he felt well generally but had some numbness and weakness of his feet and legs. The red-cell count was now 3,220,000 per c.mm.; Hb 13.4 g. per 100 c.cm. (86%); white cells 3900 per c.mm.; reticulocytes 2.8%. We tried to get him to stay in this hospital for therapy, but he felt he could not. During the next week the weakness and numbness of his legs and feet increased until he was unable to walk unassisted, and by this time the numbness involved his hands up to the wrists; there was tingling in his hands, lower extremities, and lower trunk region, and he had moderate superficial pain and tenderness over a wide zone of the mid-trunk.

A week later, thymine was discontinued (after 4 months), and he was urged again to come into the hospital. He did not come until 2 weeks later.

He now looked chronically ill, mentally dull and depressed, he could not walk and had great difficulty in shifting his position in bed because of extreme weakness and ataxia in the lower extremities; the skin and mucosæ were moderately pale but not icteric; the papillæ of his tongue were hypertrophic; and the abdomen was slightly distended with gas. The biceps and triceps reflexes were slightly hyperactive; the knee-jerks were slightly and equally hypo-active; the abdominal and Achilles reflexes were absent; and the plantar reflexes were consistently extensor on the left and about half the time on the right. There was severe hyperæsthesia to light touch and painful stimuli over the mid-trunk and somewhat less over the lower trunk; hypæsthesia to light touch over the lower extremities and distal to the mid-region of the forearms; slight hyperæsthesia to painful stimuli over the thighs and soles; slight tenderness of the muscles of the thighs and calves; the muscles of the lower extremities

had poor tone and were weak and moderately atrophied; there was no position perception in the toes or ankles, and no vibration perception over the sacrum or distal to it. He had severe ataxia (the heel-knee-shin test could not be performed); and there was a questionable decrease in the tone of the anal sphincter.

Gastric analyses showed no free hydrochloric acid even after histamine stimulation. Bone-marrow showed maturation arrest at the megaloblastic level. Red-cell count 1,930,000 per c.mm.; Hb 7.8 g. per 100 c.cm. (50%); reticulocytes 0.6%.

Despite the fact that he received no therapy for the first 4 days while baseline studies were being made, he appeared less fatigued and much less disturbed by paræsthesia than when he was admitted. On the fifth day, however, all his symptoms returned, urinary retention developed, and he lost his appetite. At this time therapy with 20 mg. of folic acid daily by mouth was begun. Five days later the reticulocytes had risen to 7.5%, and a peak of 36.6% was reached on the eighth day of therapy.

As the reticulocytosis developed his appetite improved and his symptoms in general appeared to subside somewhat. Between the thirteenth and sixteenth days of therapy, however, there was an exacerbation of all the neurological symptoms. Fæcal and urinary incontinence and severe weakness and ataxia of the upper extremities developed. He could no longer feed himself or attend to any of his personal needs. Mental dullness became more severe.

By the sixteenth day on folic-acid therapy the red-cell count was 2,800,000 per c.mm.; Hb 10.4 g. per 100 c.cm. (68%). By this time it was apparent that the progress of his neurological symptoms was not being arrested. Accordingly the folic acid was discontinued, and he was given 2 c.cm. of liver extract intramuscularly for 13 days, then 1 c.cm. daily for 17 days, and then 1 c.cm. on alternate days for 39 days. Within 4 days after liver-extract therapy was started the superficial pain and tenderness in his trunk were completely relieved. By the eighth day he had improved generally: he was more alert mentally and appeared less fatigued; the paræsthesia and abdominal and urinary symptoms were less severe; and his appetite had improved.

From this time on his improvement was progressive. By the thirty-first day of liver therapy he was sitting up, able to write and to care for many of his personal needs. He no longer had urinary or fæcal incontinence. Severe ataxia and weakness of the lower extremities persisted, however, and the knee-jerks were hyperactive, the Babinski was positive bilaterally, and the muscles of the lower extremities were moderately spastic. Numbness persisted only in his hands, legs, and feet. Strength and coördination of the upper extremities were very much improved. By 38 days after liver-extract therapy was started he could support his weight in a standing position, and he soon began to walk with the assistance of the ward attendants.

On his discharge after 59 days on liver extract he felt well in general but still complained of some numbness and increased sensitivity of the hands and lower portions of the legs and feet. Severe ataxia and impairment of position and vibratory sensation of the lower extremities persisted, and the Babinski tests were still positive. The red-cell count was 4,450,000 per c.mm.; Hb 13.6 g. per 100 c.cm.; white cells 3100 per c.mm. Since his discharge he has received 2 c.cm. of liver extract at weekly intervals and is showing continued improvement.

REFINED LIVER EXTRACT

It is well known that refined liver extract administered parenterally in adequate amounts and at suitable intervals will produce a hæmatological remission in persons with Addisonian pernicious anæmia in relapse, maintain satisfactory blood-levels, and effectively prevent and treat subacute combined degeneration. In our clinic many patients have been maintained satisfactorily on such therapy for many years. If it is not administered regularly, however, relapses take place, and eventually signs and symptoms of degenerative changes in the nervous system appear. Adequate liver-extract therapy will reverse such changes if they have not progressed too far. This is illustrated in the following case-record.

CASE 4.—A white man, aged 76, was admitted to the Hillman Hospital in September, 1946, primarily because of

difficulty in walking and moderately severe pains in the lower extremities.

He was first seen in the nutrition clinic in 1941, when he gave a history of paræsthesia of his hands, feet, and legs, and of headache, vertigo, tinnitus, insomnia, blurring vision, soreness of the mouth and tongue, anorexia, constipation, easy fatigability, and moderate loss of weight. Thorough clinical and laboratory studies revealed evidence of severe Addisonian pernicious anæmia in relapse. He responded well to liver extract. He lived a long distance from the clinic, however, and could not come for treatment as regularly as it was needed.

He had several relapses, but there was very little neurological involvement until July, 1946, when an acute attack began. He was urged to come into hospital or to come regularly to the clinic for treatment, but his wife was critically ill, and he considered it his duty to return home and care for her.

When he was admitted to hospital in September he had severe disturbance of locomotion, paræsthesia, moderately severe paroxysms of pain that spread over the lower trunk and lower extremities, emotional instability, constipation, mild dysuria, and general weakness. He appeared restless, anxious, and emotionally disturbed. The knee-jerks were hyperactive; the plantar responses were consistently extensor. There was hyperæsthesia to painful stimuli over the lower trunk, thighs, and legs; hypæsthesia to touch over the thighs, legs, and feet; and slight tenderness of the thigh and calf muscles. There was spastic weakness, severe ataxia, and impairment of position and vibratory perception of the lower extremities. The Romberg test was positive. There was hypæsthesia and slight motor impairment of the hands up to the wrists.

Repeated gastric analyses showed no free hydrochloric acid even after histamine stimulation. Bone-marrow showed maturation arrest at the megaloblastic level. The red-cell count was 2,590,000 per c.mm.; Hb 7.5 g. per 100 c.cm. (48%); white cells 3150 per c.mm.; hæmatocrit 32%; mean corpuscular volume 123 μ .

Reticulogen 2 c.cm. was given intramuscularly daily for 5 days, and then 1 c.cm. daily for 8 days. After this he was given 1 c.cm. weekly until he was discharged on the forty-second day of therapy.

The highest reticulocyte count was 5.8% on the eighth day of therapy. On the final day of therapy the red-cell count was 3,930,000 per c.mm.; Hb 12 g. per 100 c.cm. (78%); reticulocytes 2.8%; white cells 8800 per c.mm.

By the fourth day of therapy there was complete relief from pain, and he had become emotionally stable. Within 10 days he could get up and attend to all his personal needs. The paræsthesia subsided, and his strength improved progressively.

Forty days after treatment was started he complained of slight numbness limited to the feet and hands, stiffness of the lower extremities, and moderate weakness of the knees. He still had slight dysuria but no gastro-intestinal symptoms. Neurological examination indicated remarkable improvement in vibratory and position perception. The tendon reflexes were still hyperactive; the plantar response extensor; and the Romberg test positive, the patient having to watch his path while walking.

When he returned to the clinic 14 days after his discharge he had gained 8 lb. in weight and said that the previous day he had worked a half-day as a carpenter for the first time in more than a year. There were no further changes in the physical signs. He is returning regularly to the clinic for liver extract and is showing continued improvement.

SUMMARY

Synthetic folic acid (*L. casei* factor) and synthetic thymine (5-methyl uracil) will neither prevent the development of subacute combined degeneration in Addisonian pernicious anæmia nor relieve it once it has developed.

Potent parenteral injections of a potent liver extract are useful in the prevention of subacute combined degeneration and beneficial in relieving it once it has developed.

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ADRENAL APOPLEXY ASSOCIATED WITH HYPERTENSION

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ADRENAL hæmorrhage is one of the most unexpected and perplexing conditions encountered in clinical medicine. The interest lately taken in the Friderichsen-Waterhouse syndrome of adrenal hæmorrhage in septi-cæmia has tended to create the impression that this syndrome and adrenal hæmorrhage are synonymous. Adrenal hæmorrhage does, however, occur without septi-cæmia, as is illustrated by the following case.

A man, aged 60, was admitted to hospital with epigastric pain. He had been in good health until the day before admission, though several years previously he had been told that he had a high blood-pressure and that his heart was impaired. In the morning, at home, he had a constant but not severe pain round the umbilicus. After lunch he went to work. During the afternoon the pain shifted to the epigastrium and became much more severe. He was taken home, and that evening his doctor found him groaning and writhing in agony. He complained of a very severe pain in the epigastrium and the left lower chest. He was pale and sweating and had vomited several times. His pulse-rate was 100, temperature normal, and blood-pressure 200/100 mm. Hg. Heart and chest were normal. Examination of the abdomen was unsatisfactory, because the patient felt he could not lie down and twisted continuously. A tentative diagnosis of coronary thrombosis was made and morphine gr. $\frac{1}{2}$ was administered. The pain continued and next morning was most severe below the costal margin on the right side, and there appeared to be some tenderness in this area. The temperature was still normal. He was brought to hospital.

On admission he was acutely ill. His skin was pale, cold, and clammy. The heart was slightly enlarged to percussion, and the sounds were regular. No murmurs were heard. The abdomen moved well with respiration, but he had epigastric pain, which was increased by coughing. The abdominal wall was soft, but there was some tenderness throughout the entire upper portion, although no rebound tenderness was elicited. Neurological examination was negative. The neck was not stiff. The temperature was 99.8° F, pulse-rate 86, and the respiratory rate 26 per min. Blood-pressure was 210/110 mm. Hg. There was a leucocytosis of 10,600 white cells per c.mm. Nothing abnormal was found in the urine. An electrocardiogram showed left axis deviation, a poorly developed T₂-wave, and an inverted T₃; it did not suggest coronary occlusion. The serum-amylase level was not raised.

He was placed in an oxygen tent. During the first day his condition remained the same. He continued to have pain,

and the skin remained pale and clammy. On the second day the blood-pressure fell to 96/50 mm. Hg, and the pulse was weak and irregular. That evening the rectal temperature rose to 103° F. He was very restless and disoriented. During the evening he was cyanotic and had Cheyne-Stokes breathing. On the morning of the third day he was moribund and could not be aroused by painful stimuli. The blood-pressure was 52/32 mm. Hg. He died seventy-two hours after the onset of the illness, without a diagnosis having been made.

Pathological Findings.—At necropsy the cause of death was found to be massive hæmorrhage into both adrenal glands, which were enlarged, the right weighing 30 g. and the left 20 g. The capsules were tense and bulging but intact. Section showed an area of blood-clot surrounded by a thin layer of golden cortical tissue. Macroscopically the adrenal blood-vessels were free from thrombi.

The heart weighed 500 g. and showed the characteristic enlargement of hypertension. The kidneys were normal in weight, and the capsules stripped readily, disclosing pale smooth surfaces. No significant lesions were found in the other organs.

Microscopically both adrenals presented a similar appearance. The central area of hæmorrhage was surrounded by necrotic cortex infiltrated by polymorphs. The arterioles in the capsule were markedly hyalinised. The medium-sized arteries had thickened walls, which in several places were necrotic (fig. 1) and infiltrated by a few acute inflammatory cells. The picture, however, did not suggest an acute arteritis, and it was thought that the arteries became necrotic owing to an interruption of the blood-supply.

Several small veins in the pericapsular tissues were filled with recent thrombi (fig. 2). It is impossible to say definitely from the microscopical appearance whether the hæmorrhage was caused by a rupture of an artery in the medulla or by a primary venous thrombosis. The history of hypertension favours an arterial hæmorrhage.

DISCUSSION

The adrenal gland is one of the most vascular organs in the body. Most diagrams show it as being supplied by only three arteries: the suprarenal, the renal, and the inferior phrenic. In a specimen injected with 'Latex' in the department of anatomy of the University of Toronto these arteries were seen to give off many small branches that entered the gland from all sides. The adrenal resembles the hub of a wheel with vessels running towards it like spokes. The arteries break up at once into capillaries; these are in intimate association with the cortical cells, and they in turn empty into sinusoids in the medulla that are drained by a single vein (Grollman 1936). The rich blood-supply and the delicate structure increase the vulnerability of this organ to hæmorrhage.

Except in cases of the Friderichsen-Waterhouse syndrome (D'Agati and Marangoni 1945, Williams and Ellis 1944, Lindsay et al. 1941, Morison 1943) adrenal apoplexy has never been diagnosed either clinically or at

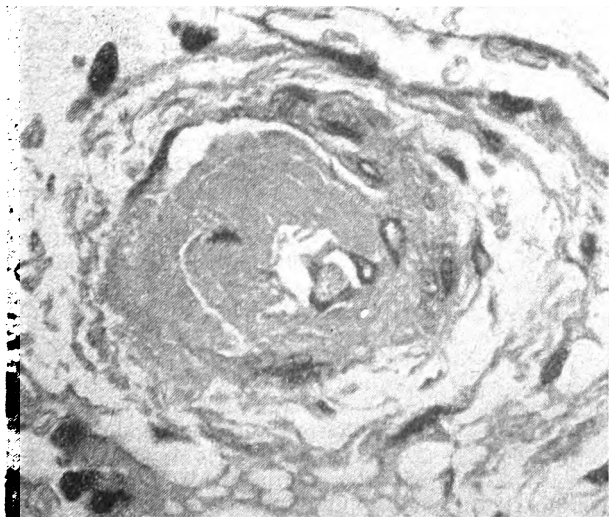


Fig. 1—Small artery in pericapsular tissue of left adrenal gland, showing extreme hyalinisation and necrosis of thickened vessel wall. (× 750.)

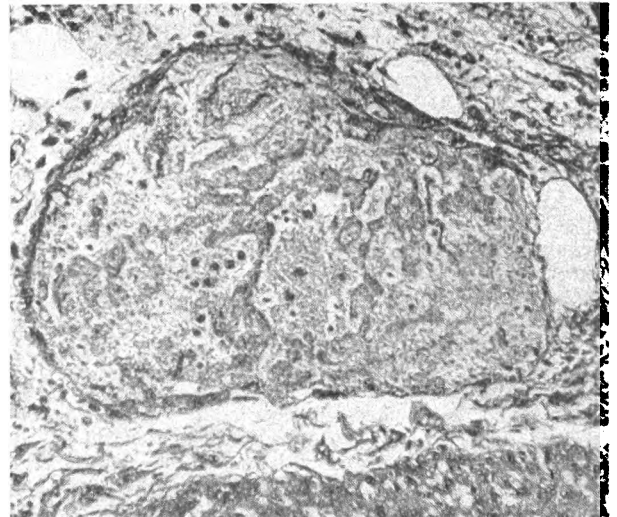


Fig. 2—Thrombus in small vein of medulla of left adrenal, showing characteristic lines of platelets. (× 175.)

operation. The four cases reviewed by Keele and Keele (1942) and the one reported by Valentin (1914) were diagnosed as ruptured viscus, and at laparotomy nothing abnormal was found. Keele and Keele believe that the condition can be diagnosed clinically, and urge that, when the history suggests rupture of a viscus and no lesion is found at operation, the adrenals should be examined.

Abdominal pain similar to that in the present case has been reported by Keele and Keele (1942), Altschule (1939), and others. The segmental nerve-supply of the adrenal has not been definitely established but is probably T5-T10. The fibres travel by the splanchnic nerves through the celiac and renal plexuses to reach the medulla. An afferent nerve-supply has not been demonstrated in animals or man (Swinyard 1937, MacFarland and Davenport 1941), but the pain associated with adrenal apoplexy is strong presumptive evidence of a visceral afferent pathway with sensory endings in the capsule. Stretching of the capsule would cause pain in the same way as distension of the gall-bladder does. The pain in adrenal apoplexy is felt over the region supplied by T5-T10, which is compatible with the probable segmental supply of the gland. Abdominal pain is of variable occurrence in the Friderichsen-Waterhouse syndrome (Lindsay et al. 1941). Vomiting is often present and is probably of reflex origin.

Death is caused by acute adrenal cortical insufficiency, leading to circulatory collapse, characterised by increasing shock, falling blood-pressure, and cyanosis.

The mechanism of adrenal apoplexy is obscure, but a hypothetical approach can be made through the consideration of four factors. The first is the tissue of the gland supporting the blood-vessels. As mentioned previously, the vessels lie in intimate contact with cortical and medullary cells. The destruction of these cells would remove support from the vessels, the walls would burst, and hæmorrhage would occur. After birth the adrenal cortex undergoes rapid involution, and the melting away of cortical cells, coincident with birth trauma, might well lead to rupture of the vessel walls. Levinson (1935) reports eight cases of fatal adrenal hæmorrhage in the newborn. The adrenal cortex undergoes hypertrophy during pregnancy, and involution takes place during the puerperium. Adrenal apoplexy at this time has been reported by Keele and Keele (1942) and Dodds (1945). The mechanism may be regarded as similar to that in the newborn, although it is reported much less frequently. This is to be expected, however, since the involution following pregnancy is much less extensive than at birth. Hæmorrhage also occurs in adrenal glands invaded by secondary tumours.

The second factor is the state of the vessel wall. The wall may be damaged by trauma (Thorstad 1942); toxæmia, as in burns (Harris 1929, Snelling and Erb 1935, Weiskotten 1917); septicæmia; or the degenerative changes of arteriosclerosis. In the Friderichsen-Waterhouse syndrome generalised purpuric hæmorrhages occur owing to damage to the vessels either by toxæmia or by bacterial emboli. The adrenal hæmorrhage is merely part of the general picture, but, owing to the peculiar structure of the organ, the hæmorrhage becomes extensive and causes cortical insufficiency. In a patient with essential hypertension the vessels are weakened by hyaline and necrotic changes.

The third factor is the pressure of the blood in the vessels. Hypertension increases the strain on the vessel walls and thus predisposes to hæmorrhage.

The last factor is a general hæmorrhagic tendency. Hall and Hemken (1936) reported a case of adrenal hæmorrhage in a patient with leukæmia. Lewis (1921) reported a case in an infant where multiple hæmorrhages were found in other organs. Many cases of hæmorrhagic disease of the newborn are now known to be caused by a deficiency of vitamin K.

These four factors may act alone or in combination. For example, in the newborn infant involution, trauma, and a deficiency of vitamin K may all be important contributory causes. The present case can best be explained by rupture of a sclerotic vessel under the strain of hypertension.

Keele and Keele (1942) and Pearl and Brunn (1928) considered that in their cases the primary lesion was a thrombosis of the suprarenal vein, with resulting infarction. Leone (1941) remarks that thrombosis of the veins is merely evidence of a circulatory disturbance, and, instead of being the cause of the hæmorrhage, may be the result of parenchymal congestion. This latter view best explains the venous thrombosis observed microscopically in the present case.

SUMMARY

A case of bilateral adrenal hæmorrhage in a hypertensive patient is reported, and it is suggested that adrenal hæmorrhage may be classified under four headings:

(1) Associated with involution or destruction of gland substance in (a) the newborn; (b) pregnancy; (c) cases of invasion by tumour.

(2) Caused by damage to blood-vessel walls by (a) toxæmia (burns); (b) trauma; (c) septicæmia (Friderichsen-Waterhouse syndrome); (d) arteriosclerotic change.

(3) Associated with hypertension.

(4) Associated with a generalised hæmorrhagic tendency, as in leukæmia and in vitamin-K deficiency in the newborn.

I wish to thank Prof. William Boyd for his assistance in the preparation of this report.

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PLACENTAL HORMONES AFTER DEATH OF FŒTUS WITH VIABLE PLACENTA

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AFTER expulsion of the placenta the pregnancy reaction of the urine normally remains positive for eight days (Aschheim and Zondek 1928), the time taken by the body to eliminate its store of placental hormones. Hormonal excretion can persist longer if chorionic fragments remain in the uterus in communication with the maternal circulation (Zondek 1931). The findings in hydatidiform mole without a fœtus show that the persistence of a positive pregnancy reaction need not necessarily signify the presence of a living fœtus.

When a positive pregnancy reaction becomes repeatedly negative, it is clear that placental function has ceased, and it can be inferred that the fœtus, if not yet expelled, is dead. But it is insufficient, in diagnosing death of the fœtus, to rely on the negative result of only one pregnancy test, especially in the later months of pregnancy, when the excretion of gonadotropin decreases and becomes less regular than in the early months of pregnancy (Zondek 1931). Spielman et al. (1933) have shown that, after

the extinction of placental function, oestrogenic hormone disappears from the blood more rapidly than does gonadotropin from the urine, and they therefore consider that disappearance of oestrogenic hormone from the blood is reliable evidence of death of the foetus.

I wish to show here that, in some cases, the placenta can continue to secrete hormones for several weeks after the foetus has died.

CASE-RECORDS

CASE 1.—The patient consulted me on Oct. 25, 1944, in the eighth month of pregnancy, because she had ceased to feel any foetal movements during the past ten days. No foetal heart sounds were heard, and death of the foetus was diagnosed. Hormonal tests, however, gave the following results:

Date	Serum	Urine	
	Oestrogen (M.U./litre)	Oestrogen (M.U./litre)	Gonadotropin (I.U./litre)
Oct. 29	333	..	..
Nov. 5	500	..	..
„ 11	500	5000	..
„ 12	..	..	10,000 F.S.H.
„ 15	..	..	5000 L.H.
(premature stillbirth)	<100	..	1000 F.S.H.
			500 L.H.

Note.—M.U., mouse units; R.U., rat units; F.S.H., follicle-stimulating hormone; L.H., luteinising hormone.

Though the foetal heart beat had been inaudible for two weeks, on Oct. 29 the urine pregnancy reaction was positive, and the level of oestrogenic hormone in the serum corresponded to that of a normal pregnancy (333 M.U./litre).

A week later (Nov. 5) the blood-oestrogen level actually rose (500 M.U./litre), suggesting that the foetus was alive. The gonadotropin level of the urine was also very high (F.S.H. 10,000 R.U./litre and L.H. 5000 R.U./litre) on Nov. 12.

A positive pregnancy reaction can generally be elicited with 1 or 2 c.cm. of pregnancy urine. Thus pregnancy is diagnosed if the urine contains gonadotropin 500 R.U./litre. However, ten times this amount was present in this patient.

The gonadotropin level of the urine fell considerably (about 90%) only after the expulsion of the dead foetus on Nov. 15. The placenta of this patient, who for four weeks had not experienced any foetal movements, was free from any maceration and histologically revealed no sign of degeneration. The foetus, however, was in an advanced stage of maceration, which fully confirmed the clinical diagnosis made a month earlier.

The placenta, analysed for oestrogenic and gonadotropic hormones (Zondek 1930, 1931, 1937), gave the following results: 2 R.U. (1 M.U.) of F.S.H. and less than 1 M.U. of oestrogenic hormone per g. of placental tissue. These values are low in comparison with the findings in the placenta of a living foetus—namely, 10 M.U. of oestrogenic hormone and 10 M.U. of F.S.H. and L.H. per g. of placental tissue (Zondek 1930, 1931).

CASE 2.—The foetus died in the eighth month of pregnancy. No foetal heart heard. The serum-oestrone level was nevertheless high (500 M.U./litre), suggesting that the foetus was alive. The results of the hormonal tests were thus at variance with the clinical findings.

Three days later the patient expelled a foetus in an advanced state of maceration, showing that the foetus had died two or three weeks earlier. In this case also the placenta showed no degeneration.

DISCUSSION

These cases show that, even if the foetus dies, the placenta can sometimes function normally and remain anatomically intact and in communication with the maternal circulation for as long as four weeks. In case 1 the placental hormones were taken up by the maternal circulation in large amounts. This placenta, though apparently healthy and showing no degeneration, contained less hormone than normal. The probable explanation is that, whereas in a normal pregnancy the placenta supplies part of its hormones to the foetus, with a dead foetus the entire hormone output of the placenta is taken up by the maternal circulation. An analogous situation is observed in thyrotoxicosis, in which the overproduction and secretion of hormone into the blood

is accompanied by a low hormone level in the thyroid gland.

SUMMARY

A placenta can sometimes remain functional despite death of the foetus and can then continue to produce hormones in a normal way for several weeks after the foetus has died.

In such cases the hormone levels in blood and urine can be higher than in normal pregnancy, because the entire output of placental hormones is taken up by the maternal circulation, none going to the foetus.

These observations indicate that death of the foetus may be either primary—i.e., independent of the placenta—or secondary, due to death of the placenta.

Whereas in secondary death of the foetus the hormone levels in blood and urine fall rapidly, in primary death of the foetus there is no such immediate fall and the levels may even rise temporarily.

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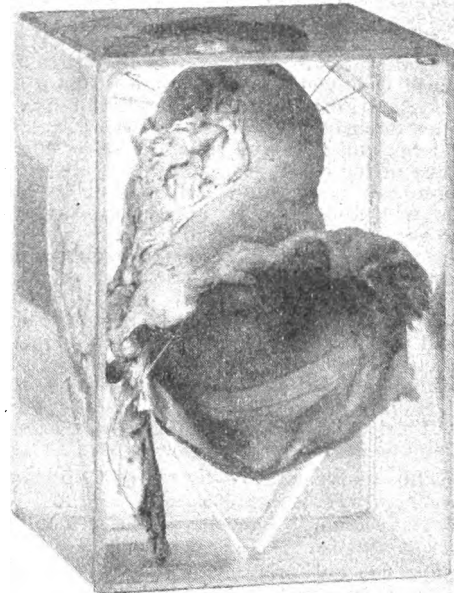
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New Inventions

PERSPEX SPECIMEN-BOXES

DURING the war, when glass specimen-jars became difficult to obtain, a method was evolved at this hospital of mounting specimens in 'Perspex' boxes made to measure. The result has been very satisfactory, such boxes being lighter in weight, clearer, and smaller than the corresponding glass jar. These boxes are more durable than glass, unspillable, and do not leak, though they have been carried about in all positions and submitted to various strains, including falls.

The perspex sheet, 1/8-3/16 in. thick, according to the size of the specimen, is sawn to the required size



and shape with a dovetail-saw; the sides are glued together with 'Diakon' cement no. 2 and allowed to dry under light pressure. The sixth side is not put on until the specimen has been fixed in Wentworth's solution; meanwhile perspex struts are glued into the box, and silk threads attached to them in suitable places for anchoring the specimen. The fixed specimen is placed in the box and anchored, and the sixth side is glued on

under moderate pressure in a vice or under a weight, without mounting fluid. The glue will stick to wood; so this part of the manufacture is done on a sheet of glass, which is easily separated.

A small hole $\frac{1}{16}$ in. in diameter is made near one corner of the box, either with a drill or a red-hot needle; through this hole the mounting fluid is injected with a 20 c.cm. syringe and needle, and air is sucked out as the pressure rises. Small gaps can be recognised by the fact that bubbles are produced on the exertion of a negative pressure with the syringe, and the gaps can be sealed with the cement, but this is a tedious business and spoils the neat finish. The puncture hole is kept open a few days to allow air to bubble out of the specimen; the box is then completely filled with the fluid, and the puncture is sealed with cement. A little pressure on the box will cause the cement to be sucked into the hole as the pressure is released. The edges are rounded with a file and fine sandpaper, and the box is polished with metal polish. The carpentry of the box must be accurate, as a minimum of cement is used to avoid roughness. No leakage has taken place with changes of temperature as the cement is very strong and all the seals are permanent.

Waterproof white drawing-ink is used instead of a label and is covered with a very thin layer of cement. The box can subsequently be opened, if required, by running a dovetail-saw along the seams.

I am greatly indebted to Mr. John Carr, pathologists' assistant, Hillingdon County Hospital, who has become an adept at this type of mounting and takes about an hour to make the box, anchor the specimen, seal, and label. He has mounted seventy specimens for various members of the hospital in the last two years.

The perspex sheets and diakon cement no. 2 have been obtained from Imperial Chemical Industries Ltd.

Hillingdon County Hospital.

L. FATTI, F.R.C.S.

Reviews of Books

Eye Surgery

H. B. STALLARD, M.B.E., M.D. Camb., F.R.C.S., assistant eye surgeon, St. Bartholomew's Hospital, London; eye surgeon, Radium Institute and Mount Vernon Hospital. Bristol: John Wright. Pp. 444. 50s.

THE first new English book on eye surgery for nine or ten years is something of an event. This one was written during the war, and naturally it gives more space to war surgery than the subject now merits: thus the reconstruction of the eyelids occupies more than a quarter of the book. Mr. Stallard is an individualist, and the techniques described are those he practises. This is as it should be, and it is absorbing to follow him through the details of his careful surgery. Not all his dogmatic statements can be accepted whole, but in general his methods will find support among eye surgeons, and any changes he suggests are well thought out and worthy of adoption. He feels that eye surgeons need to give more time to the study of plastic work on the eyelids, and they will find here all they want to know of this branch of eye surgery, though it is doubtful whether many will follow his advice and delve among the abdominal recti for shavings of costal cartilage. This is a stimulating book by an expert whose teaching on the gentle handling of delicate tissues should be a lesson to all. It includes many excellent illustrations by the author, and describes not a few new instruments.

The Psycho-analytical Treatment of Children

Parts I and II. ANNA FREUD. Translated by NANCY PROCTER-GREGG. London: Imago Publishing Co. Pp. 93. 10s. 6d.

To quote the author's own words, "child analysis as a therapeutic method has had a stormy and much chequered career." It is therefore useful to be able to turn to this collection of essays and lectures and to trace the development of the method in the hands of an expert. None of the material is new; the four lectures on technique were delivered in 1926 before the Vienna Institute of Psycho-Analysis; the paper on the theory of child analysis was read at an International Congress in Innsbruck in 1927; the final essay on indications for child analysis, first published in 1945, summarises

advances made in the understanding and evaluation of infantile neurosis in the intervening years. Whatever views may be held regarding the value of psychoanalysis as a practical therapeutic measure, the contribution that it has made to the understanding of children's emotional lives and hence to their upbringing and education cannot be disregarded. The material contained in this book speaks for itself. The evidence of exact observation, the honest presentation of facts, the freedom from exaggeration or false deduction, and the lucid writing reveal the truly scientific mind at work.

Patients and Appendicitis

SIR CRISP ENGLISH, K.C.M.G., F.R.C.S., consulting surgeon, St. George's Hospital, London. London: J. & A. Churchill. Pp. 155. 10s. 6d.

IN writing this book, Sir Crisp English seems to have two purposes which do not completely integrate: he has put down his thoughts on the doctor's—and more particularly, perhaps, on the surgeon's—approach to the patient; and he has summarised and commented on modern methods of treatment of appendicitis. The section on patients is for the student and the newly qualified doctor; the remaining chapters deal exhaustively with appendicitis. The doctor to whom appendicitis is one of the most important illnesses which can afflict his patients will find here much to guide his judgment and make sure his diagnosis. In country districts the actual operation may be done by the general practitioner; and the detailed instructions given on when and how to operate should help him. He will also value the section on postoperative care. The practising surgeon evolves his own methods; and little exception will be taken to those described here. There are one or two contradictions: the postoperative enema is condemned as a routine measure on p. 77, while on p. 82 an aperient or enema on the third day is advised; and despite an instruction to give nothing by mouth or rectum in the Ochsner treatment for cases of peritonitis, a later page recommends that "fluids, including champagne . . . should be given in sips."

It is encouraging to see so much care taken with the section on non-acute appendicitis, that common cause of indecision among general practitioners and surgeons. In Sir Crisp's experience the condition found on opening the abdomen nearly always justifies operation for chronic appendicitis.

Manual of Diagnostic Testing

Part II, *Diagnostic Testing of Personality and Ideational Content*. D. RAPAPORT, M.D.; R. SCHAFER, B.S.; M. GILL. New York: Josiah Macy jun. Foundation. Pp. 100. \$0.75.

MANY of the projection tests used by psychologists for studying the temperamental and emotional differences between people yield extremely interesting raw material. But the problems which arise in sorting and classifying the material and relating it to observed differences in human behaviour remain mostly unsolved. One has still hopefully to await the development of standard terms of assessment. The literature abounds in statements which are neither axiomatic nor sustained by adequate evidence. The terms in use are often ill defined.

In this manual the projection tests discussed are a word-association test, the Rorschach test, and the thematic apperception test. The last two are well known, and so is the general form of word-association tests. (Part I discussed tests of intelligence and concept formation.) The authors explain in detail the interpretation they place on the responses they have observed, but it is impossible to judge from the evidence they present whether their interpretations are valid. Responses are not related to their context in the case-histories of the subjects from which they were obtained—in fact, no case-histories are given. The statistical evidence is not satisfactorily presented; for example, average reaction-times for different groups on the word-association test are recorded without the numbers in the groups or the amount of variation about the averages. These are faults which might have been avoided even if others may be excused as inevitable. It is difficult to believe that this manual will be of much interest except to readers anxious to study all work published on projection tests.

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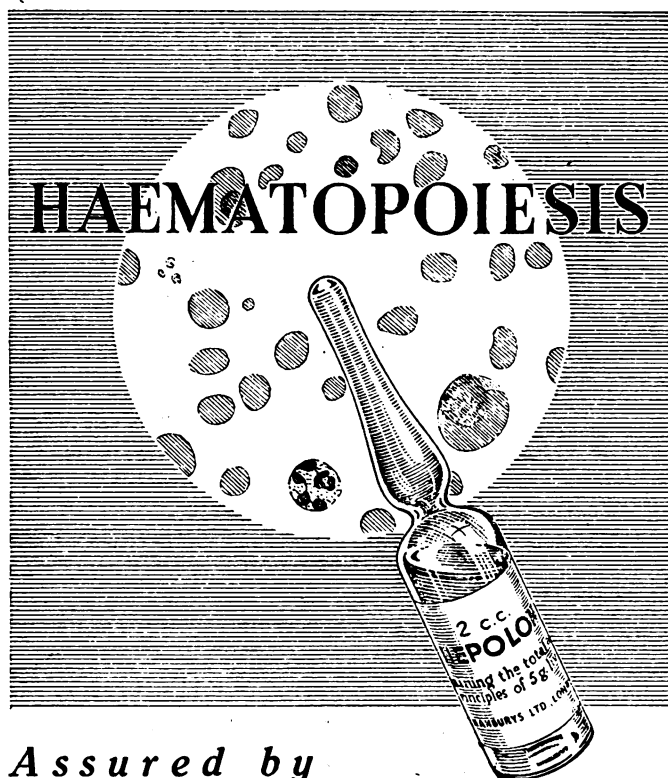


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THE LANCET

LONDON: SATURDAY, FEB. 1, 1947

The Nursing Crisis

THROUGH lack of nurses many of our hospitals are now in dire straits. In London the L.C.C. is reduced to less than half its pre-war complement of beds, and all over the country local authorities are in a similar plight. As more and more beds are closed, all talk of expansion of the hospital services becomes meaningless, and we are rudely reminded that without enough nurses all our schemes will fail. To a large extent, however, the immediate crisis is a crisis of distribution. In recent years the number of nurses entering and qualifying has risen steadily (though not sufficiently), and the great majority of voluntary hospitals have managed to increase their intake so as to provide for the higher nurse-patient ratios demanded by the 96-hour fortnight and other measures accepted as necessary if nursing is to come into line with current ideas. Many voluntary hospitals indeed still have waiting-lists of candidates. Almost the whole weight of the crisis, therefore, has fallen on local-authority hospitals. For these the special recruitment campaigns have proved of little avail; and direction, or anything like direction, of nurses from voluntary to local-authority units is out of the question—if only because it would promptly defeat its own end. What then can be done to promote distribution according to need?

In many places, such as inner London, the arrival of the "appointed day" will mean that units now belonging to local authorities will come under the wing of large voluntary units. Here the nursing staffs will be merged; and we may expect that the teaching hospitals at any rate will be able to find enough nurses for the institutions in their charge. They will be able still further to increase their intake of student nurses, and the double unit may well prove a satisfactory solution wherever there is a strong voluntary training school on which the new staff can be grafted. From this angle it is nothing but a misfortune that there are still fourteen months to go before April 1, 1948. If the situation remains as bad as it is today, the Ministry of Health may be compelled in London to anticipate the "appointed day" by associating some of the county-council hospitals with the larger voluntary hospitals. In the less popular and more remote areas, however, there will be many hospital management committees without any thriving school of nurses on which to build—their chief unit being perhaps a local-authority hospital already suffering from an acute shortage. How are these to manage?

Looking back to the days before the late war it is obvious that the stress and shortage was much more evenly balanced, and the question arises whether the present acute maldistribution is not caused by some factor which has only lately come into play. In hospital circles it is fashionable nowadays to suppose that the factor of pay can be ruled out—has not the Rushcliffe Committee done all that is necessary? In an article on another page a correspondent challenges the reasoning whereby the Rushcliffe Committee has been led to keep the remuneration of the student

nurse on a level which to many outsiders still seems unduly low. But there is another factor also which deserves much more attention than it has hitherto received. One of the first actions of the Rushcliffe Committee was to equalise the rates of pay offered in voluntary and local-authority hospitals. Whereas before the advent of Rushcliffe there were wide differences between hospitals, some asking fees for training and others paying salaries of varying amounts, the position today is quite different. In deference to the idea of placing everybody on an equal footing all this varied range of remuneration was swept away. What has been the result? Some hospitals are much more happily placed than others and have not had any real difficulty in attracting recruits; others, for reasons quite beyond their control, suffer sadly by comparison. Their obsolete buildings, their isolated position, and the type of illness treated—these and other features of their work operate against them. The policy of uniformity has made it impossible for them to offer any compensatory advantage. And why ever should a sensible girl choose to go to one of the less attractive hospitals if she can get exactly the same terms at one which offers an old and valued name into the bargain?

It is high time that this policy was reversed, and latitude was allowed to hospitals—and in future to hospital management committees—to offer real compensatory monetary advantages to girls to whom money is a consideration. There is nothing new or vicious in the principle: the London and Middlesex county councils and many others did it before the war; it is inherent in the award of higher rates for mental and certain other categories of nurses; and it applies to the salaries offered to resident medical officers. The more attractive the hospital the less the remuneration offered. If hospitals which could establish a case for so doing were authorised to offer a substantially higher remuneration for student nurses, the present tendency of candidates to flock to the larger and better-known voluntary hospitals could be, to some extent at least, controlled.

The Rushcliffe Committee ought to think again. Its policy of uniformity is certainly one of the major factors in the present crisis, and has undone much of the good work of the committee in other directions. Unless this policy is promptly and wholly abandoned, the incidence of shortage will continue to bear most heavily on those hospitals whose need for new recruits is most insistent.

Surgery for Deafness

FOR suppuration associated with deafness surgery is nowadays commonplace and routine. Its primary object is the removal of carious and unhealthy bone, and though improvement in hearing is an expected sequel in acute disease it is a pleasant surprise in chronic cases. Deafness in the absence of suppuration is quite a different problem. Broadly speaking, it is due to lesions of the conduction apparatus, or of the end-organ of perception (with or without its central connexions), or occasionally, as in otosclerosis, of both. The essential pathological feature of otosclerosis is the appearance of islands of absorption and new bone in the labyrinth capsule. So far as is known, this process continues throughout life in all parts of the labyrinth, but its special predilection for

the neighbourhood of the oval window often leads, at an early stage, to bony ankylosis between the stapes footplate and the margins of the window. This ankylosis impairs hearing because it damps perilymph movements in the cochlea, and further progress of the disease results in destruction of intracochlear structures by bony overgrowth, with degeneration of the organ of Corti and demyelination in the auditory nerve. Some regard the degeneration of the end-organ and its central connexions as a consequence of stapedia fixation, while others attribute all the changes to a single disease process. Certainly it is difficult to see why ankylosis of the stapes should cause the organ of Corti to degenerate, since there is no evidence that it interferes with the blood-supply of that structure. Moreover, the fact that a stimulus is not received at the cortical level does not necessarily mean that it has not got through to the organ of Corti.

Nearly a hundred years ago TOYNBEE tried to remedy the deafness by removal of the footplate of the stapes, and following him other otologists made similar attempts. Most of these were technically unsuccessful, but recently it has been shown that even technical success does not bring improved hearing. However, it now seems to be established that if an opening is made in the bony labyrinth of these patients, hearing is restored in greater or less degree, and it has been further claimed that the benefit persists as long as the opening remains patent. This latter contention seems to ignore the progressiveness of the disease; and there is no obvious reason why the presence of an artificial hole in the bone should prevent further deposition of bony deposits: moreover, those who take this view must necessarily accept the hypothesis that the neural changes are secondary to disuse. Nevertheless, even if the rationale appears assailable, the surgeons who have interested themselves in the operation seem to be convinced of its efficacy. Judging by the reports of Mr. GARNETT PASSE in our present issue, of Mr. SIMSON HALL,¹ and of other workers (mostly American) whom they quote, it is sometimes almost dramatically successful in restoring hearing to a useful level, and this level is more or less maintained for several years. With an operation so new, and a disease so subject to unpredictable remissions, we must postpone further judgment. Material for this judgment will no doubt be forthcoming, for the technique is now fairly well standardised and should not present too many difficulties to the experienced otologist who is willing to spend time in acquiring it.

In selecting cases of otosclerosis for fenestration those with neural damage must be excluded. When bone conduction—the capacity of the cochlea to receive sound through the overlying bone—is within certain limits it can be assumed that the end-organ and nerve connexions are intact. But although the plotted results of such tests give a picture which conveys verisimilitude, one must remember that each point on the graph is obtained by asking the patient whether he can hear a pure tone being attenuated or amplified; and a partially deaf person, often with tinnitus, does not find these end-points easy. There are other possible sources of error—notably the mental attitude of the patient at the time,

his general health, and fatigue, physical or mental. In short, these graphs or audiograms should be regarded as useful guides rather than objective data. At a conservative estimate there could easily be an experimental error of 10%, and in deciding to operate there is corresponding danger in relying too closely on apparently small losses of bone conduction. In reaching such a decision the age of the patient and the duration of his deafness are both important. As Sir ARTHUR HURST used to say, "in order to hear you must listen," and many middle-aged or elderly people who have been deaf for some years will be unable to regain this faculty, even if their bone conduction with pure tones is apparently good. The best results, therefore, are to be expected with young patients—preferably under thirty—who have not yet lost the habit of listening and in whom no neural damage has yet occurred. This is just the type of patient, however, to whom lip-reading can most readily be taught, the difficulty of doing so increasing steadily with age. Maintenance of hearing at the postoperative level cannot be promised, and careful management is necessary in order not to lose the opportunity of providing the patient with a lifelong accomplishment of priceless value. In addition, the modern valve-amplifying hearing-aid is an efficient and unobtrusive instrument. Incorporation of the mercury low-tension battery and miniature valves, together with plastic earpieces, has produced an instrument less noticeable than a pair of spectacles,² and there is little doubt that it will soon be even smaller.

In the natural desire to secure suitable cases for operation other methods of treatment must not be overlooked. Most patients expect the operation to do everything, but if this attitude can be overcome all these methods can be complementary. Surgery is offering a new approach, but to get the best from it we shall need to preserve a critical outlook.

Limitations of Folic Acid

SINCE progress with folic-acid treatment was last reviewed in these columns three months ago¹ some further information has appeared, not all favourable. We now know that folic acid is effective in the early stages of pernicious anæmia and sprue, but less is known about its use over longer periods. LOPEZ, SPIES, and others,² reporting on 18 cases of tropical sprue in Cuba, studied for some months, say that the doses previously given were too large and now recommend 5–10 mg. daily. It is noteworthy that, though all these patients had some megaloblasts in the marrow smears, the proportion was much less than in pernicious anæmia, 3–4% being representative figures. The 18 patients were treated with folic acid alone; and of the 5 women all returned to their usual housework. Of the 13 men, 9 returned to work, 1 was a cripple, and 3 were over seventy-five years old; but these last 4 men, who had previously been bedridden and helpless, were enabled to look after themselves. Two cases are described in detail, and these patients are reported as remaining well after two months without treatment. LOPEZ and colleagues

2. See, for example, *Lancet*, 1946, ii, 776.

1. *Lancet*, 1946, ii, 680.

2. Lopez, G. G., Spies, T. D., Menendez, J. A., Toca, R. L. *J. Amer. med. Ass.* 1946, 132, 906.

1. *Brit. med. J.* 1946, ii, 647.

comment on the difficulty of distinguishing between pernicious anæmia, sprue, and nutritional macrocytic anæmia. Their rule was to label as pernicious anæmia those patients with histamine-fast achlorhydria; as sprue those with acid steatorrhœa; and as nutritional macrocytic anæmia those with neither. But the borderlines were not clear, and one patient could present different pictures on different occasions.

In this climate the problem is not quite the same. Here the presenting conditions are pernicious anæmia, non-tropical sprue or idiopathic steatorrhœa, and cœliac disease; pernicious anæmia is clinically distinct from the other two. The value of folic acid in the treatment of pernicious anæmia can be regarded as established, but at the present price (1s. 2d. for 10 mg.) it is so much more expensive than parenteral liver treatment that it is likely to be reserved for difficult cases. In non-tropical sprue results have been irregular: some patients have responded well, others only partially or slowly; some have improved so far with folic acid and then further progress has been obtained with proteolysed or ordinary oral liver treatment, while others have shown the reverse. The preliminary results in cœliac disease, which are all we yet have to go on, suggest that the response is slow and that perseverance in treatment is necessary before failure is conceded. That some patients with non-tropical sprue or cœliac disease and a normoblastic marrow would not respond was to be expected, because it is reasonably clear that folic acid is effective only where megaloblastic erythropoiesis is present.

In this issue SPIES and STONE report an observation which, if confirmed, will establish a serious limitation in the value of folic acid in pernicious anæmia; for they find that folic acid has no effect on the degeneration of the posterolateral tracts of the spinal cord commonly associated with the disease. Not only has folic acid failed to relieve this syndrome but the neurological signs have worsened while the patient was receiving it; and similar results are reported with thymine. All the patients recovered when given an ordinary concentrated parenteral liver extract. It will be recalled that DOAN³ noted a remission of minor neurological signs—presumably due to peripheral neuritis—in his cases of pernicious anæmia given folic acid, and none of his patients had developed neurological changes while on treatment; so far this has also been the experience in this country, but there has probably not been sufficient time for any such complications to appear. The findings of SPIES and STONE have practical and theoretical implications. The practical ones are that cases of pernicious anæmia on regular folic acid must be carefully watched for the onset of posterolateral cord signs and promptly put on liver extract if these appear; and when such signs are already present the patients are best treated with liver. On the theoretical side this report would have delighted ARTHUR HURST, who contended that the hæmopoietic factor was distinct from the neurotrophic factor. It fits in too with other evidence suggesting that folic acid cannot in every case of pernicious anæmia completely meet the deficiency that is filled by a liver extract—that some cases are also suffering from the lack of an unidentified factor.

3. Doan, C. A. *Amer. J. med. Sci.* 1946, 212, 257.

Annotations

WORLD FOOD PLAN

LAST September the Food and Agriculture Organisation received from Sir John Boyd Orr, F.R.S., its director-general, a plan for a World Food Board¹ which was to dispose of the funds necessary to stabilise prices and to establish a world reserve for emergencies. That plan was rejected, the United States voicing a preference for multilateral agreements covering specific commodities²; and it has since become evident that many countries would have been unable, or unwilling, to subscribe the large capital needed to keep the board in business.

For the last three months the preparatory commission of the F.A.O. has been trying to work out an acceptable alternative. Its proposals, published last week, though less ambitious in design than those of Sir John Orr, have the same end. The idea of a World Food Board has been abandoned; instead, a World Food Council will be established. The council will, however, not be a marketing concern, nor will it have mandatory powers: for the attainment of stabilisation it will rely entirely on good will and international consultation. Producer countries will be expected to establish buffer stocks to keep prices within agreed limits; to sell to needy countries at prices they can afford; and, under certain conditions, to establish national reserves for world use in the event of famine. The report—looking some way ahead—emphasises that stabilisation must ultimately depend on greater consumption rather than on reduced production; and to increase their purchasing-power undeveloped regions are urged to set about the task of industrial development, seeking credits, if necessary, from the World Bank.

The virtue of these proposals is the chance that they may be generally accepted; indeed for success they must be universally accepted, since one country standing apart could wreck the accord between those loyal to the plan—for example, by undercutting for quick returns in a year of plenty. The nations may yet have to return to the Orr plan, if experience shows that nothing less will serve the world's purpose.

CONTROL OF MUMPS

No writer on mumps can refrain from quoting its description in the Hippocratic corpus; indeed, until recently it was not easy to say that there had been any advances in our knowledge of an ailment which, however painful or embarrassing, gave no reason for anxiety except in its involvement of the genitals and its rarer neurological manifestations. In the years before the war the most noteworthy innovation was the surgical treatment of orchitis which gave promise of the immediate relief of pain and the prevention of testicular atrophy at the cost of simple incision of the tunica albuginea. Soldiers and schoolboys have provided much data in the past, and it is not surprising that the opportunities provided by mobilisation turned the attention of the epidemiological board of the U.S. Army to some of the problems presented by mumps. Johnson and Goodpasture,¹ in 1934, had shown that the "cause" was a filtrable virus which would produce a transmissible parotitis in the rhesus monkey. The team headed by J. Stokes jun. and J. F. Enders² have been investigating the possibilities of inducing an active or passive immunity in man which would either prevent an infection or modify one already established. It cannot be said that the attempt has as yet been entirely successful. From

1. See *Lancet*, 1946, ii, 463.

2. *Ibid.*, p. 683.

1. Johnson, C. D., Goodpasture, E. W. *J. exp. Med.* 1934, 59, 1.
2. *Ibid.* 1945, 81, 93, 119, 137; 1946, 84, 323, 341, 407.

the evidence so far published it would not be safe to say that convalescent serum or the gamma-globulin derived from it has any dramatic effect on the incidence of orchitis as a complication. Formol-inactivated mumps virus gave only a 50% protection to a group of children who were later infected with active virus by having a suspension injected into the parotid duct, though the attack was modified in nearly all the vaccinated children.³ A promising method of stimulating an active immunity is suggested by the observation⁴ that passage of the mumps virus on the developing egg reduces its virulence while leaving the antigenicity unimpaired. So far the experimental data have been obtained in monkeys, but a single human trial was successful enough to encourage further research.

One useful fact that has emerged is that past infection (and every old wife knows that this is equivalent to a high degree of active immunity) may be detected in a human subject either by a complement-fixation test, or, more simply and effectively, by an intradermal reaction to the injection of heat-inactivated material from the infected parotid of a monkey. Testing of the population at large by the latter method gives reason to suppose that about 30% of young Americans suffer from mumps without any clinical symptoms and that the newborn child derives some immunity from its mother.

The infectiousness of mumps appears to be extreme but capricious. In every outbreak some children enjoy what appear to be miraculous escapes from infection. Not long ago a small outbreak of mumps in a rural community involved an old lady (76) with pancreatitis, a farmer and his wife with parotitis, a retired major R.A.M.C. (64) with orchitis, and the attendant doctor with parotitis and orchitis; at least 7 children under the age of ten were exposed intimately and none showed any evidence of infection. Our knowledge of the mode of spread is still slender. What is needed is some studies of the type made familiar by Dr. W. N. Pickles, of Aysgarth.

FROM SCHOOL TO INDUSTRY

THE abruptness of the change from school to industry was emphasised by Dr. A. A. E. Newth and Dr. T. A. Lloyd Davies at a joint meeting of the Society of Medical Officers of Health and the Association of Industrial Medical Officers on Jan. 24. At school, work is done in short periods and is arranged in an interesting manner; free dinners and milk are provided; and medical supervision is continuous. In industry, on the other hand, work is in long periods; for the entrant it is often uninteresting and monotonous, and its purpose is seldom explained to the child. Canteens are now regarded as an industrial asset; but, except in a few specified jobs, such as night work, there may be no further medical supervision after the inspection (often under difficult conditions) by the examining surgeon on the child's entry to employment. Greater use should be made by examining surgeons of the reports they can obtain on the medical record of the school-child, but the actual placement of the child in industry must be made by an industrial medical officer who has an intimate knowledge of work and industrial conditions. The child's early months in industry should be regarded as a period of training rather than of production.

This change takes place at a time when the child is undergoing the profound physical and psychological changes of adolescence, and it is important that the young person should be influenced for good. That is the great opportunity of the county colleges set up by the Education Act of 1944 for young people up to the age

of eighteen—in place of selfseeking and irresponsibility, to instil a sense of service and purpose. Education for citizenship must be their fundamental object. County colleges provide the student of social medicine with a magnificent opportunity of exploring the neglected field of the development of the normal adolescent. Except in a few highly selected groups, such as boys at Eton and university students, even the most elementary anthropological measurements are lacking. Valentine¹ has shown that the psychological characteristic of the adolescent is intensification of emotional experience and a sense of uniqueness, but much further study of the normal is needed. In county colleges the educationist and industrialist will meet on common ground, for what benefits the child will in the long run benefit industry.

SULPHONAMIDES FOR INJECTION

A RECENT letter by Dr. Stanley Banks¹ directs attention to a sulphonamide preparation of which more might have been heard had penicillin not gained the field so completely. 'Soluthiazole' (May and Baker) is the disodium cinnamylidene dibisulphite derivative of sulphathiazole. It dissolves readily in water, giving a colourless solution of pH about 7. It is therefore free from the drawbacks of local irritation and tissue necrosis which tend to develop when the highly alkaline sodium salts of sulphathiazole, sulphapyridine, and sulphadiazine are used parenterally. Its pharmacology was recorded in 1945 by Wien and his colleagues.² A gramme of soluthiazole contains 0.442 g. of sulphathiazole. Absorption after injection by any route is rapid and satisfactory. It is not possible to say how much of the circulating drug is unchanged soluthiazole; but very little is conjugated, presumably because rapid elimination gives the liver insufficient time for acetylation. Therapeutically soluthiazole is as effective against streptococcal infections as the sodium salt of sulphathiazole, but it is distinctly less effective, in vitro and in vivo, against the staphylococcus. Dosage can, of course, be adjusted accordingly, and the advantages of this drug in initiating sulphonamide therapy quickly, or in administering it to the vomiting or unconscious patient, are obvious. Moreover, experiments with mice have shown that toxicity is less than with either the parent substance or its sodium salt, and that urinary crystallisation in particular occurs much less readily.

CHANGE OF ADDRESS

IN 1936 an International Bureau of Human Heredity was established in London to collect the world literature on human genetics and inform inquirers, lay and scientific. When the war began in 1939 the bureau already had a unique collection of data; four times this narrowly escaped destruction by enemy action before it was safely housed in the caves at Chislehurst.

The aim has been not only to collect but to correlate reports; but unfortunately endowments to cover the cost of the trained staff essential for this purpose have not been obtained, so that the bureau has had to be transferred to another country with better prospects. It has now been opened in Denmark, under the direction of Prof. Tage Kemp, at the University Institute for Human Genetics, 14, Tagensvej, Copenhagen, N.; and its future will be decided next year at Stockholm by the International Congress of Genetics. Mrs. C. B. S. Hodson, who has had charge of the bureau since it was opened here, can congratulate herself that, since the international nomenclature has been used throughout, the work will continue without interruption.

3. Stokes, J. jun., Enders, J. F., Maris, E. P., Kane, L. W. *Amer. J. Dis. Child.* 1945, 69, 327.
4. Enders, J. F., et al. *J. Immunol.* 1946, 54, 283. Habel, K. *Publ. Hlth Rep., Wash.* 1945, 60, 201; 1946, 61, 1655.

1. Valentine, C. W. *Nature, Lond.* 1943, 152, 122.

1. Banks, H. S. *Lancet*, Jan. 4, p. 45.

2. Wien, R., Harrison, J., Freeman, W. A., Phillips, G. E. *J. Pharmacol.* 1945, 84, 203; Wien, R., Hampton, J. W. F. *Ibid.*, p. 211.

TO LORD HORDER

We in this country have never made a habit of celebrating the 70th and 80th birthdays of our teachers. The more significance therefore attaches to our occasional spontaneous expressions of affection and thanks. On Jan. 7, which was supposed to be his 75th anniversary but was really his 76th, Lord Horder found himself the subject of a symposium at Claridges, in which various speakers endeavoured to explain his remarkable case and its influence on us all.

Sir Alfred Webb-Johnson, F.R.C.S., who presided, spoke of Lord Horder as the man who brought the laboratory to the bedside and revolutionised clinical teaching. When he began his career, said Prof. Henry Cohen, the recognition of disease depended on the unaided senses; yet in more than half a century of great change he has remained an outstanding clinician, bringing to diagnosis a capacity for rapid and accurate perception and assessment, both of persons and situations, an extensive knowledge, common sense, and balanced judgment. He has withal that simple humility which is the surest shield against intellectual arrogance, and nobody has been more liberal in his help and encouragement of younger colleagues. Nor can many physicians equal his record of public service: "he claims the right of the doctor to help in advancing human welfare—a modest and unselfish claim when many creeds claim only the right to hinder." Mr. Aneurin Bevan as Minister of Health tendered the Government's thanks for the help Lord Horder has given to successive holders of that office. Dr. Geoffrey Bourne spoke as a colleague at Barts, and Dr. D. M. Lloyd-Jones as one of the first of his house-physicians there—one of many who owed him an incalculable debt.

"Since ceasing to be a full-time practitioner of the art of medicine," said Dr. Lloyd-Jones, "I have had time to consider the elements which conspired together to make Lord Horder so unique as a clinician. I would place them in the following order. First, an unusually clear, penetrating, and logical brain. Second, a prodigious memory leading to encyclopædic knowledge. But perhaps above all is his clear grasp of, and his rigid adherence to, the principles of medicine. I never agreed with those who felt that there was something almost magical or dæmonic in his brilliant diagnoses: it always seemed to me to be the inevitable result of the exercise of the above qualities. It was essentially the result of close observation which missed nothing, the careful collecting and collating of facts, and then the relentless process of reasoning it all out. It was truly scientific.

"As a man, what has impressed me is his humanity, kindness, and understanding. He is utterly unaffected and entirely unspoilt. Perhaps the greatest tribute that one can pay him is to point out that, in spite of phenomenal success, he has never degenerated into a merely fashionable physician."

"The judgment of Harold Nicolson was right," said Professor Cohen, "when he placed Horder among the most impressive of contemporary figures." But he is impressive with an endearing lightness which was evident once again in his reply to all this. We are happy to publish his remarks on another page.

REACTIONS TO INSECT BITES

THERE is a widespread belief that blood-sucking insects attack some people much more readily than others. Almost every entomologist has heard stories beginning "When my wife and I were sleeping in a room in . . ." and recounting how the mosquitoes (or bugs, or fleas) ignored one person while the other was covered with bites. It is true that some insect parasites exhibit sufficient preferences to restrict them to one host species; but until recently there has been no scientific evidence for distinction between individuals. It seems that mosquitoes do in fact prefer to bite some people, though

probably none are entirely avoided.¹ A more common explanation of the unequal sufferings of two sleeping partners is a difference in their reactions to the insect bites.² It is easily demonstrable that some people are unaffected by bites which cause large weals, erythema, and pruritus in others. Mellanby³ has lately demonstrated that people usually pass through different stages of sensitivity if they continue to be exposed to bites of certain mosquitoes. When a person unused to the mosquito is bitten there is no immediate objective effect, but a severe reaction about 24 hours later. When his experience is more extensive an immediate transitory weal is also observed. If the person is still further exposed to bites the secondary reaction on the day after the bite does not occur, and a final state may be reached in which no reaction whatever is experienced.

		Immediate reaction	Delayed reaction
1st stage — +
2nd " + +
3rd " + —
4th " — —

It is the delayed reaction experienced in the early stages of exposure that causes great discomfort and may persist for several days, waxing and waning in intensity. The immediate reaction causes some itching, but all symptoms disappear within two hours.

These results were obtained with the mosquitoes *Aedes ægypti* and *Anopheles maculipennis atroparvus*. The sensitisation and immunity seemed to be quite specific, so that a man may be in stage 1 in regard to *Anopheles* and stage 2 for *aedes*.

BACK TO NEGOTIATION

NEITHER public nor press have appreciated the reasons which made many doctors object to negotiation with the Minister of Health on the regulations to be made under the National Health Service Act. It seemed to them improper that organised medicine should reject participation in the scheme before it was fully revealed, and that the experts should refuse aid in making it as good as possible. These arguments could have been rebutted more easily if the plebiscite had shown a larger proportion of the profession against negotiation; but a majority of 8% of those voting was insufficient backing for action which outsiders would interpret as extreme. The special representative meeting of the British Medical Association has been wise therefore to accept the council's recommendation that negotiation should be resumed, though with conditions. To resume it in such a manner that it is bound to fail would be merely a manoeuvre for position; and we trust that instead a serious and sincere effort will now be made to reach agreement with the Minister. As the *British Medical Journal* said last week, the first of the fundamental issues before us, "and one which at the moment there is a tendency to lose sight of, is the need for a reorganisation of the medical services in this country so as to provide the people with the best possible Health Service."

Sir JOHN FLETT, F.R.S., a director of the Geological Survey of Great Britain from 1920 to 1935, died on Jan. 26 at the age of 77. He graduated M.B. at the University of Edinburgh in 1894, but almost at once his interests turned to geology.

THE Goulstonian lectures of the Royal College of Physicians of London will be delivered at the college on Tuesday and Thursday, March 18 and 20, at 5 P.M., by Dr. F. Avery Jones. His subject is *Hæmatemesis and Melæna*.

1. Ribbands, C. R. *Nature, Lond.* 1946, 158, 912.

2. Bristowe, W. S. *Ibid.*, p. 750. Mellanby, K. *Ibid.*, p. 751.

3. Mellanby, K. *Ibid.*, p. 554.

Special Articles

NEGOTIATION OR NOT?

B.M.A. REPRESENTATIVE BODY DECIDES

A SPECIAL representative meeting of the British Medical Association was held on Jan. 28 to consider the council's resolution that:

"The British Medical Association, having considered the final results of the plebiscite and the Minister's letter of Jan. 6 to the Presidents of the Royal Colleges, and desiring to secure for the people the best possible health service, is willing that discussions be entered into with the Minister to that end, provided that such discussions are comprehensive in their scope, and that the possibility that they may lead to further legislation is not excluded; and that after the conclusion of these discussions a second plebiscite of the profession be taken on the issue of entering the Service."

Dr. GUY DAIN, chairman of council, said that after the recent interchange of letters between the presidents of the three Royal Colleges and the Minister of Health the council met, and, noting his more conciliatory tone and his offer, made for the first time, to negotiate, decided on this form of words. The council's opposition to the Act as it stands is, said Dr. Dain, unaltered. But the Minister, having offered to negotiate on his terms, it was up to the association to offer to negotiate on its terms. The council was willing to negotiate on the basis of a comprehensive health service; its resolution was so framed as to make it clear that the association would not negotiate on regulations alone; but it had been expressed in as conciliatory a way as possible so that the Minister might accept it. No action would be taken at the expense of principles; if the Minister refused to negotiate, the association had still done no harm and had shown its desire for the best service. If the Minister accepted there was still a possibility of further legislation.

DISCUSSION OF AMENDMENTS

Dr. F. C. COZENS (East Kent) held that the council's resolution was not sufficiently precise. Only amendments to the Act should be discussed. With later speakers, he objected to the action by the presidents of the three Royal Colleges in writing independently to the Minister. He moved an amendment to refuse negotiation on the grounds that the Act violated the principles set out by the council as fundamental. This amendment was supported by Mr. C. E. BEARE (Reigate) and Dr. W. GUNN (Greenwich) who found no change of heart in the Minister's reply to the presidents. Dr. A. SMITH POOL (Glasgow) thought the resolution suggested a retreat by the B.M.A., whereas the Minister was not retreating.

Dr. J. A. PRIDHAM (council) recalled that the Act was on the statute book. If the association was to obtain alterations it must discuss the Act with the Minister; to adopt a wholly negative attitude would be to get nowhere: "do not let us be led away into an untenable position." Dr. G. DE SWIET (Paddington) also supported the resolution. The plebiscite minority, he said, was less vocal than most minorities but knew its mind; and he thought it had now become a substantial majority. Reckless action would split the profession and the association, and would not prevent the Act coming into force. A new Negotiating Committee, representing more fully the plebiscite minority, should be elected.

Dr. H. S. PASMORE (Kensington) said that the Minister did not feel himself beaten and was therefore unwilling to bring in an amending Act. The need now was for a constructive policy. Dr. O. C. CARTER (Bournemouth) saw an off-chance that by negotiation an unsatisfactory Act might be made into a workable Act. An attempt should be made to resolve difficulties round the council-table. Dr. W. B. A. LEWIS (Shropshire and Mid-Wales)

believed that amendment of the motion would alienate public opinion and might deprive the association of the chance of negotiating. Dr. G. H. BARENDT (Southampton) argued that the amendments showed inability to face the real situation in the profession. Matters of policy should be decided by a majority of two-thirds or three-quarters, and the plebiscite had not given the council that majority.

Dr. W. N. LEAK (Mid-Cheshire) contended that the wording of the amendment was not strong enough. There was no guarantee that consultation with the Minister would be of any use. Dr. J. A. IRELAND (council) also opposed the council's resolution, because there was no guarantee of the Act being amended. The Minister would, however, amend it if he were forced to do so.

Dr. R. W. COCKSHUT (council) said that a straight fight was out of the question for 9-12 months. This lead from the council was a lead from strength; it was up to the association to see how far the Minister would go. Prof. R. S. AITKEN (Aberdeen) reasoned that ultimatum and boycott were not suitable means of removing blemishes and dangers in an Act much of which was good. The resolution should go forward without any concealed ultimatum to the Minister. Dr. DAIN said that the attitude must be firm and friendly. The negotiators would have a chance to see whether amendment were possible; if not, they should withdraw. The council, he said, had not weakened in its adherence to principles, and the association was in a strong position. Up till now the Minister's method of consulting had been eyewash and a waste of time.

The amendment was rejected by a very large majority. Lord HORDER (Marylebone), moving a further amendment calling for new legislation, said he did not find the reasons for the council's motion very cogent. There were, he thought, two weak points: (1) reference to correspondence between the Minister and the colleges, since it was agreed that this did not alter the main issue; and (2) the use of the word "possibility," since it was certain that some change in the present Act must be accepted. Discussion with the Minister should first be on principles. Dr. DAIN replied with a plea that the negotiators should be given full authority; it would be wrong to tell them at what point they must come back. The amendment was lost.

Further amendments seeking to make alteration of the Act a prerequisite for negotiation were then discussed. Dr. S. WAND (Birmingham) contended that the next round should be fought at the conference-table; it would be unwise to alter the council's resolution. The proposed amendments were impracticable; the Minister could not be expected to take unconstitutional action. Dr. J. A. BROWN (council) also thought that if the council's resolution was amended any chance of discussions would be thrown away.

The amendment, and others that followed, was lost by a substantial majority, and the council's original resolution was carried without amendment by 252 votes to 17.

NEGOTIATING COMMITTEE

In reply to a motion Dr. DAIN agreed that a fresh election for the B.M.A. members of the Negotiating Committee should be held; and the meeting accepted the suggestion of Dr. Charles Hill, the secretary, that 8 members should be appointed by the council, that representatives should be informed by post, and that they should vote by post to elect a further 8 members. A further motion by Dr. J. A. L. JOHNSTON (Londonderry) that the committee should be reconstituted so that the B.M.A. had a majority was carried, with the rider that ex-Service practitioners should be adequately represented on the committee.

Further business was ended by the house being counted out,

Health Centres of Tomorrow

v—IN THE COUNTRY

FOR some years the country doctor has watched medicine advancing into technicalities which he cannot hope to master, and his own facilities have become proportionately antiquated and inadequate.

A National Health Service should give the country a chance to become an equal partner with the towns; but it will have to pay attention to the essential differences between rural and urban ways of life. Time and distance provide the greatest contrasts. For example, when acute appendicitis develops in an isolated cottage there may be hesitation or difficulty in sending a message to a doctor several miles away, and the message may arrive when the doctor is out on a long round or is committed to other work. Further time may be wasted in reaching a telephone, in securing admission to a distant hospital, and in ambulance travel both ways—not to mention many other vicissitudes arising in a thinly populated country district with doctors and nurses sprinkled wide apart, or coming out from neighbouring towns.

Putting all this right is a simple affair, on paper. Given enough trained professional men and women, and the building material and labour to house and equip them, there is no great difficulty in mapping out an efficient service. And we should certainly have such an ideal in our minds, even if the means at our present disposal will only suffice for a beginning.

AN IDEAL

In our ideal service the small market towns and larger villages, which are the natural centres of life, should serve the neighbourhood from medical centres reaching the level of the outpatient department of a hospital. General practitioners should work from these centres in comfort and privacy, and in numbers sufficient to allow careful unhurried work and a reasonable choice of doctor by the patient. The centre should be in constant and rapid communication with the parent hospital, which should regard it as an outpost enabling the patient to have specialist attention without travelling long distances.

The essence of the health centre is that it shall be a real advance on the doctor's consulting-room as we now know it: a mere communal surgery would be a step backwards rather than forwards. Whatever may be the requirements in town, the rural centre situated at any great distance from a hospital will need portable radiographic equipment, a pathological service, and a theatre for minor operations. Further, it should be self-contained, to the extent that the patients, and the doctors, once arrived, need not go outside it for anything. So it must cater for the needs of patient, doctor, nurse, dispenser, secretary, domestic, and transport, over the whole twenty-four hours.

That is what we should aim at; but it cannot be achieved without far more doctors, nurses, and ancillary staff than are available today. While they are (we hope) being attracted and trained, we had better come down to earth and consider what can be done as a beginning.

A BEGINNING

The services which exist at present must be collected together and organised to work as a whole, preferably under the same roof. This means bringing together the practitioner, the local authority's various clinics (antenatal, child-welfare, school, orthopaedic, dental, and ophthalmic), the district nurse, the local dentist, the pharmacist or dispenser, and the optician. To do so would obviate the present round of visits which a

mother may have to pay in order that her family shall benefit from these various services, which at present may be scattered haphazardly within a radius of anything up to twenty miles.

The local ambulance service should be attached, and some form of canteen included, so that patients with a long wait can at least get a cup of tea and a bun.

This heterogeneous collection will have to shake itself down to work harmoniously as a team, and must come under some form of management. Perhaps this will be most successful if it is constituted from inside—e.g., by a small committee of four or five—while the purely medical problems (roster of duty, holidays, vacations, courses for the doctors) would be dealt with by all the doctors together forming the medical staff committee of the centre.

By what is virtually a continuation of the old apprenticeship, the young doctor usually enters practice by becoming first a locum tenens, then an assistant, and finally a junior partner. There is much to be said in favour of this, and it would be a good plan to have a young man attached to each health centre on the footing of house-physician or casualty officer. Before joining a health centre he would have to spend a year in it as a regular member, and this would give him a chance to test his suitability for a particular neighbourhood, and to learn how medicine is applied in general practice: in fact a compulsory year in a health centre would be an invaluable experience for everybody, including the future consultant and teacher. At the same time, he would provide the necessary extra man in the unit, a constant locum for whoever is ill or on holiday.

The next problem is that of liaison with the parent hospital. The choice lies between the weekly visit of the hospital physician and surgeon—and possibly the other specialists at intervals—and the daily collection from the health centre, by a hospital bus, of the various cases that the centre practitioners want to refer to specialists. Both systems are open to abuse. At present the country doctor is less likely than his city colleague to be a mere signpost to the different hospital outpatient departments. And he would be less likely to become one if it were a rule that he must be present at any consultation with a specialist at the health centre. This rule would not involve the loss of so much time as its opponents aver, and it would have big advantages over the present system of consultation through notes and letters. It would also keep the country doctor in close touch with consultant medicine.

BUILDINGS

The housing of the country health centre needs careful thought. The Act makes this the responsibility of the county council, whose knowledge of local conditions may be less than its interest in economy. Nothing would discourage the country doctor more than to have to work in some patched-up derelict white elephant instead of his own comfortable house. Nothing would discredit the scheme more in the eyes of the public than that the centre should lack amenities and have a poor appearance. There are places where the buildings of the local cottage hospital might be suitable; but as a rule these have been deliberately placed outside the towns and away from traffic, whereas the first essential of the health centre is that it should be central. Probably the best solution, until new centres can be built specially for the purpose, and until experiment has found the best layout, would be to house them in the most suitable of the doctors' houses which they will render redundant.

The cottage hospitals, as such, will of course belong to the regional hospital board. But if it is decided that general practitioners shall retain their beds in them, it would be well that these should be visited at least once

a week by a senior consultant, to whom the general practitioner would stand in the relation of registrar. This suggestion may give offence to some very able general practitioners who are, for example, experienced surgeons; but it would ensure a higher standard of care for the inpatient than is universal in many of the smaller hospitals.

THINLY POPULATED AREAS

To concentrate all country doctors in health centres might be tidy but is clearly impracticable. In scattered areas it would often mean a journey of many miles to a consultation, while it would, of course, be equally inconvenient to the doctor making a visit; in remote villages, as for example in parts of central Wales, there is no alternative to continuing the present one-man or two-man practices.

It may be hoped, however, that the start of the new service will be the occasion for improving conditions for both doctor and patient in these isolated parts. Wherever possible, doctors should practise at least in pairs. The absence of the man practising alone while answering a distant call or through taking a half-holiday may mean that no other doctor is readily accessible in an emergency. Where practice in twos is out of the question, the junior man at the nearest health centre might act as relief.

For patients in outlying parts a visit to hospital for consultation is a heavy undertaking, involving often a full day's travel and sometimes a night's stay at the other end. The hardship can be, but too seldom has been, mitigated by giving priority to country patients at the hours best suiting them, and by grouping outpatient days so as to ease the arrangement of communal transport. Where the nearest health centre is much closer or more easily reached than the hospital, specialists should, wherever possible, themselves travel there to see patients.

OTHER CONSIDERATIONS

Because distance plays so important a part in his work, the country doctor cannot conscientiously look after as many patients as his urban counterpart; yet his travelling expenses are much greater. This financial handicap might be offset, for example, by ruling that the patient three to six miles away should count as 1½ patients, and the patient six or more miles away as 2 patients—this applying both to capitation payments and to the maximum numbers on the list. This would mean that the practitioner would be given the chance of earning the same maximum either in town or country, but the greater the distances the smaller would be his list. If transport were to be supplied by the Ministry of Health the question of car expenses would not arise; but if the doctor continues to provide his own car there will have to be a basic salary or allowance, and this again could be varied according to the proportion of patients living at a distance.

Country practice has always been a very arduous profession. Many of its former amenities have disappeared with improvement of telephone communications, and the single-handed doctor has literally to run a 24-hour service. Organisation in health centres is the logical answer, but it must not be achieved at the cost of what are still the outstanding characteristics of the country doctor—his close personal relationship with his patient, his self-reliance, and his sense of responsibility. If these were to disappear in a standardised form of penny-in-the-slot medicine, the health centre, for all its advantages, would still be to the disadvantage of the patient. The country doctor must be allowed to retain his individuality, and to "run the local show" for the benefit of what used to be his own practice, without having to keep an eye all the time on powers-that-be who know nothing of local conditions.

Reconstruction

THE PAY OF STUDENT NURSES CASE FOR AN INCREASE FROM A CORRESPONDENT

It is now some six years since the Rushcliffe Committee was set up to reconsider the rates of pay for nurses. The committee is composed of two panels, one comprising representatives of the employing committees—members of voluntary-hospital boards, of local authorities, and of other bodies—and the other representatives of the nurses, who are for the most part matrons. The committee's recommendations reflect the opinion prevalent in authoritative nursing circles that the student nurse should still be content with low remuneration during her training provided her financial prospects after qualification are improved.

The rates for student nurses have quite recently been revised and now stand at £55 for the first year, £65 for the second, £75 for the third, and £95 for the fourth year. Ex-Service candidates get an additional £25 in the first year, £20 in the second, and £15 in the third. But even so the rates remain low, and the case for raising them demands consideration.

ARGUMENTS AGAINST CHANGE

The view that no further increases are desirable in the rates of pay of the student nurse is based on two main arguments which to some extent overlap.

1. It is contended by the nursing authorities, and indeed by many nurses, that the emoluments of the student nurse should not be regarded as pay at all. One is reminded of the fact that at many of the well-known hospitals the student nurse used to be called upon to pay fees—with the inference that she is very fortunate to receive any allowance whatever. In what other profession, one is asked, is the student paid while training for a qualification? Where else does she get her board, lodging, uniform, and laundry free?

The answer to these questions is, of course, "In no other profession"; which seems to lead to a logical conclusion that the student nurse is, compared to her friends in training elsewhere, very fortunately placed. But the argument depends on a comparison of professions, and actually there is no comparable profession in which a girl both receives pay while in training and is asked to undertake such exacting responsibilities. This fact so weakens the argument that it becomes negligible unless confused with the one which follows below. Indeed these rhetorical questions do a great deal of harm by obscuring the issue.

2. Much more important is the contention that a high rate of pay would detract from the student status of the nurse. If further funds are available, it is said, let them be devoted to much-needed improvements in the educational facilities rather than to increasing the small salary paid while a nurse is *in statu pupillari*.

There is a good deal of force in this argument when used against any attempt to raise the salary to a level at which it could be deemed attractive; but though it establishes an upper limit, it does not really help us to decide whether the present scales are high enough. It may be, and sometimes is, used to discourage efforts to adjust the current "small salary" to modern social conditions. When it is allowed to dominate discussion, as it has apparently done in the deliberations of the Rushcliffe Committee, it prevents examination of the factors which ought to govern the actual amount to be paid.

PURPOSE OF THE STUDENT'S SALARY

What is the purpose of granting a "small salary" while in training? If it is not primarily to be regarded

as pay it must be looked upon as a maintenance allowance, which, in conjunction with board and lodging, enables the student nurse to be self-supporting and independent of her parents.

Independent of her parents? This will be challenged. It will be pointed out, as we noticed above, that in other professions the student is not independent of her parents. The masseuse for instance costs her parents money while in training—quite a lot of money. But let us look the facts squarely in the face. Quantitatively there is an all-important difference. Other professions such as physiotherapy are at a stage where there is an ample supply of candidates coming from families able to find the wherewithal for fees. Nursing is not nowadays in this position.

The demand for nurses is such that a substantial proportion of the candidates (we are not thinking of the well-known teaching hospitals) must and do come from the publicly provided primary schools as well as from the secondary schools. Statistics have been adduced to show that the numbers of girls leaving secondary schools cannot possibly provide nursing with a sufficient intake. Many preliminary nursing courses for girls from primary schools are being organised. The truth is that among the large numbers now coming into nursing there are a substantial proportion to whom the possibility of independence of support from the home is an important factor in the choice of a career. It is not wise to shut one's eyes to the fact that in many homes—where the family income is low, where there is perhaps no father and only a pension to support a family of brothers and sisters, where there may be dependent relatives—a girl is materially and rightly influenced by the desire if not to contribute a little to the family income at least to relieve the family of any charge upon them. With the demand for nurses as it is today—the crucial factor in the whole expansion of the hospital service—it is not intelligent to allow a financial consideration of this kind to deter even a proportion of potential candidates.

The case for an allowance while in training sufficient to enable a girl to be independent of her parents is overwhelming. Indeed it is often by inference accepted, and the statement made that the nurse has this independence.

REQUIREMENTS FOR INDEPENDENCE

If the need for independence be agreed, it remains only to determine what is the minimum allowance, in addition to board and lodging, which in present conditions does enable a girl to be independent of her parents, and to ask whether the present rates achieve this object. There is only one way to arrive at an answer and that is to set out a budget of necessary expenses.

Three simple and necessary items occur at once. One may set down a modest £20 a year for essential clothing other than uniform—this has to cover underwear, stockings, shoes, and shoe repairs, besides some occasional items of outdoor wear. One may set down 10s. a week, or £25 a year, for expenses while off duty and on the day out once a week. Most nurses on their day out go some distance to see friends; the alternative is to spend the day by oneself or with friends, which probably involves meals in restaurants, a visit to the cinema, &c. An allowance of 10s. is not extravagant if a girl is to get real recreation. It may strike the older generation as excessive: but let those who think so make careful inquiry among the student nurses of today, and they will soon revise such an opinion. One must set down something between £5 and £10 per annum for deductions from pay—pension and National Health Insurance contributions which are obligatory, and so on.

These items already amount to £50 to £55 per annum. They make no allowance whatever for the purely personal expenditure which falls upon every individual: visits

to the hairdresser; the unending series of petty items such as toothpaste; provision for the cost of minor mishaps, such as repairs to a watch or the broken strings of a tennis-racket; the obligation to give birthday and Christmas presents to her family; the textbooks she ought to buy. These are essential items of expense and in present conditions they rapidly mount up. On her initial salary of £55 a year the student nurse has no means of meeting this range of petty personal expense except by skimping on the major items first set out, or by trading on her family.

Nothing has been said here of the little luxuries, the cigarettes, and the occasional small purchases and consolations that mean to young people so much more than they do to their more experienced seniors. To a girl of 17 or 18 the three or four years of her training loom ahead as almost an eternity. Ought the student nurse, we must ask, be required during these years to forgo the little things which can do so much to make her now increased leisure from her exacting duties something of a pleasure rather than merely so much time off duty?

£100 A YEAR

The case is surely convincing. It points to a flat-rate allowance of £100 a year for the student nurse from the start. There is no longer any sense in the petty variations of £10 per annum in the second and third years. The differentiation and the scale of increase are relics which remain unaltered from the days of long ago. In what other profession, it may more properly be asked, do increases proceed on such a petty scale? The holder of a scholarship to the university does not receive an emolument which increases as the years go by. The true parallel with the student in other careers has been ignored, and it is high time that the student nurse was brought into line at any rate with university conditions.

There is no sufficient ground for supposing that such a flat-rate allowance of £100 a year throughout training would in fact attract to the profession girls whose only interest is in the pay; to argue thus is to betray an ignorance of the rates now current in alternative occupations. The girl who wants to make money can do far better for herself than that—£100 is less than the rate offered to an untrained girl taking up domestic work in an institution.

Living in hospital necessarily involves restrictions, and these must be accepted. But the scale of allowance paid to the student nurse should not be such as to exacerbate these restrictions and impose a rigid limit upon her real freedom while off duty.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED JAN. 18

Notifications.—Smallpox, 0; scarlet fever, 1226; whooping-cough, 2192; diphtheria, 256; paratyphoid, 6; typhoid, 4; measles (excluding rubella), 11,087; pneumonia (primary or influenzal), 1223; cerebrospinal fever, 58; poliomyelitis, 9; polioccephalitis, 1; encephalitis lethargica, 1; dysentery, 72; puerperal pyrexia, 153; 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 (0) from an enteric fever, 5 (0) from diphtheria, 15 (0) from measles, 18 (0) from whooping-cough, 96 (13) from diarrhoea and enteritis under two years, and 85 (13) from influenza. The figures in parentheses are those for London itself.

Leeds reported the fatal case of an enteric fever. Birmingham had 6 deaths from influenza. There were 12 deaths from diarrhoea and enteritis at Manchester and 7 at Birmingham.

The number of stillbirths notified during the week was 291 (corresponding to a rate of 27 per thousand total births), including 32 in London.

In England Now

A Running Commentary by Peripatetic Correspondents

ONE of two motives underlies the questions students ask their lecturers—a genuine desire to know, and a hope of tripping up the speaker with cunningly framed questions, the answers having been boned up by the questioner the previous night. The former motive I appreciate; the latter I abhor. One sinister smirking character has quizzed me this week as follows: Monday, the formula of Warburg's yellow enzyme; Tuesday, some obscure mathematical point about Donnan equilibrium; Wednesday—ah, revenge is indeed sweet. Our studies on gastric juice demanded a volunteer on whom to demonstrate the passage of a Ryle's tube. Yes, you've guessed it; eager hands propelled my *bête noire* to the front of the class. There have been no more questions since. * * *

The medical entomologist sees many people with delusions that insects are crawling over them—what the public calls "ants in the pants." It is very uncommon to find insects in such cases, even where there was originally some actual parasitic infestation which gave rise to the delusions, for these people have usually been practically bathing in every known insecticide and disinfectant. But the entomologist can never convince them that the small pieces of scurf or stick which they produce are not dangerous parasitic insects, and all one's colleagues in turn are usually pestered with no better success. I hope that the psychiatrist has more luck; anyhow he will probably get a fee for his pains. * * *

The whistle blows, my wife waves, and the train slides out of the station. Over to the right stands Table Mountain with the evening sun pouring over Kloof Nek, and a few wisps of cloud driven along the face by the south-easter. The masts and funnels of ships in the harbour can be glimpsed on the left. I settle down and look at my stable companions, colleagues for 36 hours in the run to Johannesburg. For I am off on my annual visit as an external examiner, and have before me 1000 miles of travel.

The compartments in the train hold either two or four passengers. If one is lucky, one gets a small compartment to oneself, but since the war began such good fortune is rare. A large compartment with four is a definite squash. Tonight we are three. We look with interest at each other and introduce ourselves. One is a traveller for a large pharmaceutical firm with whom I am able to do good business before the end of the journey. The other is an elderly Afrikaans farmer, very interested in politics judging from the periodicals he has provided himself with. We are all actuated by the same conditioned reflex as we make our way to the dining-car.

The thirty-odd miles of the Cape Flats slide by. This is a sandy but fertile area where vines are cultivated and market gardens raised. Presumably it must once have been under the sea, the Cape peninsula being an island. We soon reach the mountains. The railway runs up one valley, through a gorge, and then in another valley. The scenery here is as fine as any I have seen anywhere, not excluding Switzerland. The valleys are planted with vines, fruit orchards, and cereals. The picturesque old white Dutch homesteads can be seen peeping out from plantations of oaks. When it is too dark to see any more we retire to our compartment. Luckily I sleep well on trains and hear little of what has been happening during the night. The train has been nosing its way among the mountains. Finally, realising that a frontal attack is best, it boldly climbs up to the top through the Hex River pass. This fine piece of engineering takes the line up 1300 feet in 36 miles. The railroad winds up the side of the mountains, often with a sheer drop of several hundred feet on one side, and great care has to be exercised in taking trains down.

On waking we find ourselves in the karroo. At first sight one cannot imagine a scene of greater desolation—the prospect is almost frightening. It is as if the Almighty, having several million tons of rock over after

the Creation, hurled them here in indiscriminate piles. Low hills, covered with a few thin straggly bushes, alternate with dried watercourses. The karroo is an acquired taste certainly, but it has an austere beauty which grows on one. There is no doubt it could be made productive if water were available. As the train draws up at a wayside station one sees green areas of cultivation, with windmills pumping water from bore-holes. The station-master exchanges staffs with the engine-driver, some passengers are met by farmers from the district, the engine gets a fresh supply of water, and we are off again.

Gradually the terrain becomes flatter, punctuated with conical hills, some with the top cut off. We stop every hour or so to let a Cape Town train pass, or at a karroo town, where often the entire population seems to have come to the station. As the sun climbs, it gets hotter and hotter. Little puffs of wind make whirlwinds of dust on the plains, and the sun shimmers in the distance and produces mirages. We go with relief to lunch and consume large volumes of beer, returning to sleep on our beds till tea-time. By now it has cooled. As the sun sets, one sees the karroo at its best; the colours of sunset light up the landscape, ending with a deep purple which fades finally into night. In the evening we reach Kimberley, no longer a wild mining town, but a sedate and respectable city. The farmer has taken us to his bosom, for after we leave Kimberley he produces a bottle of special *van der Hum*, made by a neighbour, and we drink his health. Thus fortified we again turn in.

Next day we must be early astir, for the train arrives at 7 o'clock. Too soon the waiter has brought our early coffee. The Transvaal scenery is streaming by. There has been rain, and the rolling plains are green, a contrast to the karroo. Before long one sees a mine dump, a large and unsightly pile of yellowish-white earth. Then comes the succession of Rand towns with mines and mine dumps more and more frequent. Finally we run into Johannesburg. My stable companions and I bid each other farewell; my co-examiner is waiting on the platform; now for a bath and breakfast, and then for grappling with the examination candidates. * * *

Cautionary Tale.—I was very much on my mettle. To begin with she was exceptionally charming. Then her disability excited my warmest sympathy. And finally I represented, however imperfectly, the profession against unorthodox practice.

One of our most successful comedy actresses, she had suffered for some weeks from paroxysmal sternutation or—if you prefer the more homely equivalent—obstinate attacks of sneezing; naturally a serious inconvenience in her professional activity. Failing to secure relief from her own doctor and the specialists to whom she had been referred, she consulted a West End chiropractor who attacked the problem by a somewhat ungentle manipulation of her nose, not the least attractive of her features. That was on a Friday morning. There followed twenty-four hours of nasal tranquillity which took her back to her benefactor with words of gratitude and admiration and appropriate uncomplimentary observations on orthodox practitioners. But alas! Sunday saw a resumption of her affliction, this time in highly aggravated fashion.

My question was not in the least malicious. "Did you go back and tell him?" She did not. Thus, I reflected, are reputations made. All that Saturday she had sung the praises of the chiropractor all over London, and emphasised the ineptitude of the medical profession. Even the manipulator had a perfect right to believe in his efficiency. "D—n it all," he must have said to himself, "the patient came unsolicited to tell me of my success. What better proof could there be?"

We may smile indulgently at the gullibility of the public. We may find an easy explanation on orthodox grounds—that in this instance any manipulation might through shock or the production of adrenaline be responsible for the temporary improvement. But it is well to face facts. Should we be any better than our unqualified competitors if we heard only of our successes and were denied the chastening influence of confrontation with our failures?

Letters to the Editor

CORONARY DISEASE

SIR,—Professor Ryle's contention (Nov. 9) that mental and emotional strain are potent factors in causing coronary thrombosis in professional men, so sceptically received by Sir Henry Bashford (Nov. 23), gets a certain gloomy support from the obituary columns of the *Journal of the American Medical Association* (September–November, 1944).

I find that in 1000 consecutive notices where the cause was given—and very rarely was it not—22% of the deaths were ascribed to coronary thrombosis. The really interesting observation, however, was that of a select 7% whose worldly fame merited an obituary of over fifteen lines no less than 41% died of coronary disease—double the number among their less conspicuous colleagues.

	1000 obituaries	72 "famous" men
Average length of life	67.6 years	67.1 years
Died of coronary thrombosis .. .	22.3 %	40.7 %
Died of other cardiovascular disease	32.7 %	38.6 %
Total	55.0 %	79.3 %

The above figures show that the greater incidence of coronary disease among the "famous" men cannot be accounted for by their being older than the less famous. There seems, then, to be a definite relation between "greatness" in the profession and susceptibility to coronary disease. Moreover the relation does not apply to other forms of cardiovascular diseases, for the difference observed on the samples taken is not significant.

The "greater" the man the poorer the arteries seems to be the rule; but whether this is due to a greater burden of work and responsibility is conjecture only.

London, S.W.3.

DONOUGH O'BRIEN.

FATAL USE OF A DANGEROUS UNIVERSAL DONOR

SIR,—Major Sevitt (Dec. 28) has rightly observed that there is slender evidence for the conclusion by Dr. Morgan and Dr. Lumb (Dec. 14) that their patient died as the result of a transfusion of blood containing high-titre incompatible anti-A agglutinins.

This conclusion can be established with certainty only when it has been demonstrated that the patient's own cells have been hæmolyzed, and that the cells of the transfused blood are showing a normal survival-time in the recipient's circulation. Morgan and Lumb's paper is of value, however, in reminding us of one of the dangers associated with the routine transfusion of group-O blood. They recommend that group-O blood should be accepted as "universal donor blood" only if the titre of the anti-A and anti-B agglutinins in the plasma is below 256. This is a wise precaution, but their paper would have still further assisted in combating the hazards of blood-transfusion had it contained a warning that the phrase "universal donor blood" is a grave misnomer which should be deleted from medical terminology.

The term "universal donor" was introduced when it was thought there were only two corpuscular agglutinogens—those we now call A and B. When neither of these could be demonstrated in certain red-blood corpuscles it was concluded that blood of this type was free from all potentially dangerous reactors. This conclusion has been proved false. Corpuscles lacking A and B contain an agglutigen O; 80% contain a factor M and a similar number a factor P. The plasma of some potential recipients contains natural antibodies incompatible with one or more of these agglutinogens. Group-O blood will be accepted as "universal donor blood" by none of these recipients. In addition, all corpuscles of group O contain a minimum of three Rh and/or rh factors. Women who have had stillborn or jaundiced babies, and patients who have had previous blood-transfusions, may have formed immune antibodies to one or more of these factors, and may react fatally if transfused with "universal donor" corpuscles containing the corresponding antigen. 85% of corpuscles of group O contain an Rh agglutigen D. Levine has

demonstrated that the indiscriminate transfusion of females with corpuscles containing this antigen may result in the recipient giving birth to a stillborn baby at a subsequent pregnancy. Our so-called "universal donor" corpuscles are still further complicated by antigens described as Kell, Lutheran, and Lewis.

It is very evident, therefore, that there can be no such thing as "universal donor blood." The term should be assiduously avoided and the fact faced that, before transfusion, all blood to be given must be tested for direct compatibility against the potential recipient's serum or plasma. The only exception to this rule should be the case where urgency is too extreme to permit of such a test.

At a test transfusion incompatible reactions from natural antibodies in the plasma of the recipient can be excluded by the simple type of slide-compatibility test well known to all pathologists—a test which all practitioners giving transfusions should be prepared to undertake. More elaborate tests are required when the patient has received a previous transfusion, and especial caution is necessary when these transfusions have been accompanied by reactions, or the recipient is a woman who has given birth to a child affected with hæmolytic disease. All such cases should be referred to a blood-group laboratory whenever practicable. The serious consequences resulting from sensitisation to the D antigen will be prevented only when it becomes possible never to give D-negative females blood containing the D antigen.

"Group-to-group" transfusion will prevent the type of reaction described by Morgan and Lumb. There is an even more urgent reason, however, for the immediate adoption of this practice. The giving of group-O blood to patients other than group O is placing a great and unnecessary strain upon the group-O blood-donor panels. It behoves all clinicians therefore not only to test for compatibility before transfusion but to make every effort to ensure that recipients are given blood of homologous group. More blood will then be available, and there will not be the same risk that the group-O donor may suffer such a surfeit of bleeding that his appetite for blood donation may "sicken and so die."

GEOFFREY H. TOVEY

South-West Regional Transfusion Centre, Southmead, Bristol.

ACUTE PORPHYRIA

SIR,—The article by Jørgensen and With in your issue of Jan. 11 serves a valuable purpose in drawing attention to the syndrome of acute porphyria, but we feel that a number of statements may prove misleading.

In reference to lead poisoning, the authors state that the condition encountered is a porphyria and that the only porphyrin excreted is coproporphyrin I. According to Waldenström's¹ classification, to which the authors refer, the term *porphyria* is reserved for two familial diseases of unknown aetiology; increased excretion of coproporphyrin following poisoning by lead, &c., is regarded as symptomatic and is referred to as *porphyrinuria*. Whereas the porphyrin of normal urine² and that of patients with hæmolytic anaemia³ is predominantly coproporphyrin I, that excreted in large amounts in lead poisoning has definitely been identified as coproporphyrin III,⁴ a fact which may be of value in the diagnosis of the condition.

Secondly, whereas Jørgensen and With do not make any reference to the simple and effective test for porphobilinogen devised by Watson and Schwartz,⁵ we would point out that whenever routine examination of a urine reveals a positive Ehrlich aldehyde reaction but a negative Schlesinger test, the presence of porphobilinogen should be suspected, since this material, unlike urobilinogen, does not give a green fluorescence when alcoholic zinc acetate is added to urine containing it. Watson and Schwartz's modification of the aldehyde reaction may then be applied for confirmation.

1. Waldenström, J. *Acta. med. scand.* 1937, suppl. 82.

2. Grotepass, W. *Z. physiol. Chem.* 1938, 253, 276.

3. Dobriner, K. *J. biol. Chem.* 1936, 113, 1.

4. Grotepass, W. *Z. physiol. Chem.* 1932, 205, 193. Vigliani, E. C., Waldenström, J. *Dtsch. Arch. klin. Med.* 1937, 180, 182.

5. Watson, C. J., Schwartz, S. *Proc. Soc. exp. Biol., N.Y.* 1941, 47, 393.

We consider it dangerous to advise that if, in a suspected case of acute porphyria, porphobilinogen be absent from the specimen examined, any examination for increased amount of porphyrin may be dispensed with. The conversion of porphobilinogen to porphyrin and porphobilin takes place with some speed in these acid urines and might have occurred to completion before the specimen was examined. Direct spectroscopic examination of a suspected urine before and after the addition of a few drops of concentrated hydrochloric acid is extremely easy to perform and in our hands has proved very informative and reliable. Confusion of the absorption spectra of porphyrin metal complexes, frequently seen in these urines, with the bands of oxyhaemoglobin is readily avoided if the shift in position on addition of the acid is watched for. There is no justification for describing the test, performed in this way, as useless or misleading.

Should a quantitative determination of uroporphyrin be desired, a technique based on adsorption behaviour is available.⁶

We feel that too little attention is paid by Jørgensen and With in their article to the work of Watson and his collaborators^{7,8} on the nature of the uroporphyrin III fraction, in which the porphyrin hitherto accepted as uroporphyrin III is alleged to be in reality a mixture of at least two porphyrins. It is clear that further work is necessary before one can dogmatise on the significance of structural differences in the realm of porphyrin metabolism.

We would also like to draw attention to the fact that the structure for porphobilinogen proposed by Waldenström⁹ and quoted by Jørgensen and With is unsatisfactory in that consideration is not given to the necessary introduction of two carbon atoms (as methine bridges) when porphobilinogen is transformed into uroporphyrin, or of one such carbon atom during the formation of porphobilin.

C. H. GRAY
C. RIMINGTON.

London.

THE CRUX

SIR,—Your leader of Jan. 25 makes good reading; but surely the crux of the matter is implicit not so much in that article, or in the admirable letter by Mr. H. Taylor, as in the other letter, entitled *Rescue of General Practice*, by Mr. Wilfrid Adams. Though, in order to uncover its final meaning, one has to ask the question as to why this rescue is necessary. The answer then comes out—because the new Act plans to abolish the private patient who is in fact the crux.

The private patient is the crux because he provides the fee. Now I know it is fashionable to deprecate money, especially money freely earned. The very young often despise it; those who lack it hate it; and the B.B.C. discussion groups, together with those who talk unctuously of "the community," try to cry it down.

Yet in reality the private fee is an inestimable boon; for it gives more than anything else to the general practitioner his chance to excel: to become proficient in minor surgery; in modern therapeutics, psychology, anaesthetics, X rays, &c.; and here I can see the medical purist raising his eyes in horror at the thought of these crafts being handled by anyone but the appropriate specialist. I am aware also that the quack, whether medically qualified or not, may at times cash in on the fee system; which is a pity, but we live in an imperfect world.

I long to discover, but so far without success, how the 100% capitation system or the whole-time salary can operate in general practice with anything approaching the efficiency of the private fee as a stimulant to good work on the part of the doctor. I am therefore compelled to visualise the new health service as a great leveller (which one must admit is what some socialists seem to want). One in which the slacker or the nincompoop will find himself on equal financial terms with the born doctor; and wherein the needs of the patient will be met by a closely knit trinity—the district nurse, the

relieving officer, and the domiciliary health worker (alias G.P.). And I draw the inevitable conclusion that the only way for a vigorous medico to escape from this embrace is by getting himself "upgraded" into the ranks of the petty specialists.

And what of the residuum, the "backbone" of our profession, to whom the high-ups still pay lip service?

Time runs short. The new Act (axe I nearly wrote by mistake) will soon be upon us. We must speak out our fears. We must make them known not only to authority but also to the students who so far don't know. For if these problems are neglected, the new service, however imposing its machinery, will bring disillusionment all round.

Buxted, Sussex.

W. R. E. HARRISON.

ANXIETY AS A CAUSE OF FIBRINOLYSIS

SIR,—The following experiments, carried out between 1939 and 1945, seem to find support in the observations of Dr. Macfarlane and Dr. Biggs (*Lancet*, 1946, ii, 862) on the relationship between emotional upset and fibrinolysis.

1. *Fibrinolysis After Anaesthesia but Before Operation*.—Blood was collected from three patients who had just received a general anaesthetic and were about to undergo a major operation. A further sample of blood was also collected after the operation. The phenomenon of fibrinolysis was studied in each case according to the technique of Macfarlane.¹ The results are tabulated below.

Expected operation	Sex	Fibrinolysis	
		Postanaesthetic	Postoperative
Repair of femoral hernia and varicocele	M	Complete in 3 days	Complete in 10 hr.
Gastrectomy	M	Almost complete in 3 days	Complete in 24 hr.
Thyroidectomy .. .	F	Almost complete in 3 days	Almost complete in 3 days

Immediately after the anaesthetic we have the combined psychological trauma of the expected operation and the general anaesthetic. The actual trauma of operation seems to make the fibrinolysis more pronounced.

2. *Fibrinolysis in Emotional Upsets not Associated with Operation*.—Blood was examined after collection from patients in various conditions of anxiety. Two had just heard their first air-raid warning, two were suffering from thyrotoxicosis, and three were diagnosed as anxiety states. The results were as follows:

Condition	Sex	Fibrinolysis
First air-raid warning ..	M	Complete in 24 hr.
First air-raid warning ..	M	Complete in 24 hr.
Thyrotoxicosis	F	Complete in 3 days
Thyrotoxicosis	F	Complete in 2 days
Anxiety state	M	Complete in 24 hr.
Anxiety state	M	Almost complete in 24 hr.
Anxiety state	M	Almost complete in 24 hr.

3. *Control Experiments*.—Samples of blood from fifteen transfusion donors were studied. None of these showed any fibrinolysis, even after a period of some weeks.

The number of cases studied is somewhat small and the test employed was of a qualitative nature. Nevertheless, it would seem a fairly clear-cut observation that various conditions of anxiety can produce fibrinolysis.

The mechanism whereby anxiety leads to an increased content of blood fibrinolysin has also been under study. So far it has been shown that the addition of adrenaline to blood does not lead to fibrinolysis.

It is also interesting to note that fibrinolysis could not as a rule be reproduced in rabbits by operation or by violent death produced by a sharp blow on the back of the neck. A limited number of experiments, in which

1. Macfarlane, R. G. *Lancet*, 1937, i, 10.

6. Rimington, C. *Biochem. J.* 1943, 37, 443.
7. Grinstein, M., Schwartz, S., Watson, C. J. *J. biol. Chem.* 1945, 157, 323.
8. Watson, C. J., Schwartz, S., Hawkinson, V. *Ibid.* 1945, 157, 323, 345.
9. Waldenström, J., Vahlquist, B. *Z. physiol. Chem.* 1939, 260, 189.

both adrenals were removed in rabbits, seeded, however, to produce fibrinolysis. The phenomenon may in some way be related to the adrenal cortex.

British Postgraduate Medical School. A. L. LATNER.

PSYCHOGENESIS OF RHEUMATISM

SIR,—The solution of the problem which has hitherto been presented by the rheumatic diseases should not pass unnoticed, and Mr. Le Vay is to be congratulated on this achievement (Jan. 25, p. 125). Like most great discoveries it is after all quite simple:

1. "At least three-quarters of rheumatic disease is non-articular, producing aches and pains many of which are psychogenic. Fibrositis as an explanation for these has no pathological basis and is discredited as a clinical entity."

2. "It is less easy to fit rheumatoid polyarthritis into the psychosomatic pattern." (Nevertheless Mr. Le Vay manages to do so satisfactorily.)

3. Ankylosing spondylitis "seems to fit certain personality situations . . . and the time of onset and recurrences is often related to stress or frustration in daily life."

Osteo-arthritis remains the only important member of this group not specifically accounted for, but it seems likely that this is included, along with Paget's disease (osteitis deformans), under the heading of osseous neurosis.

London, W.1. W. S. C. COPEMAN.

INFECTIVE HEPATITIS FOLLOWING MUMPS

SIR,—I was recently interested to observe two cases of infective hepatitis following epidemic parotitis. The first occurred in a boy of 4 years within a week of the onset of the illness and while the parotid swelling was still present. The second occurred in an adult five weeks after the onset of the parotitis.

Both patients had considerable jaundice and hepatic enlargement and recovered within a reasonable time; they were unfortunately observed in a district where technical investigations were not possible. I have not so far found any reference in the literature to this combination, and wonder whether the virus of epidemic parotitis can be held responsible for both conditions, or is capable of the necessary mutation.

London, W.C.1. B. McNICHOLL.

HEALTH CENTRES OF TOMORROW

SIR,—Your articles on the health centre are excellent, and if the new health service were to develop along lines such as you lay out in this series 90% of general practitioners would, in the end come to look upon the new service as the salvation of the family doctor.

It was however with great misgiving that I read Dr. Stark Murray's letter of Jan. 18 in which he maintains that ten general practitioners could not keep a laboratory technician fully occupied and that the proper solution was a central laboratory. I maintain, Sir, that if five doctors were working as a group and using regularly the ordinary routine laboratory tests they could fully employ one technician. To get a specimen to a central laboratory and wait days for a result is a very great deterrent to the use of the laboratory. To be able to have the specimen dealt with on the premises and to receive the result in 24 hours would encourage the appeal to clinical pathology.

Dr. Stark Murray's experience of the volume of work sent to a central laboratory is no criterion of the amount which would be done in a properly equipped health centre. The present generation of family doctor has had to allow clinical pathology to become largely the prerogative of the hospital and specialist. If he had it easily available he would come to use it more frequently. The younger doctor coming out of hospital will expect its free provision in a comprehensive service and will use it if it is there. It is the younger generation we have to keep in mind.

With regard to X rays the general provision at present is debatable, since the apparatus is scarce and costly. But the general practitioner should have easy access to radiography and be able to hold the radiograph for his records just as he does now in the case of his private patients. He should also be able to be present to see his patients screened if he wishes.

In my twenty years' experience in private practice I have looked forward to the advent of a national service

where the full means would be readily at hand for the family doctor to give every patient all that his training fitted him to give. It behoves the keen advocates of such a service to strive to ensure that all ordinary aids are available to the family doctor and his patient.

I realise that Dr. Stark Murray is keen on such a service, but he should widen his horizon beyond a central laboratory, which has its own definite functions, and give the laboratory help where it is needed—in the health centre.

Newcastle-upon-Tyne.

H. B. PORTEOUS.

AIDS TO DEFÆCATION

SIR,—When the rectum is loaded and defæcation difficult, one of the simplest aids to defæcation is to press gently on the rectum with the fingers of the left hand between the left tuber ischii and the anus.

This manoeuvre expresses the lower and most constipated mass of fæces, and the remainder follows through induced action of the bowel. The anal canal and anus should first be lubricated with soft paraffin or surgical jelly.

RECTUM.

SUPRASPINATUS SYNDROME

SIR,—In his interesting article (Jan. 18), Mr. J. R. Armstrong draws attention to the almost uniform failure of ordinary conservative measures in cases with calcified deposits in the region of the supraspinatus tendon.

In 1943 my attention was drawn by Dr. M. Weinbren, of Johannesburg, to the beneficial effects of deep X-ray therapy in this condition; and since my return to this country I have learned that similar treatment has been given at various departments of radiotherapy over here, though it has received little publicity.

From the limited experience of 3 patients submitted to this treatment I can testify to its efficacy. Each noted an abatement of pain after a short course of deep therapy, during which the arm was rested in a sling. Each regained a full range of painless movement after three or four weeks of graduated active exercises. In one case the calcified deposit, ill defined in the first radiograph, "hardened up" and became more sharply outlined during the period of observation; but the other two, with deposits already sharply defined at their first attendance, showed no radiological changes during the course of treatment.

County Hospital, Pembury,
nr. Tunbridge Wells.

J. H. MAYER.

A MORAL PROBLEM

SIR,—Surely there is some æsthetic content in the way knowledge is acquired? After all, truth and beauty are said to go hand in hand.

In his approach to the problem of the Nazi experiments each of us tends to be governed by his own feelings. Unfortunately, in this present age, when moral standards have partly crumbled away, we shall have to make up our own minds on this and allied problems, such as euthanasia. Otherwise we may find ourselves in the position of the "experimenters" in the concentration camps, whose minds were made up for them.

Calcutta.

F. B. CHARATAN.

PERITONEAL DIALYSIS

SIR,—In connexion with your editorial (Jan. 18), and the article by Mr. Reid and his colleagues (Nov. 23, p. 749), we would like to raise one point. This is that the flow across the peritoneal membrane is two-way. If an isotonic crystalloid solution is used for irrigation, then a large quantity of water is absorbed (in one of our cases 14,000 c.cm. of fluid was used for irrigation in 24 hours and 5000 c.cm. was absorbed in spite of efficient drainage by suction throughout); the danger is pulmonary œdema, because the patient may be waterlogged before irrigation commences. Conversely, if a hypertonic colloid solution is used, water will be removed from the blood, and great care must be taken to avoid hæmoconcentration.

We have avoided the danger of peritonitis in the 4 patients subjected by us to peritoneal irrigation, but every precaution is necessary.

St. Thomas's Hospital, London,
S.E.1.

C. G. ROB
J. S. RICHARDSON.

Parliament

FROM THE PRESS GALLERY

Gloomy Food Outlook

IN the House of Lords on Jan. 22 Lord DE L'ISLE AND DUDLEY called attention to the food situation. There never was a time, he said, when the country stood in greater need of both physical and mental stimulus. More food now would mean greater production, and the administration should concentrate not on exhortations but on securing the food we so badly needed.

Lord HENDERSON, replying for the Government, foresaw continued shortages in the world supply of major foodstuffs throughout the crop year 1946-47; in spite of great improvements in the expected harvests the quantities for international allocation fell short of the claims made on them. Last year the gap was partly bridged, but reserves were not now available, and although the wheat harvests of the four main wheat-producing countries were 7 million tons higher than last year, the quantities for export would be some 6 million tons lower. The outlook for meat threatened a deterioration on last year. Some improvement was expected in oils and fats, but the United States was expected to be a net importer, in which case exports to deficit countries were expected to be lower than last year. Production of sugar had advanced substantially, though the pre-war output had not yet been restored. The Cuban surplus would go to the deficit countries if sugar control was maintained; otherwise it would go to the U.S.A. In Europe domestic food production was much improved, but on the Continent as a whole the production of grain, potatoes, and sugar was only 75% and meat only 55% of pre-war. The unfavourable outlook was further aggravated by the expected deterioration in the machinery of international food allocation resulting from the decontrol policy and rise in food prices in the U.S.A. Food levels in almost all countries except the major producers would continue to be restricted, in many cases severely so.

In spite of international difficulties we had maintained our high consumption during 1946, and for the first half of 1947 we could not expect to do more than that. No startling changes were likely in output from home food production, but recent changes in methods would increase production later on. There was some prospect that world cereal supplies would become easier in the second half of 1947, but such expansion would not largely increase output until mid-1948. A reduction in the bread ration might yet be inescapable. There was a good chance that we should distribute this year as many eggs as we did in 1946. Dried egg supplies would almost certainly be maintained during 1947. There was practically no hope of restoring the bacon ration to 3 oz. in 1947; indeed it might be difficult to maintain the 2 oz. ration. There would be a small increase in the total supplies of butter in 1947, but we were still a long way from having anything like pre-war quantities. It was now hoped that no further cuts would be necessary in the rations of soap and edible fats.

Lord CHERWELL pointed to the stark incontrovertible fact that in the first year of peace we had less to eat than in the last year of war; now, half-way through the second year of peace, in spite of bumper harvests in practically every exporting country, we were told we would have to put up with even more meagre rations. At any rate their Lordships had been spared the statement that thanks to rationing the people were better fed than they had ever been before. That was sheer nonsense, and every housewife knew it. A few people were better fed than before the war because they were no longer unemployed, but that had nothing to do with rationing. There was also every reason to doubt that the people were healthier than ever before. In 1945 absenteeism due to minor ailments increased constantly. All the mortality figures proved was that the diet was not lethal. If the tale of a world food shortage was to be maintained it should be supported by proper facts and figures. He had little confidence in the case presented for more food to the International Emergency Food Committee. The United Kingdom had been extremely ill served.

Lord WOOLTON asked whether the time had not now come for a change in the war-time practices regarding the obtaining and distribution of food. The continued stringency of food was hindering production and causing harassing unhappiness to housewives. The Minister of Food should lighten the housewife's burden by reducing the extent of his control and abandoning some of the practices of rationing and control of commodities on points. The time had come to think more of recovery than of doctrine. Rationing should be confined to those foods which the traders of the country could not get in adequate supplies. It was high time that the people had a break in this debilitating austerity; we needed more meat and more fats.

Special Diets for Invalids

Sir ERNEST GRAHAM-LITTLE asked the Minister of Food if he was aware that the withdrawal from a patient, in the care of certain doctors in Birmingham, of an allowance of fat essential to the maintenance of the patient's life was followed by his death within a few days: and if he would take steps to prevent a recurrence of this overriding of the opinion of doctors in actual charge of a patient.—Mr. J. STRACHEY replied: In the very sad case referred to the patient died of inoperable cancer. My medical advisers inform me that the grant or refusal of an extra fat ration can have had no influence whatever upon the course of this tragic disease. Extra milk and eggs were granted on medical grounds to this patient, and an allowance of butter was in fact granted, after being discontinued for only two days, on compassionate grounds.

Describing the system under which these special allowances of rationed foods are given, Mr. Strachey said: In 1940 the then Minister of Food obtained the help of the Medical Research Council, who set up a Food Rationing (Special Diets) Advisory Committee* to advise the Minister how best to dispose of the limited amount of extra food available for invalids. This independent, honorary, and authoritative committee advises the Minister of Food what categories of illness require special rations and establishes scales of the additional foodstuffs needed for each category. A list of these categories was circulated to every doctor in the country. The doctor's certification that the patient is suffering from the illness specified is always accepted without question. It was so accepted in this case, and the official concerned had to inform the doctor that in such cases two pints of milk daily and three eggs a week were allowed, but not additional butter. The lay official transmitted an incorrect reason for refusing the butter. The doctor then appealed, but there being no reason given for regarding this case as in any way different from others in this category the committee confirmed the refusal, giving the correct medical reasons for doing so. The committee also considers applications from doctors for additional food for patients who would be excluded on a strict application of the scales of allowances for each type of illness. The committee therefore acts as a court of appeal on borderline cases.

Colonel M. STODDART-SCOTT: Will the Minister tell us how frequently this distinguished committee meets and why it took from August 3 to Dec. 20 to get them to agree to provide white flour for a man for whom it was too late, as he died on the 23rd?—Mr. STRACHEY replied: I cannot say without notice whether the committee meets weekly or whether their meetings are arranged in relation to the business before them.

Mr. CHURCHILL: The Minister has read out a long and impressive list of all these great authorities whose high standing is supposed to flatten out all criticism of their work, but has the right hon. gentleman not taken the opportunity when examining all their credentials and qualifications to find out how often they meet and how long it takes them to get a borderline case dealt with? Is he now sure, as we all recognise the intelligence which he is giving to his task, that this impressive apparatus at the top is effectively dealing with the many

* The members of the committee are now as follows: Sir Edward Mellanby, F.R.S. (chairman), Prof. L. S. P. Davidson, Sir Francis Fraser, Lord Horder, Dr. R. D. Lawrence, Prof. R. A. McCance, Dr. M. L. Rosenheim, Dr. Norman Smith, Prof. J. C. Spence, Prof. H. P. Himsforth (secretary).

urgent matters which arise in practical instances in ordinary life?

Mr. STRACHEY: If there were any reflection on the work which this committee is doing, or on the assiduity with which they are performing their functions, I should resent it very much indeed, because I think they have performed these functions over a number of years—very arduous and often invidious functions—and they have done so voluntarily and in an honorary capacity. I certainly think they have performed them as well as they could be performed. I was most careful to find out the average time which appeals made to the committee take, and it turned out to be nine days, which seems to me to be not unreasonable.

Mr. D. G. LOGAN said he hoped the Minister would give power to medical men to give prescriptions for extras to be given to their patients. In the poorer areas it was absolutely essential that the medical man's advice should be taken: lives were saved by medical men and not by committees.—Mr. STRACHEY: I could not possibly change the system. (Cries of "Why not?") For reasons which all my predecessors appreciated, I do not wish to use any but the most moderate language, but from the amount of milk given on medical prescriptions it certainly appears that there must be some eminent and independent medical authority to review these cases.

Mr. CHURCHILL: Yes, but might not the process be conducted in reverse—namely, that if a medical man, a doctor attending a patient, certifies that the matter is urgent, the diet should be given within the approved limits, pending reconsideration by higher authority?—Mr. STRACHEY: That would be very good if it could be done. The medical committee has laid down the categories of illnesses, ailments, and conditions which qualify for the extra ration.

Mr. CHURCHILL: The point is that the doctor attending a patient should have the responsibility of saying that special patients should be allowed to have the extra rations until the matter is dealt with by the higher authority.—Mr. STRACHEY: If the doctor certifies that the patient is suffering from a condition which on the scales laid down by this committee carries with it the extra ration, then he does automatically and immediately receive that extra ration. Lieut.-Commander G. BRAITHWAITE: The patient has to have the right disease before he can have it.

Mr. Strachey was pressed further on the subject, but he maintained his ground that the system could not be changed.

SOME CASES

Sir E. GRAHAM-LITTLE asked the Minister in how many cases in the last six months his medical advisers had overruled advice as to dietetic and other requirements given by medical practitioners in actual charge of the patients concerned whom his advisers had not themselves seen at any time.—Mr. STRACHEY replied: During the six months to Dec. 31, 1946, 235 applications which had been referred to the medical advisers were refused extra supplies of rationed foods as a result of the advice which was tendered.

Sir E. GRAHAM-LITTLE asked the Minister whether he would review the case of a patient discharged from hospital after a severe operation before convalescence, owing to shortage of beds, and placed under the care of a general practitioner, who applied for special dietetic allowances and was refused by his department; and if he would now grant these allowances.—Mr. STRACHEY replied: In this case a doctor asked that a patient who was discharged from hospital after operations for general peritonitis, and already receiving extra milk and eggs, should also receive extra meat, cheese, sugar, butter, bacon, and bread. The application was refused as the committee recommended that the ordinary rations of foods other than milk and eggs are sufficient for convalescence from any illness. A review now would be inappropriate as the doctor recommended the additional rations for six weeks from July 25, 1946.

Sir E. GRAHAM-LITTLE asked the Minister if he would review the decision in a case of a radiologist who, to carry out a test for bile function on one of his patients,

required to give a diet of eggs beaten up with milk, and was refused the grant of the eggs by the medical advisers of his department who had no knowledge of the case; and if he would now authorise the required allocation.—Mr. STRACHEY replied: An application was made in June, 1945, by a doctor for supplies of eggs for six unnamed patients to determine the function of the gall-bladder. The application was rejected because the Ministry's medical advisers considered that the same purpose would be served by other fats.

Sir E. GRAHAM-LITTLE asked the Minister how many members of the committee were under 40 years of age; were in active practice as consultants and as general practitioners; and at what date the schedule of ailments with recommendations to deal with each was last revised.—Mr. STRACHEY replied: One member is under 40. Six members are in active practice as consultants. There are no general practitioners. The schedule of ailments is constantly under their review.

EXTRA MILK

Asked by Mr. CHURCHILL whether there was any reason to believe that doctors had been abusing the right of giving advice as to extra diet to their patients in the past few years, Mr. STRACHEY replied: I should not like to accuse the medical profession of abuse in the matter, but the amount of extra milk given on medical priority grounds has caused concern to myself, and, on other occasions, to my predecessors and to this medical committee, and we have asked doctors, through the medical press, to have regard to the need, in the case of milk, for restricting the extra amount which is granted on medical grounds.

Mr. S. HASTINGS asked the Minister if he would give figures to compare the amount of priority milk ordered by doctors in residential areas such as Bath, Bournemouth, Hove, or Hampstead with that in industrial areas like Tyneside or South Wales.—Mr. STRACHEY: In December, 1946, the number of domestic consumers obtaining priority milk on medical grounds per thousand of population was Bath and Bathaven, 31; Bournemouth and Christchurch, 38; Hove and Brighton, 33; Hampstead, 47; Tyneside, 15; S. Wales, 15.

QUESTION TIME

Composition of the National Loaf

Sir E. GRAHAM-LITTLE asked the Minister what was the present composition of the national loaf, with special reference to the measure of extraction in the flour supplied, the proportion of that flour derived from home-grown wheat and imported wheat respectively, and the extraneous items incorporated not derived from wheat; and what proportion of the flour used had been treated with agene, which had been shown recently by animal experiments to be noxious to life.—Mr. STRACHEY replied: The national loaf is at present composed of wheat flour of 85% extraction. The proportion of the flour derived from home-grown wheat is approximately 25%. The remainder is derived from imported wheat. Imported white flour is mixed to the 85% extraction flour in mills in England and Wales at the rate of 5% of the output and in Scotland and Northern Ireland at the rate of 10%. To each 280-lb. sack of flour 14 oz. of creta preparata are added. The proportion of the flour used which has been treated with agene is approximately 90%. This substance has been used by millers as an improver for more than 20 years, and there is no evidence to show that it is harmful to human beings. My department is studying the implications of the work recently published showing its effect on dogs.

German Trials

Mr. HASTINGS asked the Chancellor of the Duchy of Lancaster whether permission was given to Mr. Kenneth Mellanby, D.Sc., to travel to Germany in the uniform of a British press correspondent to talk to German doctors now on trial at Nuremberg about their experiments on human beings; and what use would be made of his report.—Mr. J. HYND replied: Dr. Mellanby travelled as an accredited representative of the *British Medical Journal*, and was given the usual facilities afforded to a press correspondent. The use which is made of his report is a matter for the editor of the publication concerned.

Obituary

ARNOLD LAWSON

K.B.E., M.D. BRUX., F.R.C.S.

FOR a son to follow a distinguished father in his own speciality is always difficult, and that Arnold Lawson established a reputation as an ophthalmologist in his own right is proof of his ability and energy. The fourth son of George Lawson, surgeon oculist to Queen Victoria, he was educated at the Merchant Taylors School in London and entered the Middlesex Hospital, where his father was surgeon, as senior entrance scholar in 1886. After winning the Hetley and senior Broderip scholarships



he qualified in 1891 and took his M.D. Brux. in the same year. After a period as clinical assistant to Sir John Tweedy at Moorfields, he joined his father in consultant practice, becoming in 1896 ophthalmic surgeon to the Paddington Green Children's Hospital; and it was perhaps his experience there that made him afterwards so sympathetic and successful with his younger patients. Four years later he was appointed to the staff of Moorfields. A few months before George Lawson's death in 1903 the sixth edition of his *Diseases of the Eye* appeared,

edited and revised by his son.

Shortly before the outbreak of war in 1914 Arnold Lawson became ophthalmic surgeon and lecturer in ophthalmology at the Middlesex, to whose staff he had been appointed in 1910, and this was almost the only appointment which he did not resign to free himself for work among blinded soldiers and sailors. For his services as consultant ophthalmic surgeon to the Navy he would accept no fee, saying "it was his contribution to the Service in which his son was also serving at sea." He was also on the staff of the King Edward VII and Park Lane hospitals. But it is by his work for St. Dunstan's that he will chiefly be remembered, and for this he was appointed K.B.E. in 1920. Senior ophthalmic surgeon till 1920, he remained chairman of the ophthalmic advisory committee until his death. Of his contribution to its beginnings Sir Ian Fraser, M.P., chairman of St. Dunstan's, writes: "Mr. Lawson, as he then was, was Sir Arthur Pearson's principal ophthalmic adviser, and much of the policy of St. Dunstan's was made after taking his advice into account. It was on his advice, too, that representations were made to the Ministry of Pensions, which led to the recognition of cases which were said to be 'aggravated' by war service. Indeed, I believe the use of this word 'aggravated,' now so commonly understood, first arose out of the acceptance of these recommendations.

"Sir Arnold Lawson was a very warm-hearted man as well as an eminent ophthalmic surgeon, and St. Dunstan's benefited greatly by his long period of service and wise advice. Until a few weeks before his death he was still seeing some of his old patients from the first war who came from all over the country to consult him about the little glimmer of sight which remained to them or about the condition of an eye socket. Though there is so little that the ophthalmic surgeon can do, what little he does is of such enormous importance, and the way he handles you and comforts you is perhaps more important still. Thus it is that the successful ophthalmic surgeon of St. Dunstan's must be a first-class psychologist. He must know when to encourage hope, and when it is better for the patient's recovery to tell him the hard facts about his case, and to be successful he must be believed. Sir Arnold was good at all these jobs, and there are hundreds of blinded soldiers all over the world who will mourn his passing and feel that they have lost a real friend."

"A good operator and a careful and experienced diagnostician," a colleague writes, "Lawson brought to his speciality a wide knowledge of medicine. But his

outstanding characteristic was the intense and kindly human interest which he took in all his patients. For many years up to his death he was treasurer of the Ophthalmological Society of the United Kingdom, and those who met him at the meetings of the council and of the editorial committee recognised his acute business sense and his regard for the interests of the society, veiled but not really concealed by the slightly languid air which was natural to him. I well remember the prominent part which he took with Paton, Parsons, Treacher Collins, and Lister in assuring the social, as well as the scientific, success of the jubilee congress. Middlesex men will also recall his quiet and persistent efforts in maintaining and enhancing the beauty of the hospital chapel." With his kindness went a pride in his profession, and together these qualities inspired his work for Epsom College and the Royal Medical Benevolent Fund, both of which he served for many years as ophthalmologist and as counsellor. His term of office as president of the R.M.B.F. was a fitting close to a life in which he had served his patients and colleagues well.

Sir Arnold died on Jan. 19 at the age of 79. His wife, Helen, the daughter of Mr. Andrew Clark, honorary surgeon to King George V and to the Middlesex Hospital, predeceased him in 1944, and they leave two sons and a daughter.

Diary of the Week

FEB. 2 TO 8

Sunday, 2nd

LONDON JEWISH HOSPITAL MEDICAL SOCIETY
3 P.M. (Woburn House, W.C.1.) Dr. Emanuel Miller: Recent Advances in Psychiatry.

Monday, 3rd

ROYAL SOCIETY OF ARTS, John Adam Street, W.C.1
5 P.M. Mr. A. Dickson Wright: Applications of Recent Physical Discoveries in Medical Diagnosis and Treatment. (Second Cantor lecture.)
MEDICAL STUDENTS' REPRESENTATIVE COUNCIL, Manchester
7 P.M. (University medical school.) Dr. Douglas Guthrie: Medicine—Art or Science? (Wood Jones lecture.)

Tuesday, 4th

UNIVERSITY COLLEGE, Gower Street, W.C.1
5.15 P.M. Mr. F. Bergel, Ph.D.: Aspects of Pharmacological Chemistry—(2) Symptomatic Drugs (Synthetic Analgesics, Antispasmodics, and Histaminolytics).
ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
8 P.M. *Orthopaedics*. Dr. Wilfred Harris, Mr. David Le Vay, Dr. F. A. Elliott: Pain in the Upper Limb Excluding Shoulder Lesions.
LONDON SCHOOL OF DERMATOLOGY, 5, Lisle Street, W.C.2
5 P.M. Dr. R. M. B. MacKenna: Parasitic Infections of the Skin.

Wednesday, 5th

ROYAL SOCIETY OF MEDICINE
2.30 P.M. *History of Medicine*. Dr. W. R. Bett: On Style in Medical Literature—Traditions, Circumstances, Diversions, and Lethargies.
8 P.M. *Surgery*. Mr. R. C. Brook, Mr. T. Holmes Sellors: Treatment of Non-tuberculous Empyema.
BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck Street, W.1
5 P.M. Prof. W. V. Mayneord, D.Sc.: Applications of Atomic Physics in Medicine. (Last of six lectures.)
LONDON ASSOCIATION OF THE MEDICAL WOMEN'S FEDERATION
8.30 P.M. (B.M.A. House, Tavistock Square, W.C.1.) Miss D. J. Collier: Influence of War Experience on Everyday Ear and Throat Treatment.
ROYAL FACULTY OF PHYSICIANS AND SURGEONS, 242, St. Vincent Street, Glasgow
4 P.M. Dr. Sydney M. Laird: Watson prize lecture.
ASSOCIATION OF INDUSTRIAL MEDICAL OFFICERS
3 P.M. *Scottish group*. (Royal Infirmary, Glasgow.) Clinical meeting.

Thursday, 6th

ROYAL SOCIETY OF MEDICINE
8 P.M. *Neurology*. (National Hospital, Queen Square, W.C.1.) Clinical meeting.
MEDICAL SOCIETY OF THE I.C.C. SERVICE
3 P.M. (Sutton Hospital, Brighton Road, Sutton.) Clinical meeting.
LONDON SCHOOL OF DERMATOLOGY
5 P.M. Dr. G. Duckworth: Streptococcal Infections of the Skin.

Friday, 7th

ROYAL SOCIETY OF MEDICINE
10.30 A.M. *Otology*. Mr. A. Tumarkin: Transmeatal Surgery of Attic Antrum and Labyrinth. Cases will be shown at 10 A.M.
2.30 P.M. *Laryngology*. Mr. V. E. Negus: Review of the Treatment of Intrinsic Carcinoma of the Larynx.
LONDON CHEST HOSPITAL, Victoria Park, E.2
5 P.M. Mr. J. W. S. Lindahl: Tuberculosis of the Upper Respiratory Tract.

Notes and News

BIRTHS IN 1946

THE birth-rate in 1946 was 19.1 per 1000 population, which is 3.0 above that for 1945 and the highest rate in any year since 1923. These figures are given by the Registrar-General for England and Wales,¹ who reports that the number of live births registered during the year was 820,268—the highest figure since 1921. The following table compares the total rates for live births, stillbirths, and deaths in 1946 with the corresponding figures for 1945 and 1938:

Year	Live births		Stillbirths		Deaths	
	Total no.	Rate	Total no.	Rate	Total no.	Rate
1938	621,204	15.1	24,729	0.60	478,996	11.6
1945	685,273	16.1	19,451	0.46	488,108	11.4
1946	820,268	19.1	22,844	0.53	491,759	11.5

INTERNATIONAL SOCIETY OF SURGERY

At the 12th congress, to be held in London from Sept. 14 to 20, discussions will be opened as follows: *Rôle of Penicillin in Surgical Practice*, Sir Alexander Fleming, F.R.S., London; *Recent Advances in Arteriography and Venography*, Prof. Dos Santos, Lisbon; *Recent Advances in Vascular Surgery*, Prof. René Leriche, Paris; *Surgical Treatment of Pulmonary Stenosis*, Professor Blalock, Baltimore; *Operative Treatment of Fractures*, Professor Danis, Brussels; *Results of Early Operation in War Wounds of the Lungs*, Dr. Bastos Ansart, Barcelona; *Results of Heparin in Surgery*, Dr. Crafoord, Stockholm; *Rôle of Vasodilatation in Arterial Disease*, Dr. Diez, Buenos Aires; *Skin Defects—their Repair by Flaps and Free Skin Grafts*, Prof. T. Pomfret Kilner, Oxford; and *Recent Progress in the Treatment of Burns*, by a Russian surgeon. Members who wish to take part in these discussions should send their names to the secretary, Mr. H. W. S. Wright, 9, Weymouth Street, London, W.1, or to the general secretary, Dr. Leo Dejardin, 141, Rue Belliard, Brussels.

Surgeons of consultant standing who wish to join the society are invited to apply to the secretary as soon as possible. Junior surgeons who are not eligible for full membership may be accepted as associate members with all the privileges of membership except that of voting at general meetings. The entrance fee is 400 Belgian francs, and the subscription, payable every three years, is 1000 Belgian francs. Applications for membership should be addressed to the local secretary, Mr. H. W. S. Wright, and subscriptions from present members should be sent to the British treasurer, Mr. Victor Riddell, 68, Chester Square, London, S.W.1.

QUARTERS FOR NURSES

At the West Middlesex Hospital, it seems, recruitment of nurses is mainly hindered by lack of a suitable nurses' home.¹ This has offered a good opportunity for allowing senior staff to sleep out; but the experiment has not proved successful for two reasons: comfortable lodgings are scarce in the district, and those obliged to be non-resident are inevitably penalised financially. Under the Rushcliffe scale non-resident nurses do not receive a living-out allowance sufficient to put them on an equal footing with those who live in: on the contrary, they get less than the value of a resident's emoluments, and must in addition pay income-tax on the sum they receive. In these circumstances an experiment in non-residence cannot but fail.

The council now find themselves in great difficulties. The patients waiting for admission have increased from 1000 in 1945 to nearly 3000; and the hospital cannot house more than 210 nurses except by converting wards. Out of a full bed complement of 1532 beds, 184 have been closed to provide other types of accommodation, and a further 174 by reason of shortage of nursing staff.

In November, 1945, the council approved, as a long-term policy, the building of a new nurses' home to take 500 nurses, at a cost of £300,000; but when plans were sent to the Ministry of Health the council were advised to revise the plans to provide

quarters for only 346 nurses. Authority for building the home was not granted, and last February the council decided to convert and equip three of the closed wards to accommodate 70 nurses. The Minister seems likely to agree to this, and possibly the work may soon be begun. At present 283 nurses are living in scattered quarters within the hospital, and 300 are living out. This makes up two-thirds of the authorised complement of nurses; and it is to their credit that, despite their depleted numbers, they dealt with far more cases in 1945 than the full staff did in 1939.

The council have decided to draw the attention of the Government to their plight, through the Middlesex members of Parliament, in the hope of getting the necessary authority to proceed with their schemes for providing nurses' quarters.

A RHEUMATISM UNIT

THE British Legion unit of rheumatology is housed in the Three Counties Emergency Hospital at Arlesey, Bedfordshire, and consists of two hutted wards, each with 25 beds, and a hutment for treatment by physical and occupational methods. The patients, who are Service and ex-Service men, also make use of the facilities of the Emergency Hospital, which is closely associated with the Royal Free Hospital in London.

A party of doctors visited the unit on Jan. 21, when Lord Horder, as consultant observer, made a teaching round. Dr. C. B. Heald, as consultant to the unit, summarising the lesson of Arlesey, said that such a unit should have some 40 beds and should be part of a general (and preferably a teaching) hospital, in close touch with a consultant staff and special departments. Other needs included rest and good food on sanatorium lines; absence of hurry; a long stay if needed, in contrast to the short three weeks' visit usual at a spa; detailed diagnosis; special medical and physical treatment when required; surgical appliances and boots available on demand; careful selection of patients; and rapid disposal of those who cannot be helped. Each patient should be seen as an individual who can be made happier and more useful by returning him to his own job or retraining him for other and more suitable work as quickly as possible.

The British Legion has evidently been able to overcome some of the difficulties encountered in getting the pensioner back to a full and active life. Of 104 patients so far discharged from the unit, 71 were said to show clinical improvement; and of the 68 who had not worked—in some cases as long as twelve years—35 were considered fit for some employment.

EXTRA MEAT IN LIVER DISEASE

PEOPLE suffering from infective hepatitis (catarrhal jaundice), toxic jaundice, or chronic hepatitis (cirrhosis of the liver) are now allowed two extra rations of meat a week, in addition to the household milk powder already granted. The procedure is the same as for extra milk and eggs—the doctor issues a certificate for the local food office, which sanctions supplies from the retailer. The qualifying conditions are in two categories. (1) Cases of infective hepatitis or toxic jaundice may be granted the extra rations for a month, renewable on production of further medical certificates at monthly intervals for a maximum period of four months. (2) In cases of chronic hepatitis the rations may be granted for three months, renewable on production of further medical certificates at three-monthly intervals for an unlimited period.

University of Birmingham

Dr. W. Trevor Cooke has been appointed first assistant to Prof. W. Melville Arnott in the department of medicine.

Dr. Cooke, who is 34 years of age, studied medicine at Cambridge and Birmingham, qualifying in 1935, and becoming M.R.C.P. After holding appointments at Wolverhampton Royal Hospital and the Children's and Queen's Hospitals, Birmingham, he was awarded the Walter Myer travelling studentship and a research fellowship in medicine at Harvard University, where he worked under Dr. Paul D. White in 1938 and 1939. He graduated M.D. at Cambridge in 1940, and from then until 1945 he was at the Birmingham United Hospital as medical registrar to the professors of medicine. Last year he was made assistant director of research in the department of medicine, and was elected F.R.C.P. His published work includes reports of clinical observations on cardiovascular disease, clostridial infection, the steatorrhea syndromes and other metabolic disorders, and on the physiology of the kidney.

Royal College of Surgeons of England

The Hunterian oration will be delivered at the college on Friday, Feb. 14, at 5 p.m., by Sir James Walton, whose subject is to be Hunterian Ideals Today.

1. Registrar-General's Weekly Return of Births, Deaths and Infectious Diseases for the week ended Jan. 18, 1947. H.M. Stationery Office. 6d.

1. Report of the public-health committee, presented to the Middlesex County Council on Jan. 1, p. 247.

University of London

Dr. D. W. Smithers has been appointed to the university chair of radiotherapy tenable at the Royal Cancer Hospital, as from Oct. 1, 1946.

Dr. Smithers studied medicine at Cambridge and St. Thomas's Hospital, qualifying M.R.C.S. in 1933 and M.B. in 1934. After qualifying he held clinical assistantships at St. Thomas's and the post of outpatient medical officer at the National Hospital for Diseases of the Heart. In 1937 he graduated M.D. and gained the D.M.R. Since then he has held appointments at the Royal Cancer Hospital, successively as assistant radiologist, X-ray therapist, and, since 1943, director of the radiotherapy department. From 1942 to 1943 he was honorary director of the radiotherapy department at St. Thomas's Hospital. Last year he became M.R.C.P. He is the author of a book, *X-Ray Treatment of Accessible Cancer*, and of numerous papers on radiology and radiotherapy.

Mr. J. J. C. Buckley, D.Sc., has been appointed to the William Julien Courtauld chair of helminthology tenable at the London School of Hygiene and Tropical Medicine, as from Oct. 1, 1946.

The title of professor emeritus of morbid anatomy in the university has been conferred on Dr. H. M. Turnbull, F.R.S. At the London Hospital he was director of the Institute of Pathology, later named the Bernhard Baron Institute, from 1906, holding the chair of morbid anatomy from 1919 until his retirement last September.

The title of reader in anatomy in the university has been conferred on Dr. R. W. Haines in respect of the post held by him at St. Thomas's Hospital medical school.

Royal College of Obstetricians and Gynaecologists

At a meeting of the council held on Jan. 25, with Mr. William Gilliatt, the president, in the chair, I. B. Ewart and G. J. St. C. Fisher were admitted in absentia to the membership of the college. The following were also elected to the membership:

Duncan Ballantine, Margaret R. Biggs, W. S. Campbell, J. B. Cochran, S. J. Cohen, H. V. Corbett, G. L. Daly, Albert Davis, J. R. Dickinson, Bessie Dodd, Morag Dods, Ian Donald, R. C. Gill, Jean L. Hallum, A. J. Hardy, R. F. Lawrence, T. H. Lawton, J. M. McBride, R. A. E. Magee, Eileen C. Miller, J. D. Murdoch, M. K. O'Driscoll, S. S. F. Pooley, L. J. Quinn, Kathleen M. F. Worrall, J. L. Wright.

London County Council

Dr. Reginald Thane Taylor, medical superintendent of St. Matthew's Hospital, retired on Jan. 23 after forty years' service in London hospitals.

In 1907 he was appointed assistant medical officer at the Holborn and Finsbury Infirmary (now Archway Hospital), becoming medical officer at City Road Institution (now St. Matthew's Hospital) in 1911. After transfer to the L.C.C. service in 1930 he became, in 1932, medical officer and acting master-in-charge at that hospital, of which he was appointed medical superintendent in 1937. When the hospital was closed, because of war damage, in 1941, Dr. Taylor acted as medical superintendent of St. Luke's Hospital, Chelsea. In 1942 he was seconded as medical municipal sector representative to sector 3, E.H.S., and since 1943 has acted as medical superintendent at St. John's Hospital and as assistant medical officer at Cedars Lodge Institution. In reporting his retirement the hospital committee speak of Dr. Taylor's exceptionally valuable service rendered during a long career.

Chadwick Public Lectures

The following are among the lectures to be delivered in the next six months: Tuesday, Feb. 18, at 2.30 P.M. (26, Portland Place, W.1), Prof. S. P. Bedson, F.R.S., Laboratory Investigations in the Diagnosis of Virus Infections of Man; Tuesday, March 18, at 2.30 P.M. (Westminster Hospital medical school, S.W.1), Prof. W. M. Frazier, A Medical Pioneer in Sanitation; and Thursday, May 22, at 3 P.M. (Town Hall, Cheltenham), Sir Arthur MacNalty, Advances in Preventive Medicine During the War of 1939-45.

Institute of Child Health, London

Postgraduates wishing to attend at the institute, Hospital for Sick Children, Great Ormond Street, whether for 3-6 months or for shorter periods, are advised to apply as early as possible since vacancies are being filled well in advance.

Biochemical Society

At a meeting of the society to be held at the London School of Hygiene, Keppel Street, W.C.1, at 11 A.M., on Saturday, Feb. 15, there will be a symposium on the Relation of Optical Form to Biological Activity in the Amino-acid Series.

B.C.G. in the United States

The effectiveness of B.C.G. vaccine in the prevention of tuberculosis is to be investigated in the United States by the Public Health Service. A single laboratory will produce the vaccine for use by research groups throughout the country.

Family Relations Group

This group has recently been formed, under the chairmanship of Lord Horder, to foster the pooling of experience, the exchange of views, and the implementation of agreed policy among those interested in the problems of family life. Inquiries should be addressed to the hon. secretary, Mr. Cyril Bibby, M.Sc., 69, Manor Road, Chipping Barnet, Herts.

National Coal Board Appointment

Dr. C. L. Cope has been appointed director of research (human problems) under the scientific member of the board, Sir Charles Ellis, F.R.S.

Dr. Cope, who is 43 years of age, studied medicine at Oxford and at University College Hospital, London, qualifying in 1927. He held a Beit research fellowship from 1929 to 1935, and became assistant to the medical unit, University College Hospital, London, in 1937. In 1938 he was appointed first assistant in the University department of medicine and lecturer in medicine at the University of Oxford. From 1942 to 1945 he served in the R.A.M.C. as officer-in-charge of medical divisions of military hospitals in Britain and north-west Europe.

Appointments

BEATTIE, P. H., M.B. Aberd., D.O.M.S.: asst. ophthalmic surgeon, Norfolk and Norwich Hospital.
 DAVISON, ANNA I., M.B. Edin.: asst. M.O.H. and asst. school M.O., Southport.
 DIGNAN, J. F., M.B. Dubl.: consultant surgeon, Llanelly and District General Hospital.
 DUGGAN, NORMAN, M.B. Manc., F.R.C.S.: medical referee under Workmen's Compensation Act, 1925, for Birmingham, Worcester, and North Worcestershire.
 GORDON, MENDEL, F.R.C.S., D.L.O.: asst. ear, nose, and throat surgeon, National Temperance Hospital, Hampstead.
 MACKENZIE, I. F., M.D. Edin., D.P.H., D.T.M. & H.: deputy county M.O.H. and deputy school M.O., Warwickshire.
 MATOU, C. R., M.R.C.S., D.P.H.: senior asst. school M.O., Coventry.
 ROBSON, W. G., M.B. Edin., M.R.C.P.: examining factory surgeon, Berks and Bucks.
 SCHAFF, KATE, M.D. Heidelberg: asst. maternity and child welfare M.O., county of Durham.
 SEED, JOHN, M.B. Aberd.: resident medical superintendent, County Hospital, Driffield.
 THORNE THORNE, BEZLY, M.B. Camb., M.R.C.P., D.O.: asst. surgeon, Sussex Eye Hospital, Brighton.

Colonial Service:

ANTONIO, N. M., M.B.: asst. M.O., Jamaica.
 BRYCE, J. C., M.B. Lond.: M.O., Tanganyika.
 COLDHAM, H. J. S., M.R.C.S.: M.O., Kenya.
 MCKENDRICK, A. J., M.B. Glasg.: M.O., Tanganyika.
 ROSS, E. H., M.B.: M.O., Malaya.
 SANG, D. M., L.R.C.P.E.: M.O., grade C, department of health, Trinidad.

Births, Marriages, and Deaths**BIRTHS**

BOUSFIELD.—On Jan. 18, the wife of Dr. L. C. Bousfield—a son.
 COBB.—On Jan. 18, at Guildford, the wife of Dr. J. H. Cobb—a daughter.
 EVANS.—On Jan. 22, in London, the wife of Mr. Briant Evans, F.R.C.S.—a son.
 KEELE.—On Jan. 15, in London, the wife of Dr. K. D. Keele—a daughter.
 LLOYD.—On Jan. 19, at Frome, Somerset, the wife of Dr. O. G. Lloyd—a son.
 MEADOWS.—On Jan. 21, in London, the wife of Dr. S. P. Meadows—a daughter.
 O'DONNELL.—On Dec. 2, at New Delhi, the wife of Major J. E. O'Donnell, I.M.S.—a son.
 ROBERTS.—On Jan. 19, in London, the wife of Dr. J. A. F. Roberts—a daughter.
 SITA-LUMSDEN.—On Jan. 22, at Beaconsfield, the wife of Dr. E. G. Sita-Lumsden—a son.
 SWINSTEAD.—On Jan. 11, at Cardiff, the wife of Dr. P. D. Swinestead—a son.
 TRAPPS.—On Jan. 23, the wife of Dr. Norman Trapps—a daughter.

MARRIAGES

BENCKER—LLOYD.—On Dec. 23, at Bournemouth, Frederick William Bencker, M.D., to Natalie May Lloyd.
 BRIMS—CROSLAND JONES.—On Jan. 22, in London, Donald James Brims, M.R.C.S., to May Jones.
 FERRIS—MACDONALD.—On Jan. 22, at Bucklebury, Berks, the Rev. Charles Henry Ferris to Eileen M. M. Macdonald, M.B.
 WALKER—COLMAN.—On Jan. 18, in London, David Walker, M.B., to Rosemary Colman.

DEATHS

ASHE.—On Jan. 25, at Eastbourne, Frank Ashe, M.R.C.S., colonel R.A.M.C. ret'd.
 HADLEY.—On Jan. 22, at Leicester, Ernest Cutcliffe Hadley, M.D. Lond., F.R.C.S.E.
 LEE-MICHELL.—On Jan. 13, at Wellington, Somerset, Robert Lee-Michell, M.R.C.S., D.A., aged 52.
 PEARSON.—On Jan. 23, at Edinburgh, Charles Mowbray Pearson, M.B. Edin., F.R.C.P.E., aged 72.
 REID.—On Jan. 23, at Witchampton, Dorset, Arthur Lestock Reid, M.R.C.S.
 ROUTH.—On Jan. 19, Charles Frederic Routh, M.D. Lond., aged 82.
 STADDON.—On Jan. 22, Eric John Staddon, M.R.C.S., aged 56.
 WOODS.—On Jan. 20, John Francis Woods, M.D. Durh., aged 93.

PREVENTION OF ACUTE RESPIRATORY DISEASES

WITH PARTICULAR REFERENCE TO INFLUENZA*

C. H. STUART-HARRIS

M.D. Lond., F.R.C.P.

PROFESSOR OF MEDICINE IN THE UNIVERSITY OF SHEFFIELD

The study of morbidity statistics has emphasised both in this country and in America the extraordinary importance of the minor infections of the respiratory tract, influenza, and the common cold. Further, both influenza and the common cold play an important part in the causation of fatal pulmonary disease.

Every year in this country a more or less regular series of events occurs in the population as a whole. There is a cycle of minor illnesses, such as common colds and influenza, and another of fatal illnesses of acute respiratory disease notified by doctors as deaths from influenza, which varies from year to year in its general character. In fact, three sorts of years have recently been encountered: those with sharp peaks of mortality exceeding 1000 deaths a week in the great towns; those with an irregular plateau of mortality in excess of 100 and usually with a maximum between 200 and 400 weekly; and those with weekly numbers throughout the year never exceeding 100 at any time.

Since the discovery of the influenza viruses A and B, it has been possible to interpret these mortality statistics in terms of pathology. It is clear first, that laboratory evidence of influenza virus activity is not encountered every year, even though, as every practitioner knows, cases of an influenza-like illness are met with annually. Secondly, the years with definite peaks of mortality from influenza have all been associated with activity of either A or B influenza virus. The years with high sharp peaks have all been associated with influenza-A epidemics; the years with minor peaks have been associated with either A or B influenza; and the years without rises in excess of 100 a week have usually been years when no evidence of virus activity has been encountered. In fact, viewed over a period of many years, periodic recrudescences of infection from the two viruses A and B, due perhaps to recruitment of new susceptibles or a loss of immunity on the part of those previously attacked, appear to afford a tolerably good explanation of observed epidemics.

In the U.S.A. the Commission on Acute Respiratory Diseases (1946a) has postulated, on the basis of known experience, that influenza A has a cycle of 2-3 years and influenza B 4-6 years. The experience in this country since 1933, when virus A was first discovered, does not altogether agree with this theory of regular periodicity of occurrence, and further observation is necessary before it can be accepted.

SEMI-ISOLATED COMMUNITIES

In contrast with events in the population as a whole, the behaviour of acute respiratory disease in semi-isolated communities, such as schools and Service establishments, is most puzzling. The heart of the problem may be seen by a glance at events in an Army infantry training centre which gives Army recruits their first introduction to community life and suffers every winter from a greater or lesser outbreak of acute respiratory disease. The accompanying figure shows four years' experience at an infantry training centre, with total figures of weekly new cases of acute respiratory disease, both febrile and afebrile, among recruits. The population was varying intermittently during the whole period, though the total strength remained about the same. Some of the men were stationed at the centre

for six weeks, and others for three months, and a few of the permanent staff remained throughout the period.

The various waves of infection could be interpreted on the basis of the known occurrence of the viruses in Great Britain. In 1943 the January wave might have been due to virus B and the February wave to virus A. The November wave was almost certainly influenza A, but the succeeding waves in January, 1944, could not be readily explained in terms of either virus.

The 1945 outbreak, which was one of the sharpest encountered during the war, was the only one in which cases were actually investigated. Among more than 40 cases of febrile respiratory disease tested serologically at Hampstead (Hirst test) no case either of virus A or B infection was found. Yet some of the cases were clinically typical of influenza, though there was some clinical variation, and other cases from the same unit were an exudative non-streptococcal tonsillitis as described by Stuart-Harris et al. in 1938 and more recently by the U.S. Army Commission on Acute Respiratory Diseases (1944).

Separate analysis of the incidence in recruits and seasoned troops indicated that the recruits of less than six weeks' service suffered most heavily; those with more than six weeks' but less than three months' service suffered less; and the permanent staff of soldiers of several years' standing was almost unaffected.

The prevalence of acute respiratory disease at an American Army recruiting centre (Commission on Acute Respiratory Diseases 1946b) during the same years underwent similar variations. Epidemics occurred every winter, and from 1942 to 1945 only one of the outbreaks was due to an influenza virus—the A epidemic of November, 1943. The outbreaks were essentially among the recruits, and the length of stay of recruits at this centre was sufficiently long (12-16 weeks) for a correlation to be obvious between epidemic waves and the periodic arrival of new batches of recruits. In fact, this influenza-like disease was apparently prevalent during the first four weeks of entry of any particular batch of recruits. No known micro-organism was incriminated by Dingle and his associates at Fort Bragg, but experiments on human volunteers indicated the probability that the disease was a virus infection (Commission on Acute Respiratory Diseases 1946c).

It is therefore clear from these Army studies that localised outbreaks of acute respiratory disease of an influenzal character occur which are not due to either virus A or B. It seems probable that much of the sporadic influenza and influenza-like illnesses in the general population in non-epidemic years is due to the same or similar infections as these Service cases. It is even possible that some of the cases seen during actual epidemics of influenza-virus infection and which cannot be classified serologically or by recovery of virus are due to a like infection.

Meanwhile study of Service outbreaks has led to the recognition of yet another condition of virus aetiology—primary atypical pneumonia. This disease essentially produces morbidity without mortality and is in most cases due apparently to a virus entirely unrelated either to influenza virus or to any of the pneumonia viruses of the psittacosis group.

Evidence is accumulating that the virus described by Eaton et al. (1944) is the causal agent of that variety of atypical pneumonia in which cold red-cell agglutinins develop in the blood. Yet not all cases of primary atypical pneumonia are associated with the development of cold agglutinins. The multiplicity of mild viruses known to be capable of causing pneumonia in the mouse may indicate that the virus pneumonia of man is also of complex aetiology.

It is, however, difficult to estimate the importance of this condition in civil life. In the U.S. Army recruit

* Abridged from the Malcolm Morris memorial lecture delivered at St. Mary's Hospital, London, on Dec. 5, 1946.

establishment at Fort Bragg atypical pneumonia regularly constituted about 10% of all cases of acute febrile respiratory disease. It seems unlikely that it is as common in England, at any rate in the civil population; but its relative importance may increase in the future because of its resistance to present chemotherapeutic agents.

It is clear that the groups of virus agents responsible for the common cold, influenza, and atypical pneumonia are of great importance in relation to morbidity and to periodic disturbance of the economic life of the community. The activity of the influenza viruses also appears to be related to mortality, presumably from pneumonic complications in which bacterial infection plays a part.

EPIDEMIOLOGY OF PNEUMONIA

Lung infections associated with bacteria, particularly the pneumococcus, cause a set of epidemiological events parallel to those of the virus infections. Most deaths from influenza are undoubtedly due to pneumonic complications of bacterial origin, and the statistical record furnishes some evidence of the behaviour of this form of pneumonia. There is, however, the large group of primary pneumonias which include lobar pneumonia and are not usually regarded as correlated with virus infections.

The statistics of primary pneumonia for England and Wales 1940-46 show every year, usually shortly before or shortly after Christmas, a sharp rise in recorded incidence. The peak was reached some time between January and March, and was followed by a slow subsidence to the summer endemic level. There was admittedly an increased prevalence of pneumonia every winter, whether an influenza epidemic did or did not occur, but certainly, of recent years, the largest peaks of primary pneumonia coincided with periods of known prevalence of virus A or B. This supports the view that there is a correlation between influenza-virus infection and pneumonia of bacterial origin. Yet in the individual case it is difficult to understand how the two micro-organisms—the virus and the pneumococcus—coöperate, for most cases of influenzal pneumonia appear to be post-influenzal.

Some light on the possible mechanism of this inter-relationship of pneumonia and influenza may have been shed by the observation of Smillie et al. (1938).

In a mental hospital an epidemic of influenza in 1937 (probably influenza A) was accompanied by numerous cases of lobar pneumonia. Subsidence of the influenza epidemic did not, however, lead to cessation of the pneumonia wave, which a month after the peak of the influenza was still considerable. Type-I pneumococcus was found in almost every case of pneumonia at this time, and a high type-I-pneumococcus carrier-rate (10%) was found throughout the hospital.

A later wave of pneumonia at an overflow wing of the hospital which had escaped the influenza epidemic was probably due to introduction of type-I pneumococcus by patients transferred from the main part of the hospital.

It seemed probable that the influenza epidemic led to wide dispersal of the type-I pneumococcus, and that the wave of pneumonia was really incidental to this abnormally frequent carriage of a virulent bacterium.

These facts must lead us to regard the virus and bacterial infections of the respiratory tract as being closely related. When we consider the various respiratory-tract infections, other than influenza, which have been mentioned above as due to presumed but as yet unknown viruses, it seems clear that we are still only on the threshold of knowledge concerning the mechanism of pneumonia.

PREVENTION OF ACUTE RESPIRATORY DISEASE

There are two entirely separate methods of attacking the problem of the prevention of acute respiratory disease. Both have been much studied of recent years. The first method is to develop specific prevention against each condition by the use of effective immunising

preparations. Raising individual resistance by the enhancement of circulating antibodies has abundantly proved its worth, particularly in diphtheria and yellow fever. The disadvantages of such a method are that different vaccines are required for each condition against which protection is desired. There are also drawbacks such as the duration of immunity, multiplicity of antigens, and so on in conditions, such as influenza, which are not normally associated with a durable immunity following an attack of the disease. Nevertheless immunisation against both influenza and pneumonia has been studied intensively, and encouraging results have been obtained.

Immunisation against Influenza.—The development of knowledge concerning immunisation against influenza-virus infection, either in animals or man, was reviewed by Stuart-Harris (1945).

Since the successful trial, during the war, of the concentrated and refined vaccine of Francis and Salk (Francis 1945), which involved the use of a subcutaneous vaccine of killed preparations of the two influenza viruses A and B, further studies, such as those of Stanley (1945) and Henle et al. (1946), have merely underlined the importance of the amount of antigenically active material in connexion with the antibody response subsequent to injection. However, the occurrence of febrile reactions after inoculation of purified concentrated virus vaccine indicates that there is a definite limit to the amount of antigen tolerated by man. Salk and co-workers (1945b) suggest that the duration of the immunity

INCIDENCE OF INFLUENZA 6-8 WEEKS AFTER INOCULATION WITH INFLUENZA-VIRUS VACCINE

Group	No. of centres	No. under observation	Cases of clinical influenza
University students ..	14	Vaccinated 1934 Controls 2307	28 (1.45%) 40 (1.70%)
Nurses and patients in hospital	13	Vaccinated 1481 Controls 1508	20 (1.36%) 22 (1.46%)
Industrial groups ..	6	Vaccinated 2157 Controls 2173	84 (3.90%) 140 (6.40%)
Total ..	33	Vaccinated 5572 Controls 5988	132 (2.37%) 202 (3.37%)

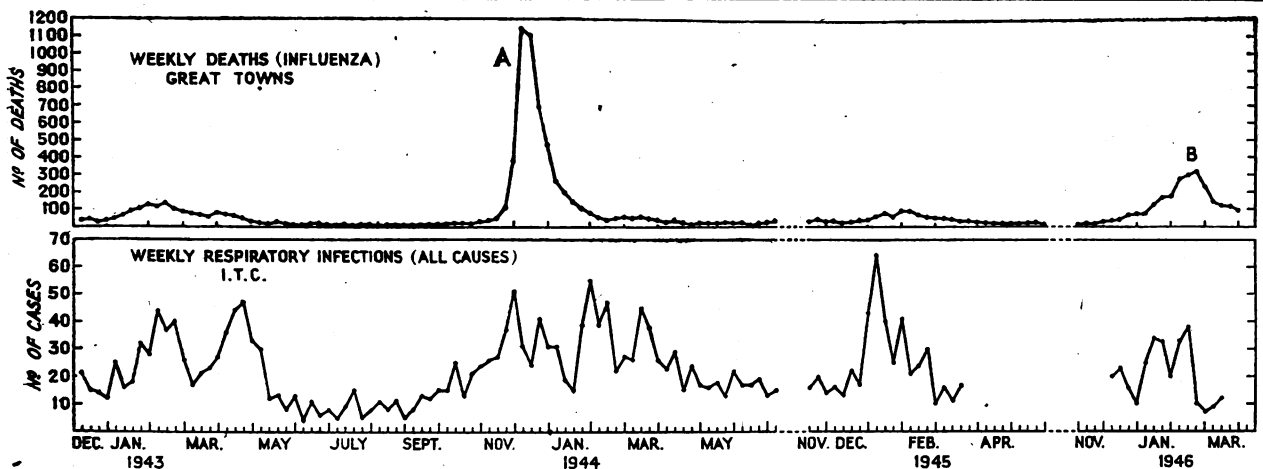
following a single inoculation may be longer than was at first thought. Some sort of protection may still be present a year after immunisation.

The possible use of adjuvants to prolong the immunising action of the vaccine still further has also been studied by Henle et al. (1946), but the preparation of Falba used by them produces an undesirable subcutaneous abscess in a small proportion of inoculated persons. The vaccine described by Salk (1945), which is purified by precipitation with calcium phosphate, has also appeared as a possible rival to Francis and Salk's original product. It is clear that there is still room for work on the best type of immunising agent.

The Francis vaccine was originally tried during a widespread influenza-A epidemic in the U.S.A., large groups of students at various centres being utilised for the purpose of the experiment (Commission on Influenza 1944). Francis et al. (1946) have published further observations on the effect of immunisation with a similar preparation of vaccine during the influenza-B epidemic of 1945.

The group of 600 immunised persons under observation consisted of Army personnel at the University of Michigan who had all been immunised in October, 1945, with U.S. Army vaccine. A group of 1100 other Servicemen, none of whom had been immunised, was housed in an adjacent block. An influenza-B outbreak developed in late November and involved the non-immunised group to an extent nine times as much as it did the Army personnel.

Francis cites these observations as indicating a protective action of the vaccine against influenza B, and



Incidence of acute respiratory disease in infantry training centre (I.T.C.) compared with deaths from influenza in great towns 1942-46.

emphasises the fact that much greater differences in incidence between immunised and non-immunised groups may be observed if the two groups are separated and do not mix. At the same time, it is obvious that two such groups are not necessarily comparable from the point of view of living-conditions and composition; hence statistical comparison of the results is impossible.

In 1945, in this country, the organisation of a field trial by the Medical Research Council (Dudgeon et al. 1946) was seriously hampered by the disturbed conditions produced by the sudden collapse of the war in the Far East, and nearly all the arrangements made before Christmas fell through. It became obvious at this time that an influenza outbreak was developing in this country, and therefore arrangements were made, with the co-operation of many of the universities in Great Britain and of medical officers at several hospitals and in charge of industrial groups, whereby 5729 persons were immunised with a mixed A and B vaccine similar to that used by Francis. In each centre an approximately similar number of persons in contact with, and living under similar conditions to those who were immunised, were left unimmunised or given injections of saline to act as controls. Inoculations were also organised on the Continent both by the Army and with the courtesy of UNRRA in the camps for displaced persons in the U.S. zone of Germany. Abroad some 8500 persons were immunised either with an influenza A and B vaccine or with a vaccine of influenza A only. After the inoculations in Europe a mere trickle of sporadic cases of influenza was encountered, and no estimate of the effect of the vaccine could be made. In this country an irregular outbreak of influenza developed early in 1946, but the figures available for estimation of the period of epidemic prevalence indicated that the vaccinations were in general effected almost at the same time as the peak period of incidence of infection. Nevertheless, a follow-up of the experience of acute respiratory infection in each area was organised at the end of March, 1946, to compute the incidence of clinical influenza in the immunised and non-immunised populations. The accompanying table shows the summarised results in the three groups of university students, nurses, and patients in hospital and industrial groups. No centre experienced an epidemic either before or after the completion of immunisation. The only large groups which showed a considerable difference in influenza in the immunised compared with the non-immunised persons were both industrial organisations. Here the follow-up was based on doctors' certificates returned on absentees, but an effort was made to check the diagnosis when each person returned to work.

Clearly no final conclusions about the value of the vaccine emerged from these experiences of our 1945

winter; yet the experiment yielded information in some directions. Thus, we realised the importance of conducting future trials in communities likely to experience a sufficiently intense incidence of influenza during a subsequent outbreak. The outbreak of 1945 winter was exceptionally patchy, and epidemics only occurred in semi-isolated communities.

The second point which emerged from 1945 winter's trials was that some of the really big groups of immunised persons seemed to experience benefit from the vaccine, whereas the small groups of 50-100 persons split up in many different centres gained no obvious benefit from immunisation. This suggested the possibility that the vaccine exerted an effect by raising herd immunity rather than individual resistance. As mentioned above, Francis has indicated that there is evidence that immunisation of a large group does exert an effect on the incidence of influenza in the non-immunised persons because of the effect on the herd-immunity level. It seems improbable, however, that the whole of the benefit observed by the American workers has been due to the operation of herd immunity, particularly because individual protection has been demonstrated by direct experimental inoculation of virus after immunisation (Francis et al. 1945, Salk et al. 1945a).

Finally, it must be clear that further trials of influenza vaccine must and should be made. It is not a question of attempting to reproduce the results of other workers but simply that, to gain knowledge of the effect of immunisation under various conditions and during various types of epidemics, more than one or two experiments are necessary. Such basic field experiences are essential for guiding the wider use of the vaccine. Clearly, however, wholesale immunisation with a vaccine whose maximal effect is limited to a few weeks or months is out of the question. It seems necessary to limit the use of such a vaccine to populations where a really significant incidence of the disease is likely. Schools and recruiting centres seem to have suffered particularly in recent epidemics; and, if future experience of influenza A repeats the experience of influenza B in 1945, possibly the importance of children as a group of the community with high susceptibility is greater than has previously been realised. It might be possible to produce more effect on the epidemic prevalence of the disease by concentrating on the immunisation of children rather than adults. Protection of groups of adults, such as industrial workers, nurses, and doctors, might also be undertaken. In any case, however, until more lasting antibody responses can be elicited by influenza-virus vaccine, immunisation will have to be carried out in years when epidemics seem likely, and in any case before and not after the outbreak has begun. Here the usefulness of

a reliable method of long-range forecasting of influenza epidemics is apparent.

Immunisation against Pneumonia.—The discovery of effective chemotherapeutic agents for the treatment of pneumonia has tended to overshadow the less spectacular advances made in the attempted control of pneumonia. In the first place, in view of what has been said already concerning the interrelationship of influenza and pneumonia, it is clear that prevention of influenza would exert an effect on the incidence of pneumonia. However, several studies made before the war indicated the possible use of specific bacterial prophylaxis against pneumococcal pneumonia. Thus, Lister et al. (1935) found pneumococcal vaccines of value among native labourers in South Africa. Ekwurzel et al. (1938) carried out studies on prophylaxis with polysaccharide derivatives of pneumococci and obtained encouraging results in the Civilian Conservation Corps camps in the U.S.A. Polysaccharide antigens were also used by MacLeod et al. (1945) under the auspices of the Commission on Pneumonia at a U.S. Army Air Force technical school, which again gave encouraging results.

In spite of the multiplicity of known pneumococcal types it has become obvious, through the many epidemiological studies in the United States (Sutliff and Finland 1933, Finland 1937, Bullowa 1937, Heffron 1939) and some in this country (Anderson et al. 1944), that a relatively few types, including I, II, III, V, VII, and VIII, are together responsible for the bulk of the cases of primary pneumococcal pneumonia. At the Army Air Force School the chief types were I, II, V, and VII in the two winters before the experiment, when pneumonia was exceptionally common; hence a mixed antigen prepared from the polysaccharides of these types was used by MacLeod et al. (1945). The results of this experiment indicated a specific effect of the vaccine in reducing the numbers of cases of pneumonia due to the four types of pneumococci incorporated in the vaccine, whereas no effect was seen in pneumonia due to other types.

MacLeod found that the experiment of immunising half the group of exposed persons had an apparent effect on the incidence of pneumonia in the unimmunised persons besides the immunised. This was shown by the fact that the gross incidence of pneumonia due to types I, II, V, and VII was much lower in the year following the introduction of immunisation, whereas that due to other types, particularly IV and XII, was unchanged.

In view of the fact that we have no experience of this type of pneumonia control in this country it is impossible to do more than mention these American results, which indicate that more interest should certainly be taken in the problem of pneumonia control.

General Preventive Measures.—In the case of diseases of the respiratory tract and others transmitted essentially through air, knowledge of the means of contagion is now considerable, and attempts at control by prevention of dissemination of contagion are passing beyond the experimental stage. The doctrine of droplet infection elaborated by Flügge (1897) was considerably extended by the pioneer work of Wells (1934) and Wells and Wells (1936) on droplet nuclei, which emphasised the importance of the minute droplets which float about in the atmosphere of closed rooms many hours after their initial expulsion by breathing, coughing, and sneezing. These droplets have been demonstrated by flash photography (Jennison 1942), and the contrast between the downward trajectory of the relatively coarse particles and the prolonged suspension of the minute droplets has become obvious (Bourdillon and Lidwell 1941). The importance of dust containing dried particles laden with micro-organisms has also been emphasised by van den Ende et al. (1940). Controversy still reigns

about the relative importance of airborne droplets and contamination by particles of dust in the various infections of the respiratory tract.

Knowledge of the relative pollution of the atmosphere and of the effect of various control measures has depended largely on the development of satisfactory techniques for the quantitative measurement of bacteria in the air. Wells' (1933) air-centrifuge has been used extensively in America, whereas the slit-sampler of Bourdillon et al. (1941) has been chiefly used in this country. Yet simple quantitative estimation of bacteria in the air is insufficient as an indication of aerial pollution, because pathogens are outnumbered by the many non-pathogenic organisms also present. Virus particles also present difficulties and cannot easily be estimated quantitatively. No simple index of air pollution, such as the *Bact. coli* content adopted for water, has yet proved entirely satisfactory; but *Strep. viridans* has been chiefly used. Besides the purely bacteriological problems, the study of the air has necessitated many technical developments, such as methods for measuring ventilation (Lidwell and Lovelock 1946).

The methods thus far utilised for reduction of the bacterial content of the air were reviewed by Andrewes (1940) and Mudd (1945). Physical methods include the irradiation of the air with ultraviolet rays and dust-laying by oiling the floors (van den Ende et al. 1940) and oiling the blankets (van den Ende et al. 1941). Chemical methods using antiseptic mists, vapours, and smokes have all been used: propylene and triethylene glycol chiefly in America, and hypochlorites and lactic acid in this country. The importance of aerial filtration and controlled ventilation has also become evident (Bourdillon and Colebrook 1946). Studies thus far carried out with all three methods have been largely confined to experiments in the laboratory and field experiments on confined communities, such as shelterers from air-raids, hospital patients, and infants in nurseries. Both in this country and in America notable successes have been recorded in the prevention of cross-infection in hospital (Harris and Stokes 1945, Wright et al. 1944), and it is abundantly clear that, in the case of certain groups of the population living in institutions such as barracks, homes, wards, and so on, practical methods now exist for the reduction of respiratory infections of many varieties to a minimum. It is a far cry from this to the prevention of an epidemic of influenza in the general population, but at any rate a start has been made. It would help matters if a trial of the new methods could be made in industry in advance of anticipated epidemics of influenza, for we do not know how important the day-to-day contacts are in the transmission of influenza. Communities already possessing a high rate of respiratory infection are also suitable for a field trial, and it is greatly to be hoped that schools and institutions will permit an extension of the work thus far begun.

CONCLUSION

We stand today in an era of unprecedented achievement against the micro-organisms responsible for many of mankind's ills. Yet, however great the advances promised by penicillin in the treatment of established infections, I cannot foresee that either it or any other chemotherapeutic weapon holds the key to the control of the acute respiratory diseases. Indeed, we are in danger of allowing the great achievements of chemotherapy to overshadow the urgency of the prevention of the common diseases of the respiratory tract. Certainly mass chemoprophylaxis with any agent thus far described does not appear to be the answer to our question.

If we consider the spectacular achievements in the past ten years in the control of other infections, such as yellow fever, typhus, and diphtheria, it is clear that an understanding of the epidemiology and immunology

of these infections has been the basis of the measures applied with success by public-health authorities. I have described here some of the pieces of the jigsaw puzzle of influenza and related infections which seem to fit into place, and I have indicated the large gaps in our knowledge. As with other infections, control measures are in process of formulation along widely different lines. We must hope that the growth of our knowledge will be speedy enough for us to be armed to the teeth, if ever we are faced with a return of the deadliest plague of all—pandemic influenza.

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"There are insufficient nurses to meet the needs of our civilian population. This is due to several factors, such as the increasing demands of the public for nurses, the requirements of the Government services, and the failure of nurses after discharge from the armed services to return to civilian work. The most important factor is the failure of the profession to attract and to hold young women. This failure is primarily an economic one. The period of preparation is out of proportion to the compensation given graduate nurses. An additional factor that applies only to nurses continuing in their field is the ever increasing boredom of their task. The doctor has three great forces to hold his interest in his work. . . . The average graduate nurse has none of these stimuli to enliven her work. For her the glamor of the uniform soon fades, and she does the same work for the same pay year in and year out. . . . The leaders of the nursing world have not yet devised any method of making the work of the graduate nurse increasingly interesting or increasingly responsible. . . . No method has been developed for relieving the highly trained graduate of that part of her work that can be done by less skilled workers. . . . It seems clear that the kernel of this problem lies in the failure of the directors of nursing to devise ways of passing along part of the nurses' work to subordinates."—Dr. W. M. FROB, *Surg. Gynec. Obstet.* January, 1947, p. 121.

MALNUTRITION IN INDIAN PRISONERS-OF-WAR IN THE FAR EAST A SURVEY OF 2000 CASES

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This report briefly summarises the clinical and laboratory observations made on a group of Indian prisoners-of-war immediately after they had been evacuated to India. All such prisoners who were sufficiently ill to require hospital treatment were received in the group of hospitals centred round Jalahalli, near Bangalore. Some 2000 patients were examined, and from a study of these our clinical impressions were formed. In addition a small group of patients was selected, on clinical grounds only, for a more intensive laboratory investigation. This group included typical representatives of each of the major classes of deficiency syndrome encountered. Full details of these findings will be published elsewhere.

Various aspects of the clinical state of Far East prisoners have already been discussed by Gupta (1946), Price (1946), and Pavillard (1946), and the condition of the prison camps has been described by several workers (*Lancet* 1946). The nutritional neuropathy common in Far East prisoners has been discussed by Spillane (1945), Clarke and Sneddon (1946a and b), and Garland (1946a and b), and much has also been written about the ocular signs (Dansey-Browning and Rich 1946, Rich 1946, Goldsmith 1946, Williamson 1946, Durran 1946, and Kirman 1946). "Burning feet" has been described by Simpson (1946) and Harrison (1946). Most of the above observations were made on British prisoners. In this paper the findings on Indian troops only will be discussed.

PREVIOUS DIETARY HISTORY

The standard daily ration issued by the Japanese to Indian prisoners consisted of 12 oz. of rice and about 8 oz. of green vegetables, usually the leaf and stem of sweet potatoes. This was supplemented by a little tea and sugar. If the prisoner were admitted to hospital, this ration was automatically reduced to half. Medical supplies were issued in totally inadequate quantities, antimalarial measures were little practised, and alimentary infections and infestations were widespread. In the absence of even the crudest drugs for their treatment, these diseases imposed a heavy mortality. Minor cruelties and torture added their quota to the heavy burden of suffering these men had to endure.

Patients were received from Bangkok, Singapore, Hong-Kong, Canton, and the Pacific Island bases of New Guinea and New Britain. In some of these areas fairly regular supplies of stale fish were provided by the Japanese, and in others it was possible for the men occasionally to supplement their rations by the secret purchase of food from the local Siamese or Chinese. All the men had been in Japanese hands for about 3½ years.

Clinical Features

Clinically the patients could readily be divided into four main groups.

WASTING ONLY

Other than an extremely low body-weight, these patients presented very few abnormal clinical signs.

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Wasting was excessive and in some cases the blood-pressure was low. There was no obvious evidence of hypoproteinaemia or anaemia; and, save for occasional signs of riboflavine deficiency, evidence of vitamin deficiency was not apparent. Laboratory investigation revealed a mild macrocytic anaemia, a slight hypoproteinaemia, chiefly due to a reduction in the albumin fraction, and a slightly reduced blood-volume. Fractional test-meals and glucose and fat absorption tests were within normal limits. Since gastro-intestinal function was but little impaired, these patients recovered rapidly on a diet rich in calories, protein, and vitamins. Patients in whom the condition was most severe were also given transfusions of blood and of plasma.

The incidence of such patients, with wasting and no other gross signs of vitamin deficiency or hypoproteinaemia, was about 60% of the 2000 prisoners studied.

WASTING AND GROSS HYPOPROTEINÆMIA

The patients of this group were gravely ill when admitted to hospital. Gross generalised oedema with massive ascites was common. Wasting was extreme, anaemia severe, and growth of hair scanty on all parts of the body.

Laboratory examination showed a low blood and plasma volume. The anaemia was often severe and always macrocytic and normochromic. The plasma-protein concentration was low. On admission these patients were too ill for fractional test-meals and glucose and fat absorption tests to be done, but during the recovery phase these tests usually gave results within normal limits. An immediate slow transfusion of plasma, generally the plasma from 750-1000 ml. of blood made up to double strength, was given. This was repeated at daily or two-day intervals until the oedema and ascites had subsided. Two or three transfusions were usually sufficient. The response to the transfusion was dramatic and life-saving in many of the more severe cases.

These patients were comparable with those treated at Belsen (Vaughan et al. 1945, Mollison 1946) and the response to concentrated plasma appeared to be as good. No dangerous reactions, such as those mentioned by Lipscomb (1945), followed any of the transfusions. This group comprised about 1% of all patients received.

WASTING AND SIGNS ATTRIBUTED TO B₂-DEFICIENCY

Such cases, the incidence of which was about 10%, could be subdivided into those with riboflavine deficiency and those with nicotinic-acid deficiency.

(a) *Riboflavine Deficiency*.—These patients presented characteristic lesions of the lips, tongue, and mouth, and changes in the production of gastric acid and in gastric mobility.

The commonest lip lesions were cracks radiating from the corners of the mouth. Greyish areas of necrotic epithelium could often be seen on the inner aspect of the lips, and there were often red pinhead papules on the buccal aspect of the lower lip. Indurated red plaques occasionally formed on the palate, and aphthous ulcers were common.

The tongue was characteristically swollen and indented by the teeth and fiery red; in this state it was extremely tender, and the patients usually complained of soreness and burning. In contrast to the picture seen in nicotinic-acid deficiency, there was no atrophy of the fungiform or filiform papillae; indeed individual fungiform papillae appeared swollen and mushroom-shaped, while their denuded summits allowed the central capillary loops to appear as permanent red spots (Jones et al. 1944).

A slit-lamp examination of the eyes was not made. Fractional test-meals showed that often the production of gastric acid and the gastric emptying-time were defective. If this were so, the defects appeared to be favourably influenced by riboflavine therapy. It should be emphasised, however, that the general nutrition of the patient and the glucose and fat absorption tests, if impaired, showed absolutely no improvement after prolonged treatment with this vitamin, even though the specific lesions on the lips and in the mouth could always be banished within a week, provided adequate dosage (9 mg. daily) was used.

(b) *Nicotinic-acid Deficiency*.—In these patients, on the other hand, there was complete atrophy of the epithelium of the tongue. The whole organ was small and pointed; its surface was denuded of papillae and presented a pale mauve glazed appearance. There was little complaint of soreness, but sometimes burning was complained of after the ingestion of hot or spiced foods.

Anorexia, tympanites, and diarrhoea were common symptoms. The stools had an abnormally high total fat-content; but the proportion of split fats was not greatly increased. Gastro-intestinal absorption, as demonstrated by the glucose and fat tolerance tests, was impaired.

Response to specific nicotinic-acid therapy was prompt and complete in most cases, but in some, where the gastro-intestinal disturbance was great, parenteral nicotinic acid had to be given before improvement began.

(c) *Concurrent Deficiencies*.—Naturally riboflavine and nicotinic-acid deficiencies often occurred concurrently. In such cases the tongue showed signs of atrophy of the central areas, usually in a strip to either side of the median fissure. The margins and the tip were red and showed the characteristic swollen fungiform papillae.

WASTING AND NEUROLOGICAL SYNDROMES

Neurological abnormalities fell into three types—peripheral neuritis (beriberi), degeneration of the long tracts of the spinal cord ("captive cord syndrome"), and optic changes ("captive amblyopia").

(a) *Peripheral Neuritis (Beriberi)*.—The neuritis affected, in most instances, both the upper and the lower limbs. Movement and sensation were impaired, and the reflexes, if present, were sluggish. Often flexor contractures, especially of the knees, had set in, and bilateral wrist and foot drop was common. After treatment with vitamin B₁ recovery was fairly rapid, except where muscular contractures had developed. This group was large, about 20% of all patients.

(b) *"Captive Cord Syndrome"*.—Many patients showed signs of degeneration of the long tracts of the spinal cord. In India this condition has been called "captive cord syndrome." Such patients were of two types: those with a sensory ataxia due to loss of function of the posterior columns (common), and those who presented as a spastic paraplegia due to pyramidal-tract degeneration (rare). Very occasionally both types were seen in the same patient.

Patients with "captive cord syndrome" had a normal cerebrospinal fluid, normal fractional test-meal findings, and no constant changes in the blood picture. They were not usually associated with the above-mentioned signs of nicotinic-acid or riboflavine deficiency, or necessarily with gross wasting. A reasonable degree of recovery was seen in cases of the first type (posterior-column involvement), but those showing spasticity (pyramidal-tract involvement) did not improve during three months' observation. Such cases formed approximately 2% of all repatriated prisoners requiring hospital treatment.

TABLE I—HEMATOLOGICAL FINDINGS IN PATIENTS ON ADMISSION AND ON DISCHARGE AND IN CONTROLS

Findings	Prisoners-of-war					Controls	
	No. of patients	On admission	On discharge	Difference	Significance of difference	No. of patients	Mean \pm s.d.
		Mean \pm s.d.					
Hb concentration (g./100 ml.)	27	10.5 \pm 3.4	14.3 \pm 1.7	3.7 \pm 2.2	Less than 0.01	9	15.2 \pm 1.9
Red-cell count (millions/c.mm.)	27	2.74 \pm 0.63	4.64 \pm 0.88	1.9 \pm 0.62	Less than 0.01	9	5.28 \pm 0.48
Hæmatocrit (%)	27	31.9 \pm 6.0	43.3 \pm 1.5	11.4 \pm 5.5	Less than 0.01	9	45.5 \pm 4.0
M.C.V. (cu)	27	119.0 \pm 14.8	94.3 \pm 8.1	-24.7 \pm 16.1	Less than 0.01	9	86.5 \pm 8.0
M.C.H. (γ)	27	39.2 \pm 6.7	31.1 \pm 2.9	-8.1 \pm 6.6	Less than 0.01	9	29.1 \pm 4.3
M.C.H.C. (%)	27	32.8 \pm 2.5	33.0 \pm 1.5	0.2 \pm 2.4	Greater than 0.05	9	33.5 \pm 2.4

TABLE II—BIOCHEMICAL FINDINGS IN PATIENTS ON ADMISSION AND ON DISCHARGE AND IN CONTROLS

Serum protein (g./100 ml.)	27	5.42 \pm 0.96	6.83 \pm 0.44	1.41 \pm 1.15	Less than 0.01	9	6.89 \pm 0.35
Serum albumin (g./100 ml.)	27	2.63 \pm 0.92	4.11 \pm 0.50	1.48 \pm 0.94	Less than 0.01	9	4.59 \pm 0.49
Serum globulin (g./100 ml.)	27	2.77 \pm 0.78	2.72 \pm 0.72	-0.05 \pm 0.84	Greater than 0.05	9	2.30 \pm 0.30
Ratio A./G. (x:1)	27	1.1 \pm 0.6	1.6 \pm 0.4	0.5 \pm 0.7	Less than 0.01	9	2.0 \pm 0.5
Serum calcium (mg./100 ml.)	27	8.5 \pm 1.5	10.8 \pm 0.8	2.2 \pm 1.5	Less than 0.01	9	11.4 \pm 0.5
Serum inorganic phosphorus (mg./100 ml.)	24	3.9 \pm 1.1	4.4 \pm 0.6	0.5 \pm 1.1	Between 0.05 and 0.02	9	4.0 \pm 0.3
Serum phosphatase (King Armstrong units)	24	16 \pm 8	20 \pm 12	4 \pm 10	Between 0.05 and 0.02	9	16 \pm 4

(c) "Captivity Amblyopia."—Many of the prisoners developed a visual defect during captivity, which condition, while still of uncertain aetiology, has been termed "captivity amblyopia." The commonest finding was a bilateral temporal pallor of the disk, with which was usually associated a crescentic zone of pigmentary disturbance consisting of a reticulated white or pinkish pattern superimposed on a bluish-black background of choroidal pigment. This pigmentary zone, which was adjacent to the temporal margin of the disk, faded into a retina which was somewhat pale and atrophic. Those cases whose visual defect was most marked usually showed total pallor of the disk, while a white "cuff" surrounded the vessels for a considerable distance from the disk margin. However, in only one case was gross attenuation of the vessels observed.

A further type of abnormality consisted in much enlargement of the physiological cup, which was occasionally so gross that its edge reached the disk margin on the temporal side and even seemed to extend beyond it in rare cases. The vessels were seen to plunge abruptly over the edges of the enlarged and deepened pit, thence to be seen indistinctly running over its floor, completely out of focus. It is not claimed that these changes are specific, but they were always associated with pronounced visual and field defects and were never observed among the rest of the 2000 patients examined, who had no visual complaint.

Perimetry showed constantly a marked concentric contraction of the visual fields; but, in contrast with the findings of Spillane and Scott (1945) and Dansey-Browning and Rich (1946), central scotomata could be demonstrated in only one case. This result must be interpreted with caution, however, since the meagre capacity of the part-time ophthalmological unit posted to the hospital was completely overwhelmed by the large numbers of patients; approximately 100, on whom it was desirable to have detailed field information within a short period of time. The patients, for the most part illiterate and understanding only one of several languages, were not generally favourable subjects on which to perform so delicate a subjective test.

This condition was seen in the absence of gross vitamin-deficiency states; it has been observed in association

with deficiency of riboflavine and nicotinic acid, and may accompany any of the above-mentioned neurological syndromes. The patients were treated with a high-calorie, high-protein diet, and considerable recovery occurred in all but the most severe cases. The incidence was of the order of 9% of all the patients examined.

Special Investigations

HEMATOLOGICAL FINDINGS

Some of the hæmatological findings are summarised in table 1. The patients studied included representatives of each of the clinical groups described above and are therefore typical of the Indian prisoner-of-war who was ill enough to require hospital treatment. For purposes of comparison the findings of a control group of 9 apparently healthy Indian soldiers are also given.

Most of the patients studied were anæmic. The mean hæmoglobin on admission to hospital was 10.5 g./100 ml., compared with 14.3 g./100 ml. when they were discharged, and 15.2 g./100 ml. for the control series. The characteristics of the anæmia were remarkably constant; it was macrocytic and normochromic. The average mean corpuscular volume (M.C.V.) on admission was 119 cu and 94 cu on discharge, compared with 86.5 cu for the control group. Also the mean corpuscular Hb (M.C.H.) was considerably raised, 39γγ on admission and 31γγ on discharge, compared with the control figure of 29γγ. The mean difference between the figure observed on admission and that on discharge for the Hb, red cells, hæmatocrit, M.C.V., and M.C.H. was, in each case, statistically significant. The M.C.H. concentration was, however, never reduced. On admission the M.C.H. concentration was 32.8%, and on discharge it was 33.0%, compared with 33.5% in the control group. Thus there was no suggestion of the dimorphic type of anæmia described by Trowell (1943). It is in fact remarkable that subjects whose diet was as meagre as the patients describe should have no evidence of iron deficiency. In most cases a blood film was made; this showed the picture characteristic of nutritional macrocytic anæmia: macrocytosis, anisocytosis, poikilocytosis, and the usual number of primitive forms.

Treatment was with the Indian liver preparation T.C.F., a sheep-liver extract prepared by the Teddington Chemical Factory, Bombay. It was usually given in doses of 4 ml. every second or third day. The response was invariably good.

SERUM PROTEINS

Serum-protein estimations, done on a representative series of patients, showed that the mean serum-protein concentration was 5.4 g./100 ml. on admission, compared with 6.8 g./100 ml. on discharge and 6.9 g./100 ml. for the control group (table II). The mean serum-albumin level was 2.6 g./100 ml. on admission, compared with 4.1 g./100 ml. on discharge and 4.6 g./100 ml. for the control group, whereas the mean serum-globulin level was 2.8 g./100 ml. on admission, 2.7 g./100 ml. on discharge, and 2.3 g./100 ml. for the controls. Thus the reduction in serum protein was entirely in the albumin fraction. This is shown in the low (1.1/1) albumin/globulin ratio found on admission which was increased to 1.6/1 when the patients were discharged, compared with a normal of 2.0/1.

Relation of Serum-protein Concentration to Oedema.—Mollison (1946), who studied the inmates of Belsen, showed that there was a good, though not absolutely strict, correlation between the serum-protein concentration and the development of oedema. Roughly, oedema developed if the serum-protein concentration fell below 5 g./100 ml. In general this was also true for the Indian prisoners, but the serum-albumin concentration was more closely correlated with the development of oedema than was the total serum-protein concentration. This is well illustrated in table III, which shows that widespread oedema with ascites developed if the serum albumin fell below 2 g./100 ml., and gross generalised oedema with pronounced ascites if it fell below 1 g./100 ml. The figures of Vaughan et al. (1945) are similar to ours. This result is to be expected because of the greater contribution made by the albumin than the globulin to the colloid osmotic pressure of the plasma.

Recent reports indicate that in Holland there was little relation between famine oedema and the plasma-protein concentration. It should be emphasised that by "generalised oedema with ascites" we refer to oedema of both upper and lower limbs and face and neck, with free abdominal fluid which can be drawn off. Mere pitting of the ankles or puffiness of the lower limbs was seen in some hundreds of cases and is not included in table III. In every case with generalised oedema and ascites in which the serum proteins were estimated the serum-albumin level was low.

"Delayed Oedema."—Often, during the early stages of recovery, patients who had hitherto had no oedema suddenly became oedematous. This oedema was invariably associated with a low serum-albumin concentration. Delayed oedema has also been reported by Stapleton (1946), and a similar condition has been reported as developing during the treatment of patients with macrocytic anæmia (Davies 1945, Holmes 1945) and with microcytic anæmia (Holmes 1944). In our patients the oedema developed when the plasma volume was increasing most rapidly; and, though the serum-protein concentration was reduced, the total quantity of plasma protein in the circulation was increased (Walters et al. 1947).

OTHER BIOCHEMICAL FINDINGS

Serum Calcium.—A striking feature was the low serum-calcium values observed on admission to hospital (table II). The low mean figure of 8.5 mg./100 ml. rapidly returned to normal, the mean on discharge being 10.8 mg./100 ml., compared with 11.4 mg./100 ml. for the control series. This may be related to a low dietary intake of calcium or to a deficiency of vitamin D. It is note-

worthy, however, that in none of these cases was there any clinical sign of calcium deficiency. Even though in some cases the serum-calcium level was as low as 5 mg./100 ml., there was no evidence of tetany, and both Chvostek's sign and Trousseau's sign were invariably absent. This may be related to a change in the distribution of the serum calcium. With a low protein concentration one would expect less calcium to be "bound" to protein and hence a relative increase in "free" and ionised calcium. It is now generally recognised that it is a reduction in the ionised calcium of the plasma that predisposes to tetany. In this respect the incidence of osteoporosis and bone dystrophies in Western Holland reported by Burger et al. (1945) is of interest. In a few of our patients, radiographed for other reasons, the bone shadows were much reduced in density.

Serum Inorganic Phosphorus and Serum Phosphatase.—There was no constant change in the serum inorganic phosphorus or serum phosphatase (table II). The difference between the mean values on admission and on

TABLE III—RELATION OF SERUM-PROTEIN CONCENTRATION TO OEDEMA

Case	Serum protein	Serum albumin	Serum globulin	Clinical condition
	(g./100 ml.)			
1	2.88	0.75	2.13	Gross generalised oedema and marked ascites.
2	4.05	1.01	3.04	
3	4.20	1.46	2.74	Generalised oedema and ascites.
4	4.78	1.20	3.58	
5	5.23	1.67	3.56	
6	5.10	1.98	3.12	
7	3.33	1.96	1.37	
8	4.18	2.00	2.18	
9	4.81	2.44	2.37	No generalised oedema or ascites.
10	4.46	2.40	2.06	
11	5.34	2.10	3.24	
12	5.17	2.48	2.69	
13	5.30	2.75	2.55	
14	5.24	3.75	1.49	
15	5.30	4.07	1.23	
16	5.12	2.56	2.56	

discharge was in each case of doubtful significance (P between 0.02 and 0.05). The absence of significant change in the serum inorganic phosphorus and serum phosphatase supports the view that the low serum-calcium level is not related to a vitamin-D deficiency.

Miscellaneous.—In some of the patients the serum urea, plasma prothrombin, bleeding-time, clotting-time, plasma fibrinogen, vitamin-C saturation test, and plasma bisulphite combining power were investigated. Except in one case, in which there was an impaired vitamin-C saturation, all these tests invariably gave figures well within the normal range. It must be borne in mind, however, that the patients had mostly received treatment, including massive vitamin therapy, immediately after their release and throughout the whole of the time they were in transit to India.

PLASMA VOLUME AND BLOOD VOLUME

The average plasma volume of the prisoners soon after admission to hospital was not significantly different from that of the control series. The plasma volume referred to unit body-weight was, however, increased, with no change when referred to unit surface area, and a decrease when referred to unit body-height. The blood volume, because of the anæmia and consequent low hæmatocrit, was reduced; and it was also reduced when referred to unit body-weight, unit surface area, and unit body-height. There was in consequence a great reduction in the total circulating Hb, total circulating red cells, and total circulating plasma protein, the last being confined to the albumin fraction. Details of the

plasma-volume findings and the pattern of recovery will form the subject of a further report (Walters et al. 1947).

FRACTIONAL TEST-MEAL FINDINGS

Of the 21 patients studied, 2 had a histamine-resistant achlorhydria, 5 had no free acid after a gruel meal but responded to histamine, 1 had a hypochlorhydria, 3 had a delayed emptying-time, and 10 were normal. After the period of treatment in hospital not one patient failed to produce free acid even without histamine, 3 had a hypochlorhydria, 1 had a delayed emptying-time, and the remainder were normal. These findings did not significantly differ from those of the control series.

Nicotinic acid had no effect on the fractional test-meal findings, but there was much improvement while the patients were receiving riboflavine. There was also an improvement, in the few cases studied, while the patient was receiving liver extract.

TESTS OF ABSORPTION FROM GASTRO-INTESTINAL TRACT

Only a few (less than 5% of those who were ill enough to require hospital treatment) of the patients had evidence of absorptive defect or complained of diarrhoea when they arrived in India. The following conclusions are based on a study of these patients only and are not representative of all repatriated Indian prisoners. In such patients there was an impairment of the glucose-tolerance test characterised by a low fasting blood-sugar and a low rise in the blood-sugar concentration after 50 g. glucose. By the time the patients were fit for discharge from hospital the glucose-tolerance test had returned to normal.

While the patients were receiving nicotinic acid there was a slight improvement in the glucose-tolerance curve. Riboflavine, on the other hand, had no effect.

In addition, there was an impairment of the fat tolerance as judged by both the height and time of the rise in amount of serum total fat and time of the rise in amount of serum cholesterol. There was also a low fasting serum-cholesterol level, but no change in the amount of fasting serum total fat. Most patients with diarrhoea also had steatorrhoea, which improved during treatment in hospital.

Treatment

The specific treatment used in the several types of deficiency syndrome has been given in the clinical account of each. Patients with peripheral neuritis and "captive cord syndrome" received physiotherapy and were taught re-educational exercises. Flexor contractures were treated with weight extension. Coincident scabies, epidermophytosis, dysentery, or malaria was treated along the usual lines.

Two diets were used. A low-residue bland diet of 3800 calories was used for those who had little appetite, sore tongues, and impaired digestive function. When appetite and digestion improved, a full diet of 5300 calories was supplied. All the patients received three major meals daily, with extra milk, tea, fruit, sweets, and biscuits. They also received 'Multavite' tablets and an extract of rice-polishings. There seemed to be few periods during the day when their mouths were empty.

Discussion

The findings in the Indian prisoners from the Far East differ from those in prisoners from Europe in three major respects: the type of anæmia, the lesser incidence of diarrhoea, and the great predominance of neurological signs. These facts are significant to those concerned with the ætiology of nutritional macrocytic anæmia, the so-called "starvation diarrhoea," "captive cord syndrome," and "captive amblyopia."

Anæmia.—The characteristics of the anæmia in the Far East prisoners are in marked contrast to those

of the anæmia of the patients from Belsen described by Mollison (1946) and those from Lamsdorf reported by Edge (1945). In the European camps the anæmia was normochromic and normocytic, while in the Far East the anæmia was normochromic but macrocytic. Thus, in both series, there was no evidence of iron deficiency, but in the Indian prisoners there was evidence of a deficiency of the factor responsible for nutritional macrocytic anæmia not seen in the Europeans imprisoned in Belsen. In other respects the two series are comparable: both showed roughly the same degree of loss of body-weight, both had the same degree of anæmia, both suffered from a comparable degree of protein deprivation as illustrated by the plasma-protein concentration and the degree of œdema. It appears that either the Indian is more susceptible than the European to nutritional macrocytic anæmia, or the inmates of Belsen received some factor in their diet not accessible to the Indian prisoners.

Diarrhoea.—It has generally been believed that starvation is invariably accompanied by a failure of absorption from the gastro-intestinal tract. All the reports of the conditions in Belsen have stressed the prevalence of diarrhoea (e.g., Collis 1945, Lipscomb 1945, Vaughan et al. 1945, Mollison 1946). Diarrhoea was also common in Lamsdorf (Edge 1945), in Auschwitz (Adelsberger 1946), and in Western Holland (Burger et al. 1945). The point we wish to emphasise is that, in Indian troops at any rate, diarrhoea and the accompanying defects of absorption are not necessarily part of the starvation syndrome. These prisoners were suffering from undoubted starvation, and many of them from extreme protein deficiency. Diarrhoea, when it occurred, was usually accompanied by other signs of nicotinic-acid deficiency, though, from the recent observations of Carruthers (1946) and Spies (1946), folic acid may also be implicated. We therefore regard "starvation diarrhoea" as a misleading term, for the diarrhoea is not the result of starvation per se. In fact, in patients susceptible to diarrhoea, an increase in the dietary intake often aggravates the diarrhoea.

"Captive Cord Syndrome" and "Captive Amblyopia."—Neuropathies such as those seen in the Far East were almost unknown in Europe. It seems likely that both "captive cord syndrome" and "captive amblyopia" have a similar underlying pathology. Though the long tracts of the cord and the optic pathway are the parts of the nervous system most frequently involved, we have, in common with others, also observed nerve deafness and paresis of the vocal cords in a smaller number of patients.

"Captive cord syndrome" and "captive amblyopia" were often seen in the same patient, and, together or separately, these conditions have been seen in either the absence or the presence of gross wasting, macrocytic anæmia, nicotinic-acid deficiency, or hyporiboflavinosis. Superficially it seems that the condition is a vitamin deficiency, and deficiencies of vitamin A, vitamin B₁, riboflavine, nicotinic acid, pantothenic acid, and folic acid have been mentioned as possible causes. The results of therapeutic trials have been disappointing. In many cases the patients improved on a high-vitamin high-calorie high-protein diet, but in others little progress was made. Clarke and Sneddon (1946a and b) suggest that the condition is due to a toxin or anti-vitamin. Kirman (1946) suggests that the optic signs are due to a toxic factor, and Goldsmith (1946) that there is "some toxicosis due to lack of good proteins or to certain low-grade proteins." As suggested by Spillane (1945), the condition appears to be similar to that which developed in German prisoners in a Middle East camp and described by Spillane and Scott (1945).

Summary

Clinical and laboratory findings based on a study of 2000 Indian prisoners liberated from Japanese prison camps are outlined.

These findings are discussed in relation to similar findings in European prison camps. The prisoners from the Far East differed from those in Europe in three main respects: the anaemia was macrocytic rather than normocytic; the incidence of diarrhoea was much less; the incidence of the neuropathies, called in India "captivity cord syndrome" and "captivity amblyopia," was very much greater.

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AMYLOID MACROGLOSSIA

REPORT OF A CASE

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The association of macroglossia with amyloidosis is an extreme rarity, only 3 cases having been published in the medical literature of this country, 1 by Parkes Weber et al. (1937), who also summarised 10 cases reported from other countries, and 2 by Barnard et al. (1938). The features of the present case are remarkably similar to those previously described.

CASE-RECORD

A night watchman, aged 63, was admitted with a history of six weeks' dysphagia, the difficulty in swallowing being

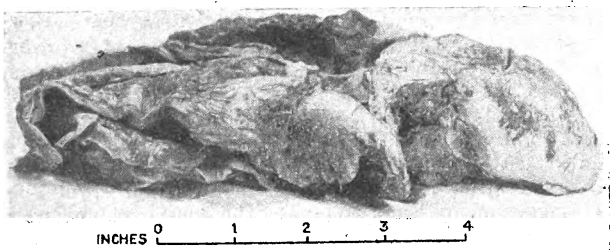


Fig. 1—Tongue, with oesophagus laid open, in amyloid macroglossia.

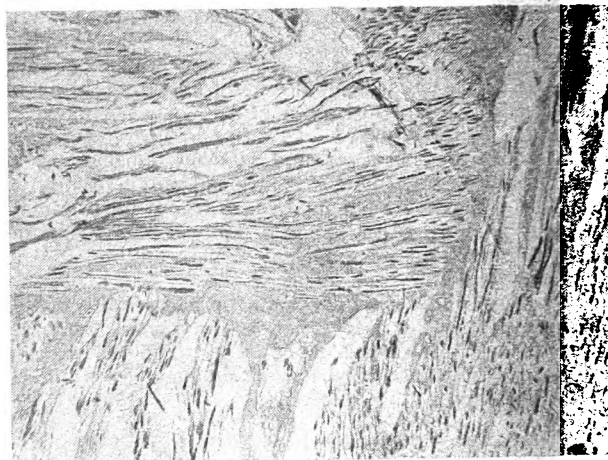


Fig. 3—Section of deeper layer of tongue showing muscle bundles degenerating and amyloid deposited interstitially. (×20.)

greater for solid than for liquid food, and giving an impression of food lodging in the throat. There was no pain. He had had weakness, dyspnoea on exertion, and a moderate loss of weight for about six months, increasing latterly. He had had painless blisters on the tongue for six months and thought his voice had altered in recent weeks. His appetite was good, but he could not take enough food to satisfy it. Digestion, bowel action, and micturition were normal. Apart from a little swelling of the feet, which had been present for several years, and an injury to the spine four years previously, the past history was uneventful. Radiography of the spine, done at another hospital six weeks before the present admission, showed only senile osteoporosis of the vertebrae. His family history shed no light on his condition.

Physical examination showed a pale wasted dehydrated man. His speech was thick and indistinct, but his voice was not hoarse. He was edentulous. His tongue was enlarged in all dimensions but did not fill the mouth completely. It was strikingly immobile, furred, and dry, and felt uniformly hard. No ulcer was seen, but there were oedematous folds in the sublingual region, which became hæmorrhagic when palpated. There were also several firm plaques underlying vesicular lesions in the buccal mucosa.

The submaxillary glands were slightly enlarged but not hard, and there were several palpable glands of the same consistence in both anterior triangles of the neck. The sternomastoid muscles felt curiously indurated, but movements of the neck were not appreciably limited. The heart and lungs appeared normal, and the blood-pressure was 110 mm. systolic, 70 mm. diastolic, pulse-rate 80. The liver and spleen were not felt, and the only additional abnormal physical signs were slight pitting oedema of one foot and rigidity and kyphosis of the lumbar spine.

Laryngoscopy showed an oedematous type of swelling in the subglottic region, but no ulceration. A blood-count revealed a mild degree of anaemia: Hb 78%, red cells 4,290,000, colour-index 0.95. White cells 5200, and film normal. The urine contained a great deal of albumin and a few hyaline and cellular casts. His blood-urea was 37 mg. per 100 c.cm.; Wassermann reaction negative. Radiography of the chest showed senile changes only.

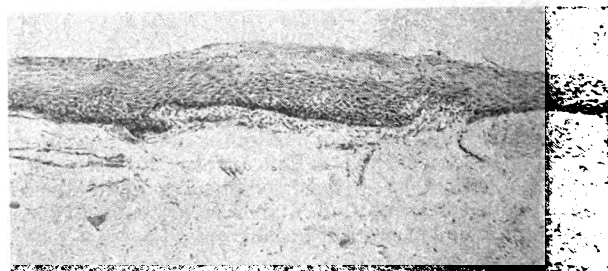


Fig. 2—Section of superficial portion of tongue showing amyloid deposit. Muscle-fibres are absent. (×40.)



Fig. 4—Section of heart muscle showing amyloid deposits. (× 20.)

A diagnosis of amyloidosis of the tongue was considered, but it was felt that a search should be made to exclude a primary new growth. A barium swallow suggested a filling defect in the upper end of the œsophagus, and for this reason œsophagoscopy was attempted. Difficulty was experienced in inserting the œsophagoscope, and a general anæsthetic was given. The attempt was still unsuccessful, owing to rigidity of the tissues, and had to be abandoned. Unfortunately the patient's condition deteriorated, his blood-pressure fell, and he died four hours later without having recovered consciousness.

Necropsy revealed coronary thrombosis as the immediate cause of death. The coronary arteries showed slight atheroma

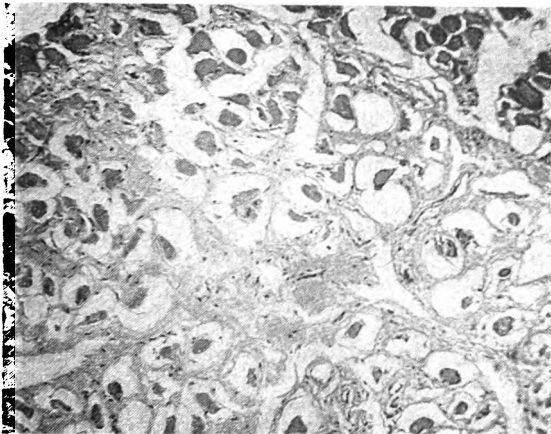


Fig. 6—Section of sternomastoid muscle showing amyloid deposits and atrophic muscle-fibres. (× 88.)

but were not grossly abnormal. The heart was small, pale, and flabby. The tongue was firm, its cut surface pale, and the muscle bundles were not visible. The whole tongue appeared to consist of pale homogeneous tissue, the cut surface of which, when stained with iodine, gave the mahogany colour typical of amyloid disease. The œsophageal wall was thickened in its entire length, being $\frac{1}{3}$ in. thick in the upper third and slightly less at the cardia. The œsophagus formed a rigid tube, and its cut surface gave the same reaction with iodine. The other organs were not remarkable, except that the gall-bladder contained "mixed" stones and inspissated pus. The liver, spleen, and kidneys appeared normal macroscopically.

Material was taken for histological section from the tongue, œsophagus, buccal mucosa, sternomastoid, heart, liver, spleen, and kidney. The tongue, œsophagus, buccal mucosa, sternomastoid, and heart showed typical amyloid tissue, staining well with methyl violet. Apart from a few deposits of amyloid material in the glomerular tufts of the kidney, the liver, spleen, and kidney were normal. Atrophy of muscle-fibres and deposition of amyloid material in the interstitial tissues

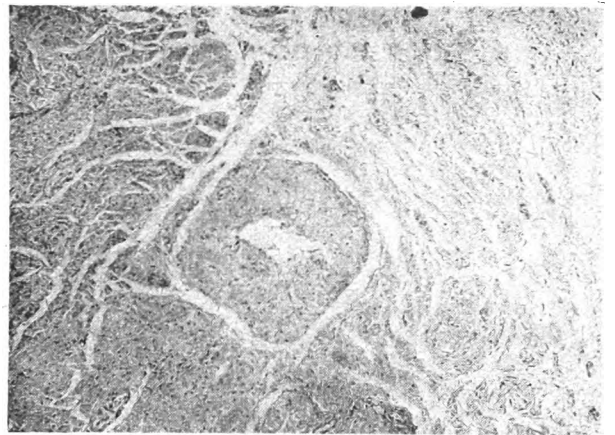


Fig. 5—Section of œsophagus showing deep layer of mucosa on left, small vessel affected by amyloid, and replacement of muscle coat by amyloid. (× 40.)

of muscular organs are illustrated in the accompanying photomicrographs. It can scarcely be doubted that this feature of the heart muscle was responsible for the low blood-pressure, which, aggravated by the administration of a general anæsthetic, led to coronary thrombosis and death. The degree of atheroma of the coronary arteries was small, and they appeared normal otherwise. Unfortunately the vessels were not sectioned.

DISCUSSION

Amyloidosis with macroglossia appears to be a different condition from the classical form of amyloid disease due to protracted suppuration, tuberculosis, syphilis, Hodgkin's disease, &c. Unlike the latter, the amyloidosis has no predilection for liver, spleen, kidneys, and intestinal mucosa. On the contrary, these sites are completely spared or only slightly affected, and the main deposits are found in the tongue, skeletal muscles, and heart. Sometimes the skin, lungs, and upper intestinal tract are involved also. None of the acknowledged causes of amyloid disease has been observed in these cases of so-called atypical amyloidosis. In the case described the presence of pus in the gall-bladder is not likely to be relevant, since this is a fairly common lesion not recognised as associated with amyloidosis.

Unfortunately this case throws no light on the obscure ætiology of the condition.

I am indebted to Prof. W. G. Barnard and Dr. Evan Jones for suggestions and help, and to Dr. T. K. Owen for the microscopical sections.

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"Two obvious steps must . . . be taken if any real progress is to be made in improving the dental health of the nation. One is that we must increase the student output of the existing dental schools and perhaps build new ones. The other is to decide how a very considerable proportion of the new entry to the profession can be attracted to the school service."
—Dr. E. W. FISH, in the Founders and Benefactors' lecture, Sutherland Dental School, Newcastle-upon-Tyne, Oct. 7, 1946. (*Brit. dent. J.* Jan. 17, p. 35.)

"Ideals may not, and usually do not, make for security or immediate advancement—often indeed, they have an opposite effect—but in spite of what the realists may say to the contrary, ideals are not illusions, and without them life is a poor thing. They may be elusive, but to those who keep them they are over and over again the 'flaming realities' of Keats. Even if they do bring to practitioners who try to live up to them some material loss, they bring at the same time something which is infinitely worth while—independence and freedom of thought and action. And these are priceless possessions."—"Ex-editor," *Manchr med. Sch. Gaz.* 1946, 26, 56.

PRODUCTION OF SUBSTANCE B BY CORYNEBACTERIUM DIPHTHERIÆ

IN RELATION TO TYPE OF STRAIN AND SEVERITY OF
TOXÆMIA

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It has been shown by one of us (O'Meara 1940) that diphtheria toxin formed by the diphtheria bacillus has two components, provisionally called substance A and substance B, which act together in the production of the clinical picture of diphtheria.

Substance A is the guineapig lethal factor and is formed in relatively minute amounts by the bacillus in all cases of clinical diphtheria, though it is formed in superabundance by the Park Williams no. 8 strain used in the preparation of laboratory toxin.

Substance B acts in conjunction with substance A. Though not appreciably toxic itself, by spreading substance A through and into the tissues it causes, when present in sufficient quantities together with minute amounts of substance A, a type of hypertoxic diphtheria in human subjects and in experimental animals, such as the guineapig. The special characteristics of this form of diphtheria are local œdema and necrosis, cardiac failure, wasting and paralysis, and sometimes hæmorrhage into the skin and mucosæ. Clinical hypertoxic diphtheria, moreover, does not respond to treatment with modern commercial antitoxin, even when administered early in very large doses; the toxæmia persists, and the membrane does not coagulate and separate in the normal fashion after treatment with antitoxin.

In the work done in 1939, showing the existence of substance B in diphtheria toxin and its importance, it was demonstrated that the avidity of diphtheria antitoxin depended on its power of neutralising substance B. It was also predicted that, for the successful treatment of hypertoxic diphtheria, none but the most avid antitoxins would be of use. Some avid antitoxin was prepared under an agreement which gave to a firm engaged in the manufacture of antitoxin the advantage of a year's knowledge of the work before its publication, in return for antitoxin to be tested clinically in Dublin (O'Meara 1943, 1946). The results of the clinical trials (McSweeney 1941) fully justified the prediction that avid antitoxin would provide the answer to hypertoxic diphtheria.

It was later shown that avid antitoxins could be prepared by immunising animals with antigens rich in substance B, and that a relation existed between the production of substance B by strains of the diphtheria bacillus and the clinical severity of diphtheria caused by them. O'Meara et al. (1946) discussed the methods of producing avid antitoxin of high dilution ratio and demonstrated its production in the serum of animals inoculated with antigens rich in substance B. The antigens used corresponded in general character to those used by the pioneers of antitoxin production who obtained therapeutic sera effective in small doses against the toxæmia of diphtheria (O'Meara 1939, 1941).

Schmidt (1946) has confirmed the production of substance B by freshly isolated diphtheria bacilli and noted the rapid disappearance of the power of producing it when the organisms are subcultured on laboratory media, an observation with which we have been familiar for some years. We find, however, that the decline in activity of the strains, though very rapid at first, is not absolute. Substance B continues to be produced in smaller quantities for a very long time, and it is doubtful

if the property is ever completely lost. Nevertheless, it is essential, when studying the production of substance B by the diphtheria bacillus, to use strains which have been subcultured as little as possible after isolation.

In the experiments described below, two series of 50 strains of *C. diphtheriæ* were studied. One of us (R. S. W. B.) was particularly associated with the study of the first series of strains, and another (H. H. B.) with the second series. In both series, to estimate substance B, we have used its property of spreading. When the first series was being studied, the importance of freshness of strains was not fully appreciated. Further, some guineapigs with dark skins, making readings difficult, had to be used for the estimations, as other animals were not available. In consequence the values for spread in the first series are lower; on the average, for all types of the organism than in the second series. If circumstances permitted very rapid work, values even higher than those of the second series would probably be obtained.

PROCEDURE

The strains studied were isolated from swabs sent to the laboratory for routine diagnosis by hospitals and private practitioners. There was no special selection of strains, and no inquiry was made about the type of case from which they were taken, until all the examinations in each series had been completed. After isolation, the organisms were typed, the criteria used being colony form on chocolate-tellurite-agar similar to, but not identical with, that of Anderson et al. (1931), and starch fermentation. When typing had been completed, the organisms, taken from 24-hour slope cultures on Löffler's medium, were emulsified in sterile heated rabbit serum. The emulsions were dried in vacuo in sterile glass tubes which were subsequently sealed and stored until required.

To measure the production of substance B the strains were inoculated into broth from the desiccated growth and incubated for five days at 37° C. The cultures were then well centrifuged to remove all organisms, and 0.2 c.c.m. of the supernatant fluid was injected intradermally into guineapigs. Eight strains were tested at a time on each guineapig. The animals weighed about 350 g. and were, so far as possible, white-skinned. Many strains were also tested by emulsifying the growth from Löffler slopes in saline in the manner originally described (O'Meara 1940). For the purposes of the present work, broth cultures were found more convenient.

In reading the results of the inoculations, diameters of the weals were measured with fine-pointed callipers 30 min. after the injection. It was found in numerous tests that 0.2 c.c.m. of uninoculated broth injected intradermally gave a weal 14 mm. in diameter. This weal did not tend to spread but, after persisting some hours, was absorbed. In recording results of spread a deduction of 14 mm. has therefore been made from all readings to obtain the true figure for spread due to the presence of substance B in the supernatant fluid.

When the types of all organisms in each series and their production of substance B had been investigated, inquiry was made concerning the cases from which they had come; and the findings in the laboratory were correlated with the clinical findings.

RESULTS

Series I.—In this series the organisms were of the types shown below. The atypical strains corresponded to type 4 of Wright and Christison (1935), giving daisy-head colonies but not fermenting starch. The production of substance B is given by the spread in mm. read 30 min. after injection.

Type	No. of strains	Maximum	Amount of spread Minimum	Average
Gravis	.. 23	.. 13 mm.	.. 3 mm.	.. 5.7 mm.
Intermedius	.. 13	.. 9 mm.	.. 1 mm.	.. 5.1 mm.
Mitis	.. 8	.. 6 mm.	.. 4 mm.	.. 4.6 mm.
Atypical	.. 6	.. 9 mm.	.. 2 mm.	.. 6.0 mm.

Total

50

The greatest single spread was given by a gravis strain. The greatest average spread was given by the few atypical strains examined. The average spread of gravis strains was close to that of the atypical strains, and the lowest average was that of the mitis strains.

The clinical histories of 47 cases in this series could be divided into two groups: (1) 11 had been artificially immunised some months or years previously; and (2) the 36 others had not been artificially immunised, or had been immunised too recently to be included in the immunised. The strains causing diphtheria in the immunised were 4 gravis, 4 intermedius, 2 atypical, and 1 mitis. The average spread given by these strains was 6.1 mm., slightly more than the greatest average for any type.

The non-immunised group were classified as mild, moderate, and severe cases according to the following standards:

Mild: faucial or nasal diphtheria with no toxic signs or complications.

Moderate: diphtheria accompanied by slight paralysis, acetonuria or albuminuria, or slight cardiac paresis, with no other signs of toxæmia.

Severe: toxic, hypertoxic, and fatal cases; including cases with bull neck, paralysis, and other complications, such as heart-failure and hemorrhages.

Of the 36 cases in this group 17 were classed as mild, caused by 7 gravis, 3 intermedius, 5 mitis, and 2 atypical strains, the average spread given by the organisms in this group being 5.8 mm.; 5 cases, caused by 2 gravis, 1 intermedius, and 2 atypical strains, were classed as moderate, the average spread being 4.2 mm.; and 14 cases, caused by 10 gravis, 3 intermedius, and 1 mitis strains, were classed as severe, the average spread being 5.1 mm.

In this series, therefore, a clear relationship does not appear to exist between production of substance B and severity of diphtheria. On the other hand, the discrepancy occurs mainly in the group of cases classed as mild. The mildness of a case may depend just as much on the natural immunity of the patient as on the virulence of the causal organism. That the resistance of the patients in this group was high is suggested by the high proportion of gravis strains. The average spread caused by these gravis strains was 6.6 mm., which contributed substantially to the high average recorded for all strains in the group.

Series II.—In this series the organisms were of the types shown below. The atypical strains were similar to those of the first series. The production of substance B was given by the spread in mm. read 30 min. after injection.

Type	No. of strains	Amount of spread		Average
		Maximum	Minimum	
Gravis	15	11 mm.	4 mm.	7.86 mm.
Intermedius	8	8 mm.	6 mm.	6.87 mm.
Mitis	8	9 mm.	3 mm.	6.25 mm.
Atypical	19	10 mm.	4 mm.	6.84 mm.
Total	50			

As in series I, the greatest individual spread was given by gravis strains, 3 of which gave a reading of 11 mm. The greatest average spread was also given by the gravis strains. The lowest average spread was given, as in series I, by mitis strains. Intermedius and atypical strains, which were more numerous in this series, ranked close together between the extremes of gravis and mitis.

The clinical histories of 44 of the cases were dealt with in the same manner as in series I. Of the 44 cases, 17 were in persons artificially immunised. The strains responsible were 9 gravis, 2 intermedius, 2 mitis, and 4 atypical. The average spread given by these strains was 7.1 mm., a figure which is second only to the average for the gravis strains.

Of the 27 cases in the non-immunised, 11, caused by 2 intermedius, 3 mitis, and 6 atypical strains, were classed as mild, the average spread given by the organisms being 5.9 mm.; 10 cases, caused by 3 gravis, 1 inter-

medius, 1 mitis, and 5 atypical strains, were classed as moderate, the average spread being 6.9 mm.; and 6 cases, caused by 1 gravis, 1 intermedius, 1 mitis, and 3 atypical strains, were classed as severe, the average spread being 8.1 mm.

In this series of cases a relationship is therefore suggested between severity of case and production of substance B by the causal organisms. The average spread given by the organisms causing the severe cases was above the average for any single type. The average spread given by the organisms causing the mild cases was below the average for any single type. It is noteworthy that among the organisms causing mild diphtheria there were no gravis strains, and in this respect the mild cases in series II differed from those in series I.

DISCUSSION

From the foregoing experiments it is apparent that substance B is produced by virtually all diphtheria bacilli which cause clinical infection. Accurate assessment of the amounts of substance B produced by strains is rendered difficult by the fact that the property of forming this important constituent of diphtheria toxin declines rapidly on subculture in the laboratory after isolation. In spite of the inaccuracies which are an inevitable consequence of such decline, it has been shown, by the study of the organisms isolated from 100 cases, that, on the average, gravis strains form most substance B, and mitis strains least. Intermedius and atypical strains lie between. The greatest individual formation of substance B is by gravis strains.

There is a strong suggestion, in the results of both series of cases studied, that diphtheria in the immunised is caused by organisms which are active producers of substance B.

In 50 cases in series I no relationship was apparent between production of substance B and severity of toxæmia. It may, however, be reasonably suggested that the absence of relationship was due in part to a high resistance to the toxæmia of diphtheria on the part of the patients in the mild group of cases, because the proportion of gravis strains causing diphtheria in the group was unduly high. In the 50 cases in series II a relationship between production of substance B by the causal organisms and the severity or mildness of the cases is suggested. It was found that the severe cases were caused by organisms which produced, on the average, more substance B, and the mild cases were caused by organisms which produced, on the average, less substance B. Cases of moderate severity were caused by organisms intermediate in their capacity to produce substance B.

SUMMARY

The Dublin work on the composition of diphtheria toxin and antitoxin and on the nature of hypertoxic diphtheria is briefly summarised to date.

The production of substance B by 100 strains of *C. diphtheria* is studied in relation to type of strain, severity of case, and the development of diphtheria in the artificially immunised.

We are indebted to the Medical Research Council of Ireland for a grant for expenses, and to numerous clinicians who kindly supplied details of their cases. One of us (H. H. B.) was in receipt of a grant from the Sarah Purser Medical Research Fund.

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BILATERAL URETEROCOLOSTOMY

A REVIEW OF 17 CASES

A. C. LOVETT-CAMPBELL
L.R.C.P. & S.

UNTREATED vesicovaginal fistula causes protracted suffering among West African women. Too often the afflicted become uncared-for social outcasts. Years may pass before treatment is sought, apathy and fear contributing to delay.

Late cure by local repair is rendered difficult by the large size and indurated edges of the fistulæ, and may have to be abandoned for the more formidable procedure of ureter implantation. The work of Hayes,¹ in India, who cured 76 out of 85 cases by local repair, demonstrates the excellent results achieved by an experienced operator.

In certain localities of West Africa, the difficulties of local repair are increased by chronic vesical bilharziasis. In areas where bilharzia is hyperendemic, bladders are seen so densely infiltrated and fibrosed from long-standing bilharziasis that they no longer contract. In such cases, even if the fistula is satisfactorily repaired, the thickened fibrosed bladder remains a passive receptacle incapable of emptying, the urine stagnates and decomposes, and the repaired fistula breaks down again. Further, the bladder muscles are so disorganised that they cannot recover their normal structure. Therefore cure by local repair has to be abandoned, and implantation of both ureters within the large bowel offers the only hope of permanent relief. Misgivings that patients having to undergo this admittedly drastic procedure may emerge resentful victims of a physiological impertinence, are dispelled when later one contrasts their well-being after operation with their previous miserable existence.

Success in operating on neglected cases depends on a simple yet reliable technique. Newcomers to the tropics, working in isolated localities, may hesitate to attempt an operation to which textbooks devote so much insistence on instrumentation with catheters and other mechanical aids to uresis during and after operation. Every young surgeon working in the tropics should familiarise himself with the admirable technique followed by Grey Turner,² who emphasises that a gentle dexterity ensures a quietude of convalescence unattainable by more elaborate time-consuming methods.

Using a similar technique I have performed, since 1936, 17 bilateral ureterocolostomies in 13 females and 4 males, aged between 22 and 58. There were 2 deaths, both in young women. Of the women who recovered, 2 subsequently bore children without mishap and were seen in good health three and five years later. A close follow-up of most of the patients was impossible after three years, but all were seen up to eighteen months after operation.

The first death after operation was due to general peritonitis following accidental spill from a colon distended with an enema, inadvertently given in the ward immediately before operation.

The second death was due to diffuse cirrhosis of the liver, discovered post mortem. It is important in the tropics to be mindful, before operation on these cases, of possible hepatic insufficiency, no less than of renal impairment. These debilitated subjects have for years suffered from the effects of protein deprivation. Hepatic cirrhosis, frequent among young people in the tropics, is mainly confined to the large pauper class into which these fistulous cases submerge. Their fall in the social scale adversely affects their diet which becomes inadequate in factors protective to the liver. A patient with a

liver unable to detoxicate is scarcely a good surgical risk. Yet the threat of postoperative "liver death," though not unfamiliar, may be overlooked as a contra-indication to surgery in these cases, in face of more immediate considerations in a preoperative assessment of the patient. Further, the rapid decline and death after operation of a patient in this manner, following bilateral implantation of ureters, may, if not clinically recognised as such, be mistakenly attributed to renal failure.

PREOPERATIVE MANAGEMENT

An erythrocyte-count less than 3,000,000 and Hb lower than 55% are unfavourable indications requiring correction. Eradication of heavy helminthic infestations will substantially contribute to improvement. In localities of Northern Nigeria, schistosomiasis and ankylostomiasis are hyperendemic. Prompt and thorough treatment to get rid of the parasites, followed by iron and liver therapy and a generous diet, raises the blood-count satisfactorily. The blood-pressure of these asthenic cases is similarly improved by such measures.

A preoperative course of sulphonamides is given as a routine. Attention to excoriated skin surfaces improves morale. Patients are encouraged to walk about and maintain muscular tone. Cheerful nurses and companions, and visits by ex-patients successfully operated on, help to restore broken spirits. On an average twelve days' preoperative stay in hospital is about the desirable limit, as many patients become fretful at longer delay. Few have any idea of the nature of their coming operation.

ANÆSTHESIA

Sedation with morphine gr. $\frac{1}{6}$ or gr. $\frac{1}{4}$ on the morning of operation ensures the necessary mental tranquillity. 'Nupercaine' 10 c.cm. given intrathecally provides durable muscular relaxation throughout the operation. In nervous cases spinal anaesthesia is supplemented with 2 or 3 c.cm. of intravenous 'Cyclonal sodium.' The ensuing sleep usually continues for three hours after the patient's return to the ward. Inhalations of CO₂ at intervals maintain respiratory vigour and help to counter the inevitable fall of blood-pressure.

OPERATION

I do not intend to give a detailed account of the operation but wish to accentuate certain procedures on which its successful outcome greatly depends.

A right subumbilical paramedian incision is favoured. As a rule it is convenient to expose the right ureter first, through a 1½-in. incision in the covering peritoneum. Careful hæmostasis in freeing the ureter from its bed, and the removal of clot within this bed before closure, are important. The freed ureter should be abundantly cuffed with areolar tissue. A "cleaned" bared ureter should be viewed with misgiving.

After the ureter has been divided as near the bladder as possible, the proximal portion is folded back and protected with gauze. Its extremity may be secured with a small mosquito forceps. There is no necessity, after dividing the ureter, to ligate its distal cut end, as a fistulous bladder has ceased to be a reservoir.

The size and mobility of the pelvic colon, and its position relative to the course of both ureters, should be observed before selecting the site of implantation. With the free ureter tentatively approximated to a likely site, the colon, grasped in the left hand, is swung from side to side through the arc of a circle, while the ureter—its extremity secured with forceps held in the right hand—is made to follow each excursion. Next, the colon is moved upwards and downwards on its axis, to test its range of mobility in each of these directions. If, throughout all manipulations, the ureter maintains satisfactory approximation without pronounced angulation or undue tension, the site chosen can be regarded

1. Hayes, S. N. *Surq. Gynec. Obstet.* 1945, 81, 346.

2. Turner, G. G. *Brit. med. J.* 1943, ii, 535.

as suitable. What constitutes dangerous angulation in the eyes of one operator may not be considered so by another; therefore any dogmatic pronouncement on the point is out of place here. Experience alone will decide.

A likely site for implantation of the opposite ureter should also be gauged, particularly when exposure may have to be delayed till a second operation. The point of entry of the second ureter need not necessarily be at the same level. Implantation close to the mesenteric border should be avoided, because of the profuse bleeding likely to arise in this situation.

When the site of implantation has been decided on, an incision 1 in. long is made in the colon to a depth that exposes the mucosa. At this point, after the mucosa has been nicked open at the distal end of the incision, the ureter is straightway inserted and anchored within the bowel. The edges of the gutter in which it lies are united to form a roof over it. A safer alternative, while sacrificing very little time, is first to secure the ureter to the proximal end of its gutter with an anchoring stitch (fig. 1). The mucosa is now opened and the free end of the ureter inserted within the bowel. The anchoring suture ensures that there is at least an inch of ureter on which the backward pull of its whole length is no longer exerted. The security thus afforded allows the ureter to be inserted unhurriedly into the bowel without backward tension. There is also time and freedom to correct, or modify, an unsatisfactory insertion, with no risk of the ureter retracting during the process.

The second suture, which carries the distal end of the ureter to its anchorage within the bowel, should transfix the ureteral coat at no greater distance than 1 mm. from its extremity (fig. 2). A longer projection of lax ureter beyond its point of fixture within the bowel incurs the risk of kinking (fig. 3). A lax unsupported extremity more than 1 mm. long cannot maintain alignment and will either angulate passively or be pressed on by mucous folds. This suture will endure until at least five days later, constituting a fulcrum or hinge beyond which any appreciable length of unsupported ureter tends to undergo acute flexion.

If, therefore, during the five days following operation urinary suppression should arise from this purely mechanical cause, the futility of giving intra-

venous sulphate to induce uresis is at once apparent. The cause being mechanical, chemical fluids provide no remedy. Appreciation of how such a mechanical accident arises should lead to its avoidance. This by no means discountenances the use of intravenous fluids when rationally evoked.

After implantation the exposed ureters should be peritonised in the manner fully described in textbooks on the subject. A few c.cm. of 'Soluseptasine' is sprayed on the area of implantation. If the ureters have been inserted deftly and cleanly, the abdomen is closed without drainage.

POSTOPERATIVE CARE

These patients should be nursed in modern surgical beds.

Colonic gaseous distension is usually a troublesome sequel which, if not promptly relieved, may lead to urinary suppression. When suppression arises in this manner, its mechanical nature should be appreciated and treated, before blindly resorting to intravenous sodium sulphate in an endeavour to promote uresis. Severe

distension raises the intramural pressure of the colon sufficiently to compress the ureters in the course of their mucomuscular tunnels. The timely insertion of a rectal tube, or even digital dilatation of the sphincter ani, will often suffice to expel the accumulated gas and relax the colon. Intramuscular 'Pituitrin' considerably aids expulsion. With the riddance of gas, urine, for the first time usually intermixed with blood, is often seen trickling through and around the tube.

The colon, then, must be prevented from becoming a taut gaseous cylinder, hindering the function of kidneys and ureters. After forty-eight hours a rectal saline washout is given by an experienced nurse. In its hasty or clumsy administration lies a real danger, from too sudden distension of the colon imposing excessive strain at the points of inosculation of the ureters.

The general discomfort of patients a waking from operation is in great measure due to immobility. The thoughtful shifting of their dead weight does much to restore restfulness. Passive movements of trunk and limbs also decrease the risk of postoperative thrombosis and pulmonary embolism. As a further precaution against this complication, patients are instructed to take deep respirations whenever they wake.

As excessive fluids encourage gaseous distension, small dry meals are allowed after forty-eight hours.

Manifest distress should unhesitatingly be relieved with morphine.

URETEROCOLOSTOMY IN MALES

Ureterocolostomy in males (apart from boys with ectopia vesicæ) is undertaken because of advanced urinary schistosomiasis, which often leads to multiple perineal fistulæ and "watering-can scrotum." A fibrotic bladder and disorganised urethra, complicated by longstanding gonorrhœal stricture, seriously interferes with normal sphincter control. Cystoscopy, when possible in these cases, reveals that the ureteral orifices too are often stenosed beyond the stage when sodium antimony tartrate is effectual.

ILLUSTRATIVE CASES

CASE 1.—A young man, aged 24, had been treated with nearsphenamine in the outpatient department for a syphilitic penile ulcer. Kahn reaction +. As there was no satisfactory response he was admitted to hospital. Schistosome ova were found in the urine, and a course of 'Anthiomaline' was given. Later the neoplastic character of the ulcer was noted, and a section of its tissue was reported on as a squamous carcinoma of low-grade malignancy with little probability of metastases.

Laparotomy was nevertheless undertaken to investigate the bladder, which was found characteristically fibrosed and contracted, with its peritoneum studded with confluent bilharzial nodules. The appendix, which also was involved in this heavy hematobium infestation, was removed, and bilateral ureterocolostomy was done. After closure of the abdomen the penis was amputated.

Convalescence was smooth, the patient being up fourteen days after operation. There was little postoperative disturbance of pulse and temperature.

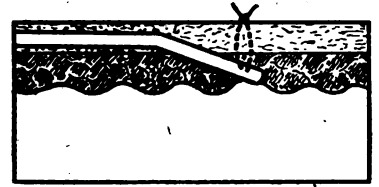


Fig. 2—Stitch anchoring ureter to distal end of gutter in bowel, only 1 mm. of ureter being allowed to project into lumen.

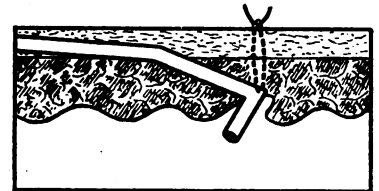


Fig. 3—Kinking of ureter due to too long a length being allowed to project into lumen of bowel.

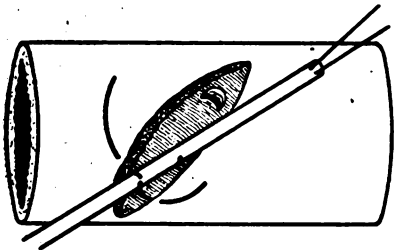


Fig. 1—Stitch anchoring ureter to proximal end of gutter in bowel.

CASE 2.—An ex-soldier, aged 58, had a sloughing scrotum, distortion of the penis, and complete urethral blockage. Multiple perineal fistulae had formed, through which urine constantly leaked. His general condition was poor.

Preliminary suprapubic cystotomy was carried out, with subsequent bilateral ureterocolostomy in two stages at twelve days' interval. Recovery was uneventful, except for some difficulty, at first, in rectal control, which later improved.

SUMMARY

A series of 17 bilateral ureterocolostomies is reviewed. There were 2 deaths.

Preoperative management is discussed; points regarded as most important in operative procedure are emphasised, and a method is described of inserting the ureters with the least possible danger of subsequent blockage.

Postoperative care is discussed.

Indications for ureterocolostomy in males are illustrated by citation of 2 of the 4 male cases operated on.

AN OUTBREAK OF WEIL'S DISEASE

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BETWEEN November, 1944, and June, 1945, thirteen cases of Weil's disease were admitted to a military hospital on the Isle of Wight. In nine of the cases the diagnosis was definitely established, and four were diagnosed presumptively. All but one of the patients were Free French Naval personnel stationed at the F.F.N. Chasseur Base, Cowes, I.o.W. These ratings lived on their chasseur's under unhygienic conditions and in contact with rats. The one exception was a British gunner (a proved case) who formed part of a detachment at Newport, I.o.W. The first case occurred in November, 1944, and this was followed by three cases in December, 1944, three in April, and six in June, 1945. The clinical picture in this outbreak differed materially from the textbook descriptions.

CLINICAL PICTURE

Onset.—In every case the illness began suddenly with severe pains in the abdomen, back, and thighs. The abdominal pain was mainly felt in the right hypochondrium and epigastric region in all except one case in which it was maximal in the right iliac fossa. The pain was accompanied by nausea, violent vomiting, and retching. On admission the patients appeared anxiously ill and toxic, and all showed well-marked suffusion of the conjunctiva and a dry coated tongue with much sordes in the mouth and around the teeth. During the acute phase of the illness there was tenderness to a greater or lesser degree over the hepatic region, in the renal angles, and not uncommonly in the thighs.

Uncomplicated Cases.—There were eight uncomplicated cases, five of which were proved and three probable. Of these, five (three proved and two probable) were gravely ill and were admitted to hospital within 12 hours of the onset. The rest (two proved and one probable) were not so severe, and as a result did not reach hospital until the second day of the illness. In all cases icterus was present on admission and was apparently maximal at that time, for it began to fade almost immediately, disappearing within 6 days on an average. The fever (in the region of 101.4° F on admission) fell by lysis slowly over a period of 6 days, and rarely amounted to anything more than peaking to 99° F after the third day in hospital. The acute symptoms lasted only 24–48 hours, after which the patients felt relatively well. Labial herpes was encountered in one case, and another had a subconjunctival hæmorrhage.

Albuminuria and oliguria were well-marked features. The oliguria persisted for only 3–5 days, and there was no associated hypertension. The albuminuria cleared

up slowly over a fortnight, and, apart from traces of bile and granular casts on admission and for a day or two thereafter, there were no other significant urinary changes.

The leucocyte-count varied considerably. In three of the proved cases the counts were 5800, 5800, and 7950 per c.mm. (average figures of repeated counts), while in the remainder they were 11,000–12,000 per c.mm. The highest icteric index observed was 50, with a serum-bilirubin level of 9.0 mg. per 100 c.cm. The diagnosis was established by the agglutination reaction.

Five of the patients were given 20–40 c.cm. of anti-leptospiral serum, the dose depending on the severity of the initial symptoms; the remainder received no specific treatment. In spite of this the course of the illness was more or less the same in all cases. The average time in hospital was 20.5 days. At the end of this period the most severe cases were sent on 2 weeks' convalescence, the rest returning to duty. Renal-efficiency tests were carried out in all cases before discharge, and none of the patients showed impairment of renal function.

COMPLICATIONS

In five cases the following complications were encountered.

Renal Failure.—Two cases showed evidence of this complication. Both followed the initial course as already outlined, but the oliguria persisted.

The first patient had to be catheterised throughout his illness, and during the first 10 days only small quantities of urine (2–4 oz. daily) were being excreted. Over this period the urine was heavily albuminous and contained granular casts, red-blood cells, and bile. Icterus was present, though not pronounced, for 12 days, and œdema was not obvious until the ninth day of the disease. The leucocyte-count was 15,000 per c.mm. at the onset, rising gradually to 26,000 per c.mm., and a progressive hypochromic anæmia resulted from frequent profuse nose-bleedings from the seventh day onwards. The patient was intermittently drowsy and maniacal, making nursing and intravenous therapy extremely difficult, and latent tetany was manifest about the fifth day. Vomiting persisted until the thirteenth day, and although there was an increase in the volume of urine excreted at this point there was no improvement in the patient's general condition. About this time petechial hæmorrhages and extensive purpuric patches began to appear, the patient became more drowsy and eventually comatose, and he died on the fifteenth day.

Apart from symptomatic treatment, this patient received penicillin 20,000 units 3-hourly intramuscularly from the time of admission and antileptospiral serum 40 c.cm. daily intravenously at the onset, reduced to 20 c.cm. intramuscularly later on. This therapy was continued until death.

The diagnosis was confirmed by positive agglutination reactions, and the findings at necropsy were in keeping with this diagnosis.

The second case showed the same persistent oliguria, only passing 5–8 oz. daily for 8 days. Despite this the patient felt fairly well after the second day, although blood-pressure readings and blood-urea estimations were climbing steadily. On admission the patient had a small patch of herpes on his lower lip and was icteric. The jaundice was present for 7 days. After the first day of illness the temperature was never over 99° F. On the eighth day the patient had a series of eight fits, epileptiform in type but with definite carpopedal spasm, and about this time slight œdema of the eyelids was manifest. There were no fundal changes. The blood-pressure was 200/120 mm. Hg. The blood-urea was 384 mg. and serum-calcium 5.0 mg. per 100 c.cm. The cerebrospinal fluid contained 40 mg. of protein per 100 c.cm., showed no other abnormality, and was not icteric. On the ninth day the fluid intake and urinary output were balanced, and there were no further fits until the tenth day when the patient had a further thirteen fits exactly similar to those already described. By the twelfth day œdema was obvious and generalised despite the polyuria now established; the blood-pressure had fallen to 155/110 mm. Hg and the albuminuria had decreased slightly, but the blood-urea was 480 mg. per 100 c.cm. Thereafter the patient's condition improved steadily, with rapid fall in blood-pressure and a much slower return of blood-urea which on the twenty-third day of the illness was still 120 mg.

per 100 c.cm. The initial leucocyte-count was 11,800 per c.mm., and this figure was maintained throughout the illness.

Treatment, after 40 c.cm. of antileptospiral serum had been given intramuscularly on the day of admission, was entirely symptomatic.

The patient was discharged on the fifty-second day, and by that time there was no evidence of impairment of renal function. He was sent for a long convalescence. The diagnosis was established by agglutination.

Persistent Tremor.—This was found in two cases (one proved and one probable). Both cases ran the usual course except for pronounced drowsiness, profuse constant sweating, and a fine tremor of the outstretched hands and protruded tongue. One of these cases (the proved one) presented as acute appendicitis, but the associated features and the leucocyte-count of 5900 per c.mm. ruled out this diagnosis. These cases made an uneventful recovery on routine treatment, and, apart from a serum reaction in the proved case, there were no skin manifestations. Their drowsiness and sweating cleared up within 5 days, but the tremor persisted into the second week of the illness. Their average stay in hospital was 17 days.

Tonsillitis and Pulmonary Complications.—One patient was admitted with the usual severe symptoms but complaining in addition of a sore throat.

The tonsils were hypertrophied, inflamed, and covered by a fine mucous exudate which gave them a cherry pink colour. The tonsillar lymph-nodes were enlarged and tender. A throat swab (repeated once) revealed no evidence of leptospiræ and there was no leucocytosis at this time. In this case the fever persisted, and the patient, who was very ill, developed bilateral basal consolidation and a fibrinous pericarditis. Antileptospiral serum was administered from the onset in 20 c.cm. doses intramuscularly to a total of 160 c.cm. without any obvious effect. Penicillin (15,000 units intramuscularly 3-hourly to a total of 1,000,000 units) was administered from the onset of the pneumonic processes and produced no detectable alteration in the course of the disease, and no improvement followed an adequate course of sulphathiazole. Sputum culture showed a predominant growth of pneumococci, and leptospiræ were not recovered despite repeated examinations. Empyema subsequently developed on the left side, but after rib-resection and drainage the patient made an uninterupted recovery. Culture of the pus from the pleural cavity confirmed that the infecting organism was a pneumococcus.

From the point of view of jaundice, oliguria, and albuminuria, this case behaved as those already described, and the diagnosis was verified by positive agglutination reactions.

CONCLUSIONS

The course of the illness was mild in the majority of cases.

Fever was a well-marked feature only in the case complicated by pneumonia; in all the other cases it was transitory.

Jaundice was never very deep; it appeared early and never persisted for long.

Renal damage was more evident than hepatic damage, and all the cases which recovered showed no lasting impairment of renal function.

Leucocytosis was not invariable.

I am indebted to Lieut.-Colonel L. F. K. Way, R.A.M.C., late o/c Military Hospital, Isle of Wight, for permission to publish these cases.

"Only 25% of the 2,000,000,000 people of the earth are properly nourished. Only 500,000,000 ever get enough of the proper food. This is not because of natural limitations. We have the scientific knowledge to provide an adequate diet for everyone if the information were properly applied. The false barriers erected by man himself are responsible. The antiquated social systems, ignorance, stupidity, and fear prevent a large percentage of the peoples of the world from enjoying even the most fundamental of the benefits of science."—C. F. KETTERING, retiring president, addressing the American Association for the Advancement of Science, on Dec. 27. (*Science*, 1946, 104, 609.)

Preliminary Communication

METABOLIC STUDY OF BURN CASES

THIS investigation, of which full details will be published elsewhere, had as its principal aim a complete study of the nitrogen balance of burned patients, including the loss of protein in the exudate from the burned area.

Nitrogen Balance.—16 nitrogen balances have been carried out on 7 patients with burns of 6–50% of the body surface. The well-marked tendency for burned patients to go into negative nitrogen balance, as shown by the work of Co Tui and others¹ and Taylor and others,² is confirmed, but it was not as difficult to attain positive nitrogen balance as might have been anticipated. Negative nitrogen balances in our cases seemed to be due to reduction in food intake rather than to an increased loss of nitrogen.

Urine nitrogen was measured in 20 cases, our findings being in agreement with the statement of Cope and co-workers³ that extensive deep burns are not necessarily accompanied by a large loss of nitrogen in the urine.

Exudate nitrogen, measured in 10 cases, made up 2–25% of the total nitrogen output (excluding faeces).

Plasma proteins were usually low. Where serial observations were made, a pronounced fall was seen soon after burning.

Creatinuria.—Creatine was present in the urine of 3 men with burns of 7, 15, and 20% of the body area, but was absent or present only in small amounts in that of 4 others with burns of not more than 2.5% of the body area. However, one young man with 60% burns excreted very little creatine: this was associated with a low excretion of nitrogen, probably due to renal damage.

Proteinuria.—This was generally related to the severity of the burn, being greatest in patients with extensive burns.

Urine and Plasma Chloride.—As a rule the urinary output of chloride was greatly reduced after moderate and severe burning, and this reduction was associated with a fall in the plasma-chloride concentration—a finding which is in agreement with Davidson's⁴ suggestion that the fall in urinary chloride output in burns is due not primarily to kidney change but rather to a lowering of the plasma chloride to below the renal threshold level. In one or two of the cases investigated, however, renal damage probably played a part (cf. McIver⁵).

Reconstituting the dried plasma with saline instead of with distilled water tended to prevent the fall in plasma-chloride concentration.

Blood-sugar.—Blood-sugar levels after burns of various degrees of severity were measured in 11 cases. In 2 cases there was undoubtedly hyperglycæmia, and values in some others were perhaps slightly high though not abnormal.

Collection of Specimens.—Many early results had to be disregarded because examination of the ward records showed that no reliance could be placed on the urine specimens having been accurate 24-hour collections. This trouble was largely due to shortage of trained staff before special nurses were put in charge of this work. The collection of urine, &c., should be supervised by a reliable and responsible person if the laboratory work in metabolic investigations of this sort is not to be vitiated.

It is a pleasure to acknowledge the help received from Dr. Leonard Colebrook, F.R.S., director of the unit, and from Mr. Garfield Thomas, biochemist to the Queen Elizabeth Hospital, Birmingham. Thanks are also due to Sister R. M. Selley and Miss L. Thrussell, the "metabolic nurses." Fuller acknowledgments will be made later.

Medical Research Council Burns Unit,
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J. W. KEYSER
M.Sc. Lond., A.R.I.C.

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2. Taylor, F. H. L., Levenson, S. M., Davidson, C. S., Adams, M. A., MacDonald, H. *Science*, 1943, 97, 423.
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Reviews of Books

The Causation of Appendicitis

A. RENDLE SHORT, M.D., B.S.C., F.R.C.S., professor of surgery, University of Bristol; surgeon, Bristol Royal Infirmary. Bristol: John Wright. Pp. 79. 10s.

In this little book Professor Rendle Short reviews rather briefly the main and more general aspects of this important and complicated subject. A short chapter on the history of appendicitis is interesting but inconclusive owing to inadequate data in medical records before the nineteenth century, and the changing meaning of medical terms. In more recent years, evidence of a striking rise in the number of cases of appendicitis in Great Britain, chiefly between 1895 and 1905, seems to be reliable, and he seeks some possible causative factor before and about this time. He finds a significant change in the national diet—mainly a decrease in the amount of cellulose eaten. This hypothesis is of course not new: he advanced it in 1920. The evidence is not entirely satisfactory, because of the lack of reliable statistics from the less civilised countries; but as far as they go, the facts of national distribution of appendicitis tend to support the hypothesis. The disorder appears to be very rare among those peoples who eat much cellulose (Chinese, Indians, and Africans), though the incidence is high among those same people when they live in the manner of Western civilisation. The Eskimos might be expected to provide a touchstone because they eat so little food with a residue; but unfortunately the small number of Eskimos and their very scattered and inaccessible communities make reliable figures unobtainable. As far as they go they rebut the hypothesis; but apes in captivity and civilised vegetarians are on the author's side.

Though it does not break new ground, this is a useful and interesting contribution to the problem; yet it leaves a feeling that the author has used statistics rather loosely and has not related the general aspects of his subject (particularly diet) sufficiently closely to the detailed facts of pathology.

The Surgery of Repair

Injuries and Burns. (2nd ed.) D. N. MATTHEWS, M.D., M.CHIR. Camb., F.R.C.S., squadron-leader R.A.F.V.R., surgical officer in charge R.A.F. plastic unit. Oxford: Blackwell Scientific Publications. Pp. 371. 45s.

CURRENT interest in the repair of burns and injuries has led to the publication of a new edition of this book within three years of the first. A section on the type of injury common in the war but likely to occur occasionally in peace is followed by a good account of facial fractures, which many textbooks ignore. The greater part, however, deals with repair, and in this the average surgeon will learn much of the principles and details. Possibly the difficulties are not sufficiently stressed: the tiro must be warned that it is not all as simple as it sounds. Nevertheless it is very important that all emergency surgeons should understand the principles, and the book goes far to fill an important gap.

The Household Doctor

London: English Universities Press Ltd. Pp. 224. 3s. 6d.

THIS little book is wrongly named: it could more accurately be called "Understand your Doctor." While offering no encouragement to the lay reader to diagnose and treat his own diseases, it does explain to him in straightforward language what symptoms may be expected in various disorders, what we know of the causes of those disorders, what treatment the doctor is likely to order, and why. About half the book deals not with sickness but with health, beginning with a very short and simple account of anatomy and physiology, followed by chapters on general hygiene and exercise, diet, the care of the expectant mother and of the child at his various stages of development, and health in the middle years and in old age, and ending with chapters on first-aid and the household medicine cupboard. Home nursing is well and shortly described, and there is a useful chapter of advice for those in the tropics—an unusual but welcome addition to this kind of book. There are some weaknesses; the nervous system cannot be adequately, or even cursorily, described in 13 lines,

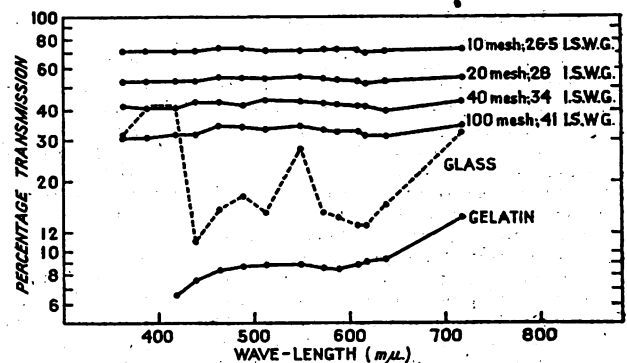
and the diagram of the central nervous system must be a puzzle to anyone who does not know what it is meant to represent; but the book as a whole is a sensible account of the body in health and illness, which could be recommended confidently to any non-medical person who wished to know more of such things. The author remains anonymous, but according to the book jacket is "a famous family doctor." Famous or not, he has done this job neatly.

New Inventions

PERMANENT NEUTRAL STANDARDS IN PHOTO-ELECTRIC COLORIMETRY

IN clinical colorimetry it is not always feasible to compare directly the unknown with the standard. This difficulty arises if the standard is unstable or cannot readily be obtained pure, or if an attempt is made to compare the transmission of light by the unknown with that by a blank, in which case the readings of the unknown are usually crowded into the lower (insensitive) range of the scale.

To overcome these difficulties a neutral filter is sometimes used instead of the standard or the blank. The neutral filter is first calibrated against the standard and substituted for it as a secondary standard, as has been recommended for the estimation of hæmoglobin.¹ By



Transmission of light by different neutral screens; data for gelatin filter obtained from makers; instrumental error of photometer $\pm 1\%$.

using a neutral filter together with a blank, crowding of readings into the lower end of the scale may be avoided. For example, a solution may show a transmission of 10%, the blank giving a reading of 100%.² A transmission as low as 10%, however, cannot be read with a high degree of accuracy on most instruments. If a neutral filter is at hand whose transmission is, say, 52%, it may be inserted together with the blank. By increasing the intensity of light the colorimeter can again be brought to read 100% on the galvanometer scale, with blank and neutral filter in position. If the unknown is now substituted for the blank and the neutral filter the reading will be roughly twice as high, falling within the sensitive range. Instead of 10% we obtain 19.2% (for $10 : 19.2 = 52 : 100$). These new readings have to be multiplied by 0.52 to obtain the correct value.

Unfortunately these grey filters are not always stable and do not show the same transmission over the whole range of the spectrum (see figure). These disadvantages can be overcome by using inexpensive permanent neutral screens made from woven wire nettings. For greater convenience during handling, and to protect them against dust and dirt, these are inserted into test-tubes, which are stoppered and sealed with wax or picein.

We are indebted to Messrs. Thomas Locker and Co. Ltd., of Warrington, for samples of woven wire nettings.

WALTER KOCH, M.D., PH.D. Vienna

DEBORAH KAPLAN, PH.D., M.Sc. Jerusalem.

Department of Hygiene, Hebrew University, Jerusalem.

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2. Gibb, T. R. P. *Optical Methods of Chemical Analysis*, New York and London, 1942, p. 151.

CHRONIC LEG ULCER OF 18 YEARS

Healed after treatment beneath Elastoplast

CASE-HISTORY

On August 5th, 1936, a married woman was admitted to hospital with an extensive deep ulcer. She had a history of an ulcerated leg for 18 years. The condition seen upon admission had prevailed for 5 years. The Wassermann was negative. Treatment in hospital consisted of applications of Red Lotion, Silver Nitrate and emulsion dressings beneath tightly applied Elastoplast bandages.

October 20th, 1936. She was discharged to continue treatment as an out-patient, and commenced doing full house-work.

January, 1937. Improvement maintained. Treatment continued with ultra-violet ray, strips of Ichthopaste and tightly applied Elastoplast bandages.

1938-39-40. Treatment as out-patient continued throughout this period and applications of Cod Liver Oil and Ichthopaste beneath Elastoplast bandages. Area of ulcer constantly diminished.

January, 1941. Hard scar was removed from base of ulcer, which was lightly packed with Jelonet, covered with Ichthopaste and bandaged tightly with Elastocrepe.

April 18th, 1941. Ulcer healed completely and patient in good health.

The details and illustrations are of an actual case. T. J. Smith & Nephew Ltd., Hull, manufacturers of Elastoplast and Ichthopaste, publish this instance—typical of many in which their products have been used with success.



Fig. 1

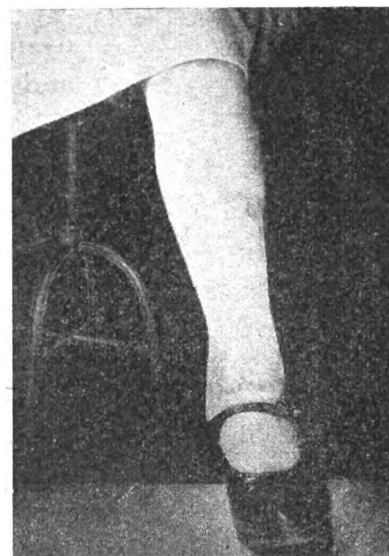


Fig. 2



In the Elastoplast elastic adhesive plasters a combination of the particular adhesive spread, with the remarkable STRETCH and REGAIN properties, together provide the correct degree of compression and grip. They mould readily to any part of the body without slipping, rucking or constriction.

In the treatment of sprains and strains, Elastoplast should be firmly bandaged over the joint and for some distance above and below. It should be applied as soon after the injury as possible, thus immediately providing firm support and controlling the formation of effusion and hæmatoma.

Elastoplast plasters available are 1" wide \times 1 yd. (1½ yds. when stretched), and 1" wide \times 3 yds. (5/6 yds. when stretched). Elastoplast, Elastocrepe, Jelonet and Gypsona are products of T. J. SMITH & NEPHEW LTD., HULL.

ANTUITRIN 'S'

(ANTROIDIN)

*A standardized solution of
chorionic gonadotrophin obtained
from human pregnancy urine*

IN the female the effect of Antuitrin 'S' is mainly luteinizing, and it is indicated in functional uterine bleeding, dysmenorrhœa, amenorrhœa, oligomenorrhœa, and habitual and threatened abortion.

In the male Antuitrin 'S' acts on the interstitial cells of the testes, increasing secretion of the male hormone, and is used in the treatment of cryptorchidism, impotence, and aspermia.

In both sexes it has been shown to be valuable in delayed puberty, genital infantilism, acne vulgaris, adipose-genital dystrophy (Fröhlich's syndrome), and in some cases of sterility.

Packages

Antuitrin 'S' is supplied in rubber-capped vials of 10 c.c. (100 International units per c.c.) and 5 c.c., Concentrated Solution (500 International units per c.c.)



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THE LANCET

LONDON: SATURDAY, FEB. 8, 1947

Justice and Prison

AMONG criminals, the young are the most easily reclaimed, and the most easily confirmed in crime. Lord TEMPLEWOOD, lecturing on Jan. 31 in the new department of criminal science in the law school at Cambridge,¹ affirmed that the fundamental problem of crime is juvenile delinquency; and he went on to discuss our disquieting failure to solve this problem. It is generally recognised that the numbers of young offenders increased during the late war—between 1938 and 1945 the offences committed by children and young people under twenty-one rose by more than half the rate of previous years—but it is less widely known that between 1907 and the beginning of the 1939 war the numbers of young offenders found guilty had already increased by 125%. We have now reached a point when 1 child in 90 between the ages of eleven and sixteen is found guilty of an indictable offence; and this figure takes no account of the many children not brought into court for their offences, or of the many offences not brought to the notice of the police. Our chosen reformatory methods—probation, and training in approved schools—can give good results when properly applied; but in many places, Lord TEMPLEWOOD finds, probation is equated with dismissal or acquittal, cases are not properly followed up, and aftercare is scarcely attempted when the probationary period is over.

Nor are the approved schools and borstal institutions anything like satisfactory at present, as the latest report² of the Prison Commissioners and the Directors of Convict Prisons reveals. Admittedly they were working under great difficulties raised by the war: staff shortage, "war restrictions, blackout, and an increasing restlessness of youth." This last element—which in one light seems healthy evidence of independence and spirit—was responsible, the commissioners say, for an increase in absconding; but surely it means, too, that the schools and borstals were not offering these growing minds enough to hold them. Naturally the task is extremely difficult; the aim, the report says, is "to hold the balance between too tight a rein, which would inhibit personal development and frustrate the intention of the [Prevention of Crime] Act, and too loose a rein, which would equally be bad training and may make the Institution unwelcome to its neighbours." They add that in the years under review the hold on this purpose has been subject to considerable strain. Lack of staff and accommodation made it necessary to reduce the average period of training, and the amount of aftercare given had to be reduced. Despite these difficulties, over 4000 of the 6084 youths discharged between April, 1942, and March, 1945, entered the Services, and most of them did well, several becoming officers and many N.C.O.s. The training must therefore have been fitted to the needs of a large proportion of boys committed to approved schools and borstals; and with better

staffing and quarters could no doubt give even better results. The care of girls has been disappointing: "It cannot be denied that the percentage of girls who have done well is low." Of 638 discharged between 1938 and 1942, 31.5% have already been convicted again on two or more occasions, and only half have avoided a reconviction. The girls under care may be a more hardened lot than the boys, but evidently there is room for advance in the management of institutions training them.

During the years under review the feeding of prisoners was investigated by Mr. MAGNUS PYKE, D.Sc. He found various deficiencies, chiefly in vitamins, which were afterwards largely corrected. He also found that the food supplied to borstal boys was inadequate in quantity, and this was overcome by a substantial increase in the bread-supply. In all prisons and borstals there was a shortage of fat in the diet, and dried eggs were excluded except for hospital use, which indicates that the commissioners estimate nutritional needs at a lower level than that set by ordinary rationing. While recording many small attempts to improve the lot of prisoners and give them an opportunity to develop into normal citizens, the report as a whole makes all too clear how much is still wrong with our attempts at criminal justice. Lord TEMPLEWOOD's Criminal Justice Bill of 1938, by raising the minimum age for imprisonment to 16, would have ensured that no young offender could be sent to prison by a court of summary jurisdiction; and none between 17 and 21 unless he could not safely be detained in a remand home. Inside the prisons, as he pointed out in his lecture, work should not be lifeless, but useful, interesting, and reformatory, though hard. He would like to see it modernised on the lines set out by the Salmon Committee, who considered that the system of earnings, which stimulates interest and self-respect, should be more widely developed. He shares our belief that mental abnormality should be taken into account in assessing criminal responsibility: the courts, he believes, should be able to order the mental examination of offenders put on probation, and those who need it should be treated at the public expense. Young offenders, if they are to be kept out of prison, might go to attendance centres once a week, and perhaps live in special hostels for a while, from which they could go out to work.

Yet he does not believe that even these much-needed reforms can cure our troubles; for our sickness is moral, and "however we may explain it, many moral restraints have lost much of their power in the confused and restless world of today." Civilised behaviour springs from mutual trust and personal integrity; we have to re-create a world in which these things are valued.

Sedimentation-rate

THE use of erythrocyte-sedimentation as a diagnostic aid originated some four hundred years B.C. with the observation of HIPPOCRATES that sickness was accompanied by an increase in the phlegma or mucus, the uppermost of the blood's four humors. So constant was this change that the Greeks concluded that the phlegma was the most important cause of illness. GALEN, in the 2nd century A.D., persuaded Roman physicians to adopt this theory, which was accepted without serious question for the next 17

1. See *Times*, Feb. 1, pp. 2 and 5.

2. Report for the years 1942-44. H.M. Stationery Office. Pp. 154, 2s. 6d.

centuries. From this faith sprang the ritual of blood-letting as a remedy and a guide to diagnosis and prognosis. Physicians of the 18th and early 19th centuries, when phlebotomy reached its peak of popularity, used to watch the sedimentation of blood standing in large brass bowls and vary the amount of blood removed accordingly. In the 1850's the humoral theory was overridden by VIRCHOW with his cellular pathology, and, while venesection fell from favour, research-workers found a field for exploration more fascinating than the naked-eye appearances of blood. In 1893 BIERNACKI returned to the study of blood-sedimentation, urging its importance in diagnosis, but his words fell on deaf ears. A further twenty years passed before FAHRAEUS,¹ in 1918, popularised the test. Since then it has been the subject of more papers, and of more controversy, than any other laboratory procedure. Physicians, surgeons, pathologists, and general practitioners all adhere to their favourite methods of estimating the sedimentation-rate; the multiplicity would matter little if results were comparable, but this, despite nomenclature, they are not. If blood-sugar values were reported in as many ways as the sedimentation-rate, the confusion would endanger lives.

Among clinicians the Westergren technique holds first place; 1.6 c.cm. of venous blood is drawn into a syringe containing 0.4 c.cm. of a 3.8% solution of sodium citrate, and the mixture is set up in a 200 mm. graduated tube. The result is expressed as the fall of the erythrocyte column in one hour. It is an advantage of this method that dilution diminishes the sensitivity of the test by retarding the initial fall, so that the normal range after an hour's fall does not exceed 5 mm. for a man and 7 mm. for a woman or child; at the same time the fall is exaggerated in pathological bloods. A disadvantage is that the same blood sample cannot afterwards be used with reliability for other purposes. If, however, blood from a previously dry syringe is added to a narrow-bore tube containing the diluent, the tube having been previously marked at the 2 c.cm. level, the rest of the blood may be used for other tests and the patient will be spared a second puncture. This device is often frowned on, but it achieves equally great accuracy in dilution. Of late years, techniques employing undiluted blood have been favoured as more reliable than the Westergren method, though such criticism has often been based more on errors in performance than on any faults inherent in the test; the common mistakes are inaccurate dilution, inconstant temperature (high temperature increases the rate), initial delay in setting up the test, and failure to keep the tubes strictly vertical. With the Westergren technique the reading is not easily corrected for anæmia. In anæmic blood sedimentation is hastened, so the observed rate will be too high. This will not matter much when, for example, the progress of a case of tuberculosis is being watched, for improvement in the anæmia will usually go hand in hand with improvement in general condition. But in diagnosis, particularly that of rheumatic disease, the presence of anæmia may be seriously misleading, unless the reading is corrected against an estimation of hæmoglobin or packed-cell volume, or a red-cell count. With the Westergren technique one of these

estimations must be done separately before a correction can be made. One of the reasons why pathologists on the whole favour the Wintrobe method is that being done in a hæmatocrit mere centrifugalisation will give the packed-cell volume, from which the sedimentation reading can easily be corrected from the published charts. Moreover, with the Wintrobe method, other procedures can be carried out on the same blood-sample, for the blood is not diluted, being kept fluid by the addition of heparin or HELLER and PAUL'S² mixture of ammonium and potassium oxalate, designed to prevent shrinkage of the erythrocytes. The Wintrobe test is set up in a 100 mm. graduated hæmatocrit tube held vertically and read at the end of an hour. There being no dilution to retard sedimentation, the range of normality is greater—up to 9 mm. for a man and 20 mm. for a woman or child—while owing to the shorter tube the scale of abnormality is reduced. In the wide-bore or "spa" method,³ a highly sensitive modification of the Wintrobe technique, 5 c.cm. of oxalated blood is allowed to settle in a wide graduated centrifuge tube and the result is expressed as a percentage, sometimes of the plasma layer to the total volume and sometimes in terms of the cell-bulk. The wide tube makes a strictly vertical posture less essential, and it is easier to fill and to clean; the packed-cell volume can also be easily obtained by running the tube in the centrifuge. Many other techniques are in common use. One of the most popular is the micro-method, practised in many ways, which is designed to obviate venepuncture and is reliable provided the tube is wide enough to exclude the effect of surface tension.

To sum up. When the sedimentation-rate is used as a periodic test of progress, the method is immaterial, provided the same technique is always used, and the choice is based on convenience. Thus the Westergren is favoured for watching the course of pulmonary tuberculosis, while the wide-bore method is convenient for controlling treatment in rheumatoid arthritis, and a micro-technique for the review of rheumatic children. In these diseases the test is more than a check on clinical acumen, for an increased rate often presages relapse. For diagnosis the choice of method is more difficult. Westergren's is possibly best unless a more sensitive technique is required, as in a suspected case of rheumatoid arthritis, and where correction for anæmia is desirable when the Wintrobe or the wide-bore techniques are preferable. The correction against packed-cell volume often gives valuable help, for the hæmatocrit is an independent yardstick of progress in rheumatoid arthritis.⁴ When all is said and done the sedimentation-rate remains simply an empirical test of clinical convenience. Factors influencing the rate are being slowly elucidated with improving analysis of plasma-proteins. Thus GORDON and WARDLEY⁵ have separated these into 9 fractions, which they combine in 39 pairs; they find that fibrinogen and euglobulin are "fast" and are inhibited by the "slow" nucleoprotein and globoglycoid. They conclude that the rate of sedimentation is controlled not by the absolute concentration of the

2. Heller, V. G., Paul, H. *J. Lab. clin. Med.* 1934, 19, 777.

3. Collins, D. H., Gibson, H. J., Race, J., Salt, H. B. *Ann. rheum. Dis.* 1939, 1, 333.

4. Gibson, H. J., Pit, R. M. *Ibid.* 1946, 5, 83.

5. Gordon, C. M., Wardley, J. R. *Biochem. J.* 1943, 37, 393.

1. Fahraeus, R. *Biochem. Z.* 1918, 89, 355.

total plasma-proteins or of the protein fractions but by the inhibition of one protein by another. A high fibrinogen content, for instance, may be found with a low sedimentation-rate, owing to an increase of pseudoglobulin at the expense of euglobulin, the total globulin remaining stationary. An increased sedimentation-rate, they say, normally denotes an alteration not in the chemical structure of the proteins (with the possible exception of Bence-Jones protein) but only in their relative proportions. It seems likely, therefore, that the test will ultimately disappear when electrophoretic analysis of proteins is generally adopted. Until then attempts to over-elaborate what is an essentially simple clinical test are to be discouraged.

The Serum of Bogomoletz

FOR the past fourteen years Russian pathologists, headed by the late Academician ALEXANDER BOGOMOLETZ, a pupil of METCHNIKOV's, have been studying the therapeutic properties of antireticular cytotoxic serum—A.C.S. for short. Knowledge of this work outside Russia has largely been founded on scientific gossip and a few odd snippets in the daily press, though BOGOMOLETZ published short summaries¹ here and in America in 1943. His review stimulated American research-workers into action, and the first results of their inquiries are now coming through.

The Russians, according to STRAUS,² claim that A.C.S. in carefully graded doses is beneficial in fractures, murine typhus, schizophrenia, rheumatism, scarlet fever, hypertension in its early stages, tuberculosis, inoperable carcinoma, and frostbite. To these we may add reports in the popular press that it is good for the degenerative changes of old age. But A.C.S. is no old-fashioned panacea, for it was found to be without effect in erysipelas. STRAUS's review enables one to piece together the theoretical background of these extraordinary claims. In the first place, by "reticular" tissue BOGOMOLETZ meant not merely the reticulo-endothelium but the whole of what many histologists call the "mesenchymal" tissue—the hæmopoietic tissues and their derivatives, vascular and lymphatic endothelium, and all the cells belonging to the superfamily of fibroblasts. If human spleen or bone-marrow extracts (both wholly mesenchymal) are injected into horses, rabbits, or goats, tissue-specific antibodies are formed which in high concentration are toxic to cells of the type that called them forth. But in low concentration, as determined by a standard complement-fixation test, the action of the antibodies is stimulatory—an idea first suggested by METCHNIKOV himself. It is to the generalised stimulating effect of A.C.S. in low dosage that its beneficent properties are ascribed.

There is nothing particularly novel or surprising in the idea that tissue-specific antibodies may be elicited by injecting cells into an animal of another species.³ Indeed, CRUICKSHANK's⁴ work on antilymphocytic sera suggests that antibodies may be aimed more exactly than against the mesenchymal tissues as a whole. For many years, moreover,

workers on tissue culture have claimed that such tissue-specific antisera have a toxic action in vitro. POMERAT and ANIGSTEIN⁵ have investigated the properties of A.C.S. itself by tissue-culture methods; and in confirming its cytotoxic action they find that a high degree of species-specificity is superimposed on its specificity towards mesenchymal tissues, in the sense that anti-rat-spleen antibodies will inhibit the growth of a rat sarcoma in culture, where an anti-chicken-spleen serum will not. So far so good; but the novelty and the whole theoretical substance of BOGOMOLETZ's claims turn on whether such antisera are stimulating in low dosages. It is technically very difficult to demonstrate feeble stimulatory actions by tissue-culture methods, but in preliminary work POMERAT⁶ does indeed find that the outwandering of cells from chick-heart fragments is stimulated by homologous (i.e., anti-chick) A.C.S. in low dosages.

No clinician, of course, will be satisfied with anything less than a clean-cut demonstration of the effectiveness of A.C.S. in vivo, and here (after satisfying themselves with the validity of their technique of assay and other technical details) STRAUS and his colleagues⁷ have made a beginning. They chose in particular to study the most overtly reasonable claim—that A.C.S. in the appropriate low dosages expedites the healing of fractured bones. The A.C.S. was prepared by injecting rabbit spleen and bone-marrow extracts into goats, and its titre adjusted by complement-fixation to 1:130. Rabbits were now subjected to a standard complete fracture of the radius and ulna in a modified Grattan osteoclast and divided for injections into four groups. Each rabbit in the first group received a "stimulating" dose of 0.00125 ml. and each in the second group the inhibitory dose of 0.10 ml. Members of the third and fourth groups received 0.00125 ml. and 0.10 ml. of normal goat serum. After two weeks the efficiency of healing was determined by radiography, histological examination, and measurement of the breaking strength of the union. All three methods combined to affirm that the 0.1 ml. dose of A.C.S. has a depressive action on healing. The mechanical method alone gave evidence that the fractures healed better in the rabbits that received the stimulating dose of A.C.S. than in the controls; whereas the breaking strengths of the bones in the stimulated groups were clustered more or less symmetrically round a mean value of 6.83 kg., the results from about a third of the controls were clustered around zero, though the other readings had about the same range of scatter as the experimental set. In short, a shot has been fired for the defence; and editorial and private comment on A.C.S., which has hitherto been cool, may be warmer after this discovery. Since A.C.S. keeps well and is not difficult to prepare (though the source of antigen may give trouble), it is to be hoped that equally critical trials will be made of the other benefactions alleged to be within its gift. So far, supplies have permitted only one small trial in England—that of BACH⁸ for the Empire Rheumatism Council—and its results were unfavourable.

1. Bogomoletz, A. A. *Brit. med. J.* 1943, II, 203; *Amer. Rev. Soviet Med.* 1943, 1, 101.
2. Straus, R. *J. Immunol.* 1946, 54, 151.
3. Cf. Landsteiner, K. *Specificity of Serological Reactions*, New York, 1945.
4. Cruickshank, A. H. *Brit. J. exp. Path.* 1941, 22, 126.

5. Pomerat, C. M., Anigstein, L. *Tex. rep. Biol. Med.* 1945, 3, 1; *Fed. Proc.* 1945, 4, 1; *Cancer Res.* 1945, 5, 724.
6. Pomerat, C. M. *Tex. rep. Biol. Med.* 1945, 3, 404.
7. Straus, R., Runjavac, M., Zaitlin, R., Duboff, G., Swerdlow, H. *J. Immunol.* 1946, 54, 155. Straus, R., Horwitz, M., Levinthal, D. H., Cohen, A. L., Runjavac, M. *Ibid.*, p. 163.
8. Bach, F. *Ann. rheumat. Dis.* 1945, 4, 62.

Annotations

NEGOTIATION

LAST week the Royal College of Physicians of London expressed its wish that the Negotiating Committee, on which it has three representatives, should "enter into discussions and negotiations with the Minister on the regulations authorised by the National Health Service Act." Neither this resolution nor the similar ones passed by the councils of the two other English Royal Colleges lays down conditions on which negotiations will be resumed: unlike the resolution passed on Jan. 28 by the representative body of the British Medical Association they do not refer to the possibility of amending legislation. On the other hand they by no means commit the colleges to approval of any part of the Government's scheme which after negotiation appears unacceptable to the profession. Opinions have differed and still differ on several sections of the Act, and the representatives of different bodies will no doubt look at it from different angles; but their general unity will be preserved so long as they are all trying to produce, by agreement, a workable service. This is also the desire of the Ministry, and we believe that joint effort will in the end prove capable of removing both mountains and molehills.

SURGERY IN VESICOVAGINAL FISTULA

THE surgeon planning his line of treatment for a case of carcinoma of the urinary bladder—one of the most distressing of human ailments—is not likely to be swayed by the mortality and end-results of ureterocolostomy. Excision of the malignant bladder after diversion of the urine into the colon or on to the skin offers the only chance of cure, even if the operative mortality is about 50% and few patients survive for longer than five years. The fate of untreated cases is so hopeless and their end so terrible that the surgeon may with justice ignore, while striving to diminish, the enormous operative mortality. But the problem is very different in the patient with a non-malignant vesicovaginal fistula. In this condition the operation of ureterocolostomy ignores the primary pathology, which is neither progressive nor lethal, and deals with the symptom—the urinary leak. The operation neither saves nor prolongs life; in all probability life will be shortened. Local plastic repair of the fistula is to be preferred whenever possible, since thereby a return to normal micturition is obtained. Some surgeons, notably Mahfouz Pasha in Egypt, Hayes in India, and Chassar Moir in England, have had great experience of this difficult operation and have reported a high proportion of successes. But unless we know the severity of the original lesions, figures representing percentage successes can be very misleading. There are cases in which plastic repair has been so often unsuccessful even in expert hands that they must be considered irreparable. These are particularly common among primitive peoples where modern midwifery is unobtainable. The well-intentioned habit of some native tribes of packing the postpartum vagina with rock salt to promote fibrosis and shrinkage leads to a particularly intractable type of fistula after the next obstructed labour. In the West African series described by Lovett-Campbell on another page fibrosis and thickening of the bladder from chronic bilharziasis was a feature of the intractable cases.

In cases like these the relative merits of ureterocolostomy and conservative measures, such as the use of receptacles, inefficient as they are, must be considered. The patient is entitled to know the hazards and end-results of the operation in order to weigh them against the discomfort and misery of her condition. In the final analysis the patient, guided by an honest presentation of the facts by the surgeon, must herself make the decision. In average hands the operative mortality is

in the region of 15%. Especially skilled operators have from time to time presented lower figures, but it is the average which must be sought while the best is aimed at. What of the end-results? Control of rectal micturition is the rule, though occasionally there is incontinence at night. As far as expectation of life is concerned, there is no doubt that a long and reasonably healthy life is possible after ureterocolostomy. Grey Turner¹ has recorded the histories of 9 patients, survivors of an original series of 17, who were alive sixteen to thirty years after operation. Wade² has published records of 16 patients, from an original group of 21 suffering from benign conditions, who were alive up to fourteen years after operation. Lower³ reported on 6 patients who were living twenty years after operation. Of the late complications, there is evidence that about half the cases develop some form of renal disease. Thus 4 of Grey Turner's 9 patients had renal complications. Hydro-nephrosis, chronic infection, and nephrolithiasis are all known to occur. It is a tribute to nature's adaptability that these complications do not develop in all the patients. Conception and childbearing are not contra-indicated after the operation. One of Grey Turner's patients bore several children, and Lovett-Campbell mentions that 2 of his patients subsequently went through pregnancy and labour without mishap.

The facts, in summary, are these. The operative risk is high but not excessive, the expectation of life is fairly good, some renal impairment develops in half the cases, continence is almost certain, and pregnancy and labour are not impossible. In the face of this evidence who can doubt what is the right advice to give to the unfortunate woman who is inflicted with an intractable vesicovaginal fistula or what choice they themselves would make if they had the necessary training to grasp the facts?

INTELLIGENCE AND FERTILITY

WE hear a good deal these days of the potential menace to the nation of the present trends in reproduction-rates among the more intelligent section of the population.¹ In a discussion at the Eugenics Society on Jan. 21, Lord Horder, who was in the chair, said that intelligence, in so far as it can be measured by formal tests, is clearly a heritable function of the mind. A negative association has been observed between the intelligence-test scores and the size of the family to which the tested child belongs, which means that the more intelligent parents of the more gifted children in all social classes are tending to have small families. A continuation of present trends would reduce the proportion of children with high mental endowment and increase the frequency of feeble-mindedness. Whether these trends will continue is an open question which Sir Alexander Carr-Saunders discussed in his opening remarks. He did not think that the trends could be safely ignored. He had no doubt that there are these differences in intelligence and fertility between different social groups, and innate intellectual efficiency is often associated with qualities of particular value to the community. How this national intellectual endowment can be conserved is a problem requiring unbiased unemotional scientific appraisal by sociologists, psychologists, and statisticians. This sentiment was echoed by Sir Cyril Burt, who pointed out that although there is general agreement about the methods and interpretation of the results so far achieved, there is no good direct evidence of a decline in the average intelligence quotient from one generation to the next. Such studies as have been done have been obscured by sociological difficulties such as migration, and fresh efforts are needed.

1. Turner, G. G. *Brit. med. J.* 1943, ii, 535.
2. Wade, H. *Edinb. med. J.* 1939, 40, 61.
3. Lower, W. E. *J. Urol.* 1943, 50, 58.

1. See *Lancet*, 1946, ii, 52, 204; Jan. 4, p. 36.

Prof. L. S. Penrose raised the possibility of restitution factors which must have been at work to counterbalance the influence of differential fertility-rates over the past hundred years. Recessive genes may be important in the genetic background of geniuses, whose deviation from the norm may also be evident in a diminished fertility. There is, too, an analogy between intelligence and stature, in that a negative correlation between height and size of family has been shown to exist in Toronto children of twenty years ago; yet a height survey recently undertaken has shown a rise, not a fall, in the average height of the Toronto children of today. The findings in intelligence-test results may be partly explained by a negative association between test score and order of-birth, since the achievement scores in a family tend to decrease from oldest to youngest. Later speakers stressed the importance of nutritional factors in the explanation of the Toronto results. Prof. Godfrey Thomson agreed that much could be done by cultural and educational improvements. On the other hand, the matter could be put to the test by direct comparisons between generations. Some studies, he said, are already under way, and preliminary results are not reassuring. The full analysis of the results of the large-scale studies will be awaited with much interest and perhaps a little trepidation.

MEDICAL SUPPLIES

EVEN nowadays, when much of the cost falls on the individual pocket, the national bill for drugs and other medical supplies is large. From April, 1948, when everyone will pay an all-in weekly contribution, it is likely to be at least as heavy. Indeed, experience in other countries where national medical services are already in action suggests that one of the problems we shall have to face, if possible before the appointed day, will be a heavy increase in the demand for medical supplies. On the second reading of the National Health Service Bill Mr. R. Sargood suggested that the annual cost of hospital supplies alone would be about £20-£25 million, and he was anxious that there should be bulk purchasing. For each region to have its own organisation would, he held, lead to overlapping and variation in the standard of equipment.

On Dec. 2 Mr. A. M. Skeffington tried to induce Parliament to discuss the subject in more detail, but was balked for want of a quorum. Speaking from his wartime experience as assistant director of medical supplies at the Ministry of Supply, he affirmed that if the needs of the new National Health Service were to be satisfied promptly there must be a superdirectorate with authority to coördinate the efforts of the "small, highly competitive and even antagonistic firms" of which the industry is largely composed.

Weight is added to Mr. Skeffington's argument by the situation mentioned in the House of Commons by Mr. de la Bere, member for Evesham, in whose constituency there lies a dump of ex-American medical equipment. This, he said, is worth about £1 million; and there is every reason to suppose that its value is really much more. Hospitals have known of it and been trying to get at it for some time now, and both the Ministry of Health and the Ministry of Supply (who are the temporary owners) are anxious that they should make use of it. They are held up, however, by the fact that the Ministry of Health, never having had to deal with stores on such a scale, has in fact no adequate machinery for doing so. The equipment is stored in 100 large hangars, jammed to the roof with crates full of equipment and drugs; and these crates are in no order, with few labels and no inventory—just as they were left by the departing Americans, whose natural instinct was to get rid of the stuff quickly and get home. To the civilian mind the problem is somewhat daunting; but, after all, during the war far bigger ones were dealt with by the R.A.O.C. almost as a matter of routine. Since it seems that the Ministry

will eventually have to handle stores on a very large scale, this might be a good moment to establish an organisation. It would first have to take over and cope with the stores in Worcestershire and elsewhere, and would then carry on in more normal manner with the medical supplies which will be needed by the National Health Service. At the moment there must be a large number of ex-officers who are experienced in attending to vast quantities of stores, and it should be comparatively easy to find the right people for doing the work.

Mr. Skeffington also wanted to see the standardisation of equipment, which had proved so successful in war, developed to meet the needs of peace. This proposal is being tackled by the British Standards Institution, who at the suggestion of the British Hospitals Association have set up a committee to go into the problem (*Lancet*, Jan. 25, p. 164). A start has already been made with the institution's published specifications for gas-cylinders and anaesthetic apparatus, hypodermic syringes, stretchers, and stretcher-carriers, and at the suggestion of Sir Alfred Webb-Johnson, F.R.C.S., a standard for apparatus for fluids for intravenous administration is now being prepared. In other countries the national standards organisations are undertaking similar work. At a conference held by the institute on Jan. 14 the chairman, Sir Clifford Parsons, F.R.S., said that most of the difficulties of bulk buying, which had not always proved as advantageous as was expected, could be overcome by the use of British Standards.

"It is not necessary," he explained, "that standards should require a precise representation of articles but the essentials with which the articles have to conform may be made standard. Standardisation does not necessarily lead to regimentation, nor to exact similarity if it is carried out intelligently and confines itself to such requirements as are essential. It is probable that there are quite a number of items of equipment in hospitals which do not lend themselves to standardisation, or for which standardisation is undesirable. On the other hand, there does appear to be a very large field from which advantages should be obtained." The new committee has an urgent and important task in hand, and its recommendations will be awaited with interest both by the executants and the administrators of the National Health Service.

TOXICITY OF THIAMINE

SOME unpleasant reactions and two deaths have now been reported after the administration of thiamine hydrochloride intravenously and by mouth. The various manifestations have been classified as toxic and anaphylactic.¹ Nausea, sneezing, dyspnoea, urticaria, and asthmatic attacks have been seen, and Mills,² Leitner,³ and others have noted a thyrotoxic syndrome with nervousness, tremor, tachycardia, and sweating. Steinberg⁴ reports three cases of herpes zoster following thiamine administration; one of these patients was receiving the vitamin by mouth, and another developed the condition a second time after a second course of thiamine.

The thyrotoxic reaction, Leitner suggests, is due to overdosage. Mills⁵ saw many examples of this reaction in Panama in patients who had previously been severely deficient in thiamine; in one woman the symptoms developed after a 2½ weeks' course of 10 mg. daily. The normal daily requirement of thiamine varies, but it is less than 5 mg.; overdosage in therapy is so common that it must be supposed that supersaturation, with or without faulty excretion, causes the thyrotoxic symptoms and not simply an overdose. When the vitamin is withdrawn the nervousness and other symptoms disappear. The anaphylactic phenomena seen in patients receiving the vitamin by injection are of all grades of severity, from sneezing to anaphylactic shock and death within

1. Reingold, I. M., Webb, F. R. *J. Amer. med. Ass.* 1946, 130, 491.
2. Mills, C. A. *Ibid.* 1941, 116, 2101.
3. Leitner, Z. A. *Lancet*, 1943, ii, 474.
4. Steinberg, C. L. *Amer. J. dig. Dis.* 1938, 5, 680.
5. Mills, C. A. *J. Amer. med. Ass.* 1941, 117, 1501.

ten minutes of the injection, the latter presumably occurring when the injection had been given into a vein. Autopsy shows multiple ecchymoses beneath the pia with encephalomalacia and perivascular hæmorrhage,⁵ and pulmonary engorgement, right-heart dilatation, and hyperæmia of the brain and abdominal organs.¹ Withdrawal of the vitamin and injections of adrenaline usually lead to recovery.

Thiamine is usually described as non-toxic. Joliffe,⁶ for instance, has observed no toxic effects in over 3000 patients, and he says that Borsook has treated 70 patients daily for three years with 100 mg. of thiamine hydrochloride without untoward reactions. However, there is need for an authoritative investigation into the frequency and severity of these reactions. The toxic doses for animals are known and the toxic dose by mouth is some fifty times the intravenous dose. A fast rate of intravenous injection increases the death-rate seven times. Molitor⁷ demonstrated toxic effects but was unable to sensitise dogs and guineapigs so that anaphylactic phenomena appeared. The anaphylactic phenomena have been shown to be due to thiamine and not to the usual preservative chlorobutanol,^{8,1} though Joliffe mentions 2 patients who were sensitive to chlorobutanol and not to thiamine. No investigation seems to have been made into the stability of commercial thiamine solutions over long periods. A neutral instead of slightly acid reaction may give rise to traces of thiochrome, pyrimidine, and thiazol in the solution; and some of the symptoms reported may result from these oxidation products. The well-marked eosinophilia reported by Leitner also requires further study.

On present evidence, thiamine hydrochloride should be given only by mouth except in severe intestinal dysfunction and acute beri-beri. If parenteral administration must be used the risk of anaphylaxis should be borne in mind, and doses of 50-100 mg. should be given very slowly. A preliminary intradermal test may be done to determine sensitivity, although doubt has been cast on the value of the skin test by Kalz⁹ who obtained positive reactions in all of 30 unselected patients. Mills, however, urges the reduction of dosage to the level of physiological requirement (about 2 mg. daily in his view), and would abandon parenteral administration altogether.

SPECIAL RATIONS DURING ILLNESS

How far should the doctor be free to prescribe extra rations besides those laid down by the Special Diets Advisory Committee of the Medical Research Council? The official categories cover most if not all of the strictly medical needs, and fairly generously at that—the two pints of milk daily for a healed peptic ulcer is an example. But there are other needs, not mentioned in the textbooks but no less important for the patient's recovery or comfort. When a man (or woman) is ill he has strange fancies, and his metabolism may be strange too.

If we all kept exactly to our rations it would perhaps be wrong to make exceptions even for the sick. But we do not. X can go to his club and get a meal with meat, butter, cheese, and sugar in it; so can Y at a restaurant; and so can Z at the works canteen. They do not require a doctor's certificate to prove that they need a meal: they can get one because the fancy moves them. And these meals are additional to their rations, which they can save up for the weekend. But poor A is confined to bed and cannot go to a club, restaurant, or canteen; nor are his friends allowed to go there and bring him an extra meal.

In his letter to the Minister of Food, published on another page, Sir Edward Mellanby, chairman of the advisory committee, points out that the refusal of extra

rations may cause patients "very real psychological distress," and asks whether strict adherence to the principles of war-time is still necessary. The Minister replies that the food situation has not yet improved, and that any general relaxation in the granting of extra food-stuffs to patients must be prevented. "It would," he concludes, "undermine our entire rationing system if it became possible to obtain, say, double the normal milk ration by means of a complaint to a general practitioner about feeling overtired or other undefined symptoms." The most he can suggest is that the advisory committee should feel able to be more lenient to individual applicants. In view, however, of the astonishing latitude allowed to dwellers in hotels and frequenters of restaurants, most of us will still wonder whether sick people living at home ought really to be treated so much less generously.

THE CENTRAL COUNCIL

THE Minister of Health has asked representative organisations to submit, by Feb. 24, names for the Central Health Services Council, which is the main advisory body under the National Health Service Act. Of the 41 members of this council, 6 will sit *ex officio*—namely, the presidents of the three Royal Colleges, the president of the General Medical Council, and the chairmen of council of the B.M.A. and the Society of Medical Officers of Health. The Act prescribes that 15 other members shall be medical practitioners (thus assuring a medical majority), and the council will include 5 non-medical people experienced in hospital management and 5 experienced in local government; 3 dental practitioners, 2 people experienced in mental-health services, 2 nurses, a midwife, and 2 pharmacists. Apart from those belonging *ex officio*, the members are to be chosen "primarily for their personal qualifications and experience and the contribution they can make as individuals rather than as representatives of particular interests. At the same time the Minister wishes to secure a proper balance of various types of knowledge and experience based on a reasonable geographical distribution." After consultation with the council, the Minister will set up standing advisory committees on particular subjects. It is expected that the specialist branches of medicine, and the professional and technical organisations, will give their opinions and advice chiefly through committees appointed by the council and through subcommittees appointed by the standing advisory committees, and the Minister will in due course be consulting the interested bodies about members for these committees. He proposes that members of the council should normally hold office for three years and be eligible for reappointment; but at the outset appointments may be for varying periods, so as to avoid the simultaneous retirement of all members in three years' time. Allowances will be made for travelling, subsistence, and loss of remunerative time.

INTERNATIONAL CONGRESSES

THE Royal College of Physicians is arranging an International Congress of Physicians, to be held in London from Sept. 7 to 14. As announced in our last issue, the International Society of Surgery will be holding its 12th congress, also in London, from Sept. 14 to 20. Other important events of the coming summer include the 17th International Congress of Physiology, meeting at Oxford from July 21 to 25.

THE appointment is announced of Dr. ARTHUR MASSEY as chief medical officer to the Ministry of National Insurance. Dr. Massey has been medical officer of health of Coventry since 1930.

Dr. ARTHUR WHITFIELD died at his home in Eastbourne on Jan. 31, at the age of 78. He was consulting physician to the skin department of King's College Hospital, London.

6. Joliffe, N. *Ibid.*, p. 1496, 1501.

7. Molitor, H. *Proc. Fed. Amer. Soc. exp. Biol.* 1942, 1, 309.

8. Haley, T. J., Flesher, A. M. *Science*, 1946, 104, 567.

9. Kalz, F. *J. invest. Dermatol.* 1942, 5, 135.

Special Articles

THE STORY OF THE KING'S FUND

1897-1947

FIFTY years ago the prognosis for many of the voluntary hospitals was poor. Demand for their services had led to rapid expansion in the nineties. Their future was menaced by financial instability as it has never been menaced by plans for nationalisation. Appeals for help were sporadic, uncoordinated, and aimed at meeting immediate crises rather than at establishing a sounder state of financial health. Wards were opened on the proceeds of a special drive for funds, and closed again almost before they were fully in use.

For the sick who needed hospital treatment the only alternative was admission to the institutions maintained by the guardians under the poor-law and by the Metropolitan Asylums Board in London—a prospect from which all but the most necessitous shrank. While housing and domestic conditions were then more favourable for the care of the sick in their homes, district nurses and trained private nurses were few, and the need for maintaining the bed-complement of the voluntary hospitals was perhaps as urgent as it is today. If the demand was less insistent that was due to remnants of the old prejudice against hospitals—a legacy from the days of sepsis and of surgery without anaesthesia.

BEGINNINGS

Meanwhile, the preparations for the Queen's Diamond Jubilee were in hand and the Prince of Wales was considering what cause was most worthy to be adopted in commemoration of it. One suggestion came from Sir Henry Burdett. He had made the great hospitals of London his special concern, but his four-volume work on *Hospitals and Asylums of the World* shows how wide were his studies. He insisted on the need for sound administration and control of expenditure, and prepared a scheme for a central hospital fund for the metropolis. The need, the hour, the advocate, and the patron thus came together, and the body which was later to be known as King Edward's Hospital Fund for London came into existence.

The first appeal for funds, a letter from the founder dated Feb. 3, 1897, which was published in all the London newspapers, met with a good response, and at a meeting in May the Prince was able to report that over £130,000 had already been received. "Naturally, everybody will ask when we have got a sufficient sum, 'What are you going to do with it? How are you going to spend it?'" said the Prince. "That is a very grave question . . . it will never do for us to give money right and left to hospitals which are in need. It will be necessary for us to investigate the state in which these hospitals are, to find out those which are in most pressing need of assistance, and also to form some opinion as to the state of efficiency in which they at present exist and how the management is carried on. The subject is one that will require the most mature consideration."

The early meetings were held at Marlborough House, the council being limited by the number of chairs which could be set around the dining-room table. Lord Lister presided over the distribution committee which was responsible for making grants—always on a constructive basis, and not as a means of making up leakages. For instance, the London Hospital was encouraged by a promise of an annual grant of £5000 to spend £100,000 of its own invested funds in bringing its equipment up to date.

One of the failings of the time was the isolation of the hospitals. They were applying the method of trial and error to many variations of the same problems, and were failing to learn from the successes and failures of their

neighbours. The King's Fund broke in on this isolation not only by building up a central reserve of capital from which regular grants could be made, but also by requiring efficiency in organisation and adequacy in accommodation and equipment of hospitals receiving its grants. Its reports, based on Sir Henry Burdett's statistics, have for fifty years given hospital administrators a means of comparing their own institution with others of a similar nature.

WAYS AND MEANS

By 1946 the generosity of donors and subscribers, together with munificent legacies, had brought the capital fund up to £5 million, while no less than £12 million had been distributed to the hospitals of London. How was this achieved?

By December, 1897, the total receipts had risen to over £227,000. This sum included nearly £35,000 raised from hospital stamps¹ issued in commemoration of the Diamond Jubilee. A Coronation gift brought in about £124,000. From donors in Canada came £400,000, and from India £15,000. A bequest for £250,000 followed. By 1905 the Fund had an assured permanent income of £50,000 a year, and the founder lived long enough to see an annual distribution of £150,000. During the next decade many large donations and legacies were made, including one of £324,000 from Sir Julius Wernher and one of £150,000 from Isabella, Dowager Countess of Wilton. The stress of the 1914-18 war bore heavily on the hospitals and increased their claims. In 1918 the joint committee of the Order of St. John of Jerusalem and the British Red Cross placed £250,000 at the disposal of the Fund, and in 1920 alone over £700,000 was distributed.

The Fund's system of annual visits to hospitals and of special visits before a grant is made towards a particular project has possibly achieved sounder and more lasting results than any attempts to impose a rigid code on the hospitals could have done. The practice of appointing one medical and one lay visitor for each visit matches the system of honorary medical staff in partnership with a lay committee which has achieved so much of value in the voluntary hospitals. The visitors are not primarily technical experts and do not act as inspectors. They are chosen as being people who are likely to bring to hospital problems a considered judgment enriched by experience in other fields of public life, though some are closely associated with the management of individual hospitals. In visiting a hospital they ask questions prompted by the conditions they meet on their visit, and on subjects chosen for special inquiry. Their impressions are reported in confidence to the Fund, and their reports, collected and summarised year by year, have offered a pointer to the directions in which help is most needed in the interest of efficiency, and have led to the publication of recommendations on such subjects as the supervision of nurses' health, hospital diet, standards of staffing, and the employment of domestic staff.

The Fund also finances special services such as the Emergency Bed Service²; the Nursing Recruitment Service, which has guided over 10,000 prospective student nurses into the hospital training-schools; the Radium Pool; and the new system of bursaries in hospital administration.

THE NEXT FIFTY YEARS

The fiftieth anniversary of the Fund coincides with the end of an era and with acceptance of a new conception of hospital provision. If the National Health Service can conserve the best of the voluntary and municipal systems, and can obtain the staff needed to give it life, the hospitals of this country might become, as Burdett said of the voluntary hospitals in an earlier epoch, "the wonder of foreigners and the just glory and pride of the British

1. Some of these stamps are being used to decorate the booklet *Today and Tomorrow* on the work and aims of the King's Fund, which has been issued this week.
2. See *Lancet*, Jan. 18, p. 109.

nation." From this point of view it is important that the Act, while providing for maintenance from public moneys, leaves the way open for supplementation from voluntary sources. The "over and above," the humanising touches which can come only from voluntary gifts, will be needed more than ever. There is always apprehension that a State service, and particularly one which is partly on an insurance basis, will by force of circumstances become a minimal service. In no other field, whether that of transport and communications, the provision of fuel, or even of education, could reduction to a minimum be more directly disastrous to the men, women, and children of this country than it would be in the field of medicine and public health.

The King's Fund will have in hand some £300,000 a year, the greater part of which has been spent in annual maintenance grants to hospitals, to supplement and humanise the national hospital service in the London regions. Its Act of Incorporation empowers it to apply its funds "in or towards the support, benefit or extension of the hospitals of London . . . (whether for the general or any special purposes of such hospitals) and to do all such things as may be incidental or conducive to the attainment of the foregoing objects."

Details of the Fund's programme for the future must, to some extent, await the pattern of things to come. But already it has shown its trend in encouraging the new methods of hospital treatment which medical science has opened up, and in providing better facilities for training all grades of staff. Nothing which would help to relieve the present pressure on hospital beds, the shortage of nursing and other staff, the plight of the chronic sick and advanced cases could be alien to it. The rehabilitation and development of convalescent homes and the provision of special equipment and amenities where they are most needed are already occupying its attention.

On its fiftieth birthday we wish the King's Fund godspeed in the belief that its influence on the quality of the hospital services in the London regions will be as important during the next half-century as it has been in the last.

SPECIAL DIETS FOR INVALIDS

THE PROCEDURE EXPLAINED

THE following correspondence has passed between Sir Edward Mellanby and Mr. Strachey.

Dear MINISTER,—I am writing to you in my capacity as chairman of the Food Rationing (Special Diets) Advisory Committee of the Medical Research Council. As you know, this committee was formed seven years ago at the request of the Minister of Health, the Secretary for Scotland, and the then Minister of Food, Mr. W. S. Morrison. Since then this same committee has functioned continuously under successive Ministers—Lord Woolton, Lord Llewellyn, Sir Ben Smith, and yourself—and until the last few weeks there have been few complaints directed against this branch of your Ministry's work. I think you will agree that this is a noteworthy achievement considering the onerous, and often invidious, duties of the committee and is in marked contrast to experience in the first European war when invalid and other claims were a major difficulty in working food-rationing plans, and even at one stage threatened to wreck the scheme. When I have reviewed the hard, disinterested, and very competent service given by its members, and in an outstanding degree by its secretary, Professor Himsworth, and also by Professor Davidson in Scotland, I could not help feeling surprised at how little their work was known or understood. There can be few instances in which the work of a whole department of a ministry, apart from routine administrative duties, has been planned and carried on for so long by an honorary committee entirely outside the ministerial organisation itself.

The committee has not only advised your Ministry on thousands of individual appeals against the rationing

regulations for invalids, on appeals from commercial food interests against restrictions on their supplies, given authoritative opinions on requests from industrial bodies and trade unions for special consideration, and undertaken negotiations with professional bodies on behalf of the Ministry, but it has also entirely devised the present system of invalid rationing down even to its administrative details.

I am sure you will appreciate that the members of the committee, being busy and distinguished men, are beginning to wonder how long their services will be required. They appreciate, of course, that no single medical man could undertake the functions which they now discharge as a body; and I, as their chairman, may perhaps be permitted to add that I know of no other group of men in this country who have either the status or the knowledge to take their place. Realising these points, and knowing that their duties will not continue indefinitely, the committee would no doubt be prepared to continue, but they do feel in need of reassurance on two points.

First, the committee would like to know if you still desire their services. If so, they would appreciate a public statement that the Government has confidence in them. Perhaps you might consider it appropriate to make such a statement in the House when you deal with the matter of invalid rationing. It would certainly be appropriate, although I realise it might be impracticable, if past Ministers of Food were to associate themselves with such an expression of appreciation.

Secondly, the committee would like to know whether the situation regarding food-supplies is still such that you would wish them to continue on the same strict principles which were necessary under the exigencies of war. Hitherto, such has been the food situation that the committee has had to formulate its advice in accordance with the following general principles:

- (a) that extra rations should only be granted to invalids on the grounds of proven therapeutic necessity;
- (b) that extra rations could not be spared for comforts;
- (c) that, in deciding between competing claims for the limited supplies of food, preference should be given to those categories of invalids who are capable of being restored to health, or preserved, by means of diet, as active workers;
- (d) that extra rations should not be granted on vague general grounds, such as debility or general ill health, but only when there were precise indications that certain foods were specifically necessary for the patient's treatment;
- (e) that only in exceptional cases could the committee advise you to exercise your prerogative of granting compassionate rations.

These are hard principles; and the members of my committee, while appreciating their necessity, have disliked applying them. As physicians they know that, although the extra rations desired by the patient may be of little or no material benefit to him, the refusal of such rations may cause very real psychological distress. But because of the food-supply situation they have had no option in such cases but to advise refusal. Are they to understand that, if you still desire their services, the food situation is still such that it is necessary for them to continue to be guided by the same strict principles?

London, S.W.1, Jan. 9, 1947.

E. MELLANBY.

Dear Sir EDWARD MELLANBY,—Thank you for your letter of Jan. 9, to which I hasten to reply.

Let me say at once that I value intensely the work of yourself and your colleagues of the Food Rationing (Special Diets) Advisory Committee of the Medical Research Council. I do not see how any Minister of Food could carry on the medical side of food-rationing without the help of such a body. As you say, it is a unique but exceedingly valuable feature of the present arrangement that an independent honorary committee entirely outside the ministerial organisation itself is responsible for this side of our work.

I also agree with you that the present membership of the committee is authoritative and eminently fitted to perform its duties. I welcome the opportunity to make these views public, which will be given me by a question put down by Sir Ernest Graham-Little which I shall be

answering in the House of Commons next Wednesday, Jan. 22.

I need hardly tell you that I do desire the continued coöperation and assistance of the committee. I realise the arduous and self-sacrificing work which it has performed, but I must appeal to the committee to continue to perform its functions while our food difficulties continue.

Finally, I come to the points raised by you as to whether some relaxation of the very stringent principles under which the committee works might not now be permitted. Unfortunately, the food situation, especially in regard to the particular foodstuffs which I take it are most often recommended, such as butter, eggs, and meat, has not yet improved. In all the circumstances, I am inclined to think that we cannot yet make any marked changes in the terms of reference of your committee. On the other hand, I do think that when your committee sits in what I might term its function as a Court of Appeal against its own regulations as applied by my divisional food officers, it might now begin to take a more lenient view of individual applications; and I would trust that such a relaxation would help your committee in its arduous and often unpleasant work.

It is, of course, still vitally important to prevent a general relaxation in the granting of extra foodstuffs to patients, such as did tend to occur this autumn in the case of milk. It would undermine our entire rationing system if it became possible to obtain, say, double the normal milk ration by means of a complaint to a general practitioner about feeling overtired or other undefined symptoms.

Ministry of Food, Jan. 14, 1947.

JOHN STRACHEY.

In reply to a request by the British Medical Association, the Ministry of Food has described in detail the procedure for dealing with applications for extra rationed foods on medical grounds. The following are extracts.

Routine Cases

The procedure in routine cases is for the form R.G.50 or medical certificate to be scrutinised on presentation at the food office for obvious clerical errors, illegible signatures, and anomalies such as the classification of a patient for extra milk under class 1(c) without any classification for extra eggs. Queries of this nature are, as far as possible, dealt with immediately and the wishes of the doctor ascertained. Applications on which no questions arise are granted immediately, and the necessity for speed in arranging for patients to be able to get their extra supplies has been stressed. Cases which must be referred to higher authority are forwarded immediately, and, when applicable, extra supplies are granted at once, either in accordance with the instructions that have been issued or under the food executive officer's powers of discretion.

Special Cases

Applications for extra foods, or for extra quantities of foods, that are not covered by the advisers' standing recommendations and Ministry instructions, are all treated as special cases. Food executive officers have no powers of decision and the applications must be forwarded without delay to divisional food officers. Divisional food officers are not empowered finally to reject any application that is supported by a medical certificate, but they are informed, both by their experience and by information passed to them by headquarters, of the requirements and views of the advisers and, therefore, they ensure as far as possible, by reference back to food executive officers or doctors, that applications include all the required information. This procedure does, of course, in practice dispose of a number of applications.

In general all non-routine cases are received at the headquarters of the Ministry, where the department concerned is in continuous and close touch with the Ministry's advisers through the Ministry's Scientific Adviser's Department.

Since the appointment of the Advisory Committee in January, 1940, a number of precedents have been established. Applications which are clearly covered by precedent are promptly granted or rejected, or, if necessary, further information is requested. Any case, however, in which there is the slightest doubt whether an exact precedent has been established, cases in which the applicant is dissatisfied with a previous ruling, and all cases specifically made under paragraph

19 of MED2 are referred to the Scientific Adviser's Department for special consideration by the Advisory Committee.

The Advisory Committee advises the Minister on the best disposal of the limited amount of foods available for invalids. In respect of the special applications referred to them by the Ministry they advise on the priority to be accorded to each on the basis of the statement of the particular case set out in the medical certificate and of the foods available. Applications from England, Wales, and Northern Ireland are sent in the first instance to Prof. H. P. Himsworth in London; applications from Scotland to Prof. L. S. P. Davidson in Edinburgh. If the application concerns a matter on which the committee has already given general guidance a written statement of the reasons for or against granting the particular application is prepared and, if agreed to by another member of the committee, forwarded to the Ministry of Food. If the application raises a new point it is referred to the whole committee, advice on the general principle being, if necessary, obtained from professional bodies, or, in the case of unusual illness, from other persons with expert knowledge.

General

In practice the Department always accepts the advice which is given and no officer of the Ministry is permitted to adjudicate on the medical evidence given in any case. This does not prevent them, however, putting into effect the known views of the Advisory Committee, but the principle which has been followed is that all lay officers who handle applications for extra foods on medical grounds do so essentially in the capacity of a secretariat for the Ministry's medical advisers.

Reconstruction

TRAINING SCHOOLS FOR NURSES NEED FOR NEW METHOD OF FINANCE

FROM A CORRESPONDENT

THE inauguration of the National Health Service offers a chance of separating the finance of the nurses' training schools from the finance of the hospitals. This would go a long way to give nursing a new start and lay aside a whole group of handicaps under which it labours today. If nursing is indeed a profession, does it not stand to reason that the nurses' training school should, like the medical school, draw its money, in part at least, from educational funds rather than from moneys voted for the relief of the sick?

PRESENT STATE OF AFFAIRS

The "apprenticeship system" which is so strongly established in this country—as contrasted with American practice—has great advantages and has contributed to the high standard of actual bedside manners, particularly in the larger training schools. But it is apt to subordinate the interests of the student to the interests of the hospital as such. Moreover, it has opened the way for hospitals to become training schools on inadequate grounds: sometimes they have been too small to give comprehensive experience; sometimes the ratio of trained staff to student nurses, or of nurses to patients, has been too low; and the quality of training is apt to suffer accordingly. It is by no means uncommon to hear of cases where the training of the individual nurse has been sacrificed to the needs of the hospital. Thus a girl who is already a qualified children's nurse and is seeking to complete her training at a general hospital too often finds herself called on to help out with the children's ward—this being the one type of hospital work of which she has already had ample experience. Help in an occasional crisis is one thing, but the frequency with which such things now happen is not really defensible. It is common to find that the needs of the training school for proper accommodation and necessary facilities play second fiddle to other requirements of the hospital.

Now all this is very largely a matter of finance. So long as the finance of the training school is inextricably bound up with the general finance of the hospital, the

matron and others responsible for the standard of training have their hands tied, and must continually give way to what are represented as more urgent demands.

It is significant that the one training school where this separation has been to some extent attempted is the Nightingale School at St. Thomas's, where the school has its own endowment and a separate set of accounts. "The distinctive advance made by the Nightingale School"—to quote Worcester's book on *Nurses and Training*—"was due to its independence. From the first its liberal endowment has allowed it to hold fast to its educational ideals. And there it has been proved that the best nursing service in a hospital can be given by pupil nurses of a school that has for its main purpose their education, and not the pecuniary advantage of the hospital."

A DIFFERENT METHOD.

The case for drawing on educational funds for a proportion of the assessed cost—not only of the teaching staff but also of the maintenance and remuneration of the pupil nurses—is therefore strong. It would perhaps be unreasonable to urge that the entire cost should be so met, since it is appropriate that the hospital should recognise by a financial contribution the benefit it gets from the presence of the training school within its walls.

The appropriate source of the educational moneys seems to be either the University Grants Committee or the Ministry of Education—supplemented, perhaps, as such funds might well be, by grants for special purposes and by grants from the great hospital trusts—King Edward's Hospital Fund for London and the Nuffield Provincial Hospitals Trust. A stimulus would thereby be given to those responsible for organising the training schools: but more than this, they would be given, in respect of the educational responsibility, a status which they at present lack. It would not then be necessary for the training school in need of a better supply of textbooks, or whatnot, to argue the claim in competition with the urgent need for repairs to the domestics' furniture, or for the matron to be told that the reprinting of the prospectus of the training school to bring it up to date was something of a luxury and must wait.

These instances of petty but serious handicaps under which the nurses' training school labours under the present régime are not far-fetched: they are everyday occurrences in many hospitals. Nor will they disappear with the mere assumption by the Ministry of Health of financial responsibility; for the hospital management committee is to have a free hand to manage its own affairs within its budget, and there is never likely to be money enough to meet all demands. The fact is that the object of the training school and the object of the hospital are not identical, though of course they overlap. It is too much to expect the hospital, which has to find money for all sorts of worthy objects of its own, always to be fair to the training school whose aims may often seem by comparison to be of less immediate consequence. We shall not be likely to get things in their proper proportion so long as the present financial tangle is preserved.

WHAT SHOULD BE DONE

The right solution appears clear enough. The training school should make up its own accounts, and it should carry the whole cost of teaching staff and also of the maintenance and remuneration of the student nurses. In return it should secure on the one hand a grant from the Exchequer, via the Ministry of Education or the University Grants Committee, and on the other an agreed amount from the hospital in recognition of services rendered. It does not very much matter how the amounts are calculated, or in what proportion, so long as the object is kept in sight—namely, that the requirements of the training school are not subordinate to those of the hospital.

The need for some such change was recognised by the Athlone Committee in its report of 1939, though this merely suggested that payment should be from the Exchequer. It was not then foreseen that the Exchequer would become responsible for hospital finance, and if in the new circumstances a distinction is to be maintained we must go a little further than the Athlone Committee and stipulate that the payment ought to come from the Exchequer by another route than through the Ministry of Health.

The introduction of the National Health Service should enable us to bring about easily and smoothly a change which might well do more than any other single step to secure the student status of the nurse in training.

Health Centres of Tomorrow

VI—CONCLUDING REFLECTIONS

AN American visitor the other day thought it odd of us to be giving health centres so large a place in our plans for the National Health Service. "As far as I can see," he said, "you haven't got any yet. In the States we should handle this differently: we should want to see some centres in operation before deciding to have a whole lot more."

As things stand, however, neither he nor anyone else need fear that health-centre practice will be generally adopted before there has been time to test its value. By the irony of fate, the era of planning which has now dawned in this country coincides with an era of material scarcity; and the plans for creating a really good medical service depend, like most other plans, on whether, despite wars and rumours of war, the new techniques of production can create the world of abundance that science has promised. Till that happens it will be impossible to build large numbers of health centres all over the country, and even our experiments may often have to be made with makeshift apparatus.

Nevertheless there is a strong case for taking these experiments very seriously, and for making them as extensive and convincing as we can. On the long view, the really well-equipped health centre may prove to be the ideal base for the general practitioner of the future, and we need pilot models now. On the short and utilitarian view, a less ambitious type of centre might be a valuable means of economising medical resources while these remain straitened. Even a makeshift centre, housed in old buildings or military hutments, and using surplus war equipment now in store, might enable practitioners to do more and better work in less time and with less effort; and without some such saving in medical manpower there will certainly not be enough doctors to provide a genuinely comprehensive medical service.

Since the State is offering medical care to everybody, it must spend enough to make that care efficient; and if health centres fulfil their promise the money devoted to them will be very well spent.

Concentration of the work of six doctors at a centre should mean overhead costs lower than those of six separate practices. With nurses, secretaries, and telephonists at hand, and the social services on tap, the practitioner should be relieved of much non-medical labour. The burden of clerical work and record-keeping can be largely shifted to clerks. Ready access to technical aids and the help of colleagues should save time and trouble. Much duplication of equipment and instruments can be avoided, while standardisation and bulk buying will reduce expense. As in large partnerships, arrangements for free afternoons, nights off duty, and sufficient holidays can obviate the chronic fatigue which prevents so many practitioners from making the best use of their skill.

HEALTH CENTRES ATTACHED TO TEACHING SCHOOLS

But the utilitarian outlook, though proper to these hard times, is not enough. Besides discovering how to supply medical care economically we have to find out how to improve its quality; and from the first there must be some centres which are in no sense makeshift but are deliberately designed as the best we can devise. These should serve the purpose both of experiment and teaching, and should therefore be attached to the undergraduate teaching schools.

In the neighbourhood of each teaching school there might be a district where the students could see general practice at its best and in process of development. Such a district, with a population of perhaps 100,000 and containing half a dozen health centres, could be the field of study for the professor of social medicine and his staff, who would work in conjunction with the health-centre practitioners in teaching, in research, and in improvement of the service.

It may be many years before the ordinary health centres elsewhere can do more than concentrate on the work in hand; but in the health centres of a designated teaching area the staff could be supplemented from university and trust funds, and many valuable experiments could be made without throwing an undue strain on the participating practitioners. For example, within the designated area periodic examination of all the people could be undertaken, accurate morbidity statistics could be collected, the technique and results of health education could be explored, and medical liaisons with local industry could be formed. At the same time the field of general practice could be demonstrated to the student in a way that has hitherto been impossible, and his outlook could thereby be given a new and preferable orientation.

In a word, the health centres attached to a teaching school could from the beginning be given a special opportunity to live up to their name—to promote the positive health of the people under their care. In so doing they would enable us to form opinions as to what should or should not be undertaken later elsewhere.

This would, of course, carry the corollary that, as soon as circumstances allow, centres embodying all that has been found best in these prototypes must be planned and provided as widely as possible. Otherwise we should only be preparing for the next generation of general practitioners further frustrations. If we are to show the medical student how efficient and attractive general practice can be made, we must not deny him the use of the same methods in his own practice.

PRIORITIES

Naturally, for many a long day, priorities will still have to be observed. The case for the establishment of centres is, and will continue to be, stronger in some areas than others. It would be idle to attempt now any detailed assessment of future needs; but we may hope that well-designed and well-equipped centres will prove a potent means of attracting the best of the new doctors (and perhaps some of the older ones, too) to areas where they are most required. Therefore consideration should be given to the early establishment of centres in unattractive and under-doctored areas.

Another pre-eminently suitable field for experiment will be the new satellite towns. Here there should be a good opportunity for testing new methods of approach to health problems, both preventive and curative, and for finding ways whereby the health services may best be integrated into the life of a newly developing community.

PERSONAL HEALTH AND PUBLIC HEALTH

The health-centre project again exposes the impermanence of the old boundaries between the provinces

assigned to the medical officer of health and the practitioner. The M.O.H. was supposed to concern himself with preventive medicine, and the practitioner with curative medicine. But the real boundary, in so far as there must be one, lies between personal health and public health. The M.O.H. is primarily interested in the *community*, and therefore in epidemiology, in environmental standards, and in general health education. The practitioner's particular duty, on the other hand, is to do all he can for his *individual patient*, and he will fail therein unless, besides curative medicine, he practises preventive medicine and what we have termed functional medicine—the promotion of the highest level of function possible for the individual.

The health centre, as we have been describing it, is essentially a place where personal health is to be sought—through curative, preventive, and functional medicine. It is dedicated to the individual patient or person, not to the community, and only by a series of historical accidents does it come at all within the realm of the doctor who specialises in public health.

It is natural that the keen M.O.H., now accustomed to administering hospitals and remedial clinics, should tend to see it as an extension of his own department, affording him a welcome opportunity of closer study of the environmental and social aspects of public health. Indeed, by taking away from the local health authority its function of providing a hospital service, and placing on it the new task of establishing, maintaining, and largely staffing the centres, the National Health Service Act lends colour to this idea that these centres are part of the local public-health service; and the M.O.H. may be forgiven for thinking of the practitioner's quarters as a mere annexe to the local-authority clinic. Nevertheless the personal-health service is *not* a part of the public-health service, however closely the two should be connected. To regard it as such is to invite difficulties, and we feel sure that the best work for health centres will be done by the M.O.H. who, in the temple of Personal Health, is content to serve as provider and arranger, taking care to reserve his vestments of a chief priest for the temple of Public Health where his supremacy is unquestionable.

GROUP PRACTICE

Another fundamental question that arises is the relation of the patient to the doctors working in a group. The traditional foundation of the personal-health service is a contract between the patient and a single doctor. Is this basis to be changed when the service is embodied in a health centre? Will the patient cease to be the patient of a particular doctor and become the patient of the group?

We should be sorry to see so great a departure from former custom. Hitherto the patient has had the benefit of two kinds of care. From his family doctor he has had the care of an adviser who accepts responsibility as an individual, and often as a personal friend. When this adviser has felt that his help was insufficient, he has handed over the patient to a second kind of care—that of a group of people forming the staff of a hospital. Here, though admitted in charge of a particular member of the staff, the patient is really under the care of the group as a whole, many of whose members share the responsibility for him.

Those who think that a patient attending a health centre should be the patient of the whole group are bringing the hospital conception into general practice, to which it is foreign; and they may be depriving the patient of the comfort of committing himself and his fortunes to a single person whom he knows and trusts. Might it not be better if, on the contrary, we increased rather than diffused the responsibility of the individual practitioner for his patient? Ideally, should we not arrange that even when he transfers his patient to the

hospital he should continue to watch over that patient's interests, just as the captain of a ship remains on the bridge when a pilot is taking his vessel through difficult waters?

All the same, if half a dozen practitioners are to work together in the partnership of a health centre they will fail in their duty towards one another if they do not develop a certain responsibility for each other's patients; and in a good health centre the patient, though he gains all possible advantage from having his *own* doctor, will also enjoy the protection of the group as a whole and of any member whom he encounters.

The development of a group spirit among the doctors in a health centre is indeed a necessity; for the biggest advantages to be expected from inviting several practitioners to work under one roof are the intangible advantages of professional and personal association. Here it may be relevant to recall Bion and Rickman's requirements for a good group spirit,¹ which included—

(a) a common purpose; (b) common recognition of the "boundaries" of the group and their position and function in relation to that of larger units or groups; (c) the capacity to absorb new members and to lose members without fear of losing group individuality; (d) freedom from internal groups having rigid boundaries; (e) each individual member of the group is valued for his contribution to the group and has free movement within it, limited only by the generally accepted conditions devised and imposed on the group; (f) the group must have the capacity to face internal discontent and must have means to cope with it.

GENERAL PRACTICE

Those who see the patient as belonging to the group rather than to his "own" doctor usually have in mind a partnership in which the partners develop specialised functions and the patient (as in a hospital) goes to the ones most skilled in managing his ailment. In our third article we contested this view that the health centre should become a group of specialists forming a minor Mayo Clinic, and argued that each member of the staff, though he might develop special aptitudes, must continue to be a truly general practitioner.

Those who favour a high degree of specialism among practitioners often claim that this is the only way to keep them interested in what is otherwise apt to be a dull occupation. We believe that general practice need not be dull, but can and should, under proper conditions, be capable of giving a full and satisfying life. Specialisation should only be necessary to the extent that it enables the individual to enhance his contribution to the group and so more effectively allows him to fulfil criterion (e) above. It is possible that, in the course of cultivating such a special interest, the practitioner may find that he has an aptitude for his chosen specialty which justifies his eventual translation to the purely specialist field, but he should be encouraged to take this step rather because it offers better chances of his using his particular talents than because it promises much better financial reward. There is much to support the argument of those who say that general practice is itself a specialty, demanding a great deal of knowledge, skill, and judgment from those who take it up. The renaissance of general practice, they feel, will be achieved not by making each practitioner a graded specialist in something else but by asking a high standard in his own specialty.

Whether it is or is not desirable for him to make a hobby of some particular kind of work, the G.P. still has wide scope for the exercise of his talents. He will always have great responsibilities.

To him comes the patient with his earliest presenting symptoms. Many of these will only be manifestations of minor illness or injury. Yet the proper and skilful handling of these ailments—learnt best, and perhaps only, in general practice—may often prevent their

developing into more serious troubles. Especially is this true in the case of minor psychological disorders. And always among these seemingly unimportant symptoms there will be the first warning signals of the commencement of more serious illness, the early detection of which must essentially remain the task of the general practitioner. He must as well continue to shoulder the responsibility for the early diagnosis and prompt handling of surgical and medical emergencies, and should be able to call on the nursing and laboratory facilities that would enable him to deal efficiently himself with the pneumonias, with cardiac failure, and with diabetic coma, without necessarily losing touch with his patients in a specialist hospital.

The general practitioner will remain the close confidant of his patient. He it will be who will decide when hospital investigation is needed or consultation should be sought. He should be given every opportunity of easy personal access to the consultant services. His position of trust, the "family-doctor relationship" he has with his patients, makes him the most suitable person to advise on matters of health as well as illness. Ideally he should be the doctor giving continuous advice through all ages on the problems on which his patients so often need help—problems which may range from those of diet and clothing to those of genetics and family relationships. Apart from the judicious education of his patient in healthy living, the practitioner has the duty to see that he has the full benefit of preventive methods such as immunisation. Much of the antenatal, pædiatric, school, and industrial work now done by full-time medical officers should and can be restored to the general practitioner, and obstetrics will still be practised by those interested in it.

The fact that so much more can nowadays be done for people means that the general practitioner has a more important rôle in seeing that it is really done. The health centre of tomorrow must give him all he needs to realise the great potentialities of what is still to many the most fascinating and useful branch of medicine. It remains for the profession to convince itself and to persuade others that the vigour of a country's medical service is measured by its strength in general practice, from which all other branches spring.

The new National Health Service must not become just a new method of paying for the general practitioner's services: it must give him new advantages, enlarge his capabilities, and restore some of the opportunities which general practice has—with the advance of medicine—been lately in danger of losing. To do this it will be necessary to explore and utilise to the full the conception of group practice in health centres.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED JAN. 25

Notifications.—Smallpox, 0; scarlet fever, 1286; whooping-cough, 2151; diphtheria, 247; paratyphoid, 1; typhoid, 6; measles (excluding rubella), 11,671; pneumonia (primary or influenzal), 1270; cerebrospinal fever, 94; poliomyelitis, 5; polioencephalitis, 1; encephalitis lethargica, 3; dysentery, 97; puerperal pyrexia, 133; ophthalmia neonatorum, 87. No case of cholera, plague, or typhus was notified during the week.

The number of patients in the infectious diseases' hospitals of the London County Council on Jan. 22 was 1153. During the previous week the following cases were admitted: scarlet fever, 39; diphtheria, 22; measles, 55; whooping-cough, 41.

Deaths.—In 126 great towns there were no deaths from scarlet fever, 1 (0) from an enteric fever, 4 (0) from diphtheria, 7 (0) from measles, 8 (0) from whooping-cough, 83 (4) from diarrhoea and enteritis under two years, and 92 (17) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 277 (corresponding to a rate of 27 per thousand total births), including 29 in London.

1. Bion, W. R., Rickman, J. *Lancet*, 1943, ii, 678.

In England Now

A Running Commentary by Peripatetic Correspondents

It requires some time in general practice before one compiles a working terminology. With growing relief one abandons the academic approach for expressions which doctor and patient can understand.

Suppose, for example, that you are faced with a child with a high temperature. To announce hesitantly that it is rather difficult to say at the moment but that pneumonia may well develop serves truth but is not helpful. The confident statement, however, that this is a severe chill is immediately acceptable, and allows for a really remarkable recovery by the next day, or alternatively a definite localisation of the trouble. Thus a chill may settle on the chest, even to the extent of the lungs becoming congested. Other possibilities include a "chill on the kidneys," or, more simply, a "chill round the water-works."

It is important to avoid such terms as "neurosis" or "anxiety state." These not only annoy the patient but often lead to vague circuitous conversations which completely alienate him. Neurasthenia, on the other hand, or its little brother, nervous debility, are solid and understandable. From these it is fortunately possible to make a passable recovery in a short time.

The word "injury" carries profound significance in legal circles, so it is best to adhere to such a classification as "bruised foot," "sprained foot," "fractured foot," or "septic foot." Incidentally, for goodness' sake get an X-ray film taken of any injury round the ankle which may conceivably lead to litigation. It may not do the patient any good, but it will save you from looking a fool some day in the witness-box.

Skin conditions are rather well known to the public and not interchangeable. Hence one must consider carefully scabies, ringworm, impetigo, eczema, and even psoriasis. Dermatitis, another implement for litigation, is to be avoided. When in doubt, eczema will do as well as anything until you know what the diagnosis really is—if you ever do.

I confessed to a literary friend that there were times when the urge to write was so insistent that I did not feel happy until my thoughts were on paper. Did he have similar literary crises? "Yes," he replied, "I do get that very feeling and invariably in an acute form on the day before I start a cold. I fancy it must be the manifestation of an outpouring of adrenaline."

That set me thinking. I could not agree with the idea of the crisis depending on adrenaline, for no palpitation, sweating, or other physical discomfort accompanies the urge. Those indications impress themselves on me just before I get up to make a speech but not when I feel I must put pen to paper. No; it must be something which overcomes inhibitions and enables the brain to pour out the product of its workings. We are all aware of men of genius who were the victims of drug-addiction, under the influence of which they often wrote masterpieces, but that is the exception, and in fact we do not know what physical conditions lead to moments of inspiration. We do know something of the psychological motives of literary power but it is rather degrading to analyse them too much.

During the few hours preceding the onset of a severe cold in the head I have often had the feeling that I was much better than usual, that I was "on top of the world." That must surely be due to the absorption of small quantities of the poison generated by the microbe or virus which is responsible for the cold. It is as if there were a homœopathic dose of a living vaccine. Surely it should be possible to extract the substance which causes this euphoria and to use it medicinally? Everyone is aware also that in phthisis the patient may feel that he or she is improving although the physical signs indicate the reverse. Here again there must surely be some protein derivative either in the microbe itself or manufactured in the tissues by that microbe which affects the cerebrum benevolently. If one could only isolate that substance it might prove to be the finest pick-me-up or tonic ever. You will ask your patient: "How do you feel today?" and get the answer: "Jolly rotten—very depressed." "Well," you will reply, "just take a small dose of this tuberculin-extracted tonic and you

will feel splendid." Only I feel sure that in the initial language of today we should refer to it as T.E.T.

Family life seen through the eyes of the Ministry of Health and the Central Council for Health Education appears to consist in one catastrophe after another. Their film, *Your Children and You*, leaves one with the impression of crashing crockery, harassed parents, screaming children being sent to their rooms, favourite toys being removed, and battles over food. Even the domestic dog turns and bites the baby. It is true there are admirable sequences showing real insight into children's feelings. These include shots of the baby's view from the pram, small boys helping their fathers dig, small girls washing their dolls' clothing, and some excellent advice on how to handle the older child when a new baby is on its way. These are happy and helpful scenes. But the fact that I can recall only one smiling mother and countless harassed ones indicates the film's overall mood.

We start with the landlady and the parents being woken in the night by a screaming baby, and we are at once warned that having a baby means work, work, work; warned too that if we don't master him, he'll master us—no mention of fun and pride, or the fascination of seeing an infant grow and become an individual, or the subtle changes of feeling which parents undergo when their children are growing up. The relationship depicted between parents and children is often disciplinarian, rarely that of mutual enjoyment. There is no understanding that with parenthood, as with all professions, unless we get satisfaction and pleasure from it we are unlikely to be successful. On the contrary this presentation is so largely in terms of blood, sweat, and tears as to be most discouraging to the beginner. Perhaps the Royal Commission on Population will ban it on these grounds.

When the film concentrates on how to keep children happy occupied it is good; when it tells us how to deal with difficulties it is frankly deplorable. When the three-year-old is found playing with the carving knife, instead of his being offered some alternative plaything and his interest diverted, the knife is wrenched from him with the expected screams. Granny, who takes his side, is held up as a monster from whose spoiling ways the child must at all costs be preserved. The child who prefers pudding to veg. is given the option of veg. or nothing. No give or take, no finding out what suits, above all no humour. When the child of five years wets herself mother is reprimanded for inadequate training. Naughty children, naughty mothers, naughty grannies!

To many whose work lies with parents and children, especially those who have got into difficulties, this film will seem a calamity. The very fact that about half of it is very good makes the resulting mixture even more unfortunate, since the bad parts will appear more plausible. No doubt its sponsors on reading these criticisms will remark that it is hopeless to attempt anything in this field because all the experts disagree. But the B.B.C. has shown us how a nationalised or governmental body can deal with controversial topics—by giving exponents of different points of view an opportunity of expressing them and by avoiding any suggestion of authoritative statement. So far from discouraging the Ministry from making films on child upbringing, therefore, I hope that others will be made, presenting so far as possible the divergent points of view now current. And I am willing to bet that the one which is psychologically most accurate, and therefore most helpful, will be the most popular.

Teaching physiology to second-year medical students has its lighter side in our college. Recently I was asked, "Sir, what is pH—is it a substance like an enzyme?" I clutched the lab bench for support, and trotted out what every medical student should know about H-ion concentration. The oaf apparently digested this information in toto, and I felt justly proud of having got something home into his hemispheres. Two or three days later we were discussing blood-groups. I gave a snappy survey of the Rh factor and its importance. I chanced to encounter the oaf afterwards and brightly asked him if he grasped the idea of the Rh factor. "Oh, yes, sir, it's got some connexion with pH, hasn't it?" Well, he may be right, but should a Qh (or qH) be discovered, God help us!

Letters to the Editor

HISTOLOGY OF THE COMMON COLD: AN APPEAL

SIR,—Apart from the work of Hilding¹ we have found no references to careful studies of the histological changes produced in man by the common-cold virus. Further information about such changes would be of great value in the studies of this disease now being conducted here.

Many people are killed in accidents or die suddenly from other causes; many people have common colds, especially at this time of year: there must therefore be many who die suddenly in the early stages of a cold. We should be very grateful to any pathologist who could let us have small pieces of nasal mucous membrane from cases of accidental or other sudden death where it was known that the subject was in the first week of a cold. Material should be placed in saturated corrosive sublimate solution containing 10% of formalin (40% formaldehyde) and sent to this address. One of us would also be glad to attend personally any autopsy on such a subject taking place in the London area.

National Institute for Medical Research,
Hampstead, London, N.W.3. C. H. ANDREWES
J. S. F. NIVEN.

TREATMENT OF TUBERCULOSIS

SIR,—One thing that appears to be quite clear from this correspondence is that the authorities entirely disagree.

While Dr. Houghton and Dr. Corrigan (Dec. 14) find it necessary and advisable to use the "harmless" amphetamine for blotting out the deleterious and often disastrous apprehension of active interference, which is generally felt by patients in modern sanatoria, Dr. Simmonds (Jan. 11) finds that "the majority of patients here accept the need for active interference without emotional upset." Dr. Howard (Jan. 4) is of the opinion that amphetamine is not harmless, and that some patients have an individual idiosyncrasy to it which is far greater than with other drugs; the makers of amphetamine question this view (Jan. 18).

The surgically minded tell us of the benefits to be derived from immobilising the lung by artificial pneumothorax, inflating the peritoneal cavity, paralyzing the diaphragm, and cutting out portions of the bony thorax; yet perhaps the least mobile part of the lung, the posterior aspect of the apices, is most often attacked by the disease, while during and following such procedures the other lung is given double the work to do. Is it that, ignoring the diseased lung, they have adopted for the lesser affected lung Mr. MacMahon's advice (Jan. 25): "Physicians and nurses who are to have charge of tuberculosis cases should, by breathing and physical exercises, fully develop their chests and lung capacity, for it seems to me that lungs which are thoroughly aerated must have a better chance of resisting the disease."

We are indebted to Dr. Temple Clive (Jan. 25) who very ably sums up the difference between treatments in the various institutions: "Let us not forget that the quiet and peaceful surroundings of the true sanatorium have as prominent a place in the treatment of the tuberculous as the noisy and restless environment of the surgical wards of the chest hospital."

Though opinions conflict on these matters it is generally agreed that resistance to the disease is lowered by poverty and overwork in cold, damp, ill-ventilated, or overcrowded dwellings; yet we still see millions expended on sanatoria, and mass radiography which could more profitably be used in building up resistance by improving the food and homes of the people.

We also know that by far the greater majority of the people who contract tuberculosis recover from it without the disease being specifically treated or even recognised except by chance or mass radiography, and that the disease has progressively diminished with improvement in the social welfare of the people. Would it not therefore be cheaper and more reasonable to expend our efforts in this direction rather than waste them in expensive, ineffective, inefficient fractional measures?

Birmingham. JAMES F. BRAILSFORD.

SIR,—Dr. Clive's axe, though possibly somewhat blunted, can still be wielded to good advantage; he does

well to draw attention (Jan. 25) to the increasing amount of surgical interference in pulmonary tuberculosis, and the "noisy and restless environment of the surgical wards."

The true value of collapse therapy has yet to be assessed; as far as I am aware there is still no sound statistical proof on an actuarial basis that cases needing this therapy have end-results even as good as those not needing it. I would be the last to deny that collapse measures have often been brilliantly successful; but with the present demand, both inside and outside the profession, for more and more collapse therapy, there is need for a firm restatement of the fundamental importance of rest and fresh air. Rest must be not only physical but mental. The quietude of mind induced by old-fashioned sanatoria was the basis of many successful cures; and there was little need in those days to fall back on amphetamine or other cerebral stimulants to allay the feeling of "apprehension and alarm" which has been mentioned in this correspondence.

Lip-service is always paid to the value of long-continued rest; but very few institutions have really carried out this treatment, although it is the bedrock of all tuberculosis therapy and the only measure which has stood the test of time. Since Lillingston and Riviere raised their voices in its favour few in this country have emphasised the value of a long period of rest; and in these days of restless unceasing search for new methods of collapsing the lung, or draining cavities, or raising the diaphragm, or removing ribs, I feel that collapse measures already at hand should be appraised anew.

J. H. CRAWFORD
Douglas House, Bournemouth. Medical superintendent.

GENTIAN VIOLET IN GASTRO-ENTERITIS

SIR,—I have had considerable success in the treatment of gastro-enteritis, where no specific organism is involved, with gentian violet in keratin-coated capsules. This should be combined with a bland bismuth mixture as a sedative for the gastric mucosa. The dose for an adult is 1 grain twice daily given as four gr. $\frac{1}{4}$ capsules. For a child half this dose and for an infant a quarter. Young children with teeth are apt to bite the capsules, and unless this is prevented by administering the capsules in jam and tickling the child the treatment may fail.

The treatment is of almost immediate benefit to most cases and a few hours suffices to produce well-marked improvement. It should however be continued for a day or two to avoid relapse.

I have found it of great use in the present widespread gastro-enteritis at all ages, though I have not had the opportunity of trying it in a bad epidemic of neonatal diarrhoea. In the few cases of the latter that I have tried it on it has been successful, and in my opinion it deserves further trial. I consider it far superior to the sulphonamides as a bacteriostatic in the gut.

Lytham. ROBERT F. E. HARRINGTON.

DOCUMENTATION

SIR,—In the third of your series of articles on Health Centres of Tomorrow (Jan. 18) you imply that R.A.F. records during the war were written by hand. After four years of Army psychiatry during which I saw many R.A.F. cases I wholeheartedly agree that Air Force medical records are good. The reason however is that they are typewritten. All special investigations and reports are also typed on the same record, and it is thus possible to read a R.A.F. case-paper in a fraction of the time which it takes to peruse other forms of record, which often consist of a multitude of odd-sized pieces of paper with every variety of scribble. As to the accuracy of the typewritten records, which you mistrust, I found very few errors; and the simple check of initialling after perusal should be sufficient to guard against major mistakes.

My experience of handwritten case-records of chronic patients in mental institutions leads me to the same conclusions. The value of these records is severely limited by the difficulty which one experiences in reading them, written as they are by many hands.

In my opinion the typewritten flimsy is the ideal solution. The importance of uniform paper size cannot be over-emphasised, and all additional reports and informa-

1. Hilding, A. *Arch. Otolaryng.*, Chicago, 1930, 12, 133.

tion should be copied on to the same record. In addition a special summary form at the front showing special features, such as operations, X-ray of chest, or vaccination, is essential. It is high time that ordinary doctors as well as consultants demanded the use of efficient methods commonly required by business concerns of much less national importance. The setting up of the new health centres should give the patient the benefit of a modern record system without saddling the doctor with the burden of additional clerical work.

St. Mary Cray, Kent.

BRIAN H. KIRMAN.

GERMANY

SIR,—We want to plead for the better provision of good therapeutic material for the Germans of the British zone. While we cannot claim to have made a detailed study of what drugs are available, we have been in Germany for a considerable time, and our dismay at their inadequacy has grown steadily. Having but just returned from leave in England, we are frankly ashamed to think that, whereas in Britain life-saving and limb-saving drugs such as penicillin may be prescribed for simple sore throats and other trivial ailments, they are denied to all Germans save those with acute gonorrhœa. Presumably nobody denies our responsibilities towards the population of the zone, and we wonder if there can be more than a handful of your readers who would not share our sentiments in this matter had they been timidly approached by eminent German doctors with a request for some penicillin to save a life or a limb which would otherwise perish. We make the plea that British medicine should restrict or ration its use of this and comparable drugs in order to help our fellows.

We are aware that the press generally makes life in Great Britain appear intolerably hard just now, and occasionally features life in Germany as just a little more intolerable. As two medical men who know both worlds and have seen the slow hunger and helplessness that have so embittered our ex-enemy protectorate we venture to cast a little shame on us all and beg that we be allowed to relapse into Christianity, which we have fought for, and so long denied in our dealings with these people.

Lübeck.

N. SAUNDERS
L. F. LEVY.

* * * In our issue of Jan. 25 (p. 158) an appeal for money to buy penicillin for Germany was made by the Ecuemenical Refugee Commission, 21, Bloomsbury Street, London, W.C.1.—Ed. L.

CHILBLAINS

SIR,—I have been using calciferol in the treatment of chilblains for several years, and agree with Dr. Phelan (Jan. 25) that it is a most potent curative agent; but it seems to be less valuable in prophylaxis.

I have always administered calciferol in the form of high potency 'Ostelin' tablets (50,000 I.U. per tablet); 1 tablet daily is given, irrespective of age, until cure or marked improvement is apparent—which is often in less than a week. After that 1 tablet is given three times a week for several weeks, to prevent relapse. In severe cases in adults I sometimes start by giving 1 tablet twice daily. Most cases are quickly cured by this treatment, and no ill effects have been noticed.

Troon.

JAMES ROSS.

PAYING THE ANÆSTHETIST

SIR,—Anæsthetists will, I am sure, appreciate the emphasis in your leading article of Jan. 4 on their responsibilities at a surgical operation.

The wide range of the anæsthetist's duties, which is still not recognised, will not, I fear, of itself attract enough suitable recruits to the specialty. To ensure that they are forthcoming the remuneration will have to be considerably improved.

Outside the teaching centres it is exceptional for an anæsthetist, however competent, to be able to earn a living solely by the practice of his specialty, and nowhere does he enjoy a reward comparable to that of his colleagues otherwise engaged. The tradition of high surgical fees and low anæsthetic fees will not be ended until the advantages of having skilled anæsthetists are appreciated. And who will champion the anæsthetist's interests?

The addition of higher anæsthetic fees to the already high cost of surgery would, I believe, be unfair on most

patients, to whom the cost of surgery must already be well-nigh insupportable. How then is the anæsthetist to receive a proper reward for his services?

An operation requires a team consisting of surgeon, anæsthetist, and assistant, upon whom responsibility devolves in that order, with, as you have emphasised, a close bracketing of the first two. It would seem reasonable to charge the average patient an inclusive fee for the team's services and to remunerate its individual members out of that sum by a division which fairly reflects the responsibility of each. Opinions will differ as to the division, but long experience and much thought lead me to suggest that a fair division would be: surgeon 60%, anæsthetist 30%, and assistant 10%.

The institution of a scheme such as this would, I believe, be gratefully welcomed by the public; while adequately remunerating the surgeon it would establish the practice of anæsthesia on a financial basis satisfactory enough to attract sufficient able recruits.

Bournemouth.

S. F. DURRANS.

CHEST DISEASE IN RAND MINERS

SIR,—An error has crept into your annotation of Dec. 28 (p. 952). You say, "The miners are examined every three years after an initial examination . . ." As a matter of fact all miners were examined every six months during the period covered by the Miners' Phthisis Medical Bureau Report—the three years ended July, 1944. Since then the Act of 1946 has modified this proviso, and miners with less than six years' continuous or cumulative service need only be examined once every twelve months. However, miners with continuous or cumulative service of more than six years must still be examined every six months, as has been the law for many years past.

This matter is of great interest to those concerned with the control of silicosis. In the opinion of all of us who have had lengthy experience with this disease, the initial examination, by eliminating persons who are likely to be more than ordinarily susceptible to dust inhalation, plays a not inconsiderable rôle in reducing the incidence of silicosis; and the periodical examination, by influencing the retirement from the industry of a certain number of early cases of silicosis, is often an important factor in preventing the progress of the disease or at least greatly slowing it down.

Rand Mines Ltd., Johannesburg.

A. J. ORENSTEIN
Chief medical officer.

SIR,—It might be instructive to compare the conclusions drawn in your annotation of Dec. 28 with those we carried away from visits to various hospitals and mines in Johannesburg and district in October, 1944.

In the first place, the statement "no form of mass radiography has yet been introduced" seems peculiar, as we saw the miniature radiography equipment installed at the Witwatersrand Native Labour Association Ltd. Hospital. With this equipment the officer in charge of the X-ray department, K. G. F. Collander, told us that he could examine the chests of about 500 natives in a forenoon. We were also led to believe that native workers were examined by X rays at intervals of approximately 6 months, especially those in whom some abnormality had been found. Here we were shown some miniatures of a very high standard, as well as the large plates from the same case.

With regard to the factors concerned in the spread of chest disease, we were told, in the mine we visited, that the air was dried, in an endeavour to prevent the incidence of silicosis and tuberculosis; yet, in almost his next breath, our guide drew our attention to the large water tanks throughout the mine, all open to the air. On the actual drilling face we found a thick moist warm fog through which it was impossible to see for more than a yard or two; to us this appeared to be the perfect place for the production of silicosis, yet there was no evidence of any prophylactic face-masks being worn.

We note with interest your statement that any miner found to have phthisis is forced to stop underground work. We were informed (though our information may have been false) that native workers suffering from phthisis were given a choice similar to that allowed to cases of silicosis. As the pension awarded was stated to be equivalent to a year's pay, the natives almost invariably

chose to continue work in the mines, a choice tantamount to signing their own death warrant, since tuberculosis is known to have a high mortality among natives.

In conclusion, a word about the treatment of native workers suffering from chest diseases. During a brief visit to the W.N.L.A. Hospital, no case of chest disease was seen, but at the Infectious Diseases Hospital at Rietfontein we found that the admission of more than minimal numbers was impossible owing to shortage of staff. In a further hospital near the centre of the city this shortage of staff was responsible for several new wards for the treatment of tuberculous cases remaining unopened.

J. F. D. FRAZER
J. J. WALKER.

MEDICAL ASPECTS OF MARRIAGE GUIDANCE

SIR,—Dr. Griffith's comprehensive survey last week raises a question which is discussed in the medical press less often than I would wish.

There is general agreement that ignorance of erotic technique among married people is a bad and deplorable thing. The intelligent and sane study of erotics as an art and a source of pleasure and satisfaction seems to me to be the mark of a civilised community, just as is skill in the preparation of food. Yet anyone who attempts to publish an explicit account of the variations and methods of this study is likely to find himself the butt of a silly and humiliating prosecution, in which, as in a recent case where a medical man was prosecuted and resoundingly acquitted, he is liable to find himself in company with the writers of erethistic books on torture and of other paper-backed works which are simply printed symptoms of abnormal behaviour-patterns. Even a work directed wholly to medical readers may not escape criticism.

The real offence lies in directing instruction to the general public at a reasonable price. The idea of illustrating such a work to make it intelligible would raise any publisher's hair. Our own society takes a view which is probably unique.

This is one of the forms of stupidity for which we, or rather our patients, pay in loss of normal enjoyment, and in the guilt and malaise which accompany sexual distortion. The range of normal variation in sexual practice is wide enough to satisfy all but the grossly deranged; but unless they can read French or Latin they have no means of informing themselves.

I wonder how our health would fare if the entity which is optimistically described as "public morality" took the same view of cookery as it does of sexual technique. The anomaly is one which medical opinion cannot itself remove; but medical protest might in time persuade the public at large to remove it.

PHYSIOLOGIST.

THE NURSING CRISIS

SIR,—Your leading article last week cannot claim to be comprehensive in its dealing with this problem of nursing shortage.

You lay emphasis on the disadvantages of the standard Rushcliffe range of salary, pointing out that the policy of uniformity has made it impossible for some hospitals to offer any compensatory advantage. This is not true. The Rushcliffe scale has only established a national minimum range of salary. There is nothing to prevent a hospital paying more, except that this extra would not qualify for the 50% grant which the Ministry of Health is prepared to give to cover the increased costs to them by adopting the scale. Less attractive hospitals can, therefore, increase this minimum in order to secure nurses.

Cardiff.

DAVID G. MORGAN.

* * We are obliged to Dr. Morgan for drawing attention to a gap in our article: we should have explained how the minimum scale has come to be regarded as a maximum. He is no doubt technically correct, but the Rushcliffe policy of uniformity is none the less a reality. Though the committee was appointed to draw up "agreed" scales of remuneration, it has used its influence to ensure that its "recommended salaries and emoluments" shall be generally adopted without additions by individual hospitals or authorities. Its attitude was made clear in its first report (1943), which spoke of "undesirable competition for staff between different

hospital authorities" and said that "the national adoption of the scales we have drawn up will bring such competition to an end."—ED. L.

LEPTOSPIROSIS CANICOLA

SIR,—Dr. Klein (Jan. 4), commenting on the paper by Dr. Baber and myself,¹ states that Professor Lukes was the first to identify *Leptospira canicola*. I should like to point out that I have acknowledged Lukes's pioneer work on Stuttgart disease in a recent paper,² but I cannot admit his identification of this organism. The spirochæte found by Lukes and Debrek³ in the kidneys of affected dogs was called by them *Spirochæta melanogenes canis* and was said to be highly virulent for guineapigs. Later, in 1926, Lukes admitted certain technical errors in his earlier work and implied that the virulence had not been established. I quote from Wirth⁴: "Lukes später (1926) selbst wörtlich: 'Wir müssen aber zugeben dass uns die Arbeiten von . . . auf Irrwege geführt haben . . . so dass wir die Mehrzahl unserer Versuche weglassen müssen und nur seltene als positiv bezeichnen.'"

Although its feeble virulence for the guineapig is one of the major features distinguishing *L. canicola* from *L. icterohæmorrhagica*, this somewhat equivocal information does not prove that Lukes was working solely with the first organism. Again the transmission of Stuttgart disease to animals does not identify the organism in the inoculated material as *L. canicola*. Wirth⁵ showed experimentally that rat leptospiræ (which are never *canicola* strains) could occasionally produce typical Stuttgart symptoms in dogs, and suggested⁶ that the symptomatology depended as much on the age and resistance of the infected animal as on the infecting strain. It is of course now well established that Stuttgart symptoms in dogs are usually caused by *L. canicola*, but the fact that they can on occasion be produced by *L. icterohæmorrhagica* invalidates any claim to identification on this ground. Accordingly, I consider that Klarenbeek and Schüffner⁷ who first isolated and serologically differentiated *L. canicola* must be accorded the credit for its first identification.

The earlier work of Lukes and his colleagues is of sufficient intrinsic merit to obviate any necessity for a claim which cannot be substantiated; I freely acknowledge that some of the spirochætes seen by Lukes as early as 1910⁸ may have been *L. canicola*.

Central Public Health Laboratory,
Glasgow.

R. D. STUART.

FATAL USE OF A DANGEROUS UNIVERSAL DONOR

SIR,—It is to be hoped that all clinicians who order or give a blood-transfusion will appreciate the importance of Dr. Tovey's letter (Feb. 1), in which he abhors the use of the term "universal donor." It is certainly one which should have been discarded by now, though it is still employed quite generally by doctors; and because of unfortunate propaganda it is now well established in the lay mind. Many blood-donors who find that they are not of the "universal group" feel that they are not required, which is particularly unfortunate in the case of group-A donors. As group-A and group-O people are, roughly speaking, numerically equal, if patients were grouped before transfusion the demands for A and O blood could be made nearly equal; people of groups B and AB can of course be used to provide plasma. With donor panels decreasing in most regions, the urgent need for group-to-group transfusion cannot be too strongly emphasised.

It is perhaps unfortunate that the human organism can survive considerable insults in respect of incompatible transfusion; I know of a group-O patient who was recently given in error 2 pints of group-A blood, and who was none the worse for it. The fact that a clinician

1. Baber, M. D., Stuart, R. D. *Lancet*, 1946, ii, 594.

2. Stuart, R. D. *Vet. Rec.* 1946, 58, 131.

3. Lukes, J., Debrek, M. (1923) cited by Lukes, J. *Ann. Inst. Past.* 1924, 38, 523.

4. Wirth, D. *Wien. tierärztl. Mschr.* 1935, 22, 129.

5. Wirth, D. *Tierärztl. Rdsch.* 1935, 41, 1.

6. Wirth, D. *Wien. tierärztl. Mschr.* 1939, 26, 353.

7. Klarenbeek, A., Schüffner, W. *Ned. Tijdschr. Geneesk.* 1933, 77, 4271.

8. Lukes, J. *Rec. Méd. vcl.* 1910, 67, 376.

may "get away" with transfusion of blood of the wrong group has in some instances established a somewhat casual attitude to transfusion, with the omission of direct compatibility tests—an attitude engendered in the first instance by the erroneous conception of the universality of "universal" blood. I think it is a pity to suggest that direct compatibility tests can be omitted even "where urgency is too extreme to permit of such a test." Surely the patient can and should be saved temporarily by the use of plasma until correctly matched blood is available. As an aid to routine compatibility tests in those patients who may require blood urgently (I refer to severe postpartum hæmorrhage), it should be an automatic procedure that when a woman goes into labour, particularly at home, a specimen of her venous blood is withdrawn into a sterile tube. Her serum is then available for the direct compatibility test should she require blood.

DOUGLAS MCRAE
Director.

Blood Transfusion Service, Edinburgh
and South-east Scotland Region.

Parliament

THE SCOTTISH BILL IN COMMITTEE

ON Jan. 28 a standing committee of the House of Commons began the consideration of the National Health Service (Scotland) Bill under the chairmanship of Mr. G. MATHERS. The people of Scotland, Lieut.-Colonel WALTER ELLIOT declared, had themselves done a great deal to provide effective health services, and he feared that the Bill's policy of centralisation might slow up this process. Therefore, in their criticisms and amendments of the measure, the Opposition would seek rather to lay emphasis on that danger.

THE HEALTH SERVICES COUNCIL

Mr. J. S. C. REID moved an amendment to clause 2 designed to make the ambit of the Health Services Council as wide as possible so that it could advise upon services not yet in operation as well as existing ones. Mr. J. WESTWOOD accepted the amendment in the spirit in which it was moved, as helpful in providing a more comprehensive service. The amendment was agreed to. He also accepted an amendment, which was agreed to, providing that the council should be allowed to appoint its own members on the standing advisory committees instead of their appointment being made by the Secretary of State after consultation with the council.

Colonel ELLIOT moved an amendment to omit the proviso enabling the Secretary of State to refrain from laying before Parliament the report of the council if he was satisfied that it would be "contrary to the public interest." The danger of unauthorised disclosure, he held, was completely covered by the Official Secrets Act. But Mr. WESTWOOD insisted on retaining this safeguard, and the amendment was negatived.

On the question that clause 2 stand as amended part of the Bill, Mr. Westwood, without pledging himself to accept any particular suggestions, promised to consider any proposals to secure as comprehensive and as good a health service as could be provided for Scotland. In setting up the advisory committees he had in mind the appointment of medical, nursing, hospitals, mental health, dental, and pharmaceutical committees; and it might be that the idea of other committees would crop up. Because of the special health problems in those areas a Highlands and Islands committee would also be set up. Each standing advisory committee under clause 2 would be empowered on their own initiative to advise on any matters connected with their special services. Both the Secretary of State and the main council might refer to a standing advisory committee.

TEACHING AND RESEARCH

Mr. REID, in moving the omission of subsection (2) of clause 3 which throws upon the Secretary of State responsibility, in providing hospital and specialist services, to make available facilities for clinical teaching and

research, affirmed that if there was to be a flourishing school of medicine there must be close and friendly relations between the university and the hospital in which the clinical teaching took place. The Secretary of State and his permanent officials were not the right people to deal with the four universities in Scotland and dictate to them what clinical teaching they ought to have. The Scottish universities would be put into a position of inferiority and have to take what was given to them. If the Bill passed in its present form Mr. Reid viewed with apprehension the future of Scotland as a resort for foreign students of medicine. Sir JOHN GRAHAM KERR, F.R.S., pointed out that a university or medical school was not independent of the teaching hospital; they were inextricably entangled one with the other and constituted a unity which was important to the welfare of the whole health service.

Dr. STEPHEN TAYLOR felt that the English Bill had a considerable advantage over the Scottish Bill in the way it treated its teaching hospitals. There was a great deal to be said for a teaching hospital having a considerable degree of autonomy. The committee should take special thought for the protection of rebels, because it was desirable to give the rebel in medicine the maximum opportunity for developing himself free from excessive supervision. But Dr. Taylor did not think that the proposal to omit this subsection achieved its object. The Secretary of State clearly must have the duty of considering the size of the medical labour force which he would require in the future. Therefore, he must make some kind of decision as to how many people were needed in the medical school, and how much clinical teaching was required. Dr. Taylor had heard it said that owing to the popularity of the Edinburgh school the ratio of students to clinical teaching in the Royal Infirmary had become increasingly unsatisfactory. He thought that the regional board might also not be a desirable body to nominate the teaching hospitals. The Secretary of State could take a nation-wide view in deciding how big a medical force would be needed. But once the teaching hospitals had been chosen Dr. Taylor thought it would be an improvement to give them the kind of autonomy they had under the English Bill.

Mr. G. BUCHANAN, Joint Under-Secretary of State for Scotland, said that the Bill did not affect teaching at all; teaching remained the duty of the university. The Secretary of State provided the facilities for teaching, but in no sense did he interfere with what had always been the historic privilege of the universities. The Scottish set-up, he thought, was superior to the English one. On this issue the local authorities, the British Medical Association, and the universities were in principle agreed. The only body against the scheme was the British Hospitals Association. In Scotland the teaching hospitals played a much larger part in the provision of bed accommodation than in England. If the teaching hospitals were set apart from the ordinary regional work a serious disservice would be caused. It was proposed to set up for the teaching hospitals a separate board of management which would not be responsible to the regional board. He hoped to see teaching hospitals expanded rather than contracted. It was proposed to give the universities representation on every board of management, and the only condition imposed was that if there was a substantial amount of teaching the university should have a larger representation. The Government went further still and said that the staff should be represented on the board. These were more important and far-reaching proposals than the English ones. The amendment was negatived by 34 votes to 18.

QUESTION TIME

Special Diet for Invalids

Colonel M. STODDART-SCOTT asked the Minister of Food how many times the Food Rationing (Special Diets) Advisory Committee had met during the last six months of 1946; and how many medical men were present on each occasion.—Mr. JOHN STRACHEY replied: Applications for special rations for individual patients are not taken to the committee as a whole, but are sent by the secretary to at least two members of the committee, the two members most qualified to deal

with the particular case. All cases raising a new point are sent to all members of the committee. This is more expeditious than attempting to convene the committee to deal with each application. The full committee meets when a change of the scales of extra rations automatically available for each illness is in question. For this purpose the committee met twice during the last six months; 8 of the 10 members were present at the first and 9 at the second meeting. Colonel STODDART-SCOTT: Does the Minister think it is a satisfactory arrangement that a committee advising in regard to food for invalids should meet only twice in six months?—Mr. STRACHEY: I think it is a perfectly satisfactory method that eminent men who are best qualified should be consulted in the case of each particular illness.

Food Rations in British Zone in Germany

Mr. E. M. KING asked the Minister concerned the average value in calories per head of food consumed by inhabitants of the British zone in Germany.—Mr. HYNDE replied: For the period Jan. 6 to Feb. 2 of this year, the weighted average of rations—including those of normal consumers, heavy workers, nursing mothers, and other special classes—is about 1750 calories per day. This figure excludes the extra rations of children attending school in certain areas who receive a supplementary meal, assessed at 300 calories daily up to twelve years and 490 calories daily over twelve years of age.

Hospital Staffing

Replying to questions, Mr. A. BEVAN stated that the number of nursing vacancies notified by hospitals in Great Britain to the nursing appointment officer of the Ministry of Labour and National Service at Dec. 9, 1946, was 29,847. The number of vacancies for hospital domestics outstanding on the registers of employment exchanges of the Ministry of Labour and National Service on Nov. 22, 1946, was 8868.

Foreign Domestic Workers

In answer to a question, Mr. GEORGE ISAACS stated that from April 1, 1946, when the permit procedure was reintroduced, to Dec. 31, 1946, 7622 permits for domestic workers were issued in respect of applications from private householders, and 162 in respect of applications from hospitals, nursing-homes, and convalescent homes.

Atomic By-products

Mr. P. PIRATIN asked the Minister of Supply what steps were being taken to obtain radioactive iodine and other useful medicinal by-products of atomic energy from the U.S.A.—Mr. JOHN WILMOT replied: The American government have been asked for supplies of radioactive iodine and other isotopes. Their distribution is controlled by the Atomic Energy Commission, which has only recently taken office. Its decision is expected shortly.

Nutrition in Newfoundland

Mr. J. PARKER asked the Under-Secretary of State for Dominion Affairs what steps had been taken to implement the recommendations of the recent report on nutrition in Newfoundland.—Mr. A. G. BORTOMLEY replied: Dr. Cuthbertson's valuable report is being carefully studied. In the meantime a member of the staff of the Rowett Research Institute, Miss F. Russell, has been seconded to Newfoundland as a nutrition adviser. Among the measures which have already been taken following Dr. Cuthbertson's visit to Newfoundland, I may mention the trebling of the rate of fortification of margarine with vitamins A and D, the removal of customs duties on margarine and canned milk, and an increase in relief allowances. Arrangements are also being made for a largely increased quantity of chocolate powder to be distributed in 1947.

Children in Mental Hospitals

Mr. A. E. STUBBS asked the Minister of Health if he was aware of the tendency of public-assistance committees to get children certified and admitted to mental hospitals; that several children of tender age had been admitted to the Cambridgeshire Mental Hospital; and what steps he intended taking to provide proper homes or institutions for their care.—Mr. BEVAN replied: I am aware that mentally defective children are occasionally sent to mental hospitals owing to the serious shortage of accommodation for mental defectives. More accommodation will be provided in mental-deficiency institutions as soon as labour and materials are available.

Obituary

ALI IBRAHIM Pasha

HON. K.B.E., HON. F.R.C.S.

Ali Ibrahim Pasha, head of the Fuad-el-Awal University and a former Egyptian minister of public health, died in Cairo on Feb. 3. Egypt's foremost surgeon and the recognised leader of her medical profession, he had long exercised a dominant influence on the medical education of his country. He was appointed K.B.E. in recognition of his aid to Britain in peace and war.

In 1901 he qualified at the Cairo School of Medicine, and he first won recognition for his work in the plague epidemic of that year and the cholera epidemic which swiftly followed it. In 1911 he was appointed head of the Egyptian medical mission in the Balkan war, and soon after his return to the Kasr-el-Aini Hospital his reputation as a surgeon was unrivalled throughout the country. But though he had a large practice he never allowed it to prevent him from devoting much time and energy to administrative work.

In 1929 he was put in charge of the Kasr-el-Aini Hospital and appointed dean of the medical school when plans were taking shape for building a new hospital on Rhoda Island. Not only did he plan and carry through a complete reconstruction of the old hospital and school buildings in the Kasr-el-Aini, but he induced the government to build the great Fuad I Hospital, now a familiar landmark on the bank of the Nile. In the course of this rebuilding he also introduced many reforms in the medical school. His last project was the creation of a new school in Alexandria. In war-time the difficulties were formidable. Building materials and equipment were in short supply, suitable teachers had to be found and induced to leave Cairo, and inertia and opposition had to be overcome. At this time his duties as rector of Cairo University were heavy and exacting, and his health had already shown signs of failing, yet he did not hesitate to put his hand to this new task. If much remains to be done at Alexandria, the main task has been accomplished, and he leaves behind him a second Egyptian medical school in full operation and with a full complement of students.

While a staunch believer in the ability of Egyptians to teach their own students, Dr. Ali Ibrahim was well aware of the dangers of inbreeding, and he was insistent on the need for an outside leaven among the staff and on the importance of Egyptian teachers being trained abroad. He was particularly anxious to maintain close relations with this country and to obtain postgraduate facilities for Egyptians without delay once the war ended. Himself an honorary fellow of the Royal College of Surgeons, he often expressed his desire that his son Hassan should come to London and take his F.R.C.S., and happily he lived to see this wish fulfilled.

"In the course of several years spent in Egypt during the war," writes D. E. B., "I came into frequent contact with Dr. Ali Ibrahim in connexion with the medical school, and later, during his illness, in a more personal capacity. The longer one knew him, the more one came to appreciate and admire his wisdom and achievements. In appearance frail rather than robust, he possessed tremendous physical resources, and his capacity to work long hours without cease had become legendary in Cairo. History will, I believe, place his name alongside those of Mohamed Aly and Clot Bey among the founders of modern medicine in Egypt, and the loss of his guiding hand at this crucial period of post-war reconstruction must prove a heavy blow to the Egyptian medical profession. Among those who served in Egypt during the war there must be many besides myself who look back gratefully on his kindness, courtesy, and hospitality."

"When Lord Moynihan visited Egypt," writes Sir Alfred Webb-Johnson, F.R.C.S., "he was tremendously impressed with the high standard of surgery in that country, and he regarded Ali Ibrahim Pasha as one of the most brilliant surgeons he had ever seen at work. This authoritative opinion was endorsed by successive visitors from the Royal Colleges. Now Ali Ibrahim has gone, but he has set a great example and left behind him a great reputation. He has done so much for

Egypt and for Anglo-Egyptian relations, and has done it for so long, that it is difficult to realise that he was only 66 when he died. He has indeed a remarkable record of achievement, of which Egypt will be proud for many generations to come, and of which the English Royal Colleges will also be proud, for they feel that they have had the honour of coöperating in many of Ali Ibrahim's plans which have been crowned with such conspicuous success."

IAN STEWART MCGREGOR

M.D. GLASG., F.R.C.S.E., D.O.M.S.

WITH the death of Ian McGregor on Jan. 23 ophthalmology lost one of its most promising and faithful adherents. The first decade after his graduation from the University of Glasgow twenty years ago was spent in resident hospital appointments in general medicine and surgery and later in general practice on the Island of Bute. His sure knowledge of medicine, his keen mind and sympathy which allowed him to mix assessment with charity, and his catholic tastes in painting and literature made him the ideal general practitioner and endeared him to all. This period was, however, for the measurement of his own capacity and for his individual staking of the limits of medical practice.

Once sure of these, he confined his direct attention to ophthalmology: this he did with such concentration of purpose that within seven years he had become clinical assistant to the Glasgow Eye Infirmary, assistant to the professor of ophthalmology at Glasgow, and finally visiting surgeon to the Ophthalmic Institution. Within that brief period he took his doctorate of medicine and the diploma of ophthalmic medicine and surgery of England, and was admitted to the fellowship of the Royal College of Surgeons of Edinburgh and of the Royal Faculty of Physicians and Surgeons of Glasgow: this despite an absence for several years on war service, when he held the rank of squadron-leader R.A.F.V.R. His acceptance into the highest ranks of his speciality in Glasgow was made possible by the qualities so successful in general medicine, together with the growing evidence of his power of original thinking. True to character, his publications awaited his precise knowledge of the known boundaries of ophthalmology, but when they came they had the marks of developing thought and were a promise of greater things to come. His work on melanotic tumours of the choroid and on certain aspects of neuro-ophthalmology are of lasting value.

To many of us Ian McGregor will continue as the memory of an enchanting, if at times unpredictable, character. He could quickly sense the ridiculous, which gave him wit; and the unfair, which made of him a hard-hitting opponent. Generous in things, thoughts, and feelings, he was a true friend and a good companion.

I. C. M.

ERNEST CUTCLIFFE HADLEY

M.D. LOND., F.R.C.S.E.

Dr. E. C. Hadley, who died on Jan. 22 at the age of 71, was before his retirement one of the best-known medical superintendents.

Member of a well-known-Birmingham medical family, he was educated at King Edward School and the Mason University College, Birmingham. He qualified M.R.C.S. in 1900, taking the F.R.C.S.E. in 1903. He graduated M.B. Lond. in 1907 and M.D. in 1910.

In 1914 he was appointed the first whole-time medical superintendent to the North Evington Infirmary, Leicester, at that time one of the most up-to-date poor-law infirmaries in Britain. There he instituted a regular course of training, including lectures, for the nursing staff. In 1930, when the infirmary was transferred to the health committee and became the City General Hospital, Hadley was appointed medical superintendent and surgeon, retiring early in 1940 after holding office for 26 years. During that time he instituted many improvements, both for staff and patients. As a side-line he was interested in the electrocardiogram, and he had amassed a great deal of material which at one time he hoped to publish.

On retiring from his hospital appointment he plunged into medical work in Leicester, and up to the time of

his death was in active private practice. He also held several posts as industrial medical officer and was a member of the local recruiting board. At one time he was hon. secretary of the Medical Superintendents' Society, of which he was later a vice-president.

Hadley always worked for the improvement of nursing conditions, and most of his many publications were concerned with training of nurses and hospital administration. Only last month this journal published a letter setting out his views on the problem of medical versus lay administration in hospitals. Always extremely energetic, he had numerous outside interests, being a keen gardener, musician, and artist. In the early part of the century he did a considerable amount of experimental work on wireless. He took a great interest in freemasonry, and at the time of his death was worshipful master of his lodge.

He leaves a widow and a young family of three sons and one daughter.

A. P. M. P.

EDITH GHOSH

M.B. LEEDS, M.R.C.O.G.

Dr. Edith Ghosh, the well-known Calcutta obstetrician and gynaecologist, died on Jan. 16 from knife injuries received when attacked in her home by unknown men. A Yorkshire woman, Mrs. Ghosh graduated M.B. at Leeds University in 1923, and in 1937 she was elected a foundation member of the Royal College of Obstetricians and Gynaecologists. She leaves her husband, Dr. B. C. Ghosh, former principal of Vidyasagar College, with two sons.

A colleague writes: "Dr. Edith Ghosh had won by her charm, ability, and skilled service to all classes of the public a large place in the affections of Calcutta. She carried on a large practice with unsparing devotion and unstinted generosity. For many years she was in charge of the outpatient department of the Eden Hospital for Women, where she looked after the sick with skill and kindness and taught Indian students alike by example and clarity of teaching. In addition, she had many philanthropic and cultural interests. Many Servicemen will long remember her weekly salons where she dispensed tea and the best of good music at her house. During the war years she regained for many wounded and paralysed men the use of their limbs by conducting rehabilitation courses at the Calcutta swimming-baths. Her own crippling accident of a fractured thigh three years ago did not prevent her specialising as an anaesthetist, in which she attained great proficiency. For her qualities of heart and hand; her activities, and her reputation she stood out as one of Calcutta's best-known citizens."

THOMAS MCCORMICK ADAIR

L.R.C.P.E.

Dr. T. Adair, who died on Jan. 25 at the age of 85, was in his day a well-known Belfast doctor. After medical studies at the Queen's College and at the University of Edinburgh he qualified in 1895 and returned to practise in Belfast for 40 years. In his busy life he still found time for writing. His *Romance of Strangford Power Scheme* appeared in 1928, and his published poems included *Poem by a Wayside Well* and *The Lion of Judah*. In 1924 he also wrote a long poem lamenting the death of Viscount Pirrie, who had been a discerning and generous friend to the Royal Victoria Hospital.

Dr. Adair is survived by his wife and two sons.

JOHN LISSAUER

M.D. BERLIN

Dr. John Lissauer, who died at his home in West Hartlepool on Dec. 21, was born in Hamburg in 1890. He received his early education in Berlin and, after studying at the universities of Munich, Heidelberg, and Berlin, graduated M.D. in 1915. During the first world war he served as a medical officer in the German army on the western front. A keen clinician, after holding resident posts at two Berlin hospitals he was appointed chief physician to the Kreuzberg Children's Institute, Berlin, and engaged in private practice.

From the beginning of the Hitler régime his life was beset with difficulties, and after a spell in a concentration

camp he came to this country in 1939. Eventually he became assistant medical officer of health to the West Hartlepool corporation, an appointment which he held until his death.

Apart from medicine, Lissauer's interests were centred in his home and in the faith of his forefathers. His mind possessed a sparkling quality which, together with his urbane manner and sensibility, always suggested a Gallic origin, perhaps the result of a French bias in his early education. His death was keenly felt by his colleagues, who salute a life of brave endeavour. He is survived by his wife, Dr. Charlotte Lissauer, of the Middlesbrough school health service, and by one young daughter.

J. C.

Diary of the Week

FEB. 9 TO 15

Monday, 10th

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

3.45 P.M. Prof. F. Wood Jones, F.R.S.: Structure of the Perineum.

5 P.M. Dr. David Londe: Physiology of the Kidney.

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1

8.30 P.M. Dr. Geoffrey Marshall, Mr. C. Price Thomas: Surgical Treatment of Pulmonary Tuberculosis.

Tuesday, 11th

ROYAL COLLEGE OF SURGEONS

3.45 P.M. Dr. Alan Kekwick: Nutrition and the Surgeon.

5 P.M. Prof. J. D. Boyd: Distribution of Vascular Pressor-receptors and Chemo-receptors in the Body.

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

5 P.M. *Experimental Medicine and Therapeutics*. Dr. E. E. Pochin, Dr. R. G. Macfarlane: Radioactive Tracers.

5.30 P.M. *Psychiatry*. Dr. Maxwell Jones: Emotional Catharsis and Re-education with the Help of Group Methods. Dr. Charles Anderson: Aspects of Pathological Grief and Mourning.

CHELSEA CLINICAL SOCIETY

7 P.M. (South Kensington Hotel, 41, Queen's Gate Terrace, S.W.7.) Mr. Kenneth Walker, Mr. N. J. Scorgie, Mr. G. N. Gould: Artificial Insemination.

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

5 P.M. Dr. A. C. Roxburgh: Cutaneous Syphilis.

EDINBURGH POSTGRADUATE BOARD FOR MEDICINE

5 P.M. (Royal Infirmary.) Prof. A. G. Ogilvie, B.Sc.: Human Habitat and Social Geography.

Wednesday, 12th

ROYAL COLLEGE OF SURGEONS

3.45 P.M. Dr. Kekwick: Nutrition and the Surgeon.

5 P.M. Professor Boyd: Arteriovenous Anastomoses.

ROYAL SOCIETY OF MEDICINE

5 P.M. *Joint meeting with the Scientific Film Association*. Dr. Peter Hansell, Mr. J. P. Stephenson, B.Sc., Dr. Brian Stanford: Filmstrip in Medical Teaching.

Thursday, 13th

ROYAL COLLEGE OF SURGEONS

3.45 P.M. Dr. E. L. Patterson: Relations and Connexions of the Thalamus.

5 P.M. Prof. W. R. Spurrell: Physiology of the Alimentary Tract.

ROYAL SOCIETY OF MEDICINE

5 P.M. *Ophthalmology*. Mr. R. Affleck Greeves, Prof. B. W. Windeyer, Dr. M. Lederman: Radiotherapy in the Treatment of Non-malignant Superficial Eye Lesions.

LONDON SCHOOL OF DERMATOLOGY

5 P.M. Dr. G. Duckworth: Chronic Pyodermitis.

EDINBURGH POSTGRADUATE LECTURE

4.30 P.M. (Royal Infirmary.) Mr. A. Logan: Prognosis in Empyema Thoracis. (Honyman Gillespie lecture.)

Friday, 14th

ROYAL COLLEGE OF SURGEONS

5 P.M. Sir James Walton: Hunterian Ideals Today. (Hunterian oration.)

ROYAL SOCIETY OF MEDICINE

3.30 P.M. *Joint meeting with the Tuberculosis Association*. (26, Portland Place, W.1.) Mr. A. L. d'Abreu, Dr. I. W. Magill, Dr. Joan Millar: Anaesthesia for Major Thoracic Surgery in the Tuberculous.

ROYAL MEDICAL SOCIETY, 17, Melbourne Place, Edinburgh

8 P.M. Dr. R. W. Durand: The Doctor, the Patient, and the Law.

On Active Service

AWARDS

M.B.E.

Major TURNER McLARDY, M.B. Glasg., R.A.M.C.

Major N. C. WELPHY, M.R.C.S., R.A.M.C.

Captain SARDAR AHMED, I.A.M.C.

MENTIONED IN DESPATCHES

Captain C. S. SINGH, I.A.M.C.

Notes and News

WAR OFFICE DEMAND FOR JUNIOR OPHTHALMOLOGISTS

THE Central Medical War Committee is informed that, because of the shortage of ophthalmologists available for military service, the War Office is prepared to employ, as trainee ophthalmologists with a view to early grading as graded specialists, a number of men who, although not at present of graded specialist status, have held resident appointments for not less than six months in ophthalmic hospitals or ophthalmic departments of general hospitals in the United Kingdom, and are recommended by the ophthalmologists under whom they have worked as being competent to deal with errors of refraction, to perform minor operations of the eye, and to treat the common diseases of the eye.

A large part of the ophthalmic work in the Army falls under these headings, and if men with the limited experience referred to were available to deal with such work, the cases requiring the attention of a fully trained ophthalmic specialist could be concentrated at special centres in the home and overseas commands, and greater economy in the use of the specialist officers would thus be effected.

The Central Medical War Committee is now considering the recruitment of young practitioners whose experience of ophthalmology is such as to satisfy the Army's requirements as stated above. It invites applications from practitioners who will shortly complete junior resident appointments in eye hospitals or eye departments and who would like to undertake their military service at this stage as trainee ophthalmologists. Communications should be addressed to the secretary of the committee at B.M.A. House, Tavistock Square, London, W.C.1.

SCOTTISH NURSING

IN Scotland, as elsewhere, nursing recruitment reflects general labour conditions, being good in times of industrial depression and poor in times of prosperity.

The Scottish Advisory Committee of the Nuffield Provincial Hospitals Trust have lately published a report¹ by their medical committee on hospital staffing which reads like the refrain of an old song. All the usual troubles are there: the proportions of trained staff to total staff, and of nurses to patients, are not high enough; there are too few nurses to relieve during off-duty times and in case of sickness among the staff; the 96-hour fortnight is rarely possible; students suffer strain from combining nursing duties with study, and they do too much domestic work; trained staff who choose to live out do not get adequate allowances; there are few ways of bridging the gap between school-leaving age and admission to training; and the impression that nursing is an overworked and understaffed profession is justifiably widespread.

Cheerfully and calmly the committee set out the known remedies. The 96-hour fortnight should be enforced. The ratio of staffing in the wards of a general hospital or a sanatorium should be 1 nurse to 1.5 patients; in a fever hospital the ratio should be 1 to 2; in a maternity unit or a children's hospital 1 to 1. Much more, and much better, domestic help is needed. They remind hospitals politely of the part parsimonious administration has played in creating the present adverse impression among potential recruits. They suggest that experiments in the three-shift system should be tried. Nurses' homes should be managed with a more liberal outlook, and without irksome regulations. A simple matrix test, employed at Crichton Royal Hospital, has made it possible to recognise early those applicants who will have little difficulty in passing examinations, and it might, they think, be more widely applied. They recommend the block system of training, and advise the employment of orderlies to relieve nurses of unsuitable duties. More use could, they believe, be made of male orderlies, but they do not foresee much scope for the employment of male nurses in acute general hospitals.

It is noteworthy that there is a disinclination among entrants to the profession to become assistant nurses. "Girls who are attracted to nursing as a career want to become State-registered nurses in the full sense of the term, not to become an admittedly inferior type of nurse, expected to spend a considerable part of her time doing domestic work."

1. Nursing Staffing in Hospitals, 1946. Copies may be had from the Secretary to the Scottish Advisory Committee, 10, Duke Street, Edinburgh, 1.

The last part of the sentence indicates the light in which the nursing profession at present regards the assistant nurse. The committee suggest that the whole question of the "assistant nurse" should be reviewed—an opinion with which we cordially agree.

A WELL-ESTABLISHED CEREBRAL PALSY UNIT

At Queen Mary's (London County Council) Hospital for Children, at Carshalton, a cerebral palsy unit, the first to be set up in Great Britain, has been active since 1943.¹ An average of 14 children at a time receive treatment along the lines laid down by Prof. W. M. Phelps, of Baltimore; and many of them improve enough to attend a school for physically defective children, while a few become fit for a normal school life. Most of them are helpless and bedridden on admission, but as they are usually normally intelligent they can learn to manage their disability, in time being able to feed, wash, and dress themselves, and to take part in the communal life of the unit. The unit provides for observation, diagnosis, and intensive treatment in surroundings which maintain the atmosphere of a residential nursery rather than a hospital ward. The numbers under treatment are soon to be increased to 20; and later it is hoped to take 40, and finally 60, when it is estimated that between 120 and 150 could be treated yearly. The head therapist of the unit has had training and experience in the Phelps method of treatment. The education committee of the council have been asked to help in finding suitable schools for children on discharge; and close links are being made with St. Margaret's, the new voluntary school for children with cerebral palsy recently founded at Croydon.² Proposals for increasing the staff of the unit are being put before the council.

TEACHING BY FILM

A YEAR ago the Royal Society of Medicine and the Scientific Film Association met to discuss the application of the cinema in medical teaching. A report of the discussion has now been published in a booklet¹ which covers the principles and practice of teaching by film and reveals a strong demand for short silent illustration films in preference to long film lessons. The booklet also includes a list of subjects on which films would be welcomed by teachers of medicine; this will be a useful guide to intending film makers. On Feb. 12 another joint meeting is to be held at the Royal Society of Medicine (5 P.M.), the subject for discussion being the use of filmstrip in medical teaching.

A PATIENT'S VIEW

Mr. Wilson Midgley, editor of *John o'London's Weekly*, has described his experiences in a general hospital ward.¹ With an artist's eye, and a journalist's appreciation of their true interest, he has seen all those daily episodes of the ward that we so easily take for granted, and perhaps even find humdrum. He has translated them into a series of essays, clearly and charmingly written, and though he writes primarily for a public unversed in the ways of hospitals, and perhaps often unduly apprehensive of them, almost every essay contains something, either of praise or well-weighed criticism, which we should heed. Whether he is discussing pain, or the qualities that go to make a good sister, or tepid cabbage, or the folly of nursing old men and boys in the same ward, or whether he is just painting pictures of what he sees about him, he writes with insight.

This is a book from which we may learn what we must alter in the future and what we must resolutely retain. Because of its appreciation of the humanity and humour of the life of a hospital ward it also contains much of interest to the potential patient or the would-be nurse.

Royal College of Surgeons of England

During the next months the dinners held in the college for fellows and members and members of the associations linked to the college will take place on the following Wednesdays at 7 P.M.: Feb. 12, March 12, April 9, May 7, June 11, and July 9.

1. Report of the hospitals and medical services committee to the London County Council, Jan. 21.
2. See *Lancet*, 1946, ii, 354; Jan. 18, p. 108.
1. *The Place of the Film in Medical Education*. Scientific Film Association, 34, Soho Square, London, W.1. Pp. 30. 1s.
1. *From My Corner Bed*. By Wilson Midgley. London: Chaterson. Pp. 159. 7s. 6d.

University of Oxford

On Jan. 23 the following degrees were conferred:

B.M.—Granville Freeman, J. B. Walker, E. J. Madden, John Gask, R. A. L. Leatherdale.

Royal College of Physicians of London

At a meeting of the college held on Jan. 30, with Lord Moran, the president, in the chair, the following were elected representatives of the college: Dr. A. S. Barnes on the court of governors of the University of Birmingham; Sir Reginald Bond on the council of the Professional Classes Aid Council; Dr. W. G. Wyllie on the National Association for Mental Health; and Dr. Janet Vaughan on the advisory board of nursing education of the Royal College of Nursing. Sir Allen Daley was nominated to represent the college at the conference of the Royal Sanitary Institute in June.

The following having satisfied the censors' board were elected to the membership:

D. G. Abrahams, M.B. Camb., W. B. Alexander, M.B. Camb., J. V. Almeyda, L.R.C.P., C. L. Half, B.M. Oxfrd, A. H. Baynes, M.B. Camb., Patricia L. Bidstrup, M.B. Adelaide, J. H. Burkinshaw, M.B. Camb., C. R. Burton, M.D. Toronto, James Carson, M.D. Belf., A. G. C. Cox, M.B. Lond., H. D. Crosswell, M.B. Lond., P. H. Davison, M.B. Birm., John Dean, M.B. Camb., R. B. Franks, M.B. Camb., B. F. Gans, M.D. Lond., R. T. Gaunt, M.B. Sheff., K. B. Gibson, M.B. Lpool, William Goldberg, M.B. Witw'srand, K. J. Grace, M.D. Melb., G. R. Handy, M.B. Lond., Margaret M. Henderson, M.D. Melb., R. A. Henson, M.D. Lond., R. D. Hotston, M.B. Lpool, John Lowe, M.B. Birm., Anne E. McCandless, M.B. Lpool, J. A. Malloch, M.B. Edin., E. P. G. Michell, M.B. Camb., E. P. Morley, M.B. Camb., E. J. Moynahan, L.R.C.P., A. P. Norman, M.B. Camb., Gordon Osborne, M.B. Camb., J. H. S. Pettit, M.B. Lond., W. J. E. Phillips, M.B. Camb., J. R. K. Preedy, M.B. Camb., Frederick Prescott, L.R.C.P., W. A. Pritchard, M.B. Lond., E. G. G. Roberts, M.B. Wales, J. B. Robinson, M.D. Lond., N. A. Rossiter, M.B. Witw'srand, Gregory Shneerson, M.B. Lond., John Simpson, M.D. Durh., Eric Smith, D.M. Oxfrd, J. B. Stanton, M.B. Camb., T. H. Steel, M.D. Melb., G. H. Valentine, M.B. Brist., captain R.A.M.C., Albert Venner, M.B. Lond., A. P. B. Waind, D.S.C., M.D. Leeds, C. W. M. Whitty, B.M. Oxfrd, M. H. C. Williams, B.M. Oxfrd, H. H. O. Wolf, M.B. Camb., Max Zoob, M.B. Lond.

Licences to practise were conferred upon the following 96 candidates (70 men and 26 women) who have passed the final examination of the Conjoint Board and have complied with the by-laws of the college:

D. A. B. Ashcroft, J. H. Atteridge, A. R. Baines, D. C. Barker, Mary E. Benians, N. O. Bennett, P. R. Boyd, G. A. Bracewell, D. C. Bradford, Alison M. Brydone, Joyce M. Buck, Irene M. S. Cade, G. H. Carriett, Kenneth Carter, D. J. E. Cheshire, Jeanne M. Clements, Mary M. H. Cogman, C. I. Cohen, J. J. Content, Edward Coupland, K. S. Daber, Sylvia Danks, Barbara M. Davey, Joan M. Denman, Robert Dryden, K. H. Food, D. S. Foster, Joan Frankton, Angela D. Fuller, P. R. G. Graham, Gordon Hadfield, M. J. Hargrave, B. M. C. Harris, J. A. B. Harrison, A. J. Harrold, Mary W. Hart, F. C. B. Harvey, Hugh Herbert, G. M. Hopwood, Barbara M. F. Jacobs, K. E. Jolles, R. T. Jones, Basil Karat, R. A. Kershaw, C. S. Kirkham, S. A. Lateef, D. D. La Touche, Norman Lees, Ursula E. K. Leitner, Lillian J. Letty, A. H. Levy, F. M. MacDonagh, Anne J. W. Manley, E. D. Marsh, Stefan Mejzner, Christine L. Miller, L. G. Nicol, Jakob Niwes, C. F. Noon, A. G. Norman, Vivienne Norman, F. G. Orton, Mathoor Panikkar, Enid H. Pettigrew, G. S. Plaut, I. R. D. Proctor, D. R. V. Prys-Jones, Harry Rawlings, Michael Redfern, E. N. Rees, D. E. R. Richardson, Kathleen J. Rigg, Diana M. Robinson, Sonia Rollin, G. W. J. Rothwell, C. D. Rushworth, R. A. Ryan, A. I. Sahyoun, Joan Seaman, Henry Shapiro, F. J. Sharrod, J. G. H. Shaw, S. G. A. Slute, N. T. Smith, Joan E. T. Spong, Cynthia F. Stephenson, H. S. Trafford, Maxwell Vites, David Walker, N. H. Warburton, J. C. Ward, P. A. M. Weston, H. D. White, R. M. C. Williams, Elizabeth Williamson, G. M. Woodwork.

Diplomas were conferred jointly with the Royal College of Surgeons on those named in *THE LANCET* of Dec. 21 (p. 930) and of Jan. 18 (p. 123), and on the following:

D.P.H.—J. B. Bramwell, Alan Butterworth, W. A. Cannell, W. J. Christie, C. W. Coffey, J. S. Coleman, Eveline M. Cumming, C. L. Day, H. McD. Forde, A. H. T. F. Fullerton, Margaret R. Gilmour, D. W. T. Harris, R. A. Hoey, E. I. Holloway, G. J. Laws, C. D. L. Lycett, H. G. Magill, J. E. Masterson, B. U. Meyer, Robert Murray, J. J. O'Dwyer, M. J. Pleydell, Isadore Reubin, Arna E. Rides, R. D. Rutherford, Christina M. Small, T. D. Spencer, M. E. M. Thomas, P. de B. Turtle, G. P. Wallace, W. M. Walsh, E. R. Winton.

D.L.O.—W. F. Dickie-Clark.

Pharmaceutical Society of Great Britain

On Thursday, Feb. 13, at 7 P.M., at 17, Bloomsbury Square, London, W.C.1, Mr. H. Davis, Ph.D., will speak on *Chemical and Pharmaceutical Aspects of Anaesthesia*.

Lectures on Child Psychiatry

Dr. Michael Fordham and Dr. R. D. Newton will give a course of lectures on child psychiatry at the West End Hospital for Nervous Diseases, 40, Marylebone Lane, W.1, on Monday and Tuesday afternoons from Feb. 10 to March 4. The course is open only to members of the Fellowship of Postgraduate Medicine, 1, Wimpole Street, London, W.1, where further particulars may be obtained.

Scottish Triple Qualification

The following, having passed the requisite examinations, have been admitted to the Licentiatehip of the Royal Colleges of Physicians and Surgeons of Edinburgh and of the Royal Faculty of Physicians and Surgeons of Glasgow:

J. D. Bowie, Audrey G. Burdett, J. G. W. Cunningham, Matthew Devlin, Pearl I. Evans, William Frame, J. M. Gilles, S. J. Glueck, A. J. Graham, F. H. Hamill, Winifred M. Hiscock, R. J. Kleinglass, George Metz, W. C. Palmer, E. L. Peel, N. W. Preston, I. M. Ratner, J. M. Raynor, Eva Revesz, Stanley Rose, Georgina M. H. Smeaton, Bernard Taylor, W. B. Willder, Richard Wolfson.

Department of Health for Scotland

The Secretary of State for Scotland has appointed Mr. G. H. Kimpton to be an under-secretary in the department in charge of the divisions which deal with health services.

London Hospital Medical College

The Liddle triennial prize for 1946 of £120 has been awarded to Dr. F. O. MacCallum for his essay on epidemic jaundice. Dr. Sheila Sherlock (proxime accessit) has been awarded £50.

Nuffield Fellows from Australia

Winners of 2 of the 12 Nuffield fellowships awarded to ex-Service doctors in Australia last year have left Australia to take up their appointments. Dr. W. J. Simmonds, of Brisbane, holder of a three-year fellowship in physiology, is going to Oxford to work under Dr. F. C. Courtice. Dr. F. L. Ritchie, who holds a one-year fellowship, will take a four-month course at the Brompton Chest Hospital and at Queen Square Hospital for Nervous Diseases in London. He also intends to spend eight months at Sheffield with Prof. C. H. Stuart-Harris.

International Cancer Research Congress

The fourth International Cancer Research Congress will be held in St. Louis, Missouri, from Sept. 2 to 7, under the joint auspices of the Union Internationale contre le Cancer and the American Association for Cancer Research. Dr. E. V. Cowdry, professor of anatomy at the Washington University school of medicine and director of research of the Barnard Free Skin and Cancer Hospital, will preside. Further information may be had from Dr. M. G. Seelig, Barnard Free Skin and Cancer Hospital, St. Louis, 3, Mo., U.S.A.

Blood Shortage in Glasgow

Glasgow is seriously short of blood-donors. War-time reserves of plasma are now exhausted, and not enough donors are coming forward to meet the increasing demand for both whole blood and plasma. Figures given by the Glasgow and West of Scotland Blood Transfusion Service for the week ending Sunday, Jan. 19, show that while the output of blood and plasma, expressed as donors, was 336, the number of donors bled was only 226—a shortage of 110.

Chemists' Federation

At the federation's annual luncheon in London on Jan. 30, Sir Arthur Rucker, deputy secretary, Ministry of Health, expressed his belief that a fine service could be evolved from the National Health Service Act. The patient should, of course, choose his own doctor, "provided that the latest biennial plebiscite of the profession has shown that he is willing to give his advice." Dr. Charles Hill, secretary of the British Medical Association, said that the profession was fighting to prevent its being made into a technical branch of central or local government.

Summer School on Social Biology

The British Social Hygiene Council hopes to hold in Switzerland, during the last fortnight of August, a summer school on Social Biology—its International Aspects. The school is intended for teachers, social workers, and others interested in social biology, and it is hoped that there will also be students from other countries. Lectures will be in English. The estimated cost, including travel, board, and tuition, is between £25 and £30.

Early application should be made to the secretary, B.S.H.C., Tavistock House North, Tavistock Square, London, W.C.1.

PENICILLIN FOR INSURED PERSONS.—Penicillin is now sold in two forms—the ordinary yellow form, and "white" penicillin which may be crystalline or amorphous. The Ministry of Health have instructed pharmacists to use yellow penicillin or solution-tablets when dispensing N.H.I. prescriptions for local applications and to reserve white penicillin for eye-drops and preparations intended for injection.

Appointments

EVANS, T. P., M.B.C.S.: M.O.H., Amersham, Chesham, and Beaconsfield.

HAMBRIDGE, RHODES, M.B.C.S.: asst. chest physician, Surrey county council.

LAWRIE, J. H. D., M.D. Edin., D.P.H.: M.O.H., Shoreditch.

MURRAY, CHARLES, F.R.C.S.E.: asst. orthopaedic surgeon, Royal Portsmouth Hospital.

STARKIE, COLIN, M.D., B.S.C. Manc., D.P.H.: M.O.H., Kidderminster, and asst. M.O., Worcester health department.

Middlesex County Council:

BURNETT, C. W. F., M.D. Lond., M.R.C.O.G.: senior obstetrician, West Middlesex County Hospital.

CALLUM, E. N., F.R.C.S.E., D.T.M.: surgeon, Ashford County Hospital.

CHESTER, A. W., M.D. Durh.: chief asst., obstetric department, Hillingdon County Hospital.

COGILL, N. F., M.B. Camb., M.R.C.P.: physician, West Middlesex County Hospital.

DAVIES, D. A., M.B. Lond., M.R.C.O.G.: senior obstetrician, West Middlesex County Hospital.

DEANE, M. M., M.B. Melb., A.R.C.P., D.P.M., D.A.: physician, West Middlesex County Hospital.

PEMBERTON, T. M., M.B. N.Z., F.R.C.S.: surgeon, Chase Farm Hospital.

SCHOLEFIELD, JOHN, M.B. Leeds, F.R.C.S.: surgeon, West Middlesex County Hospital.

STEPHENS, T. W., F.R.C.S.E., D.T.M. & H.: chief asst. to thoracic surgeon, Clare Hall Hospital.

Births, Marriages, and Deaths**BIRTHS**

BARCLAY.—On Jan. 27, the wife of Dr. G. A. Barclay—a daughter.

GRAHAM.—On Jan. 28, in London, the wife of Dr. Ian Graham—a son.

HARVEY.—On Jan. 27, at York, the wife of Lieut.-Colonel W. G. Harvey, R.A.M.C.—a son.

HILEY.—On Jan. 25, in London, the wife of Surgeon Lieut.-Commander Charles Hiley, R.N.—a daughter.

KENNY.—On Jan. 27, in London, the wife of Mr. W. T. Kenny, F.R.C.S.I.—a son.

KIRSHNER.—On Jan. 29, at Chichester, the wife of Dr. A. Kirshner—a son.

PARTRIDGE.—On Jan. 28, at Worthing, the wife of Dr. A. J. Partridge—a daughter.

PEASE.—On Jan. 29, at Oxford, the wife of Dr. J. C. Pease—a son.

REINOLD.—On Jan. 27, the wife of Dr. D. G. Reinold—a son.

RICHARDSON.—On Jan. 28, at Perth, the wife of Colonel Frank Richardson, D.S.O., O.B.E., R.A.M.C.—a son.

RIGBY.—On Jan. 9, at Lewisham, the wife of Dr. J. P. V. Rigby—a daughter.

WRIGHT.—On Jan. 24, in London, the wife of Captain John T. Wright, R.A.A.C.—a son.

MARRIAGES

HARWOOD—HUGHES-JONES.—On Jan. 28, in London, Robert Paul Harwood, M.B.C.S., R.A.M.C., to Margaret Hughes-Jones.

KEYMER—GRAY.—On Jan. 23, at Khartoum, Ronald C. Keymer, O.B.E., to Mary Rae Gray, M.B.

PALMER—SMYTH-RICHARDS.—On Jan. 21, at West Buckland, Devon, G. R. C. Palmer, M.B.C.S., Lieut.-colonel I.M.S., to Mary Smyth-Richards.

DEATHS

AYLWARD.—On Jan. 29, at Tunbridge Wells, Walter Charles Aylward, M.B.C.S., aged 89.

FIDO.—On Jan. 25, in London, Herbert Adamson Fido, M.B.C.S., aged 81.

LAMBERT.—On Jan. 26, at Bucklebury, Berks, Gordon Ormsby Lambert, M.D. Camb., F.R.C.P.

LANKESTER.—On Jan. 30, at Eastbourne, Herbert Henry Lankester, M.D. Lond., aged 84.

MACLEOD.—On Jan. 24, at Bradford, Norman Alexander Macleod, M.D. Glasg.

MOORE.—On Jan. 26, Reginald Mark Moore, M.B. Camb.

SMITH.—On Jan. 30, at Long Eaton, Notts, Reginald Farmery Smith, M.B.C.S.

WHITFIELD.—On Jan. 31, at Eastbourne, Arthur Whitfield, M.D. Lond., F.R.C.P., aged 78.

WRIGHT.—On Jan. 25, at Romford, Essex, Samuel Reginald Wright, M.B.C.S., aged 78.

The first issue of the *Nutrition Bulletin* contains articles on the consumption of milk, the meat ration, school meals, and food education. The bulletin, which is intended for those interested in the application of nutritional knowledge to social welfare and public health, will be issued every two months by the Central Council for Health Education, Tavistock House, Tavistock Square, London, W.C.1. The annual subscription is 3s.

The Ministry of Food bulletin, *Food and Nutrition*, now appears in a new and improved form. This little journal, hitherto hampered by paper restrictions, has proved so popular that it is now to be printed by H.M. Stationery Office, and will be accessible to a wider circle of readers. It appears monthly at a subscription rate of 4s. yearly, and records advances in our knowledge of foods, encourages the study of food values, and answers questions.

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THYROIDECTOMY AND THIOURACIL IN TOXIC GOITRE
AN INTERIM COMPARISON

H. P. HIMSWORTH
 M.D. Lond., F.R.C.P.

M. E. MORGANS W. R. TROTTER*
 M.B. Lond., M.R.C.P. D.M. Oxfd, M.R.C.P.

From the Medical Unit, University College Hospital

THAT thiouracil controls the symptoms of thyrotoxicosis is generally conceded. Once this control has been achieved one of two courses may be followed: subtotal thyroidectomy may be performed as soon as the patient is sufficiently improved; or the drug may be continued indefinitely in reduced dosage without other treatment. At present both procedures have their advocates, and few attempts have been made to assess their relative values. We here attempt to make such an assessment, though recognising that final conclusions cannot be drawn at this interim stage.

The comparison of two forms of treatment of an acute disease, such as lobar pneumonia, is relatively straightforward, and, provided the necessary statistical conditions are fulfilled, the result can be expected to be decisive. So also is such a comparison in a disease which is commonly fatal. Toxic goitre is neither acute nor usually fatal, and a satisfactory comparison of methods of treatment cannot be achieved by a simple statement of recovery-rates. An adequate comparison must include evidence bearing on the following points: (1) the applicability of the two methods—that is, the proportion of cases of toxic goitre which is suitable for treatment by either method; (2) the complications attributable to either treatment; (3) the proportion of cases which return to apparent normality after each treatment; and (4) the duration of such remissions, or, conversely, the relapse-rate. Evidence is presented here on these four points; in view of the relatively recent introduction of thiouracil therapy this evidence is necessarily incomplete and does not pretend to provide a final answer.

APPLICABILITY

A total of 91 cases of toxic goitre, admitted to hospital in 1943-46, have been treated with thiouracil or methyl thiouracil. In 12 of these operation was decided on at the initial examination, either because of tracheal compression or because the patient would not be able to attend regularly after leaving hospital. In these 12 cases thiouracil was used solely as a preparation for operation. In a further 13 cases the drug had to be discontinued on account of toxic effects; and 1 other patient died of coronary thrombosis during treatment. We are left with 65 cases which proved suitable for a trial of long-term thiouracil therapy.

These cases have been compared with 93 cases of toxic goitre treated by subtotal thyroidectomy in 1937-41. This group was selected from a series of 134 cases of toxic goitre, the remainder being considered unsuitable for this form of treatment. Since the control of treatment was in various hands, this series provides an index of the proportion of cases which general physicians and surgeons considered suitable for operation, and is thus more useful for comparison than a similar series from a specialised clinic. The proportion of cases found suitable for long-term thiouracil therapy (72%) is similar to the proportion generally considered suitable for subtotal thyroidectomy (69%).

The initial state of the patients constituting the two series is shown in table I.

COMPLICATIONS

The standard dosage of thiouracil or methyl thiouracil in this series was 600 mg. daily for the first three or four weeks; when it was obvious that the patient was responding to the drug the dose was dropped to 100 mg. daily. The patient usually left hospital on this dose, which was further reduced while he was an outpatient when his condition allowed.

The complications encountered on this scheme of dosage, and the corresponding surgical complications, were as follows:

THYROIDECTOMY SERIES	THIOURACIL SERIES
Total cases 93	Total cases 91
Operation deaths 2	Fatal agranulocytosis 8
Postoperative crisis (not fatal) 2	Leucopenia 3
Tetany 5	Drug fever 3
Recurrent nerve palsy 4	Rash 1
(unilateral)	Pericardial effusion 1
Postoperative auricular fibrillation 6	Joint swellings 1
Myxœdema (permanent) 4	Enlarged lymph-glands 1
	Myxœdema (temporary) 5

* Both these cases occurred during the early experience and when penicillin was not available.

Since both series are small, the figures are not necessarily representative of the general rate of complications. The operative mortality in specialised clinics is lower than that recorded here, but in the country as a whole it is probably higher. On the other hand, the death-rate from agranulocytosis among patients on thiouracil is very much less in larger series. Thus Van Winkle and others¹ collected 5745 cases with a death-rate from agranulocytosis of 0.4%, and Moore² 1091 cases with a rate of 0.5%.

The non-fatal complications of thiouracil therapy were severe enough to cause treatment to be stopped in 11 cases, 5 in the first three weeks and another 5 in the second three weeks after starting treatment. All but one, therefore, occurred in the first six weeks. These figures agree with Moore's² statement that in about 10% of cases thiouracil has to be stopped because of reactions.

1. Van Winkle, W. jun., Hardy, S. M., Hazel, G. R., Hines, D.C., Newcomer, H. S., Sharp, E. A., Sisk, W. N. *J. Amer. med. Ass.* 1946, 130, 343.
2. Moore, F. D. *Ibid.*, p. 315.

TABLE I—COMPARISON OF THE MAIN CLINICAL FEATURES OF THE TWO SERIES

Clinical findings	Thyroidectomy		Thiouracil	
	%		%	
Males	22		17	
Females	78		83	
Age (yr.):				
Under 20	6		7	
20-35	33		23	
36-49	35		40	
50 and over	26		30	
Previous iodine	33		24	
Goitre:				
Diffuse	83		80	
Nodular	15		13	
Recurrent	2		7	
Severity:				
Mild	26		34	
Moderate	63		50	
Severe	11		16	
Complications:				
Auricular fibrillation	12		10	
Hypertension	4		3	
Rheumatic heart disease	2		0	
Diabetes	1		2	
	Av.	S.D.	Av.	S.D.
B.M.R.	+49.6%	20.2	+42.6%	14.2
Minimum pulse-rate per min.:				
Waking	95.3	12.1	90.4	20.0
Sleeping	88.7	10.5	87.2	13.6

*Receiving a personal grant from the Medical Research Council.
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He found that 79% of the instances of agranulocytosis occurred between the fourth and eighth weeks after starting treatment. After the second month of treatment, therefore, the period of greatest danger, both from agranulocytosis and from the less alarming complications, can be regarded as past.

As regards the complications after thyroidectomy, most of the cases of tetany were mild and cleared quickly; some of them might easily have been missed if the condition had not been specifically looked for. Similarly, the vocal cords were examined before and after operation as a routine, and it was noted that in some cases a unilateral cord palsy produced only the slightest alteration in function. Postoperative auricular fibrillation usually ceased spontaneously in forty-eight hours and did not lead to cardiac failure.

The incidence of myxœdema is roughly the same in the two series. This suggests that the "antithyroid potency" of the two agents—thyroidectomy and thiouracil—is of roughly the same order. From the practical point of view, however, there is a difference, for the symptoms and signs of thiouracil-induced myxœdema disappear rapidly when the dose is reduced, whereas surgically induced myxœdema is for the most part permanent, though easily controlled by thyroid extract.

IMMEDIATE RESULTS

The effects of thyroidectomy and of thiouracil on the minimal waking pulse-rate and on the basal metabolic rate (B.M.R.) in the initial period were as follows:

	THYROIDECTOMY SERIES		THIOURACIL SERIES	
	Mean	S.D.	Mean	S.D.
<i>Minimum waking pulse-rate per min.:</i>				
Initial	95.3	12.1	90.4	20.0
Final	76.3	6.24	84.0	11.2
<i>B.M.R.:</i>				
Initial	+49.6%	20.2	+42.6%	14.2
Final	-0.7%	15.7	+10.9%	12.0

The figures given above refer to the period in hospital, generally comprising about four weeks in either case; the period from the time of operation to the time of discharge was only about two weeks, and therefore shorter than the period from the start of thiouracil treatment to the time of discharge from hospital.

Sleeping pulse-rates were not as a rule recorded postoperatively; therefore only waking pulse-rates are compared. These show a greater fall in the surgical series. A similar effect is shown with the B.M.R. figures; but these should be interpreted with caution, since postoperative estimations were done on only 17 cases.

The surgical patients were not weighed as a routine before leaving hospital, so we cannot compare the changes in weight in the two series. From what figures we have it seems that there is no gain in weight in the first two weeks after operation (the non-specific tendency of any operation to cause a negative nitrogen balance may have been a factor); whereas the thiouracil series gained on an average 6 lb. while in hospital.

Though 9 cases with auricular fibrillation were treated with thiouracil, it was used only as a preoperative measure in 3 of them. Of the remaining 6, 2 patients developed drug-reactions, and thiouracil was discontinued after two and six weeks; fibrillation was still present at that time. Of the remaining 4 patients, 2 had gross arteriosclerotic heart disease; one of these subsequently died of coronary thrombosis, and the other became regular on thiouracil but developed fibrillation again twelve months later. There remain therefore only 2 cases in which the action of thiouracil on fibrillation could be studied. In one of these the heart became regular three weeks after the start of thiouracil therapy; in the other the heart did not revert to normal rhythm until quinidine was given in addition. Normal rhythm

has continued in both. It will be seen that for a variety of reasons there are not sufficient uncomplicated cases for a fair comparison of the effects of thyroidectomy and thiouracil in thyrotoxicosis with auricular fibrillation.

We conclude that with both types of treatment there was evidence of a considerable amelioration by the time the patient left hospital, and that possibly this was greater in the surgical series.

LATER RESULTS

When the patient has left hospital the comparison of results becomes more difficult. For the purposes of

TABLE II—GENERAL COMPARISON OF THE EFFECTS OF THYROIDECTOMY AND THIOURACIL

Months after start of treatment	Thyroidectomy series		Thiouracil series	
	No. of cases	Percentage "apparently cured"	No. of cases	Percentage "apparently cured"
3	87	29	69	32
6	82	35	57	35
12	82	29	48	37
18	85	32	31	46
24	56	36	20	40
30	68	38	12	42

general comparison we feel that the best index is the proportion of cases which are both subjectively and objectively free of symptoms of thyrotoxicosis. For this reason we have classified as "apparently cured" those patients who are leading a normal life, free of symptoms (excluding those who admit on questioning to "slight palpitations"), and whose resting (outpatient) pulse-rates are 80 or less per min. Patients who fulfil these requirements can fairly be considered free of their thyrotoxicosis. The use of a strict criterion such as this does injustice to any form of treatment, for in both of the present series the proportion of patients who are satisfied with the result is certainly higher than the proportion of those "apparently cured." The latter is therefore to be taken as an index of the effectiveness of a treatment and not as an estimate of the number of cases that can be expected to benefit by it. The results at intervals of three or six months are shown in table II.

We cannot present any numerical data concerning the time after start of treatment at which patients returned to work. Most of our patients were engaged in housework after leaving hospital, and they progressively increased the amount of work done during the day, so it is impossible to state a definite time at which their work-capacity became normal. So far as we have been able to judge, nearly all cases, of either sex, resumed their usual occupations within a month after leaving hospital.

The figure shows the rate of gain of weight in the two series, the patient's initial weight being taken as the starting-point. Since this figure was obtained in hospital, without outdoor clothes, the gain of weight shown for the first period is over-estimated in both series.

In our observations on eye signs we have distinguished between retraction of the upper eyelids (lid-retraction) and true proptosis (exophthalmos). Proptosis does not appear to be directly related to the degree of thyrotoxicosis and was not materially affected by treatment in either series. Lid-retraction, which seems to have a more direct relation to thyrotoxicosis, tended to decline after both thyroidectomy and thiouracil. The time taken for lid-retraction to disappear in 55 cases treated by thyroidectomy and 49 cases treated with thiouracil was as follows:

Months after start of treatment	Percentage of cases with lid-retraction	
	Thyroidectomy	Thiouracil
0	100	100
3	55	89
6	53	69
12	47	65
18	38	35

During the first twelve months the rate of decline was greater in the thyroidectomy series, but at eighteen months lid-retraction had disappeared in about the same proportion in both series.

Apart from lid-retraction, it seems that symptoms disappear at about the same rate whether patients are treated with thiouracil or by thyroidectomy. The methods of measurement used do not permit of fine distinctions, and we do not consider that the data presented here indicate more than that thyroidectomy and thiouracil are of the same order of effectiveness.

Most of the patients treated with thiouracil still have a goitre. Whether such a persistent goitre is preferable to a thyroidectomy scar or not remains a matter for debate; a great deal depends on the quality of the scar, which in some cases may be almost invisible but in others may be extremely ugly. In 8 of our thiouracil cases an initially large goitre has become impalpable, or palpable only with difficulty. On the other hand, the 5 cases which have shown signs of myxœdema have simultaneously developed an enlargement of their goitres; when the dose of thiouracil was reduced the signs of myxœdema disappeared and the goitres reverted to their original sizes.

REMISSIONS AFTER THIOURACIL

In 25 cases which had shown a good response to thiouracil treatment was suspended, and the patients were kept under observation. In 3 cases thiouracil had been administered for six months or less, in 9 cases for twelve months, in 7 cases for eighteen months, and in 6 cases for twenty-four to thirty months.

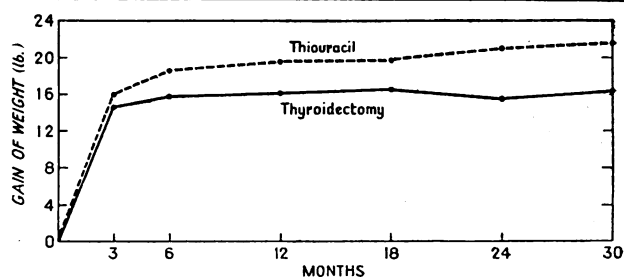
In 7 of the 25 cases symptoms and signs of thyrotoxicosis have recurred and thiouracil has had to be started again. Of these relapses, 1 occurred six months after the treatment was stopped; 2 occurred twelve months, and 4 between eighteen and thirty months after stopping treatment. There is thus a variable latent interval before the symptoms recur, and the true relapse-rate cannot be determined until the cases have been followed for a longer period. Only 6 cases have so far been observed for eighteen months or more after treatment was stopped, and 4 of these have relapsed. It cannot yet be said with confidence that thiouracil can induce permanent remissions of thyrotoxicosis.

The duration of thiouracil therapy may have some bearing on the subsequent relapse-rate, after treatment is stopped. Thus all 7 of our relapses occurred in the 12 patients who had been treated for twelve months or less, whereas none have so far occurred in the 13 patients whose course of thiouracil was longer than twelve months. The small number of cases and the variable periods of observation do not permit of a firm conclusion on this point; but we are sufficiently impressed by our findings to suggest that, when long-term treatment with thiouracil is used, it should be continued for at least twelve months, however good the response has been.

DISCUSSION

From the data presented here the following comparisons may be drawn between long-term thiouracil therapy and thyroidectomy: (1) thiouracil therapy is applicable to roughly the same proportion of cases of toxic goitre as would be operated on by the average surgeon; (2) the death-rate with thiouracil is probably less than that of thyroidectomy in the hands of the average surgeon, and the incidence of other complications is not notably greater than after thyroidectomy; (3) the immediate effect of thiouracil on thyrotoxic symptoms is well marked though probably not so rapid as that of thyroidectomy; and (4) the long-term effects of the two types of treatment are not significantly different.

We consider that these findings justify the provisional use of thiouracil as a long-term treatment of toxic goitre.



Average gains of weight after thyroidectomy (93 cases), and after thiouracil (65 cases).

All patients with toxic goitre can be treated in this way except those with signs of tracheal compression, those with severe drug-reactions, and those who cannot be seen at regular intervals. The initial dosage used in the present series (600 mg. daily of methyl-thiouracil for three weeks) may be unnecessarily high, for in the average case of toxic goitre the speed with which the symptoms are brought under control is not of great importance. We are considering a trial of smaller doses but as yet have no experience to offer.

In the present series white-cell counts were performed weekly while the patient was in hospital and at every subsequent attendance (at intervals of two to four weeks). We do not recommend this practice for general adoption, for two reasons: first, because the only major catastrophe to be feared—agranulocytosis—develops with such suddenness that these relatively infrequent blood-counts are little safeguard; secondly, because reliance on routine blood-counts tends to produce a sense of false security and diverts attention from the only real protection. This is, that every patient should be told that if he develops a sore throat or fever he must immediately discontinue the thiouracil and report to the doctor. It is the doctor's duty, on seeing such a case, to arrange for an immediate blood-count; if this shows a severe leucopenia, treatment with penicillin and other agents is urgently required.

SUMMARY

A total of 65 cases of toxic goitre have been treated throughout with the thiouracil series of drugs. The cases have been followed for periods of up to thirty months and compared with a similar series of 93 cases treated by subtotal thyroidectomy.

The reduction in pulse-rate and B.M.R. during the first three weeks of treatment with thiouracil was similar to, but probably of lesser degree than, that produced by thyroidectomy in the same period.

From three to thirty months after the start of treatment there was no appreciable difference in the condition of the patients treated with thiouracil and those treated by subtotal thyroidectomy.

Since the mortality from thiouracil is less than the overall mortality from subtotal thyroidectomy, the continued use of this series of drugs appears to be a good alternative treatment of toxic goitre.

Thyroidectomy is, however, advisable when tracheal obstruction is present, when a drug-reaction occurs, and when the patient is unable or unwilling to attend regularly for review for an indefinite period.

In 25 cases the administration of thiouracil was stopped after from three to thirty months' treatment, and 7 cases relapsed, but no relapse has so far occurred in the 13 patients who had been under treatment for a year or longer. But in the group as a whole the longer patients were followed after the cessation of treatment the more frequently did relapse occur, and it is impossible as yet to say whether such remissions can be permanent.

We wish to thank the physicians and surgeons of University College Hospital for their generous coöperation.

BLOOD-VOLUME CHANGES IN PROTEIN DEFICIENCY

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In a previous report the clinical condition of Indian prisoners-of-war evacuated from Japanese prison camps was described (Walters et al. 1947). From a selected group of these patients further information has been obtained about the plasma and total circulating volume. It has generally been assumed that in malnutrition the blood and plasma volumes are decreased, but the exact extent of the fall, so far as is known, has never before been measured, nor has the rate or pattern of recovery been observed.

METHODS

Hæmoglobin (Hb) was estimated by the acid-hæmatin method with an Adams diluting-type hæmoglobinometer with a Sahli-Adams square-sectioned diluting tube. The instrument, including the one pipette used throughout, was calibrated by the alkaline-hæmatin method of Clegg and King (1942) from two separate specimens of hæmin, one from Prof. E. J. King, of the British Postgraduate Medical School, and one from Major M. Hynes, R.A.M.C., of the G.H.Q. (India) Anæmia Research Team. The two specimens gave identical results.

Red blood cells were enumerated in a Spencer "bright-line" counting chamber with an "improved Neubauer" ruling. The dilution was made in each of two calibrated pipettes, and two counts were done on each dilution. The recorded result was the average of the four counts done on every specimen of blood.

The *hematocrit* was done in a Wintrobe tube, the Wintrobe oxalate mixture being used as an anticoagulant. The tubes were spun at 2500 r.p.m. for 1 hour.

The *serum-protein* level was measured by the copper-sulphate specific-gravity method of Phillips et al. (1945). There is now ample evidence (see, for example, Hoch and Marrack 1945) to show that this method is reliable, and repeated checks with the micro-Kjeldahl and biuret methods have confirmed this. When unusually low figures were obtained, the results were checked chemically. All determinations were made on serum, and the relation

$$Pr = 343 (G_p - 1.0070)$$

was used throughout, where Pr = serum-protein concentration in g./100 ml., and G_p = serum specific gravity. This relation was found to be correct for the low serum-protein figures found in patients with malnutrition, but gave results up to 5% too low in normal and recovered patients. For convenience, however, all results have been expressed in terms of this relation.

The *albumin/globulin ratio* was measured by the biuret method, half-saturated ammonium sulphate being used as a precipitating reagent, and checked by the micro-Kjeldahl method using 22% sodium sulphate.

Surface area was calculated from body-weight and height by the Du Bois formula.

Plasma volume was measured by the Evans blue technique. The colour matching was done on diluted plasma without any previous removal of proteins with an improved form of the pocket photometer described by King and Delory (1944). This instrument, using an Ilford spectrum-orange light-filter, is well suited to plasma-volume determinations, and it is felt that such errors as arose were physiological rather than technical. Samples were withdrawn 10, 20, and 50 min. after injection of the dye, and the plasma volume at zero time was determined graphically.

Blood-volume was determined from the plasma volume and the hæmatocrit. It is assumed that the peripheral hæmatocrit gives a true estimate of the red-cell plasma ratio for the whole circulation—i.e., (1) that there are no large stores of non-circulating red cells, and (2) that there is no great quantity

of plasma in cell-free films in the small vessels of the peripheral circulation. Errors caused by the invalidity of these two assumptions are in the opposite sense and tend to cancel each other. With regard to assumption (1), Ebert and Stead (1941) could find no evidence of red-cell stores in man. If assumption (2) is incorrect, the blood-volume measured would be too high, because the estimate of the red-cell volume from the plasma volume and hæmatocrit would be too high.

Preliminary measurements with the differential agglutination method (McMichael et al. 1943) and with the carbon-monoxide method (Hopper et al. 1944) indicate that there is little difference between the dye method and the more direct methods of determining red-cell volume. On the other hand, the radioactive iron method of Hahn et al. (1942) and the radioactive phosphorus method of Hevesy et al. (1944) indicate that blood-volumes measured by the dye method are some 10% too high. If this were so, the data given for the total circulating Hb and total circulating red cells would be too high, but the relative values would be of the same order and the general conclusions still valid.

Total circulating plasma protein was calculated by multiplying the plasma volume by the serum-protein concentration. This is really a measure of the total circulating serum protein—i.e., total circulating plasma protein less fibrinogen.

EXPERIMENTAL

Blood-volume measurements were made on the patients soon after they were admitted to hospital and thereafter at intervals of 3 or 4 weeks. The data obtained on admission and shortly before discharge are summarised in tables I-VI. Full details for each case have been given in an unpublished report (Walters et al. 1946), a copy of which has been deposited with the Medical Research Council. Tables I-VI also contain the results from a control series of apparently healthy Indians and those from a small series of patients studied shortly after their admission to hospital but not followed up. All the figures, for purposes of comparison, have been referred to unit body-weight, unit surface area, and unit body-height.

Tables I-VI show that, after a period of treatment in hospital, the patients approached normal in every respect; but, because the intermediate values are not given, they do not show the rate at which recovery took place, nor the relative rate of recovery of each of the different blood constituents. For instance, the plasma volume returned to normal very quickly (0-4 weeks); this was followed by the blood-volume and total circulating plasma protein (2-12 weeks), and it was not until much later (8-16 weeks) that such factors as the body-weight, the total circulating hæmoglobin, the concentration of Hb and plasma protein in the peripheral blood, and the albumin/globulin ratio returned to normal. Various details of this recovery process will be mentioned in the text and illustrated by individual cases. Since the phases of recovery differ considerably from patient to patient

TABLE I—HEMATOLOGICAL FINDINGS

Group	No. of cases	Mean Hb concentration (g./100 ml.) (±s.d.)	Mean red-cell concentration (10 ⁶ cells/c.mm.) (±s.d.)	Mean hæmatocrit (%) (±s.d.)	Mean M.C.V. (c.µ) (±s.d.)	Mean M.C.H. (γ) (±s.d.)	Mean M.C.H.C. (%) (±s.d.)
Control series	9	15.2	5.23	45.5	86.5	29.1	33.5
		± 1.9	± 0.48	± 4.0	± 8.0	± 4.3	± 2.1
Cases on admission	12	9.8	2.52	30.4	121.4	39.2	32.0
		± 2.0	± 0.39	± 4.8	± 16.2	± 8.0	± 2.7
Same cases on discharge	12	13.6	4.41	41.6	95.4	31.3	32.3
		± 0.7	± 0.57	± 3.0	± 8.7	± 3.5	± 1.9
Cases on admission not followed up	5	7.3	1.93	23.5	121.4	38.2	31.5
		± 3.1	± 0.82	± 10.3	± 12.8	± 4.5	± 1.8

in their time relations, the use of average figures would tend to flatten and conceal the points it is desired to emphasise.

Hæmatological Findings.—The hæmatological findings in this series (table I) differed in no essential respects from those of the larger series previously reported (Walters et al. 1947). There was a normochromic macrocytic anæmia which responded well to treatment. The mean corpuscular volume (m.c.v.) and the mean corpuscular Hb (m.c.H.) fell rapidly, and the mean corpuscular Hb concentration (m.c.H.C.) remained within normal limits throughout. It was noticed, however, that the Hb concentration, the hæmatocrit, and, more rarely, the red-cell concentration usually continued to fall for a period of up to 4 weeks and then rose steadily to normal values. Two typical cases are illustrated in fig. 1.

Serum Proteins.—The serum-protein findings (table II) were also similar to those of the larger series previously reported (Walters et al. 1947). The serum-total-protein concentration was low, the reduction being confined to the albumin fraction. During treatment the serum-albumin concentration progressively rose parallel to the total-protein concentration, and the albumin/globulin ratio consequently increased. But, before increasing, the serum-total-protein concentration, like the Hb concentration, often decreased for a short time. It then

TABLE II—PLASMA PROTEIN AND PHYSICAL MEASUREMENT FINDINGS

Group	No. of cases	Mean serum protein (g./100 ml.) (±s.d.)	Mean serum albumin (g./100 ml.) (±s.d.)	Mean serum globulin (g./100 ml.) (±s.d.)	Mean ratio A./G. (x: 1) (±s.d.)	Mean body-weight (kg.) (±s.d.)	Mean height (cm.) (±s.d.)	Mean surface area (sq. m.) (±s.d.)
Control series	9	6.89 ±0.35	4.59 ±0.49	2.30 ±0.30	2.0 ±0.5	51.8 ±5.2	165 ±6	1.59 ±0.10
Cases on admission	12	5.24 ±0.74	2.63 ±0.77	2.61 ±0.72	1.1 ±0.5	45.8 ±4.1	169 ±7	1.50 ±0.10
Same cases on discharge	12	6.69 ±0.12	4.25 ±0.49	2.44 ±0.42	1.8 ±0.4	61.7 ±5.7	169 ±7	1.71 ±0.12
Cases on admission not followed up	5	4.82 ±0.65	3.01 ±0.45	1.81 ±0.35	1.7 ±0.3	41.2 ±5.8	166 ±3	1.45 ±0.08

returned to normal, rapidly at first, but later more slowly. It was during this period of reduced plasma-protein concentration that the delayed œdema, seen in patients recovering from protein deprivation (Stapleton 1946, Walters et al. 1947), manifested itself.

Body-weight.—It was obvious that the body-weight of the patients studied was much below normal. The average weight on admission was 45.8 kg. (table II). This had risen, after a stay in hospital of about three months, to 61.7 kg., an increase of almost 16 kg. (over 2½ stone). The average weight on discharge (61.7 kg.) is greater than the average weight (54.8 kg.) of the control group, even when allowance is made for the difference in average height. The average reduction in weight was to 75% of the original weight. This figure, however, is misleading. Many of the patients were grossly œdematous on admission, and during the first four weeks in hospital, as the œdema disappeared, the body-weight fell; hence the reduction in body tissue other than water was much more than 25%. When the body-weight eventually began to rise, the increase was exceedingly rapid, often being some 7 lb. a week.

Body-height.—The average body-height of the patients was 169 cm. (table II). This is higher than that of the control group (165 cm.). The patients studied had

TABLE III—PLASMA VOLUME AND BLOOD-VOLUME FINDINGS

Group	No. of cases	Mean plasma volume (ml.) (±s.d.)	Mean plasma volume per kg. (ml./kg.) (±s.d.)	Mean plasma volume per sq. m. (ml./sq. m.) (±s.d.)	Mean plasma volume per cm. (ml./cm.) (±s.d.)	Mean blood-volume (ml.) (±s.d.)	Mean blood-volume per kg. (ml./kg.) (±s.d.)	Mean blood-volume per sq. m. (ml./sq. m.) (±s.d.)	Mean blood-volume per cm. (ml./cm.) (±s.d.)
Control series	9	2600 ±229	47.5 ±2.9	1634 ±95	15.7 ±1.2	4779 ±370	86.5 ±4.8	3004 ±131	29.0 ±1.7
Cases on admission	12	2446 ±328	53.6 ±6.2	1625 ±182	14.4 ±1.7	3514 ±413	76.9 ±7.4	2334 ±212	20.7 ±2.0
Same cases on discharge	12	2977 ±458	48.1 ±5.0	1737 ±94	17.6 ±2.3	5090 ±669	82.5 ±7.0	2973 ±288	30.0 ±3.4
Cases on admission not followed up	5	2430 ±453	56.1 ±8.1	1670 ±244	14.6 ±2.5	3158 ±232	73.9 ±10.9	2186 ±168	19.0 ±1.0

obviously been, therefore, men of fine physique before they were imprisoned.

Surface Area.—This was calculated from the body-weight and height by the Du Bois formula. The area, so calculated, was low on admission and, during treatment, it at first fell slightly and then returned slowly to normal (table II).

Plasma Volume (table III).—The mean plasma volume of the patients on admission to hospital was 2446 ml., which is slightly lower than that of the control group (2600 ml.); but the difference is of doubtful significance. The mean figure is also less than that reported by Mollison (1946) for patients in Belsen Camp, but the scatter, 1880 ml.—2940 ml., covers much the same range. If the plasma volume were originally low, it increased to normal quickly (0–4 weeks), and then rose to well above the normal figure (2–12 weeks); and it was only later (8–16 weeks) that it fell again to normal levels. In all the cases studied the plasma volume was the first figure to return to normal.

The plasma volume referred to the body-weight in kilogrammes (pv/kg.) was above normal when the patients were admitted to hospital. This means that the relative decrease in plasma volume was not as great as that of the body-weight. During recovery pv/kg. invariably rose to figures far in excess of normal and then gradually fell again to normal values. This is because, during the early weeks of recovery, the plasma volume increased much more rapidly than the body-weight; the plasma volume reached normal values after 0–4 weeks, but the body-weight not until 8–16 weeks.

TABLE IV—TOTAL CIRCULATING HÆMOGLOBIN FINDINGS

Group	No. of cases	Mean Hb concentration (g./100 ml.) (±s.d.)	Mean total circulating Hb (g.) (±s.d.)	Mean total circulating Hb per kg. (g./kg.) (±s.d.)	Mean total circulating Hb per sq. m. (g./sq. m.) (±s.d.)	Mean total circulating Hb per cm. (g./cm.) (±s.d.)
Control series	9	15.2 ±1.9	730 ±117	13.4 ±2.5	460 ±71	4.4 ±0.7
Cases on admission	12	9.8 ±2.0	345 ±79	7.5 ±1.7	229 ±50	2.0 ±0.4
Same cases on discharge	12	13.6 ±0.7	692 ±85	11.2 ±1.1	405 ±39	4.1 ±0.4
Cases on admission not followed up	5	7.3 ±3.1	225 ±87	5.5 ±2.6	159 ±67	1.3 ±0.5

The plasma volume referred to unit surface area (pv/sq.m.) was much more constant. It was within normal limits when the patients were admitted to hospital and remained so when they were discharged. During the initial recovery phase (0-4 weeks) it rose slightly on occasions, but the percentage rise was small compared with that of pv/kg.

The plasma volume referred to unit body-height (pv/cm.) was low on admission, 14.4 ml./cm. compared with 17.6 ml./cm. for the same patients on discharge and 15.7 ml./cm. for the control series. Like the absolute plasma volume, pv/cm. first rapidly increased to above normal and then decreased to normal values.

Blood-volume (table III).—The mean total circulating volume of 3514 ml., observed when the patients were admitted to hospital, was considerably lower than either that of the control series, 4779 ml., or that of the same patients on discharge, 5090 ml. This mean figure is of the same order as that reported by Mollison (1946) for the Belsen cases. The low total circulating volume gradually returned to normal (2-12 weeks). This return to normal was not so rapid as that of the plasma volume (0-4 weeks), but it was much quicker than the return to normal of many of the other factors measured. Unlike the plasma volume, there was not a period when the figures for the total circulating volume were greatly in excess of normal.

The blood-volume, even when referred to unit body-weight (bv/kg.), was on the average lower than normal (76.9 ml./kg. on admission, compared with 82.5 ml./kg. on discharge and 86.5 ml./kg. for the control series). Mollison (1946), quoting normal values of Gibson and Evans (1937), states that "blood-volume in severely undernourished subjects is not reduced in proportion to body-weight." In 10 out of the 12 of our cases so studied, bv/kg. on admission was less than that on discharge, and in 15 out of the total of 17 patients bv/kg. on admission was lower than the mean of the control group, all the estimations being done by exactly the same technique. Application of Fisher's "t" test gives: P is less than 0.01 for the difference between the means of the patients on admission and those of the control group, and P is less than 0.02 for the difference between the means of the patients of cases investigated on admission but not followed up and the control group. It therefore seems clear that the total circulating volume is decreased to a slightly greater extent than the other body tissues. bv/kg. returned to normal after first going through a period when it was above normal. This was due to the fact that, on recovery, the total circulating volume increased more rapidly than the body-weight.

The blood-volume referred to unit surface area (BV/sq.m.) was reduced relatively much more than

bv/kg. During treatment BV/sq.m. rose steadily to normal values. The relative reduction in blood-volume referred to unit body-height (BV/cm.) was greater still. A normal Indian (control series) has 29.0 ml. of blood for every cm. of his body-height, but the repatriated prisoner, on admission to hospital, had only 20.7 ml., whereas on discharge he had 30.0 ml. Improvement of BV/cm. was continuous throughout the whole of the recovery period.

Total Circulating Hb (table IV).—It has previously been seen that in the early stages of recovery there was often a phase during which the Hb concentration, before

TABLE VI—TOTAL CIRCULATING PLASMA-PROTEIN FINDINGS

Group	No. of cases	Mean plasma-protein concentration (g./100 ml.) (±S.D.) (albumin+globulin)	Mean total circulating plasma protein (g.) (±S.D.) (albumin+globulin)	Mean total circulating plasma protein per kg. (g./kg.) (±S.D.) (albumin+globulin)	Mean total circulating plasma protein per sq.m. (g./sq.m.) (±S.D.) (albumin+globulin)	Mean total circulating plasma protein per cm. (g./cm.) (±S.D.) (albumin+globulin)
Control series	9	6.89 ± 0.35 (4.59 + 2.30)	180 ± 21 (120 + 60)	3.3 ± 0.3 (2.2 + 1.1)	113 ± 10 (75 + 33)	1.09 ± 0.11 (0.73 + 0.36)
Cases on admission	12	5.24 ± 0.74 (2.63 + 2.61)	128 ± 33 (64 + 64)	2.8 ± 0.7 (1.4 + 1.4)	85 ± 20 (43 + 42)	0.75 ± 0.17 (0.38 + 0.37)
Same cases on discharge	12	6.69 ± 0.42 (4.25 + 2.44)	199 ± 31 (125 + 74)	3.2 ± 0.4 (2.0 + 1.2)	117 ± 15 (74 + 43)	1.17 ± 0.17 (0.74 + 0.43)
Cases on admission not followed up	5	4.82 ± 0.65 (3.01 + 1.81)	120 ± 34	2.7 ± 0.7	82 ± 22	0.72 ± 0.20

it began to improve, actually fell still further. If the Hb concentration is multiplied by the blood-volume, the total amount of Hb in the circulation can be calculated. It was found that the total circulating Hb rose steadily throughout the whole of the recovery period, even though in the initial stages the Hb concentration may have fallen, for it was at this time, when the Hb concentration was falling, that the increase in blood-volume was greatest. These points are well illustrated in fig. 2, which gives the Hb concentration, total circulating Hb, and total circulating volume changes in two typical cases. This is important from the clinical viewpoint, for it means that a patient may be producing Hb into the circulation at a surprisingly high rate—in the two cases illustrated Hb was being formed at the rate of 40.5 and 28.0 g./week—with the Hb concentration actually falling. It follows therefore that, if the Hb concentration of an undernourished patient falls during the first few weeks' treatment, it does not necessarily mean that the patient's condition is deteriorating. He may still be elaborating Hb at a very satisfactory rate.

The total circulating Hb when the patients were admitted to hospital was exceedingly low, 345 g. compared with 730 g. for the control series, but by the time the patients were fit for discharge it had risen to 692 g. The total circulating Hb per kg. of body-weight was also greatly decreased on admission, signifying that the loss of Hb was relatively much greater than the loss of other body tissues. During the period of treatment in hospital this rose rapidly at first, and then more slowly.

The relative reduction of the total circulating Hb referred to unit surface area was much greater. When the patients were admitted to hospital the total circulating Hb per sq.m. of body surface area was 229 g., compared with 405 g. for the same patients on discharge and 460 g. for the control series. This figure gives some idea of the disability under which the patients were suffering during their imprisonment, because the Hb requirement is pro-

TABLE V—TOTAL CIRCULATING RED-CELL FINDINGS

Group	No. of cases	Mean red-cell concentration (10 ¹² cells/c.mm.) (±S.D.)	Mean total circulating red cells (cells × 10 ¹²) (±S.D.)	Mean total circulating red cells per kg. (cells × 10 ¹⁰ /kg.) (±S.D.)	Mean total circulating red cells per sq.m. (cells × 10 ¹¹ /sq.m.) (±S.D.)	Mean total circulating red cells per cm. (cells × 10 ⁹ /cm.) (±S.D.)
Control series	9	5.28 ± 0.48	25.3 ± 3.7	46 ± 4	15.9 ± 1.7	15.3 ± 2.0
Cases on admission	12	2.52 ± 0.39	8.8 ± 1.4	19 ± 3	5.9 ± 0.9	5.2 ± 0.8
Same cases on discharge	12	4.41 ± 0.57	22.2 ± 2.6	36 ± 5	13.1 ± 1.7	13.1 ± 1.6
Cases on admission not followed up	5	1.93 ± 0.82	6.0 ± 2.5	15 ± 3	4.3 ± 2.0	3.7 ± 1.5

portional to the surface area. With treatment in hospital the total circulating Hb per sq.m. steadily returned to normal.

When referred to unit body-height, the total circulating Hb was greatly reduced. On admission to hospital the repatriated prisoners had only 2.0 g. of Hb per cm. of body-height, whereas the figure for the control group was 4.4 g. Presumably the latter figure is a fair estimate of the total circulating Hb per centimetre body-height of the patients before they were imprisoned. The actual loss of Hb to the body was therefore much greater than that indicated by the fall in the Hb concentration. With treatment in hospital the total circulating Hb per centimetre body-height gradually increased.

Total Circulating Red Cells (table v).—It has previously been seen that the red-cell concentration rarely fell during the early stages of recovery as did the Hb concentration. This is reflected in the progressive fall in the M.C.H. and the disappearance of the macrocytosis. Multiplying the red-cell concentration by the blood-volume gives the total number of red cells in the circulation. The average for the repatriated prisoners on admission to hospital was 8.8×10^{12} cells, whereas the figure for the control series was 25.3×10^{12} , and that for the patients on discharge was 22.2×10^{12} . The total number of circulating red cells thus approached normal during the period of treatment in hospital.

The total number of circulating red cells referred both to unit body-weight and unit surface area was also greatly reduced, as also was the total number of circulating red cells referred to unit body-height. The figure of 5.2×10^{10} cells/cm. on admission can be compared with 15.3×10^{10} cells/cm. for the control series. All these figures approached normal after the treatment in hospital.

Total Circulating Plasma Protein (table vi).—After a period during which there was little improvement, the serum-protein concentration rose, at first rapidly and then more slowly, until normal values were reached. This rise was almost entirely in the albumin fraction; hence there was a progressive increase in the albumin/globulin ratio.

TABLE VII—STAGES OF RECOVERY IN PROTEIN DEFICIENCY

Observation	Stage I (0-4 weeks)	Stage II (2-12 weeks)	Stage III (8-16 weeks)
Body-weight	Decreases	Increases rapidly	Increases to normal
Plasma volume	Increases rapidly to normal	Increases rapidly to above normal	Decreases to normal
Blood-volume	Increases	Increases to normal	No change
Hb concentration and haematocrit	Decreases or no change	Increases	Increases to normal
Total circulating Hb	Increases	Increases rapidly	Increases to normal
Red-cell concentration	Increases slightly or no change	Increases	Increases to normal
Total circulating red cells	Increases	Increases rapidly	Increases to normal
Plasma-protein concentration	No change or increases slightly	Increases rapidly	Increases slightly to normal
Total circulating plasma protein	Increases	Increases very rapidly to normal	No change
Total circulating albumin	Increases	Increases rapidly	Increases to normal
Total circulating globulin	Increases slightly from normal	Increases to above normal	Decreases to normal
A./G. ratio	Increases slightly	Increases	Increases to normal

TABLE VIII—RATE OF PRODUCTION OF Hb, RED CELLS, AND PLASMA PROTEIN

Case	Time observed (days)	Change in total circulating			Change per day in total circulating		
		Hb (g.)	Red cells (cells $\times 10^{12}$)	Plasma protein (g.)	Hb (g./day)	Red cells (cells $\times 10^{10}$ /day)	Plasma protein (g./day)
5	35	235	9.5	110	6.7	27.1	3.1
7	25	144	6.7	73	5.8	26.8	2.9
10	28	295	12.3	77	10.5	43.8	2.8
24	18	140	3.3	31	7.8	18.3	1.7
25	30	180	7.3	47	6.0	24.3	1.6
26	25	153	5.8	68	6.1	23.2	2.7
28	25	101	4.6	43	4.0	18.4	1.7
31	29	354	12.2	55	12.2	42.1	1.9
32	33	352	11.1	49	10.7	33.6	1.5
34	21	205	6.2	47	9.8	29.5	2.2
36	25	181	3.8	70	7.2	15.2	2.8
				Mean	7.9	27.2	2.3

By multiplying the serum-protein concentration by the plasma volume, an estimate is obtained of the total circulating plasma protein. It is seen that this was 128 g. when the patients were admitted to hospital, compared with 199 g. when they were discharged and 180 g. for the control group. It is also seen that, even though many of the patients were received in a state of acute protein deprivation, the relative decrease in the total circulating plasma protein was less than that of the total circulating Hb, because the relative reduction of the plasma volume was less than that of the blood-volume, and the relative reduction in serum-protein concentration was less than that of the Hb concentration. The improvement in the total circulating plasma protein was both dramatic and rapid. Normal figures were reached at the end of 2-12 weeks, long before normal figures for the total circulating Hb.

The total circulating plasma protein increased steadily in all cases, even though, in many, the serum-protein concentration fell at first. The initial rise in plasma volume was so rapid that there was always an increase in total circulating plasma protein. Fig. 3 illustrates these particular points in two typical cases. As in the case of the Hb, it does not necessarily follow that, because the serum-protein concentration falls, the patient is not progressing. In patient 28 (fig. 3) plasma protein was being produced at the rate of 12 g./week, and yet the serum-protein concentration actually fell.

The total circulating plasma protein referred to unit body-weight (Pr/kg.) was slightly less than that of the control series, indicating that plasma protein was not greatly reduced relative to other tissues. Because of the rapid rise in total circulating plasma protein and the slower rise in body-weight, Pr/kg. quickly rose to figures well above normal before it fell again to normal levels. The total circulating plasma protein referred to both unit surface area and unit body-height was also reduced, and in both cases rose very rapidly to normal values.

It is seen that the reduction in the total circulating plasma protein was entirely in the albumin fraction. The total circulating albumin was only 50% of normal, whereas there was no change in the total circulating globulin. On recovery, at first both fractions increased, but the albumin increased more rapidly than the globulin. Then, as time progressed, the increase in total circulating albumin became more rapid, and that of total circulating globulin less rapid, until finally, in many cases, the total circulating globulin, which by now had

risen to figures above normal, began to decline. Some interest attaches to the reduction in total circulating albumin because of the finding of Sachar et al. (1942) that the reduction of tissue protein produced by an insufficient dietary intake of protein is directly proportional to the reduction of total circulating albumin. On the basis of nitrogen-loss experiments in dogs, these workers concluded that

$$T.Pr_t = 25 \times Alb_t$$

where $T.Pr_t$ and Alb_t represent the loss in g. of tissue protein and total circulating albumin respectively. The difference between the mean total circulating albumin of the prisoners on discharge and that on admission was 61 g. Application of the above formula would thus give a tissue protein loss of 1525 g.

The formula of Sachar et al. (1942) for calculating the loss of total circulating albumin,

$$Alb_t = 0.5 Wt (4.6 - Alb_o)$$

where Wt is the normal body-weight in kg. and Alb_o is the serum-albumin concentration in g./100 ml., gives an estimated albumin loss of 62 g. compared with the loss of 61 g. measured directly.

When referred to unit body-weight, surface area, or body-height, the figures for the total circulating albumin and globulin do not reveal many points of special interest. It will be noticed, however, that, since the total circulating globulin was normal on admission when the body-weight was reduced, the total circulating globulin, when referred to unit body-weight, was above normal (1.4 g./kg. as opposed to 1.1 g./kg.). As the body-weight increased, the total circulating globulin per kilogramme body-weight fell.

STAGES OF RECOVERY

From the foregoing it is possible to reconstruct the general picture of the pattern of recovery in a protein-deficient patient. For the sake of ease of description this

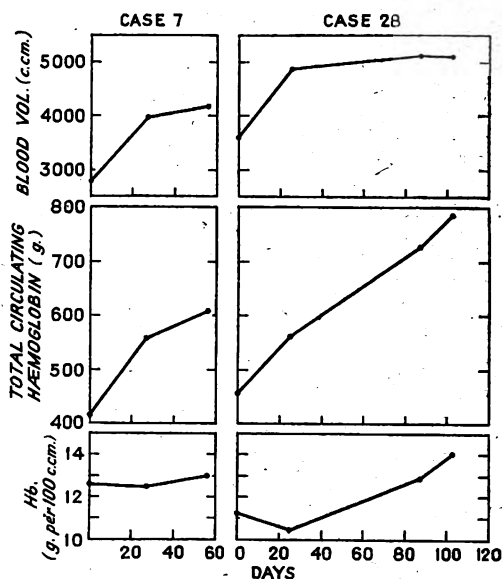


Fig. 2.—Typical changes in cases 7 and 28 (see table VIII).

recovery process has been divided into three stages. These are arbitrary and show very considerable variations in their time relations. Most of the patients studied, however, demonstrated these stages clearly, and the remainder would, we feel confident, have demonstrated them had blood-volume determinations been done at sufficiently frequent intervals. It must also be remembered that, in some of the patients, the recovery process had already begun during their evacuation to India; in these, stage I had been passed before they were admitted to hospital.

Stage I (0-4 weeks).—This is characterised by the rapid rise in plasma volume to normal. During this period the body-weight at first falls as oedema disappears, and then may slowly rise. The blood-volume rises steadily but at such a rate that, though the Hb concentration, together with the haematocrit, usually falls, the total circulating Hb increases. Despite the decrease in Hb concentration, the red-cell concentration may increase, since the m.c.h. is falling as the patient's blood is rapidly becoming less macrocytic. The number of circulating red cells increases, as does the total circulating plasma protein. Because of the rapid rise in plasma volume, the plasma-protein concentration changes but little; it sometimes falls slightly and sometimes increases. The increase in total circulating protein is in both fractions, but more albumin is formed than globulin; so the albumin/globulin ratio increases slightly.

Stage II (2-12 weeks).—This is characterised by the rapid rise of both the total circulating volume and the total circulating plasma protein to normal. The plasma volume, which had attained normal values in stage I, increases rapidly to values well above normal. There is also a rapid increase in body-weight and in total circulating Hb, because both the Hb concentration, which fell in stage I, and the blood-volume are increasing rapidly. The haematocrit and the red-cell concentration, and hence the total circulating red cells, are also increasing. The increase in the total circulating protein is in both fractions, but the albumin fraction increases much more rapidly than the globulin; the total circulating globulin does, however, often reach figures well in excess of normal. The albumin/globulin ratio continues to increase.

Stage III (8-16 weeks).—This stage marks the transition from stage II to normal findings. It is characterised by the return of the plasma volume, which had risen to

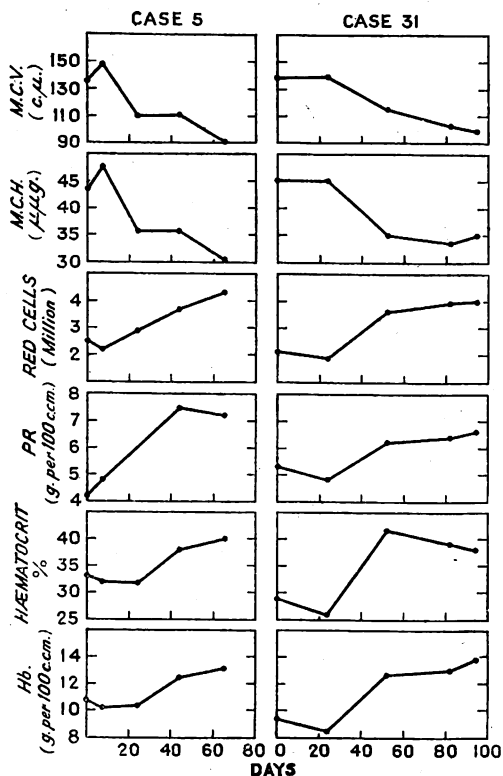


Fig. 1.—Typical changes in cases 5 and 31 (see table VIII): Hb, haemoglobin; PR, plasma-protein concentration; M.C.H., mean corpuscular Hb; M.C.V., mean corpuscular volume.

values far in excess of normal in stage II, back to normal and by the maintenance of the total circulating volume at normal levels. This is accompanied by a rise in the Hb concentration, red-cell concentration, and haematocrit, and therefore of the total circulating Hb and total circulating red cells. There is a steady rise in the body-weight and a rise in the plasma-protein concentration; but, because of the fall in plasma volume, the total circulating plasma protein remains the same. There is, however, still a rise in the total circulating albumin, which is balanced by a corresponding fall in the total circulating globulin. This is reflected in the continued increase of the albumin/globulin ratio.

The above description, which is of necessity an oversimplification, is summarised in table VII, and the salient features of the stages of recovery are represented schematically in fig. 4.

RATE OF RECOVERY

The total circulating Hb, the total circulating red cells, and the total circulating plasma protein being known at any given stage in the recovery process, it is possible to judge the rate of recovery in terms of the rate of production of Hb, red cells, or plasma protein.

Table VIII gives the change in total circulating Hb, red cells, and plasma protein in a series of patients at the time of maximal recovery. It is seen that the average rate of Hb production for the series was 7.9 g. a day (or roughly, if the total circulating volume remains

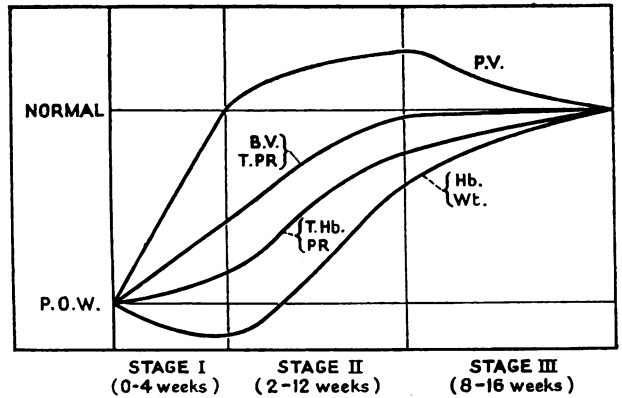


Fig. 4—Schematic representation of stages of recovery: P.V., plasma volume; B.V., blood-volume; Hb, haemoglobin concentration; PR, plasma-protein concentration; T.PR, total circulating plasma protein; T.Hb, total circulating Hb; Wt., body-weight.

a reduction in the serum-total-protein concentration which was confined almost entirely to the albumin fraction, and hence a reduction in the albumin/globulin ratio; a reduction in body-weight; little change in plasma volume; an increase in plasma volume referred to unit body-weight, no change referred to unit surface area, and a decrease referred to unit body-height; a reduction in total circulating blood-volume which was also reduced when referred to a unit body-weight, unit surface area, and unit body-height; a reduction in the total circulating Hb, total circulating red cells, and total circulating plasma protein which was also reduced when referred to unit body-weight, unit surface area, and unit body-height. The reduction in total circulating plasma protein was entirely in the globulin fraction.

All the above findings returned to normal during treatment in hospital.

The Hb concentration, and sometimes the plasma-protein concentration, often fell during the first four weeks' treatment in hospital. Although this was so, the increase in blood and plasma volume was so great that the total circulating Hb and plasma protein was increased. Therefore it does not necessarily follow that, because the Hb concentration or serum-protein concentration falls during the initial stages of treatment, the patient is not making satisfactory progress.

The rate of recovery of each of the above factors was followed, and from this the pattern of recovery was reconstructed. The recovery process has been divided into three arbitrary stages, which have been described in detail.

The rate of recovery in terms of the rate of production of Hb, red cells, and plasma protein was also observed.

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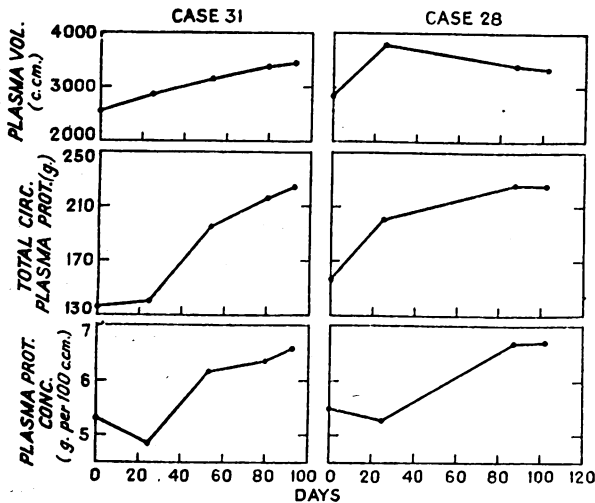


Fig. 3—Typical changes in cases 31 and 28 (see table VIII).

constant, 1% a day on the Haldane scale). The average rate of red-cell production was 27.2×10^{10} cells per day. This reduces to the astonishing figure of 3 million cells every second. The average rate of plasma-protein production was 2.3 g. a day. Thus, even though every tissue of the body must be suffering from protein deprivation, over 10 g.* of the daily dietary protein intake is converted either to Hb or plasma protein. Of the 2.3 g. a day of plasma protein formed 1.5-2 g. is albumin. On the basis of the calculations of Sachar et al. (1942) this would mean a deposition of tissue protein of about 37-50 g. a day.

SUMMARY

Plasma- and blood-volume observations were made on Indian prisoners repatriated from Japanese prison camps and on a control series of apparently healthy Indians.

The chief findings in the ex-prisoners on admission to hospital were a normochromic macrocytic anaemia;

* This is neglecting the non-Hb protein content of the packed cell volume, which may be considerable.

LOIASIS

R. D. C. JOHNSTONE

M.D. Lond., M.R.C.P.

LOIASIS is caused by the infection of man with the filaria *Loa loa*, whose other names, all associated with the eye, are African eye-worm, *Dracunculus oculi*, and *Filaria oculi humani*.

Loiasis was first observed and recorded pictorially by Pigafetta in 1598 on his journey along the Congo river. In 1770 a worm was removed from the eye of a negress in Haiti by Mongin. In 1777 loiasis was accurately observed by Guyet in Angola, and in 1805 he wrote the first description of the disease. Manson (1891) first demonstrated microfilariae in the blood of an infected patient. The original discovery of the intermediary host must be accredited to Manson, but it was not until 1913 that Leiper proved Manson's observations to be correct.

Infection by *Loa loa* is limited to Africa, chiefly along the west coast from Sierra Leone to Benguela but also extending inland as far as equatorial Sudan, which shows a high incidence. Probably the areas which show the heaviest infection are the Cameroons and the borders of the Congo river. The condition was formerly common in the West Indies and America but is now only rarely seen there, and the cases recorded are universally held to have been due to infection in Africa. There is no fly vector in the American continent which carries the disease.

LIFE-CYCLE AND DESCRIPTION OF PARASITE

Man is infected by the bite of the mangrove fly, of the species *Chrysops dimidiata* and *C. silacea*, though there is strong evidence that other flies may at times carry the disease.

The female chrysops, which bites during the day, deposits the larvæ on the victim's skin, through which they burrow in no more than a minute. Apparently the larvæ move into the deeper tissues, where they grow into adult worms. Opinions differ about the rate of growth and the time taken by the worms to mature, but it seems certain that they reach their full size within a few months. It is probably some years before they produce microfilariae, and during this period they wander about the body, passing freely through the connective tissues; their rate of progress may be as much as $\frac{1}{2}$ in. a minute.

After a variable period the female filariae produce microfilariae, which enter the blood-stream. Some say that at least three years elapse between infection and the appearance of microfilariae in the blood. It is generally held that the microfilariae are strictly diurnal, but this fact is denied by some. Possibly there is some confusion with microfilariae of *Acanthocheiloneema perstans*, but it is certain that the microfilariae of *L. loa* are far more plentiful during the day than the night. Their periodicity is therefore in sharp contrast to that of the microfilariae of *Wuchereria bancrofti*, which are definitely nocturnal.

To complete the life-cycle of *L. loa* it is necessary for the infected person to be bitten again by a chrysops, whereupon the microfilariae pass into the insect's stomach with the blood and later migrate to its thoracic muscles. Here they undergo morphological changes without multiplication, and finally pass to the proboscis, where they await their new host. The cycle in the fly lasts 10-12 days.

The adult filariae are $\frac{3}{4}$ to $2\frac{1}{2}$ in. long, the females being somewhat longer than the males. They are white and resemble a thick thread of cotton. The microfilariae are about 300 μ long and about equal to a red corpuscle in diameter.

CLINICAL PICTURE OF LOIASIS

Both sexes and all races, including young children, are liable to infection, and in heavily infected areas some 20% of the inhabitants are infected.

Many writers say that loiasis is harmless and almost symptomless, causing no disability, but I cannot agree with them. For several years after leaving an endemic area it is common for no symptoms to appear, and cases are recorded in which the first knowledge of infection was five years after return to a temperate climate.

Calabar Swellings.—These are by far the most common symptom. They are so named after the town in Nigeria where the disease is rife. Usually there is a fairly sudden onset of a swelling $1\frac{1}{2}$ -2 in. in diameter, which lasts as a rule three to five days and is most common on the forearm. The swelling may irritate slightly and show minimal pitting and occasionally redness of the overlying skin. Apart from an ache these swellings cause no great disability, unless they are close to a joint or a nerve. They gradually shrink, but at times they seem to move their position. It is said that even in heavily infected cases only a very few swellings will appear each week. In my opinion their number is almost unlimited at any one time—indeed, several may appear together. After the patient's return to a temperate climate the swellings tend to become less frequent and eventually disappear, though the adult filariae may persist. The swellings may first appear within four months of the patient's arrival in an endemic area, or they may not develop until many years after infection.

Distribution of Filaria in the Body.—The filariae most commonly appear near the eyes, for which they seem to have a predilection, and few patients have not at some time had a worm in this region. It is in this area that their movements are most easily felt, and they can often be seen wriggling under the loose skin of the lids. Commonly they cross the eye, passing easily and rapidly under the conjunctiva. While they are in this region they may cause swelling, conjunctivitis, lacrimation, and pain. The worms have been seen in the eye within nine months of infection. They have been removed from an eye thirteen years after the patient has left an endemic area, and live filariae have been seen fifteen years after the patient's return to a temperate climate. The worms may be seen under the skin in many parts of the body, such as the back of the hands, the nose, the penis, and elsewhere. Their movements when close to the surface of the skin cause paræsthesiæ, creeping sensations, and itching.

Eosinophilia.—This is an absolutely constant finding, but after a long period in a cold climate the count tends to fall almost to normal. The average count is 15-30%, the highest recorded being in a European with a count of 84%.

Psychological Effects.—Most authors do not even mention this aspect of the disease, and I can find only two references to it. Elliot (1920) writes: "The combination of itching, pain, and irritation caused by the movements of the parasite under the conjunctiva are simply maddening." Clothier (1943) writes: "If a worm is not removed but merely driven into the deeper tissues by cold applications, it frequently returns many times to harass a tired and overworked individual until a partial nervous breakdown is the end-result."

The constant creeping sensation caused by the filaria under the skin of the face for hours or even days on end is indeed distressing, and the relief afforded by removal of the worm cannot be adequately appreciated by an observer. The knowledge that probably many more parasites are present in the body, or the discomfort of removing the worm, can in no way detract from the satisfaction felt at seeing the immediate cause of the trouble safely removed.

Less Common Manifestations.—Various skin eruptions, including a generalised urticaria, have been recorded. Nausea, headaches, œdema of the glottis, transient

hemiplegia, dysuria, and many other symptoms have from time to time been attributed to loiasis. There is, however, little proof that these are due to infestation by *L. loa*. Manson-Bahr (personal communication) has known a patient with a massive infection to develop multiple cystic swellings all over the body but chiefly on the arms; these finally broke down and discharged dead filariæ. The dead worms may cause abscesses, but they usually become calcified.

Chronic Calabar swellings are well recognised, and may persist for over two months. My impression is that they develop early and are only rarely seen in the later stages or after the patient's return to a cold climate. They form a more or less ill-defined lesion, usually on the arm below the elbow. Little is known of their pathology, but they are thought to arise from Calabar swellings which keep recurring at the same site.

PATHOLOGY

The filariæ of *L. loa* differ from those of *W. bancrofti* in that they wander about the body, chiefly in the connective tissues. As a rule they do not obstruct lymphatics, but sometimes they cause fairly severe lymphatic œdema and elephantiasis. Several observers maintain that in hyperendemic areas they are a common cause of hydrocele, varicocele, and hernia. In such areas about 10% of patients coming to operation for hernia and allied conditions have live worms in the regions exposed. In one case Chesterman (quoted by Strong 1944) found forty parasites close to the cord. The adult filariæ have been found in almost every part of the body, including the heart and pericardium.

A moderate enlargement of lymph-glands is a common finding in infected patients; nearly every patient with many Calabar swellings on the arms will have enlarged epitrochlear glands.

There has been much speculation about the pathology of Calabar swellings. The theories that they indicate the birth of microfilariae or are associated with the wanderings of the adult can now have little support. Undoubtedly they are the local anaphylactoid reaction of the host to the loa antigen, and this explanation is borne out by the fact that they have been artificially produced by the injection of a similar type of antigen obtained from *Dirofilaria immitis* into patients with loiasis (Lloyd and Chandra 1933).

Dead filariæ usually become calcified without suppurating and then are clearly visible on radiography.

Enlargement and chronic fibrosis of the spleen have been found at necropsy, and serial sections have shown microfilariae embedded in fibrous tissue surrounded by much cellular infiltration. Chronic malaria may be at least a partial cause of the splenic enlargement in these cases.

Loiasis undoubtedly lasts a long time. *L. loa* is said to be able to live for twenty years, and many observers say that loiasis lasts about fourteen years. Manson-Bahr (1945) records a case in which microfilariae persisted in the blood for seventeen years.

DIAGNOSIS

A history of visiting an endemic area at some time is essential for diagnosis, since infection cannot take place without a suitable vector.

Calabar swellings are such a constant feature that the diagnosis of loiasis should hardly be considered if there have never been any. Often physical examination will be entirely negative, but the outline of a worm may be seen under the skin, or one may be seen crossing the eye. The diagnosis must be in serious doubt if the differential white-cell count is normal, for eosinophilia is present in every case at some period.

The absence of microfilariae from the blood is no bar to the diagnosis, since they may be absent for a consider-

able period even in heavy infections. They should be searched for in thick blood films taken during the day-time. If present they are usually easy to find with a low-power microscope. Either a thick fresh film with overlying coverslip and no stain, or a thick dried film stained with one of the Romanowsky stains, will reveal them. By the first method they are seen to be actively motile. If there is any doubt about the diagnosis, it may be necessary to have stained films examined to differentiate the microfilariae of *L. loa* from the harmless microfilariae of *A. perstans*, which is commonly found in some districts of Africa and gives rise to no symptoms.

Should the diagnosis still remain in doubt, skin tests may be carried out. These consist of the intradermal injection of a filarial antigen; an extract obtained from *D. immitis* is the one most commonly used. Or a complement-fixation test may be done on the patient's serum. Both these tests are highly accurate in the diagnosis of filarial infections as a group, differentiating them from other worm infections, but they do not give positive information about the species of filaria involved.

Ease in making the diagnosis correctly is the rule rather than the exception.

TREATMENT

General Treatment.—Prophylaxis must rest on avoiding being bitten by chrysops and any other possible vectors.

There is no known cure for loiasis. A wide variety of drugs have been tried, each in turn being credited with some successes. However, careful observation has shown that, given in doses not toxic to the host, they had no effect on the adult filariæ and little if any on the microfilariae. Those which have seemed the most hopeful are 'Anthiomaline,' stibophen, methylene-blue, and organic arsenicals.

Microfilariae can live for a considerable time—indeed, heavily infected blood has been injected intravenously into dogs, and more than a year later the microfilariae have been found alive in the circulation. By themselves the microfilariae probably cause no symptoms; therefore their destruction cannot help the host but merely prevents the continuation of a reservoir for the transmission of the disease. Thus, should an effective drug be found for killing the microfilariae, its only justifiable use can be in an endemic area where vectors are a constant source of danger to other people.

The indiscriminate use of potent drugs in treating loiasis is not only futile but often harmful. I have seen one patient with a severe agranulocytosis following the unsuccessful administration of a toxic drug.

Deep X-ray treatment, to sterilise the female parasites in the tissues, has been advocated by some, but there does not seem to be enough justification for its use in loiasis. This form of therapy appears to have more scope in *W. bancrofti* infections.

Local Treatment.—Calabar swellings do not as a rule require any treatment, but at times local soothing applications may be indicated. Chronic swellings should benefit considerably from daily massage.

Removal of the filariæ should always be attempted when they can be located in a suitable site. This can most easily be done when they are passing over the globe under the conjunctiva. The method is as follows:

Cocaine, in the form of a 4% solution or lamellæ containing gr. $\frac{1}{20}$, should be instilled into the eye only when the parasite has been located in a suitable position for removal. This point is important, because it is essential to have the whole worm in view if the operator is to be sure of removing it. Almost certainly the anaesthetic will arrest the worm in this position. The conjunctiva should be snipped with a pair of very fine scissors parallel with the length of the worm and as near its centre as possible. The worm is then grasped with a pair of fine forceps and removed intact. When no suitable instruments are available, the worm can be removed

with a cutting needle, but the operation takes longer and is more difficult.

When a worm has been located under the skin and can easily be seen, it should be removed by passing a fine stitch under it and tying it securely. This stitch should be inserted without local anaesthetic, because the parasite tends to become obscured by the injected drug. Once it has been firmly secured it may be removed without hurry through a small incision after injection of local anaesthetic.

CASE-RECORD

I reached West Africa at the end of June, 1943, and, after two weeks in Sierra Leone, proceeded to Southern Nigeria, where I remained for the next year working in a casualty clearing station. During this period we were always stationed in the bush, conditions being usually somewhat primitive, since we were under canvas much of the time. The surrounding country was thick tropical forest, and I often made trips into this during my spare time to collect butterflies. There was therefore ample opportunity for being bitten by flies of all sorts. Except for M.T. malaria and bacillary dysentery, my health was good. I was moved to Accra, Gold Coast, in June, 1944, where the conditions by comparison were excellent and civilised.

In July-August, 1944, I first noted the gradual onset of a swelling above the right wrist. This was pronounced to be a sprain, but the swelling gradually spread to involve the whole of the right hand, and writing for more than a few minutes caused cramp. Although daily massage seemed to help considerably, the condition persisted to such an extent that playing any games which involved holding a handle was impossible.

At this stage, and lasting about ten days, a severe neuralgia in the distribution of the right median nerve came on regularly every night, and at no time during this period did I manage to sleep more than twenty minutes at a time. Getting out of bed and moving the hand removed the pain and tingling within a minute or so, but tying the hand up with a sling to the mosquito netting did not help. Later I found that the somewhat excessive intake of alcohol during the evening helped considerably in giving me a restful night. At this time the maximal swelling was in the centre of the palm.

Gradually these unpleasant symptoms passed off, and the nights which I had come to dread became more peaceful. The swelling of the wrist and hand persisted for at least 6-8 weeks. Slight pitting oedema was always present, but apart from the short period mentioned above there was little interference with my work or normal activities.

Within a few weeks of the appearance of the first swelling a regular crop of swellings kept coming and going. In one week in October, 1944, I had 16 swellings, 3 coming in one day. At times they were irritating and the overlying skin red; at other times they appeared to be situated more deeply, causing an ache which usually felt like a bruise and lasted twenty-four hours. By far the greatest number developed on the forearms, but few parts of my body have so far escaped. Throughout the disease the eosinophilia has ranged between 36% and 12%. Repeated search for microfilariae has always been negative.

I left West Africa in December, 1944, the journey to England taking four weeks. The weather was extremely cold, and with the fall in temperature there was a noticeable decrease in the number of swellings. In fact, by the time that I reached this country I was getting about one every third day at the most.

The night before we docked I noted discomfort in the right eye; and, though I suspected a worm as the cause, I could see nothing abnormal, and the feeling passed off. Next evening there was a repetition of this symptom, followed shortly by a creeping sensation on the globe. There was no difficulty in seeing the filaria under the conjunctiva, and it was removed intact with a needle after cocainising the eye. The procedure took some twenty minutes and was unpleasant but not really painful. Any unpleasantness was well worth the sense of relief which I felt on knowing that the worm had been removed. A mild conjunctivitis persisted for several days.

During the following months Calabar swellings developed at an average of about two a week. A second filaria made its first appearance about the last week in June, 1945, near the left eye, and for the next two and a half days it wandered round the eyelids, sometimes passing across the bridge of the nose but always returning to the same eye. It gave the impression that it was anxious to find the conjunctiva but

could not do so. During this time it caused no true swelling, but often I could see it clearly under the loose skin of the lids, and throughout the day and the night I was constantly aware of its presence, as it seldom remained in any one position for more than a few moments.

After consultation with an ophthalmologist it was decided that, should the worm appear in the upper lid again, an attempt should be made to remove it. This was most ably carried out in the following manner. A stitch was passed under the filaria when it next appeared, and the suture was tied firmly. Local anaesthetic was then infiltrated and the whole worm removed intact, the small wound being closed with a suture. There was a moderate degree of swelling of the orbital tissues which lasted several days. I cannot recommend this method of removal as simple or completely painless, and the possibility of a portion of the worm being left behind and thus causing suppuration near the inner canthus must be borne in mind.

A third worm appeared near the right eye in August, 1945. Like its predecessor, it spent some days wandering round, but it differed in the fact that at one time it coiled itself in the outer aspect of the upper lid and formed a small Calabar swelling. Next morning it continued its movements, again crossing the nose but returning to the eye a few hours later. Several people have advocated the removal of the worm while it is crossing the nose, but I took most careful note of both these worms, and at no time was it really possible to discern them under the skin in that position.

At this time I had to go to London and was therefore unable to remain near medical assistance, should the worm appear under the conjunctiva. Later in the day I was fortunate enough to be in a London hospital, when I suddenly experienced the most acute pain deep in the right eye. This pain extended up over the frontal region to the top of the head. It was grossly aggravated by even the slightest movement of the eyes, and it was the worst pain that I have ever experienced. No worm had been visible or felt to be moving for about half an hour before the onset of this pain. These symptoms persisted for one and a half hours and then equally abruptly ceased, leaving nothing more than an ache, which was worst when the eye was turned. Fifteen minutes later the filaria could be felt crawling over the inner aspect of the conjunctiva, having apparently emerged from the inner canthus. It was rapidly and most efficiently removed by the sister in charge of the ophthalmic department.

The fourth worm was removed from my right eye after wandering round that region for over two weeks. Like the others, it seldom seemed content to stay quiet in one place, and throughout this period it was an almost constant source of annoyance and discomfort. Owing to lack of suitable instruments its removal was possibly somewhat slow, necessitating three lamellae of cocaine. This dosage appeared to paralyse it, and there was little urgency in removing it, as it became almost motionless under the conjunctiva.

As I write this, my right hand and wrist are slightly swollen, having been like this for over a month, but there are no localised Calabar swellings.

The course taken by the Calabar swellings throughout the last nine months is of interest, as during the hot summer months they were most frequent but never exceeded three in a week. During the cold weather they have been distinctly uncommon. Even their character has altered, in that they are more transient, and indeed, if I did not know that I had the disease, they might pass unnoticed.

SUMMARY

Loiasis is a chronic condition, not amenable to any specific treatment, and may well be encountered in this country for years to come.

Removal of the worms should always be attempted when they are crossing the eye.

The mental distress which the filariae cause in their wanderings should not be lightly disregarded.

Treatment with toxic drugs is not justifiable in any circumstances, since the possibility of permanent damage or disability resulting from the disease is almost negligible.

My own case-record is given in full, but it covers only a brief period of a long disease. It does, however, show most of the important points and is remarkable in that already four filariae have been removed.

References at foot of next page

THE PAINFUL NODULAR BREAST

A PLEA FOR THE TERM FIBRO-ADENOSIS

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A SUITABLE name is required for the painful nodular breast not due to bacterial inflammation, neoplasm, or fat-necrosis. There is no lack of choice of names which have been applied to this condition—e.g., chronic mastitis, cystic mastitis, interstitial mastitis, cyst-adenoma papilliferum, involution cysts, cystic disease of the breast, Schimmelbusch's disease, mazoplasia, and chronic cystiferous epithelial hyperplasia. It is a reflection on the unsuitability of these names that the one most commonly used is chronic mastitis, a name which is descriptively as unsatisfactory as any, but has been sanctioned by long usage. Before adding another name to this list, therefore, it is necessary to make out a strong case for its exclusive adoption, and I wish to argue the claims of the term "fibro-adenosis" to describe the condition defined above.

What, in medicine, are the requisites of a name? It should tell us as much as possible about the condition in the shortest possible way. It should be easy to remember and pronounce, and suggest familiar associations. Further, it must not commit us to any as yet unproved hypothesis. In looking for a name, therefore, we must first review what is known about the painful nodular breast so as to include in our name as much of the aetiology, structure, and symptoms as possible.

ÆTIOLOGY AND STRUCTURE

Ætiology.—We know nothing of the aetiology of the painful nodular breast except that it is probably the consequence of a hormonal effect; and, since our knowledge is so meagre, all that we need ensure is that the name selected does not commit us to any preconceived theory.

Macroscopical Appearance.—When we examine the naked-eye and microscopical structure of the painful nodular breast we are on sure ground. To the naked eye a section from the affected part of the breast suggests a mass of fibrous tissue ramifying in the breast without definite boundaries, in which there may or may not be cysts containing clear, grumous, or grey fluid. In over a hundred biopsies taken from breasts affected by this condition I have found cysts, sufficiently large to be visible to the naked eye, in a very small proportion of cases. This is a significant finding when we are seeking a name for the condition, for it implies that cyst formation is a secondary, not an essential, change; and this complication should not be indicated in the name as a fundamental part of the picture. The prefix "cystic" may be added, should it be necessary to emphasise this quality, just as we add "cystic" to "fibro-adenoma" when the cystic changes predominate.

Histology.—When we examine the stained section under the microscope, the fibrous quality of the specimen is confirmed. There is intense fibroblastic activity both in the periacinous and subepithelial connective tissues, particularly in the former; but, in addition, epithelial changes are observed. These have been described so accurately and so often elsewhere that it will not be

necessary to go into them in detail. Suffice to say here that there is a hyperplasia of the epithelial tissue; the number of acini is increased, and the epithelium of the individual acinus is hyperactive. Dilated ductules become lined with cells many layers thick, and the superficial cells are thrown off as debris into the lumen. Here and there papillomata may project and tend eventually to fill the lumen of the ducts or ductules with a delicate lace-work of epithelium supported by a fibrous stroma. This hyperplasia of the glandular epithelium may properly be called an adenosis. This term has been used by Dawson (1934) to describe only part of the process—i.e., the multiplication of the glandular elements. Nevertheless, it may justifiably be extended to cover the epithelial changes within those elements, a task which it already bears in the connotation of the term adenoma.

Finally, the specimen contains fat.

Were we to consider only the structural picture of the painful nodular breast, the term fibro-adenosis must have an almost irresistible appeal. It describes precisely what is found, it makes no claim which cannot be substantiated, and it emphasises the two primary changes of the condition. But there are other considerations.

SYMPTOMS

The symptoms of this condition are lumpiness and pain. The lumpiness is due to fibrosis or cyst formation; and, as the cysts cause the lumpiness in a minority of cases and then only as a complication of a pre-existing lumpiness due to the fibrosis, the lumpy quality is sufficiently indicated in the term fibro-adenosis, which, as we have seen, may be qualified if necessary by the epithet "cystic."

How about the pain? For some time I considered the possibility of the term "fibrous mastalgia" to describe the condition, but I concluded that this term was too indefinite, made no reference to the epithelial changes which are fundamental, and suggested no link with the allied condition of fibro-adenoma. On closer examination, moreover, the term fibro-adenosis suggests a painful condition. The suffix "osis" implies a diffuse rather than a localised process such as is connoted in the suffix "oma." Vertue (1946) discusses the etymological significance of the suffix "osis" and points out that it denotes action or condition. By his definition "fibro-adenosis" should mean "a condition of fibrotic glandularity," and that is just what we wish it to mean. All diffuse fibroblastic activity in structures supplied with nociceptive nerves is painful, as for instance in "fibrositis," fasciitis, fibrillation of synovia in osteoarthritis, and Riedel's thyroiditis. Further, this "fibroblastic" pain has a tendency to vary with states of the weather, a tendency which is shared by the painful nodular breast. I therefore considered that the term fibro-adenosis, while giving a precise picture of the structural form of the condition, at the same time sufficiently indicated the clinical picture.

RELATION TO FIBRO-ADENOMA

The term further suggests an association with fibro-adenoma, and it will be necessary to justify this association before it can be perfectly acceptable. Let us turn first to the histological and clinical aspects. Histologically, with ordinary methods of staining, the only difference between the painful nodular breast and the painless fibro-adenoma, conditions which may in fact coexist in adjacent parts of the same breast, is that the painful nodular breast contains fat, whereas the fibro-adenoma does not. Fibro-adenoma is, moreover, usually supplied with a well-defined fibrous capsule. Otherwise the fibrous and epithelial changes are precisely similar, as is shown by the accompanying figure, the left-hand column being photomicrographs of sections of the painful nodular breast and the right-hand column of fibro-adenoma.

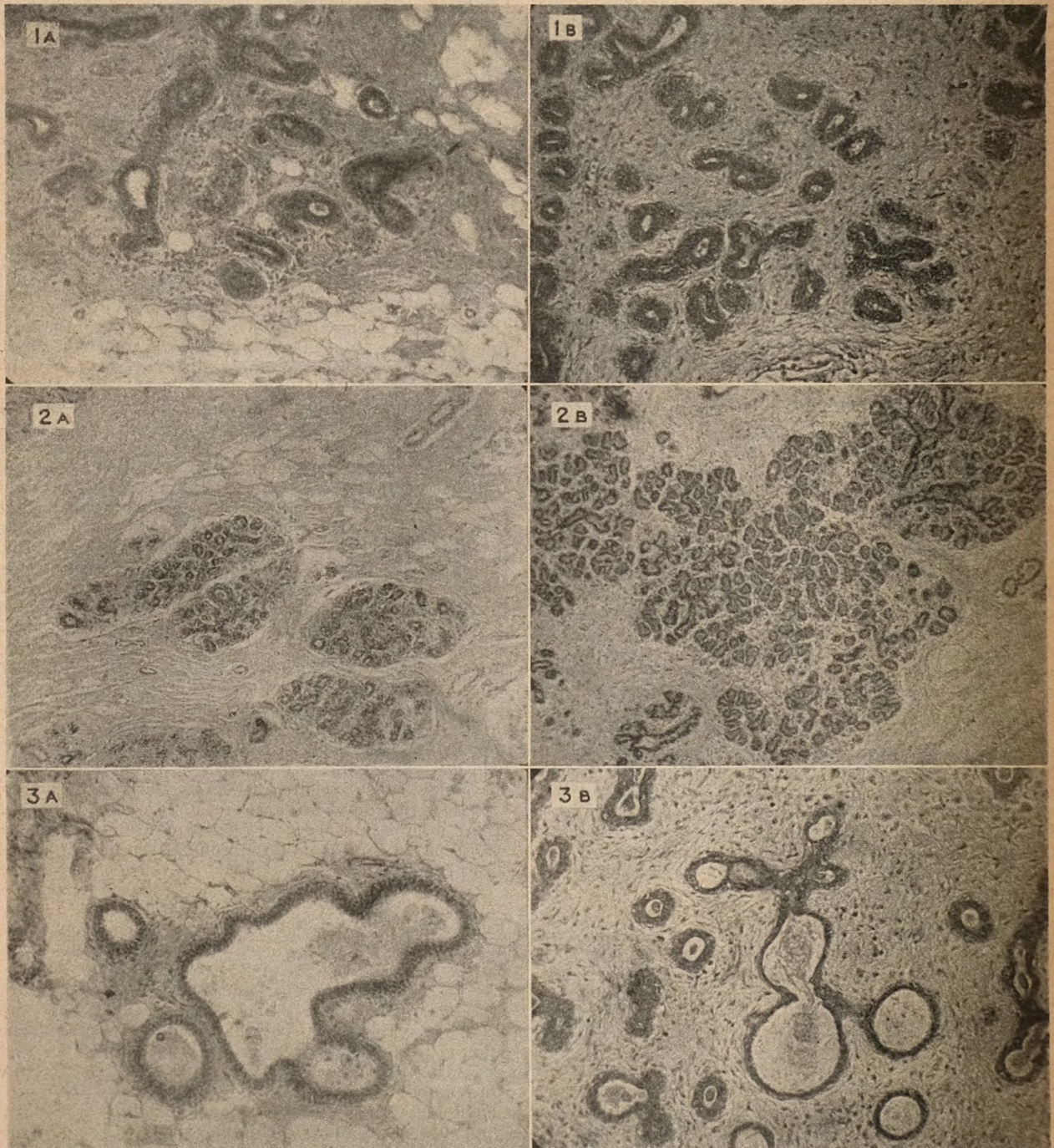
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It is true that the epithelial changes are inclined to be more advanced more commonly in what we may agree temporarily to call fibro-adenosis, and this is a point to which I shall return later. The presence of fat in the fibro-adenosis indicates how diffuse it is. The process infiltrates and incorporates all the structures in the organ, including the fat and the nerves; hence its painful nature. Fibro-adenoma, on the other hand, is localised. It probably arises in one acinus and, generating a formidable fibrous-tissue barrier, is everywhere exclusive of the remaining breast tissue. It expands by pushing the surrounding structures out of the way rather than by

incorporation; thus it comes about that it contains no fat, excludes all nerves, and is painless. It is submitted that these differences, comparable to those existing between endometriosis and endometrioma, are nicely comprehended in the terms fibro-adenosis and fibro-adenoma.

In discussing the aetiology of fibro-adenosis I had to admit that our knowledge was scanty and inexact; the same must be said of our knowledge of the aetiology of fibro-adenoma. If, however, we are ignorant of this aetiology we have grounds for suspecting that the unknown cause is the same or similar in the two conditions. If it



Photomicrographs of fibro-adenosis (A) and fibro-adenoma (B): 1, early epitheliosis, with desquamation of cells into lumen of small ducts (note fat-cells along the right-hand margin and bottom edge of A, and absence of fat in B) ($\times 130$); 2, alveolar arrangement common to all hyperplastic conditions of the breast (note fat-cells above the alveoli in A, and absence of fat in B) ($\times 78$); 3, early cystic dilatation of ducts, with hyperplasia of lining epithelium and desquamation (note ducts are embedded in fat in A, and there is no fat in B) ($\times 130$).

can be shown that a similar aetiology is a likely hypothesis, the use of the term fibro-adenosis to describe the one and fibro-adenoma to describe the other is amply sustained; if it is eventually proved otherwise, nothing is lost.

RELATION TO CANCER

In a previous paper (Atkins 1939) I attempted to reconcile the benign behaviour of fibro-adenosis with its extraordinarily "precancerous-looking" histological picture by suggesting that the coincident fibroblastic activity was a protective mechanism allied to the granulation-tissue response to bacterial invasion. In this connexion I wish to amplify that conception further.

Although these suggestions are speculative, it is an attractive hypothesis to picture the growth stimulant or "extrinsic factor" to be the same in all three hyperplastic conditions of the breast: cancer, fibro-adenosis, and fibro-adenoma. The histological changes in all three can be adduced as evidence in support of this. Further, the work of the experimental pathologist makes it probable that this extrinsic factor is hormonal (Lacassagne 1934). When we consider the above three conditions in series we find that their age-periods are, roughly, for cancer 45 and over, for fibro-adenosis 30-50, and for fibro-adenoma 30 and under—i.e., as the age increases so the restricting fibrosis becomes less effective. The epithelial tissue of cancer always breaks its bounds, of fibro-adenosis rarely, and of fibro-adenoma never. In fact, if fibro-adenoma becomes malignant, it is the fibrous tissue that gallops away, and a sarcoma is the result.

Without submitting in all respects to the conception of Waldeyer and Thiersch that cancer is an expression of the breakdown of tissue balance between epiblastic and mesoblastic tissues, we have in the instances of the behaviour of two conditions where fibroblastic activity is intense—i.e., the atrophic scirrhus, where the most anaplastic epithelial cell is held in restraint for years, and fibro-adenosis, where "precancerous" changes but rarely fructify—evidence that there is an antagonism between the growth potentials of these two types of structure. It is not impossible that, as age advances, the growth potential of the epithelial cell increases at the expense of the fibroblast; hence the effect of an extrinsic growth-producing factor on such an organ as the breast will induce different clinical pictures, depending on the age at which it operates. In the young the perfectly encapsuled fibro-adenoma results. In middle years the combat is more strenuous, the battle, which is occasionally lost, is joined on many fronts, and a diffuse fibro-adenosis, with its more flagrant epithelial changes, appears. In later life the growth potential of the fibrous tissue is exhausted, and the epithelial phase, now paramount, reigns as cancer.

Should such a conception turn out to be an approximation to the truth, the term fibro-adenosis would prove a fortuitously happy choice. If, on the other hand, such a conception cannot, in the light of subsequent investigations, be entertained, this term makes no claim on any aetiological theory and serves still to describe the structural changes more exactly than do other synonyms. It is further submitted that it indicates the clinical picture sufficiently clearly to warrant its exclusive adoption.

I am grateful to Sir Heneage Ogilvie and Mr. Raymond Hinde for their help in the preparation of this paper, and to Mr. J. F. Dudley, head technician in the Dental Research Department, Guy's Hospital, for the photomicrographs.

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PENICILLIN PROPHYLAXIS IN ACUTE RHEUMATISM

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THE work of Berman and Spitz (1945) on the treatment of diphtheria carriers by the local application of penicillin suggested the possibility of using this substance by mouth as a prophylactic against attacks of pharyngitis, particularly those due to streptococcal infections, in an effort to prevent the recurrence of acute rheumatic manifestations in susceptible patients.

In September, 1945, 20 patients, who within the previous twelve months had had acute rheumatism preceded in every case by pharyngeal infection, were divided into two groups of 10, matched as closely as possible in regard to age, sex, occupation, and clinical condition.

The patients in the treated group were given three pastilles, each containing 500 Oxford units of calcium penicillin, to suck each day. They were instructed to place the pastilles between the cheek and lower gum, to allow them to dissolve slowly, and to swallow the saliva containing the penicillin in solution. One pastille was to be used on awakening in the morning, another before lunch, and the third on retiring at night. Two weeks' supply of pastilles was dispensed at a time. They were kept in cool places in the patients' homes, because none of them had a refrigerator. The patients have continued the treatment daily, for twelve months, while going about their ordinary avocations. This group is composed of three school-children, two housemaids, two farmers, two labourers, and an ex-sailor, and their ages range from 11 to 29 years.

The patients in the other (control) group received no special treatment beyond ordinary precautions against overcrowding, fatigue, and exposure.

No bacteriological or other laboratory tests were carried out, and the results, assessed on clinical grounds alone, were as follows:

	Treated group (10 cases)	Control group (10 cases)
Sore throat	3	18
Acute pharyngitis and/or tonsillitis	1	5
Subacute rheumatism	1	4
Acute rheumatism	nil	1

Infections of the pharynx and/or tonsils with mild or transient pyrexia not needing medical treatment or confinement to bed for more than one day are classified as "sore throat."

"Acute pharyngitis and/or tonsillitis" includes only severe infections with acute clinical symptoms and necessitating confinement to bed and medical attention.

"Subacute rheumatism" includes all forms of acute rheumatic manifestations with pyrexia except rheumatic fever.

"Acute rheumatism" includes cases of frank rheumatic fever only.

DISCUSSION

The pioneer work of Thomas and France (1939) and Coburn and Moore (1939), which was begun ten years ago, introduced the prophylactic use of small daily doses of sulphonamides over long periods to prevent recurrence of rheumatism. Since then a large amount of experimental sulphonamide prophylaxis, both in selected groups of patients and in fairly large communities, has been carried out in the United States, and the Surgeon-General of the U.S. Army (1944-45) has given official approval to such prophylaxis in the American Army. Much of this work has been reviewed by Rosenberg and Hench (1946), and two facts emerge clearly from their analysis: (1) the recurrence of rheumatic manifestations is much reduced by sulphonamide prophylaxis; and (2) such treatment is not unattended by a real danger of toxic reaction.

The time seems to have come when the physician, confronted by the patient convalescing from an acute rheumatic attack, must seriously consider instituting sulphonamide prophylaxis. The great objection to such a course in general practice is the need for frequent blood-counts to forestall toxic reactions. In a scattered rural community, such as that from which the patients under review are drawn, this difficulty is almost unsurmountable because of the distance from a pathological laboratory. Also, it is not always possible to keep the necessary close supervision over patients engaged in their ordinary occupations. It was hoped that penicillin might offer a way out of these difficulties and still provide a safe and effective alternative to the sulphonamides in the prophylaxis of acute rheumatism.

The findings in this small group of patients, who had acute rheumatism preceded by throat infections and were treated with penicillin by mouth, show a considerable reduction in the incidence of both pharyngitis and

rheumatism in comparison with an untreated group of similar types of patients over twelve months. It is hoped that these findings will lead physicians with laboratory facilities to investigate this form of prophylaxis.

SUMMARY

A group of ten rheumatic patients were treated prophylactically with penicillin by mouth for a year, and the clinical findings were compared with those in an untreated group of similar patients.

Rheumatic manifestations were five times more frequent, and throat infections six times more frequent, in the control group than in the treated group.

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Reviews of Books

Hypometabolism

A clinical study of 308 consecutive cases. ESSEN KIRK, chief physician, Holstebro District Hospital, Denmark; SVEN ANCHER KVORNING, assistant, pharmacological department, University of Copenhagen. Copenhagen: Munksgaard. London: W. Heinemann. Pp. 83. 7s. 6d.

HOLSTEBRO is a country district in north-west Jutland, and until recently there was no organised medical service there. During the years 1940-42, 308 patients with basal metabolic rates below 88% of the normal were admitted to the district hospital, and this small monograph describes the analysis of these data. No indication is given of the number of patients with normal metabolic rates who were admitted in the same periods, so the authors are really only concerned with the reasons for the low B.M.R.s, and the symptoms to which they may have given rise. Only 18 of the 308 patients had genuine myxœdema, but 11 more had had treatment for exophthalmic goitre; 41 are attributed to undernutrition due to gastro-intestinal disease, anorexia nervosa, and vegetarianism, and the reason for the low B.M.R. remained undiagnosed in 108. Over 30 signs and symptoms were investigated in each of these patients, and the greater part of the monograph is taken up with tables showing the frequency with which such things as chilliness, decreased sweating, and impaired memory appeared in the patients in each of the diagnostic groups. This part of the book is almost unreadable and can be recommended only for reference. The authors give their findings for these symptoms in a control group, and conclude that the hypometabolism detected in many of these patients has no pathological significance. This really amounts to saying either that the normal rating is too high or that normal people may have B.M.R.s above and below the accepted range of normality. The monograph will have a limited appeal but it may be found useful by those concerned with the various manifestations of undernutrition seen in many parts of Europe today.

Practical Methods for the Microbiological Assay of the Vitamin B Complex and Essential Amino-acids

E. C. BARTON-WRIGHT, D.S.C., F.R.I.C. London: Ashe Laboratories. Pp. 58. 7s. 6d.

MANY bacteria are nutritionally exacting towards a variety of vitamins and amino-acids, and this fact has been made the basis of methods of estimation of these growth substances.

In principle, the method consists in taking a medium which is nutritionally satisfactory in all respects with the exception of the one substance which is to be assayed. The amount of growth of an organism which is nutritionally exacting towards that substance will then depend upon the amount of that substance which is added to the medium, and a "standard" curve can be constructed to represent the growth which occurs in relation to the amount of assay substance present. The amount of this substance in an unknown solution can then be

estimated by determining the amount of growth which it will promote at various levels of concentration of the unknown. The method thus involves: (1) preparation of a satisfactorily nutrient medium in which growth will be conditioned *solely* by the amount of assay substance added; (2) preparation of a standard inoculum; (3) removal of assay substance from medium and inoculum to give a satisfactory blank in the absence of added factor; (4) construction of an accurate and reproducible response curve; (5) quantitative recovery of assay substance from materials to be assayed; and (6) an accurate method of observation of the growth of the organism or of some consequence of growth such as fermentation acid.

Dr. Barton-Wright gives an elementary outline of the media, organisms, and practical methods involved in such studies for the assay of various vitamins and certain amino-acids; but his account is misleading about this difficult technique, which is still under investigation. He claims that "microbiological assay with the lactic acid bacteria is straightforward and presents no great difficulties," which is about on a par with saying "life is simple." The technique of this type of assay has only been developed within the last few years, and the little experience so far obtained serves mainly to emphasise how complicated interpretation of results may be. Results can be turned out so rapidly and easily that the method encourages a deceptive sense of accuracy in the operator; consequently a book of this kind should carry full warning of the likely errors.

The analyst undertaking assays of amino-acids, for example, must consider: how many estimations are necessary for each point on the curve in order to get a statistically accurate result; what degree of scatter can be expected and is permissible; how quantitative are the extraction procedures used and how has this been determined; what is the effect of the presence of peptides on amino-acid analysis; what percentage of assays with neurospora mutants show a reversion to wild type; what is the effect of salt content or buffering capacity of assay material; and how is the size of the inoculum controlled and standardised? This book does not answer these queries and does not hint that such questions arise.

Die Scheuermannsche Krankheit

J. E. W. BROCHER, dozent, University of Geneva. Basle: Benno Schwabe. Pp. 91. Sw. fr. 11.

THIS monograph is more than a description of adolescent kyphosis. As a disciple of Schmorl, Dr. Brocher has tried to correlate the radiological signs of disk pathology with clinical symptoms, and has produced an interesting study of Scheuermann's disease. He rightly stresses the frequency with which this apparently benign condition gives rise to chronic pain and disability in later life, as the result of arthritic changes in the mobile segments of the spine above and below the immobile and painless kyphos. The less common but more disabling lumbar form of the disease is given the prominence it deserves. On aetiology he has little new to offer us, but those inclined to attribute all low-back pain to posterior prolapse of the intervertebral disk might do worse than study this carefully written monograph.

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References: Shortage of space precludes list of references, but full documentation may be obtained on application to Clinical Research, Dept. 6B

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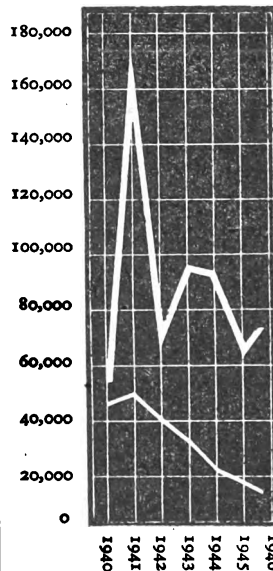
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Left Thick line Whooping cough cases notified.
Thin line Diphtheria cases notified.

Vital statistics embodied in this graph (England and Wales) were supplied by the Minister of Health in the House of Commons on 16th October 1946 (Hansard 1946, 197, 427, 227).

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LONDON: SATURDAY, FEB. 15, 1947

Crisis and Recovery

THE Proprietors of THE LANCET regret that restrictions in the use of electric power will prevent normal production and distribution of the journal during the next two or three weeks. Everything possible will be done to minimise inconvenience thus caused.

Our thoughts inevitably go back to the General Strike of 1926, when our weekly issue was reduced to a single sheet; and it is natural to compare the two crises. Today's, though less acute, is more serious, because the country has less reserve of strength. But it has a redeeming feature: instead of two hostile groups facing one another, we now see a whole nation facing mankind's proper and eternal enemy—the scarcity of means to live. If opinions differ widely, as they do, on how best to keep the wolf from the door, we are at least united in wanting to drive him far away. By any method this will take time. When HITLER boasted that if Germany was defeated she would bring us down with her, he came all too near the truth: at best there must be a long period during which even our present standard of living will remain in danger. Our resources have been exhausted by war; and once again, for the third time in a generation, some of our friends doubt our capacity to make the necessary response. But for the third time it will be made. As at the end of the war in Europe, we recall Mr. CHURCHILL's saying that the mettle of a nation, as of a man, is proved by what it can do when it is tired. What we have to do now, though irritated and dispirited and perhaps underfed, is to work for material security and prosperity. But even this is not enough: we have also to work for social justice. To pursue simultaneously recovery and reform is difficult, yet neither the quantitative nor the qualitative aim will succeed unless we attempt both. We cannot truly serve ourselves unless we serve what we believe to be civilisation; for recovery from sickness depends largely on hope of better things to come.

Treatment of Toxic Goitre

SINCE we are ignorant of the primary cause of toxic goitre, treatment aims at the reduction of thyroid hypersecretion. Until 1943 this was achieved satisfactorily only by subtotal thyroidectomy. But since then favourable results have been obtained by purely medical means. Antithyroid drugs, notably thiouracil and its methyl derivative, have proved capable of reducing thyroid function with much the same certainty as the extirpation of thyroid tissue.

Both methods, surgical and medical, have their advantages and drawbacks, and their relative merits cannot be finally assessed on the basis of a mere three years' experience with thiouracil. On another page Professor HIMSWORTH and his colleagues make an interim comparison of about 90 thiouracil-treated

patients with an equal number treated surgically in a previous period. From the patients' point of view there is no doubt that most prefer to get well by taking tablets rather than by undergoing a major operation. Moreover surgical treatment means admission to hospital or nursing-home, whereas this is often unnecessary with drug treatment, provided close supervision can be arranged. As to the safety of the two methods, HIMSWORTH found the mortality-rates about the same—2%—but the rates with both treatments are now probably lower than this. The 2% mortality for thyroidectomy done by the expert is a figure from the prethiouracil era; with preoperative detoxication by thiouracil, and perhaps also the avoidance of long domiciliary treatment with iodine, the mortality should be still further reduced. Agranulocytosis accounts for all the thiouracil deaths, and these should become very rare with early recognition and treatment with penicillin, which controls infection till the leucopoietic system has recovered. In their surveys of several thousand cases of thyrotoxicosis treated medically VAN WINKLE and others¹ and MOORE² found that the mortality from agranulocytosis was less than 0.5%, with a total incidence of 2.5%. They could find no relationship between the daily dose of the drug and the incidence of agranulocytosis, but the doses given in their cases were on the whole higher than we now know to be necessary. The smallest effective dose is the one of choice. Apart from fatalities, there are some complications in both treatments. With thyroidectomy there may be myxœdema, tetany (rare but distressing), injury to the recurrent laryngeal nerves, and other complications inseparable from any major operation. With thiouracil there are mild or moderate toxic reactions which may make it advisable or necessary to abandon the drug.

Once thyroidectomy is successfully accomplished little is required in the way of aftercare, though account must be taken of recurrences in later years even with a nine-tenths removal of the goitre. With antithyroid drugs treatment cannot be discontinued as soon as symptoms are under control—it must be continued for a long time, perhaps for years, until remission occurs. This remission may be long or short, lasting some months or up to two years, but we still cannot claim that a permanent remission can be obtained. It is perhaps a matter of controlling thyroid secretion until the abnormal pituitary stimulus, or some other disturbance a stage beyond that, has died away, or possibly until the thyroid itself has become relatively unresponsive to higher stimuli. It is clear that this is a lengthy process, and too long for the endurance of some patients.

It is too early to say that drugs will supersede thyroidectomy or even that they are a satisfactory alternative. The drugs now being used in this country—thiouracil and its methyl derivative—are reasonably safe when given with proper precautions, and they are almost certain to be improved on in time. The biochemistry of all antithyroid drugs is in an early stage, but we may expect before long that they will be prescribed with as little fear of toxic reactions as are the sulphonamides.

1. Van Winkle, W. jun. et al. *J. Amer. med. Ass.* 1946, 130, 343.
2. Moore, F. D. *Ibid.*, p. 315.

Prefrontal Leucotomy

WHEN MONIZ published his monograph on prefrontal leucotomy ten years ago we pointed out that it is not timidity or conservatism that holds up advance in the treatment of mental illness.¹ Since then, more than a thousand patients in Great Britain, and probably a similar number in the United States, have had this drastic operation done on them. From statistics collected here, which are reviewed on another page, the Board of Control conclude that "remarkable improvement in behaviour follows in a large percentage of cases who have had severe symptoms with poor prognosis and have failed to respond to other methods of treatment." This resembles the conclusion reached by those who have reported similar mass figures in the U.S.A.—notably ZIEGLER² and FREEMAN and WATTS.³ A recent acid comment on these statistics is not, however, without pertinence for the Board of Control's figures:

"Unfortunately, aside from their value as vital statistics, it is impossible to assess the validity of these findings. At no point have there been other than superficial attempts made to standardize the criteria for the pre-operative and post-operative clinical status of the patients. Not a single patient has been adequately studied. For a moral and social responsibility to do this, there has been substituted a phenomenal array of case statistics. Unfortunately the pyramiding of unknowns is scarcely a pathway to knowledge."⁴

HALSTEAD, CARMICHAEL, and BUCY, in this unpromising passage, are taking for granted more rigorous standards of "adequate study" than clinicians commonly satisfy or administrators expect; and though, as the board point out, the returns they summarise were mostly compiled during the distractions and shortages of the war, and represent remarkable and praiseworthy effort on the part of those who supplied them, this makes it all the more necessary to interpret the results cautiously. It would be churlish to quarrel with the board's interesting report for not answering some crucial questions, which mass returns from forty different hospitals could not possibly elucidate—the postoperative changes in personality, for example. It is essential however that the inevitable crudity and uncertainty of such figures as these should be recognised, and that they should be classed and valued as vital statistics rather than as trustworthy data which permit the therapeutic range, the indications, and the risks of the operation to be judged. It is easy to infer too much from lumping together disparate reports, just as it is easy, at the other extreme, to generalise falsely from the intensive study of a single instance or a small series. The former extravagance is perhaps the commoner when a method of treatment has been in use for some years, and it may be seen in a recent pronouncement on leucotomy: "if further reports confirm the high percentage of desirable results, it should become a routine procedure in mental hospitals."⁵ The report of the Board of Control is free from such intemperance, and its last word is a plea

for caution: "we are of the opinion that the operation should be carried out only after careful consideration of each individual case by experienced psychiatrists."

Another moral, and perhaps a less obvious one, to be drawn from this report is that when a severe new method of treatment is to be tried in psychiatry, or anywhere else in medicine, those employing it are under an obligation to carry out their share of the therapeutic experiment with something of the discipline they would accept if they were participating in a laboratory experiment—planning, executing, and recording it systematically, and frankly surrendering a little of their clinical independence so that the rightness of the therapeutic hypothesis may be more surely tested.

Traumatic Paraplegia

DURING the late war it was the standard practice of British and American surgeons to perform an early suprapubic cystotomy for all cases of traumatic paraplegia. The paraplegic has therefore arrived at a special centre with a cord lesion and an open bladder wound. RICHES¹ now believes that the primary cystotomy can be delayed 24–36 hours without fear of irreversible pressure effects on bladder or kidneys, an interval within which most cases can now reach a special centre. GUTTMAN² goes further and believes that many paraplegics can be treated throughout without a suprapubic cystotomy, provided they reach the special centre for their primary treatment.

The paraplegic after primary treatment presents five major problems—the urological, the neurological, the orthopaedic-ambulatory, and the dietetic, and the plastic problem of the decubitus ulcer. It is on the control of the urinary tract that the prognosis of life chiefly depends. The greatly improved methods of recent years are best reflected in the mortalities, which at most centres here have been about 5–10% over the first five years. In the war of 1914–18 the figure was nearer 40%. The critical urological question is whether the patient should be condemned to a permanent suprapubic life. RICHES has described the excellent results, in terms of watertight closure and freedom from infection and stone, which can follow a high suprapubic cystotomy with an oblique tract and a small tube. Nevertheless, the highest standards of social and economic rehabilitation are impossible while the patient is condemned to a suprapubic tube. In the U.S.A. the policy of Prof. DONALD MUNRO at Boston has been more or less generally adopted in the Army paraplegic centres, where about 1200 of these patients have been treated. This school regards a permanent suprapubic as a confession of surgical failure. Chiefly by the use of tidal drainage they aim in each case at the institution of an automatic bladder, without dribblings or residual urine. Those who have visited the paraplegic centres at Staten Island, Atlantic City, White Sulphur Springs, and Toronto, have reported that about 90% of the cases show this result, and are voiding urine per urethram. It is clear, too, that this policy of closure of the suprapubic drainage is not reflected in a higher mortality than has been obtained in this country. The mortality in the first year after reaching special centres in America has

1. *Lancet*, 1937, i, 156.

2. Ziegler, L. H. *Amer. J. Psychiat.* 1943, 100, 178.

3. Freeman, W., Watts, J. W. *J. ment. Sci.* 1944, 90, 532.

4. Halstead, W. C., Carmichael, H. T., Bucy, P. C. *Amer. J. Psychiat.* 1946, 103, 217.

5. Kalinowsky, L. B., Hoch, P. H. *Shock Treatments*, New York, 1946, p. 227.

1. Riches, E. W. See *Lancet*, Jan. 4, p. 23.
2. Guttman, L. *Ibid.*

been 1-2%.³ There are some resistant cases which do not develop an efficient automatic bladder on tidal drainage, and in these cases, which show residual urine, well-marked trabeculation, and a trigonal fold across the internal meatus, the neck of the bladder has been resected. For the same type of case Lieut.-Commander HOEN, U.S.N., in Long Island, divides the anterior root of s.4 on one side to weaken the tone of the compressor urethrae. Both these procedures must still be considered experimental and awaiting full evaluation. The efficient application of tidal drainage for paraplegics is a most laborious and exacting procedure. For its routine and continuous use in large groups of patients over a period of weeks an exceptionally high standard of devotion in the medical staff at all levels is needed if the best results are to be obtained. But MUNRO and many others have now shown that most paraplegics can acquire an automatic bladder in two or three months by the thorough use of the tidal-drainage method, which not only can eliminate infection and check stone formation but in giving the patient voluntary control over micturition completes his reablement. The value of streptomycin against bladder infections is not yet settled. The antibiotic is undoubtedly effective against many of the common gram-negative organisms found in the urinary tract of these patients. However, during the first year of its use in the U.S. Army paraplegic centres many recurrences were reported, and acquired resistance in urinary organisms was often observed. Streptomycin must be given early and in very heavy dosage to be effective, and even then a single catheterisation can reinfect and undo the work of a whole course of the drug. Its chief value appears to be in the treatment of the acute infections or reinfections, when treatment must also be directed towards establishing and removing the primary cause of the infection.

The neurological problem comprises, in addition to the study of all the phenomena seen in paraplegia, the relief of pain and of spasms. Both here and in the U.S.A. intrathecal injections of alcohol have been shown to relieve these symptoms in selected cases. In perhaps one case in ten a chordotomy or rhizotomy may be indicated for the relief of persistent pain. The special value of a rhizotomy is that it permits a direct inspection of the cord lesion, which in some incomplete cases may be caused by pressure of bone or foreign body, the removal of which may effect a cure. In this war there were no reports of successful regeneration after the suture of divided caudal roots, or after the even more enterprising procedure of transposing dorsal roots above the lesion into the spinal canal and suturing them there to distal caudal roots.

It was a characteristic feature of the war's paraplegic casualties that they were more wasted than other wounded men. Their fall in weight seems to be chiefly the result of protein-loss, from the bedsores and the infected bladder. As much as 50 grammes of protein a day has been recovered from the dressings of a single large bed sore. Correction of the negative nitrogen balance is vital in the treatment of these patients. It is accomplished by intensive protein over-feeding. Up to 150-200 g. of protein may have to be taken daily for weeks on end. In this dietetic scheme

concentrated milk-shakes play a large part. The beneficial effects of this generous diet are seen in every aspect of the patient's condition—in the urinary infection, in the healing of the ulcer and of the nerves, and in the patient's morale.

GUTTMAN, whose accurate descriptions of the gross anatomy and pathology of bedsores have greatly clarified our understanding of their progress and healing, stresses the adverse effect of the continued presence of adherent sloughs on the patient's general condition. He has drawn attention to the undermined edges, the sequestering bone, and the burrowing sinuses with undrained pus pockets which are often seen, if looked for, in the early stage. At this stage ad-hoc surgery, for the removal of sloughs and sequestra and the adequate drainage of deep pockets, is essential; but radical reparative surgery may be disastrous if done before the patient's nitrogen balance has been restored, the edge of the ulcer has been sealed off by an epithelial response, and cultures have ceased to grow hæmolytic streptococci. The later alternatives in treatment of these ulcers are conservative dressings, free grafts, and repair by flaps of skin and fat. GUTTMAN has shown that, in favourable cases under expert treatment, moderate-sized ulcers can heal spontaneously in about three months. But many bedsores take much longer to heal, and all of those treated conservatively or by free grafts end up with a scar of thin epithelium on a dense fibrous base. This scar is commonly insensitive and unstable and must be protected for the rest of the patient's life. Such an end-result—at any rate when the ulcer is large—does not compare favourably with those obtained with big rotation flaps of skin and fat. At the Halloran Hospital on Staten Island, CROCE and his colleagues⁴ in the U.S. Army covered sacral defects measuring as much as 18 × 12 cm. with local rotation flaps whose good vascularity and subcutaneous fat provided a more stable repair than could be obtained by natural healing. There is the further advantage that some of these flaps cut from sensitive areas may carry with them over the sacrum a degree of sensibility.

It is the object of treatment to make the patient independent of an armchair life. To do this walking is obtained by the use of crutches and braces. The lower the lesion the more trunk muscles are available and the more successful and stable is the gait, which may be either the "tripod" or "one-two" variety. But for walking with crutches to be possible at all power of grip must be present; c.8 must therefore be intact. The remarkable results obtained at Stoke Mandeville are illustrated by the fact that nearly half their patients have been discharged and half of these have found employment. Special training in such crafts as watch-making and photography is of particular value to patients with paraplegia. There is obvious value, too, in seeking, as has been done in the United States, the coöperation of the motor trade to make the adjustments necessary to enable the paraplegic to drive a car. With such cars driving lessons can become part of the reablement training at the special centre.

Few injuries present more complex therapeutic problems than paraplegia. Among war casualties the disability ranks next to blindness with loss of

3. Clarkson, P. War Office Report, March, 1946. Abridged from *Guy's Hosp. Gaz.* 1946, 50, 1508, 1511, 1513.

4. Croce, E. J., Schullinger, R. N., Shearer, T. P. *Ann. Surg.* 1946, 123, 53.

two limbs. Successful results by modern standards demand the integrated attentions of a number of specialists. The paraplegic centre must be under the clinical direction of one of these specialists—neurologist, urologist, or orthopaedic surgeon—who must coördinate the work of the others in the treatment of the individual patient. This means that the centre should be sited at a hospital which has other special centres under the same roof, such as orthopaedic, neurological, urological, or plastic. It is this organisation and the clinical devotion of the medical and nursing staffs, rather than any special form of therapy, which have yielded such successful results on both sides of the Atlantic.

Annotations

FOOD AND THE MINER

THE general policy of the Ministry of Food throughout the late war was to allow the maximum rations to all consumers rather than to give more to some at the expense of the remainder.¹ The special needs of heavy workers, such as miners and agriculturists, who have no access to canteens or "packed-meal" schemes, and so have to carry their midday meals with them to work, were partly met by a grant of extra cheese, and when bread-rationing was introduced last year these people received more bread units than the normal consumer. At the beginning of November, 1946, underground miners were allotted an extra ration of meat "in recognition of the efforts required to secure the maximum possible output of coal"²; and at the same time the allowance of meat to canteens was increased. These special rations are, of course, based on the fact that heavy muscular work uses up more food than lighter work, and that production is dependent on calorie intake. During the war the setting-up of industrial canteens and British Restaurants played an important part in maintaining health and output. These canteens made some discrimination in favour of the heavy worker, and there were two categories of rations, A and B, for canteens in heavy industries, both of which were more generous than that under which food was supplied to restaurants.

The Kaiser-Wilhelm Institut für Arbeitsphysiologie, to give it its full name, did some useful research at Dortmund before the war on the physiology of work, much of the expense of its upkeep being borne by the mining industry.³ During the war, to avoid the bombing, the institute was evacuated partly to Bad Ems and partly to Diez. One of the many researches carried out by the staff has now been described by Kraut and Muller,⁴ and this deals with the relationship between food and production, especially of coal. In the summer of 1943 rations in Germany had to be decreased far below the actual requirements. Kraut and Muller divided the calories contained in food into two groups—those necessary (1600–1800 per day) to maintain the body during strict rest, and the "work calories" needed for muscular activity of any kind. Experiments on a group of men building an embankment showed that output varied directly with the number of work calories in their rations. When a bonus of cigarettes was offered for increased output the relation between output and available calories was upset at once: the men lost weight in trying to do too much on the available food. A second investigation in 1943 was done on a group of 31 miners between 20 and 30 years of age. During a training period a

daily total of 2800 calories, allowing 1200 work calories, secured a daily output of 7 tons of coal per man—i.e., each ton of coal was equivalent to about 170 work calories. When given 400 extra calories a day the men increased their output to 9.6 tons a day, but by thus expending only 155 work calories per ton they lost in six weeks an average of 1.2 kg. in body-weight. When they were given a further 400 additional calories the output again increased slightly—to 10 tons per day—and the men slowly regained their original weights.

The calorie consumption of coalminers in the Ruhr before the war varied from 3600 to 4800 a day, and in the first year of the war the average daily ration was 4200 calories. In the second year rations were cut and the output dropped, though there was a time-lag before this result was observed. Kraut and Muller are convinced that the fall in coal output was primarily due to these ration cuts. They maintain that each kind of work requires a fixed number of calories and that no activity can be continuously greater than the appropriate calorie intake. If output is forced the workers lose weight and this in itself lowers their capacity. A regular control of body-weight in industrial workers is a good measure of their calorie supply. Rationing of food, on this view, also means the rationing of industrial production.

An unpublished study of the diets of miners in various British coalfields was carried out by the Ministry of Food in 1944. This showed that underground workers were getting 3500–4500 calories daily. There have been no more recent figures, and it is possible that increasing mechanisation is reducing the miner's expenditure of physical energy. A study of present-day diets and body-weights might be illuminating.

GONOCOCCAL ARTHRITIS

IN considering obscure infective arthritis there is no excuse for failure to exclude gonococcal infection by such simple tests as examination of an early-morning urethral smear taken before micturition, and of the first urine specimen of the day. Yet such tests are often omitted, partly perhaps because it is not always recognised that the clinical and radiographic features of gonococcal and rheumatoid polyarthritis may be identical. Some interesting points emerge from a recent analysis of Service cases of infective arthritis by King and colleagues.¹ Excluding gonorrhœa, a quarter of the patients had non-specific genito-urinary infection. Involvement of a single joint was equally uncommon (less than 20%) in the gonococcal and non-gonococcal cases. While the heels and plantar fascia were affected with equal frequency in both types, gonorrhœa turned out to be the prime cause of infective Achilles tenosynovitis; arthritis of the metatarsophalangeal joints was most commonly not gonococcal.

King and colleagues advise rest in bed for all patients, whether febrile or not, and whether or not the affected joints are weight-bearing. Local heat is comforting, but splintage for more than a short period easily leads to stiffness. Urethral irrigation is not yet obsolete in dealing with stubborn foci of infection, but prostatic massage must be practised with restraint and only after the sub-acute stage, since early vigorous treatment spreads infection. While the sulphonamides (and for that matter penicillin) did not prove very effective against the arthritis, they were valuable, in combination with fever therapy, in clearing up resistant genital infection, and were routinely used for this purpose. Artificially induced pyrexia, which is the great standby in dealing with these joints, is most easily obtained by intravenous injection of T.A.B. vaccine; this is not without its dangers and calls for skilful nursing, for it must be applied early and often, and the dosage pushed boldly to the limit of

1. King, A. J., Williams, D. I., Nicol, C. S., Loudon, J. *Brit. J. ven. Dis.* 1946, 22, 1.

1. Ministry of Food Pamphlet: Our Food Today. No. 2: The Industrial Worker. H.M. Stationery Office. 1945.
2. Supplement to above, 1946.
3. British Intelligence Objectives Subcommittee Final Report 83: Item no. 24. H.M. Stationery Office. 1945.
4. Kraut, H. A., Muller, E. A. *Science*, 1946, 104, 495.

safety so that the bursts of fever follow closely with only a day or two of remission; transitory signs of liver damage are not uncommon. Of the patients receiving this treatment, 90% of the gonococcal and 69% of the other cases made a complete and permanent recovery.

Assessment of results with hyperthermy—mechanically induced hyperpyrexia—was more difficult because this method is usually reserved for late and resistant cases. The unit of dosage is eight hours at 106° F, preceded by two days of sulphonamide therapy. Of 130 patients who were given this treatment, about half had one such session and the remainder two or three. Each patient wears a B.L.B. mask throughout, breathing 5% carbon dioxide in oxygen during the induction, pure oxygen during the session, and the carbon-dioxide mixture again for two hours after the treatment. A litre of 5% glucose-saline was given routinely at an early stage of the proceedings. There was only one death in this series, but here again minor liver damage is not rare. The immediate response to the first dose, and the rapid restoration of function, are a great fillip to morale. It is sometimes difficult to decide whether recurrent joint irritability is due to persistent active infection or merely to the inevitable results of inflammatory damage. In this series 57% returned to full duty in their initial category, and 17% had to be down-graded. Of the 26% who were regarded as failures and discharged as unfit, many later made an excellent recovery in civil life. After several years 72% of the whole group of hyperthermy cases had made an excellent functional recovery; and though the recovery-rate was higher in the gonococcal than in the non-specific cases—76% as against 65%—the latter figure is high enough to hearten those who have been gloomy about the prognosis of chronic infective polyarthrititis.

We may conclude that artificially induced hyperpyrexia of one kind or another is the treatment of choice for gonococcal arthritis and for metastatic arthritis from a non-specific genito-urinary focus of infection; T.A.B. vaccine, vigorously used, gives excellent results in the early stages, but hyperthermy is better for late and resistant cases.

DRYING PROTEIN

In a report to the Medical Research Council¹ Dr. Greaves discusses the technical problems met in drying protein materials, particularly serum and plasma, and describes the rapid growth of the M.R.C. drying unit at Cambridge during the war. A relatively simple "pilot plant," modelled on that of Greaves and Adair and producing 48 200 ml. bottles of dried serum a week, developed into one with a normal weekly output of 2500 400 ml. bottles of dried plasma, or in emergency twice as many. The experience gained in designing, building, and operating this large plant, which is now published as a whole for the first time, will be of great value to those engaged in similar work.

The degree of dryness achieved is of fundamental importance if proteins are to be properly preserved; but Greaves emphasises that, unless the containers used for the dried material are airtight, moisture may be taken up during storage and cause denaturation of the dried material, rendering it unfit for use. Thus dryness alone is not all; sealing must be perfect if preservation is to be satisfactory over any considerable length of time, especially in hot humid climates. Accurate observations on the storage qualities of dried-protein materials in relation to their initial residual moisture content, their storage conditions (especially temperature and humidity), and the length of time they are kept under these conditions, could not, unfortunately, be made during the

overcrowded war years, and it is to be hoped that this gap will now be filled, so that one will then be able to forecast with assurance the "performance" to be expected from dried-protein material in any given circumstances.

Freeze-drying is the method of choice for preserving most therapeutic substances, and extension of its use in peace-time may be expected. Materials in the medical field which Greaves thinks are best preserved in this way include biological standards, therapeutic immune sera prepared in animals, immune and convalescent human sera, diagnostic antisera, human plasma for transfusion, unstable drugs, hormone preparations, bacteria, viruses and yeasts, vaccines, and human milk. Many of these substances are packed in small amounts, whose freeze-drying presents difficulties not encountered in drying larger quantities. Greaves concludes his survey by describing the "centrifugal vacuum spin-freezer" evolved to overcome these difficulties.

This is a worthy record of the technical progress made in the M.R.C. drying unit, under the stimulus of the war. The unembellished lists of figures representing the work accomplished by the unit give no indication of the anxieties, difficulties, and frustrations which had to be overcome before the plant got into its stride.

SOME LUTON FAMILIES

LUTON is "a new, expanding industrial town, an urban island in a rural sea." It is also a town that takes its social problems seriously and shows enterprise in getting them investigated. Mr. C. G. Tomlinson¹ has added another good survey to those of Dr. Grundy and Mr. Titmuss and the various reports of the Luton school medical officer. Its interest is general in that the "social problem group" is carefully discussed.

Mr. Tomlinson distinguishes from his "problem families" three other groups who have come to grief: (1) "biological casualties," individuals or families who by reason of age or infirmity are unable to take proper care of themselves; (2) "social casualties," families whose efficiency and circumstances have greatly deteriorated because of the death of husband or wife, or because of the physical disability of the wage-earner or housewife owing to acute or chronic illness or too frequent pregnancies; and (3) "problem individuals," such as solitary migrants, prostitutes, habitual criminals, and delinquents. The true social-problem group he classifies as families who for none of these reasons "require a substantially greater degree of supervision and help over longer periods than is usually provided by existing social services." Thanks to this clear analysis his estimate of the incidence of social-problem families is much lower than any given by other workers, and the idea of the "submerged tenth" is dispelled by his figures. While he himself points out that London, South Lancashire, and other "reservoirs of human wreckage" may yield higher figures, in Luton at least, the proportion is more like a submerged hundredth.

The factors important in creating the problem family are, he finds, subnormal mental capacity, adverse family influence during childhood, broken families, absence of the husband in the Forces, alcoholism, and mental disharmony. In the 167 families studied these factors were found singly or in combination, or, in a small number of cases, coexisting with "social casualties." Mental disease as opposed to mental deficiency does not seem to be a causal factor. Only one case is mentioned in which a parent was admitted to a mental hospital, and in that case the family is said to have deteriorated owing to her absence rather than her illness. Moreover, most of the families exhibiting mental deficiency are not

1. Preservation of Proteins by Drying, with special reference to the Production of Dried Human Serum and Plasma for Transfusion. By R. I. N. Greaves, M.D. *Spec. Rep. Ser. med. Res. Coun., Lond.*, no. 258. H.M. Stationery Office. Pp. 54. 2s.

1. Families in Trouble. Charles G. Tomlinson, B.A. Admin., senior administrative officer, Public Health Department, Luton. Luton; Gibbs, Bamforth. Pp. 44. 3s. 6d.

problem families; so that to be subnormal mentally is by no means a necessary first step towards becoming a social problem. The conclusion is that there is not really any distinct social group to be picked out: "On the contrary, the lesson seems to be that each problem family presents a unique complex of circumstances which can only be fully understood when regarded in its entirety." Encouraging though it may be to conclude that the incidence of problem families is low, nevertheless the absolute number, even in a relatively privileged town like Luton, is quite large enough to need some special measures.

Mr. Tomlinson wants a combination of prevention and therapy. He favours voluntary sterilisation, though here he seems to disregard his own findings which provide little evidence of any inherited stigmata. The case for contraceptive measures rests on quite different grounds, and the inclusion of birth-control advice in the case-work organisation seems fully justified. Nursery schools, he thinks, can and do help to prevent fecklessness spreading from parents to children; and, however expensive these may appear, money spent on inculcating good habits and giving the child some experience of a happy life is soundly invested. On the therapeutic side, Mr. Tomlinson describes with admiration the work of the pacifist service units in Manchester and Liverpool, and appeals for more workers willing to attack the problem as they did—by going in person to scrub away the filth and mend and patch the derelict home and furniture. Anybody who undertakes constructive work for such people must recognise their "obtuse of mind and degenerate habits" and to try to discover the means of overcoming the resistance that has already defeated innumerable attempts to help them. "To wash one's hands of those who do not respond willingly to the help which they are offered is to evade the whole issue and leave the worst cases untouched."

For its purpose *Families in Trouble* could hardly be better. It belongs to what has been called the Beatrice Webb school of medicine, and is altogether worthy of that school.

VITAMIN B AND BLOOD VELOCITY

THE circulation-time now has an important place in the assessment of heart-failure. The latest agent to be recommended for the test is the vitamin-B complex.¹ Its value for this purpose was discovered by chance through a woman to whom it had been administered parenterally complaining of a taste on her tongue like that of a "chewed-up vitamin tablet." The preparation consisted of 10 mg. each of thiamine hydrochloride and riboflavine, 5 mg. of pyridoxine hydrochloride, 50 mg. of calcium pantothenate, and 250 mg. of nicotinamide, dissolved in 5 ml. of sterile isotonic saline. House-officers and nurses who were given this preparation confirmed that the onset of the taste was abrupt, intense, and unmistakable. Descriptions of the taste ranged from that of a brewer's yeast tablet to one of stale fish with a warm sensation on the tongue and in the throat.

The test is carried out by rapidly injecting 5 ml. of the solution into the antecubital vein, and noting with a stop-watch the time between the beginning of the injection and recognition of the taste. In a control group of 50 healthy adults the average arm-to-tongue circulation-time was found to range from 9.8 to 10.3 sec. The figures for patients with heart-failure were: congestive failure without treatment (15 cases), 23-53 sec.; congestive failure controlled by digitalis (10 cases), 9.8-13.4 sec.; heart disease without congestive failure (10 cases), 9.9-31.0 sec. Few side-reactions were noted: 2 patients complained of epigastric fullness, 4 of feeling unusually warm, and 1 of bladder tenesmus twenty-

four hours after the injection. The possibility of serious reactions in patients who are hypersensitive to thiamine² should however be borne in mind. Further work is being done to determine which component of the complex is responsible for the characteristic taste.

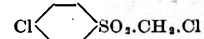
These results compare favourably with those obtained by other methods. Unfortunately, as with many other means of measuring circulation-time, the result depends on the patient's acuity; with an intelligent, coöperative patient the error is probably small, but with an ill or less intelligent patient there is bound to be a lag before he detects or indicates that he has detected the taste.

GERMAN INSECTICIDES

THE spoils that fall to the victors in a modern war are usually meagre; moreover, the vanquished enemy remains as a liability. All that can be extracted in the way of reparations seem to be some scientific secrets. The investigations of the Allied Intelligence Service have revealed some interesting research in the German chemical industry. The work on insecticides, like that in other fields, was uncovered in all stages from preliminary laboratory tests to large-scale manufacturing methods.¹ On the whole, chemical research was more efficient than the biological testing methods, some of which were rather crude.²

It seems that the Germans had known of the value of D.D.T. for some years and were experimenting in two directions—to simplify its manufacture and use, and to find a substitute which was not subject to Geigy's patents. A simplified mixture of D.D.T. analogues, about a quarter as insecticidal as D.D.T.³ but easy to emulsify, was produced under the name 'Lauseto.' This was used extensively to proof clothing for the German forces against lice. In their efforts to find substitutes, the German workers tested a number of compounds chemically analogous to D.D.T. The most promising were 'Gix' (in which fluorine replaces chlorine in the *para*-phenyl positions) and 'Me 1700' or dichlorodiphenyl-dichlorethane; both have about a third to a sixth of the insecticidal power of D.D.T.³ Me 1700, sometimes known as 'D.D.D.' or 'T.D.E.', has been manufactured commercially in America, where tests have shown it to be highly toxic to mosquito larvae.⁴ On the whole, however, these analogues do not compete with D.D.T. in general utility.

Another type of compound which was shown to have high insecticidal powers was the organic sulphones. The dialkyl sulphones are very toxic to mammals as well as to insects, but the replacement of one alkyl group by an aromatic group gives a much safer, though no less insecticidal, compound. A number of substances of this type were tested, the most promising being, apparently, chlorophenyl-chlormethyl-sulphone,



which was given the name 'Lauseto Neu.' This is actually more toxic to lice and bed-bugs than D.D.T.; but it has the drawback of very low solubility in kerosene (about 1/4%).³ The Germans used it in the form of powders, dispersions, and emulsions; they were in any case so short of mineral oils during the war that little could be spared for insecticides. The value of these sulphones as insecticides deserves to be further explored; their toxicity to mammals must, however, be investigated before they are used here in practice.

In the absence of nicotine, the Germans evolved for agricultural use a substance known as 'Bladan,' the

2. See *Lancet*, Feb. 8, p. 223.

1. Combined Intelligence Objectives Subcommittee. Item no. 24, File no. XXXII-20; Item no. 24, File no. XXVI-73. H.M. Stationery Office, 1945.

2. Kilgore, L. B. *Soap*, 1946, 22, 122.

3. Busvine, J. R. *Nature*, Lond. 1946, 158, 22.

4. Deonier, C. L., Jones, H. A. *Science*, 1946, 103, 13.

1. Swenson, R. E. *Amer. Heart J.* 1946, 32, 612.

active ingredient being the hexa-ethyl ester of tetra-phosphoric acid— $[(C_2H_5O)_2PO]_3PO$. This compound is, however, believed to be less satisfactory than the natural product. In addition, a considerable number of organic nitrogen and phosphorous compounds were tested as insecticides. Many of them were produced in connexion with research on chemical warfare and are still on the secret list: none combines high insecticidal power with reasonably low toxicity to mammals.

One programme was directed to discovering mosquito repellents, and, although the test method seems to have been rather crude, one very effective substance was found and called '50/181.' This is trichloroacetyl chloroethylamide ($C_2Cl_3CO.NH.C_2H_4Cl$), whose effectiveness has been confirmed by S. R. Christophers in some work which has not yet been published. The Germans used it in the following formula: trichloroacetyl chloroethylamide 7.5%, calcium chloride 1.25%, magnesium chloride 1.25%, absolute alcohol 60%, water 30%. It is said to be innocuous when applied to the skin, but this would require further investigation.

BATTLES LONG AGO

NOWADAYS, if the water-supply or sanitation of a big town goes wrong for an hour or two the citizens feel that their rights are being infringed, and say so in bitter letters to the press. Yet only a hundred years ago legislation to provide these amenities was held to be an attack on the liberty of the subject.

Mr. Asa Briggs has lately reviewed¹ the passionate differences which ushered in the birth of our public-health system. The filth created in our towns and cities by the industrial revolution was the main argument of Chadwick and his colleagues—Dr. Southwood Smith, Ashley the philanthropist, Bishop Blomfield, Viscount Morpeth, and many others—and their method was to make the facts known. Chadwick published reports on sanitary inadequacies and abuses, and reached the conclusion that by knowing the general lay-out of a town he could tell where the worst epidemics would occur; Southwood Smith found that "wherever the Commissioners of Sewers have not been, there fever is prevalent"; and in Sheffield James Heywood and William Lee told how, "with awful precision," they could detect by inspection alone the unhealthy parts of the town. Everywhere filth and squalor were associated with unnecessary deaths and murderous epidemics. Southwood Smith summed up the debasing effect on the human mind:

"There is a point of wretchedness, which is incompatible with the existence of any respect for the peace and property of others; and to look in such a case for obedience to the laws, when there is the slightest prospect of violating them with impunity, is to expect to reap where you have not sown."

The facts could hardly have been stronger; and by 1848, when Morpeth was introducing the Public Health Bill, they were very widely admitted. But the fight had merely shifted ground: it was now a debate on methods. "There were interests everywhere that had a stake in dirt and disease." The Bill, criticised as un-English, was said to embody an alien principle of centralisation, to endanger local pre-eminence, to permit an objectionable assumption of power by the Government, to be more like a Russian ukase than an English Act of Parliament. Reports on the towns, it was said, were exaggerated (though the facts in *Our Towns*² published nearly a hundred years later make it clear that they could not

have been); the smoke clause would disable industry and make the manufacture of coke impossible; dirt, disease, and crime had no connexion with each other; water-closets had nothing to recommend them; and the whole thing was too expensive.

Mr. Briggs—though he himself resists the temptation—says we can hunt for parallels and differences if we wish. It is hard to refrain, for some of the arguments of the opposition have such a familiar ring. It is reassuring, at least, to know that one much-questioned innovation in the health field turned out so well.

MENTAL NURSING

If general nursing is facing serious difficulties at present, the situation of the mental nursing service is yet worse. Dr. A. Allan Bell, medical superintendent of Dundee Mental Hospital, recently reported to the city's mental-health committee that in the daytime he had only eight nurses looking after seven wards of 30–40 patients each; and that the nurse sometimes had to leave a ward wholly unattended while she took a meal. Many senile and sick patients in these wards cannot possibly receive the nursing attention they need.

Invited to send us his personal opinion, Dr. Bell praises highly the nurses who have stuck to their work under these trying conditions. Most of them have been in the hospital through the war, when overcrowded blacked-out wards increased the strain and anxiety of their work. This branch of nursing, he believes, is neglected because of the "prejudice, fear, and awe felt by the community against mental patients and mental hospitals." Even general-trained nurses share this prejudice; and he points out that though general nurses might profit by a period of experience in mental hospitals, that would not make mental nurses of them. The mental nurse has a different approach to the problems of mental disorder: "she has had her character so moulded and formed during her early years of training that no matter what her own particular personality may be she will continue to show the same sympathy and devotion to her patients, however difficult or aggressive these may be, thus displaying the value of well-organised sentiments in helping the emotional difficulties of others." It is interesting that Dr. Bell distinguishes this as a quality of the good mental nurse, and finds it undeveloped in the general run of State-registered nurses. There will be exceptions in both groups, naturally; but there is certainly some reason for supposing that this tenderness towards patients is more commonly fostered by mental than by general training; and yet it should be the chief attribute of every nurse.

In his staffing difficulty, Dr. Bell is turning to the new recruitment service started in Scotland under the Nuffield Hospital Trust; but as a long-term policy, he would like to see a well-planned regional mental-health service, each region having its own psychiatric administrator. The hospitals in the region would exchange staff, so that mental nurses, after training in a mental hospital, would be drafted to observation wards, psychiatric wards of general hospitals, child-guidance clinics, centres for the care of the aged, mental convalescent homes, and reablement centres. They would be of special value in the field of social psychiatry, and some might perform the history-taking duties of psychiatric social workers (who are almost unobtainable). They could certainly do much for the families of mental patients, helping them through difficult periods with recovered members, and encouraging them to seek early treatment when signs of breakdown threatened.

THE next session of the General Medical Council will open on Tuesday, Feb. 25, at 2 P.M., when Sir Herbert Eason, the president, will take the chair.

1. Public Opinion and Public Health in the Age of Chadwick. Published by the Chadwick Trust, and obtainable from the lecture secretary, 204, Abbey House, Westminster, London, S.W.1.
2. *Our Towns*. London. 1943; see *Lancet*, 1943, 1, 631.

Reconstruction

ORGANISATION FOR OLD AGE

AN INSTITUTE OF GERONTOLOGY ?

TREVOR H. HOWELL

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The present arrangements for the care of the aged sick are inadequate. All over the country doctors and social workers echo the question, "What can we do for our old folk ?"

Once this was a problem for the relations only ; now it concerns the whole community. Medical practitioners are anxious to get elderly patients into hospital ; medical superintendents want to discharge them and free beds for other cases ; almoners seek homes, domestic help, or nursing care for those no longer able to look after themselves. Outside the hospital sphere social workers, welfare committees, religious bodies, and charitable organisations make patchwork attempts to cater for the growing number of old people. Yet, in spite of all these efforts, the care of the aged sick and infirm remains unsatisfactory. Organisation against old age is long overdue.

WORK IN HAND

First let us consider some of the societies interested in this matter. On the purely medical side pride of place must be given to the Club for Research on Ageing. This body, whose members are scientists or doctors, is occupied with fostering research and investigation into senescence. Gerontology in the abstract is the chosen field for its labours. Its approach to old age is impersonal and not concerned, except incidentally, with the human or social aspect.

When we turn to the care of sick persons, most of the work is done by general practitioners, who gradually acquire considerable skill in geriatrics. Unfortunately, little of this is transmitted to younger generations, most of it dying with the doctor. During recent years the municipal "chronic" hospitals have undertaken the care of large numbers of old people ; but, according to the hospital surveys, few of these are comparable in efficiency with the average general hospital. In fact, the Institute of Almoners paints a gloomy picture of the conditions existing in some of them. The voluntary hospitals, which do not cater for the long-stay case, treat relatively few elderly patients.

It seems, therefore, that there is a great gulf between those who perform research into problems of senescence and those who look after the aged sick. The needs of the one are unknown to the other, and research is rarely carried out in hospitals for chronic sick. At the same time, the unrecorded clinical wisdom of the practitioner is lost. Hence little advance has been made in this branch of medicine during the last fifty years. It may be said of geriatrics that "the harvest truly is plenteous, but the labourers are few." There is need for more interest in the diseases of old age, more teaching of geriatrics, and a higher status for those who work in this sphere.

To bridge the gap between the medical and social aspects of gerontology, we have the work of the Nuffield Foundation. This promotes research on the one hand and collects social-welfare data on the other. Its beginnings in this field are full of promise. As the one organisation with adequate funds to perform its task, the Nuffield Foundation can be a fairy godmother.

Apart from this, there are numerous societies interested in the care of the aged. One of the most notable is the National Old People's Welfare Committee, sired by the National Council for Social Service. In the first place it promotes the formation of local old people's welfare

committees all over the country. These perform very useful work and fulfil a long-standing need. Secondly, it is trying to coördinate the programmes of philanthropic and religious bodies which would otherwise compete or bid against each other for charity and public funds.

In the domain of housing, several schemes have already been put into practice. These vary from special municipal flats and cottages to colonies for the aged, such as the Whiteley Village Trust and the Victory and Churchill Homes of the Church Army. The Old People's Homes Committee of the Family Welfare Association performs valuable work, keeping in touch with various homes, hostels, and almshouses, and trying to find suitable vacancies for homeless old folk. A recent development has been the provision of hostels for the elderly who need more care and attention than they have in their own dwellings. Perhaps the best examples of these are the Hill Homes at Highgate, where some 150 old men and women live under sympathetic supervision in comfortable quarters. There has also been a renewal of interest in almshouses, and a new association has been formed in London to promote their well-being.

Another development is the formation of clubs for old folk, where meals and social amenities are available for a small subscription. The best known of these is the Darby and Joan Club at Streatham. For those who live in their own homes the Ministry of Health system of home-helps and the Women's Voluntary Services arrangements for the provision of ready-cooked meals are a boon and a blessing.

The organisations mentioned above are only a selection of those engaged in this branch of welfare work ; the National Old People's Welfare Committee has no less than 34 separate bodies represented on it. Therefore we cannot say that there is a lack of interest in the problems of old age.

DEFECTS AND DEFICIENCIES

When we come to consider the results of all these busy activities, defects and deficiencies begin to make their appearance. For instance, there is not enough provision for the infirm old person who needs nursing care or supervision at home. Lack of staff causes the nursing-homes either to refuse such cases or to charge high fees. The chronic hospitals consider them fit enough to be discharged, but they are not always equal to the task of caring for themselves. Home-helps and ready-cooked meals go somewhere towards their needs, but such cases are numbered by hundreds, not by tens. The Old People's Homes Committee does good work within its limits but gets swamped by floods of applications. The Church Army and other bodies interested in the provision of housing tend to work in relative isolation. The Institute of Almoners can act for patients in a hospital, but its knowledge and resources are not so readily available to the private practitioner. As yet there is no central bureau to correlate all the information and tap the various sources of help and expert knowledge. If a doctor or social worker is seeking assistance for some elderly person, it is often necessary to approach organisation after organisation, committee after committee, and secretary after secretary. First one and then another will plead shortage of funds, lack of accommodation, or a long waiting-list.

We see therefore, both in medicine and in social welfare, that there is a great shortage of facilities to meet the needs of old folks today, and that the existing organisations do not work together as they might. More homes, more hostels, and more hospital beds are wanted—more nurses, more doctors, and more welfare workers. Further, we must have contact between those who look after the elderly when they are well and those who care for them when they are sick. The coördination begun in the social sphere by the National Old People's Welfare Committee and the Old People's Homes Committee

must be widened and extended to cover the realms of medicine and social service. In the United States the Gerontological Society attempts to perform this necessary duty as regards the scientific and economic aspects of old age, and the American Geriatric Society fosters an interest in the medical and nursing care of the aged. But a combination of medical, scientific, social, and economic efforts is needed if a real advance is to be made. There is a case for the foundation of an Institute of Gerontology in this country to relate the activities of all workers, medical or social.

AN INSTITUTE OF GERONTOLOGY

Let us consider how such an institute might be of service. In the first place, a central body would be able to extend the work of the Club for Research on Ageing and the Old Age Research Committee of the Nuffield Foundation. It could also organise teaching and encourage publication of original work on gerontology. Though there are now two American journals devoted to the subject, no British periodical of this kind exists. The issue of such an organ would supply a want long felt by those interested in old age. While knowledge of geriatrics was thus being disseminated through the profession, special hospital units could be set up in suitable centres. This suggestion was made by the authors of the Ministry of Health Hospital survey of the London Area and has much to commend it. In no other way will the care of the aged become an active, effective, and respected branch of medicine.

With research, teaching, literature, and practice thus encouraged, the social-welfare aspect of gerontology can be brought into line. There is at present an emergency bed service in London which can arrange urgent admissions to hospital on behalf of any doctor. With a similar central bureau, domestic help, convalescent homes, physiotherapy, and a bed in some hospital or hostel could as readily be found for the senile. Such an institute as that envisaged could make good use of the information already collected, hence only staff work would be necessary to give many old folk their freedom from fear. It seems a small price to pay for a very great blessing.

Some may think that an appeal for the foundation of an Institute of Gerontology is premature. After all, the subject is comparatively young, and only a few doctors are interested. In less than two years the new National Health Service is likely to be operating; hence some think that the Ministry of Health should be left to grapple with the problems and difficulties which have arisen. But these are the very reasons for prompt action. The young plant of gerontology must be watered and fertilised. All the present interest in the subject must be harnessed while it is still fresh. As for the National Health Service, it is a challenge to act while voluntary initiative can be effective. Before long, every new proposal will have to be referred to the mandarins of Whitehall. An organisation in being before 1948 would have a better chance of survival than one arising after that date. The need for it is urgent enough. At present the doctors' surgeries and the municipal hospitals' beds are choked with elderly patients needing help. Now is the time to act. Let us get ready to deal with the difficulties which beset old age. *Nunc floreat gerocomia.*

"... To find a truth and have it repudiated and neglected ... is one of the bitter things for the discoverer, and often an incalculable calamity for the world. In 1827, Melier, a young intern in a Paris hospital, expressed the belief that inflammation in the right iliac fossa depended upon disease of the vermiform appendix. He reported undoubted cases of appendicitis confirmed by autopsy. He described gangrene, perforation, concretions, and peritonitis. He ... believed that if the diagnosis could be made, operation was demanded. The great Dupuytren arose in discussion and destroyed that young surgeon."—Dr. EDWARD A. SCHUMANN in a presidential address to the American Gynecological Society (*Amer. J. Obstet. Gynec.* 1946, 52, 881).

Special Articles

PREFRONTAL LEUCOTOMY

REPORT ON 1000 CASES

In 1945 the Board of Control started an inquiry into the results of prefrontal leucotomy. A questionnaire was sent to all county and borough mental hospitals in England and Wales, to all registered hospitals, and to most of the private mental institutions; from the replies received the board has published a report¹ on the results of this operation in 1000 cases of mental disorder.

THE OPERATION

In prefrontal leucotomy the frontothalamic tract, which connects the prefrontal area of the frontal lobe of the brain with the thalamus, is divided; and after this division the nucleus medialis dorsalis of the thalamus degenerates.

The crude intention of the operation, which was introduced by Egas Moniz in Lisbon in 1935, is to break the connexion between the patient's thoughts and his emotions, thus relieving mental tension and taking the sting out of experience. Emotional tension is an important symptom in many types of mental disorder, especially in melancholic and obsessional cases. The schizophrenic, though he appears unemotional, may be dominated by the emotion associated with his hallucinations and fantasies. It is for such cases that the operation is commonly used. The report notes that according to Freeman it can also be used to lessen mental distress from intractable physical pain.

Operative risks include death from hæmorrhage, immediately or later (19 cases in the series), or from a complication such as bronchopneumonia (4 cases), meningitis (3 cases), or cerebral abscess, respiratory failure, subdural hæmatoma, or empyema (each 1 case); the development of epileptiform fits or other post-operative symptoms; and changes of personality.

The surgeon cannot be certain of cutting the frontothalamic fibres.

The report quotes a case, recorded by A. Meyer, of successful prefrontal leucotomy performed on a schizophrenic of 5 years' standing. This patient did extremely well, becoming happy and unworried; but when he died of carcinoma of the œsophagus 18 months later, autopsy revealed that the frontothalamic fibres had not been cut and the nucleus medialis dorsalis had not degenerated.

It is therefore possible that damage anywhere in the brain might have a beneficial effect in some cases; even so, as Meyer says, "it would be difficult to conceive of a theoretically and practically more rational place for the operation than Moniz has suggested."

STATISTICAL RESULTS

Of the 1000 patients 348 were males and 652 females. Cases were grouped broadly for statistical purposes under the following diagnoses: schizophrenia; manic-depressive insanity; neurosis, (a) obsessional, (b) other; postencephalitic states; mental defect; epilepsy; various.

Patients discharged recovered amounted to 24.8%, and patients discharged improved to 10.5%—making together 35.3% of cases treated. Among these, 9.3% relapsed. Patients who improved but remained in hospital amounted to 32.3%, and 3.7% of them relapsed. Only 1% were worse after the operation; 24.8% remained in hospital unchanged. Of 6% who died, only half (30 cases) died as the result of the operation; in 19 of these hæmorrhage was the cause. Fits were reported after

1. Prefrontal Leucotomy in 1000 Cases. London: H.M. Stationery Office. Pp. 31. 6d.

the operation in 3.3% of cases; only 21 (2.1% of the whole series) cases had more than one fit.

For the schizophrenic cases treated (60% of the whole series) there was a discharge-rate—recovered or improved—of 23%, excluding relapsed cases. For the manic-depressive cases (25% of the series) the discharge-rate was 50%, excluding relapsed cases.

Among patients reported to be recovered or improved there was an apparent sex differentiation in favour of males, the figure being 65.2% for males and 62.0% for females. For those discharged as recovered or improved the percentages were 35.9 for males and 29.9 for females.

The older age-group (55 and over) had the best discharge-rate. The form of mental disorder influenced this result, for there was a higher proportion of manic-depressive cases in this group.

In a fifth of all the patients treated the present attack had lasted less than two years; and 58% of them were discharged as recovered or improved. The report notes how unfavourable to treatment, from the point of view of eventual discharge, are schizophrenics whose existing attack of disorder has lasted for more than two years.

Social behaviour was analysed in 958 patients: that is, in all surviving patients, plus 18 who died sufficiently long after operation for some estimate to be made. The results were: unchanged, 244; milder in behaviour or psychosis, 295; coöperative, 166; living as citizens, 242; worse, 11. Changes in violent or difficult behaviour and in habit of work were analysed in all cases where relevant information was given, with the following results:

After operation:	Worse	Prominent	Less	Gone
Violence (364 cases) ..	3	101	89	171
Difficult behaviour (175 cases) ..	1	64	23	87
		Lost	Unchanged	Gained
Habit of work (115 cases) ..		1	19	95

Symptoms as a whole were analysed in 958 cases, and were found to be worse in 11 (1.1%), prominent in 350 (36.5%), less in 377 (39.4%), and gone in 220 (23.0%).

An analysis of individual symptoms showed that though delusions and hallucinations remained prominent in more than half the cases, depression and agitation were relieved or lost in a high proportion (80–90%). Excitement was relieved or lost in nearly 60%, and obsession in nearly 70%. Of 74 who had seemed to intend suicide, 62 had lost this intention.

CONCLUSIONS

The board note that the mesh of their inquiry has been "too coarse to catch the fine qualities of personality which may make all the difference to a man's inner life and to his influence on society"; and they had not enough information before them to analyse changes in intelligence. They feel able, however, to make the following general conclusions:

Prefrontal leucotomy is usually a simple operation for the patient, if not always easy for the surgeon. Complications are rare, and the death-rate cannot be said to be high when the seriousness of established mental disorder is taken into account.

Remarkable improvement in behaviour follows in a large percentage of patients who have had severe symptoms with poor prognosis and have failed to respond to other treatment. Many are discharged from hospital, and others, while unfit to leave, become more placid and easier to nurse.

The operation should be done only after each case has been carefully considered by experienced psychiatrists.

FOR FUTURE STUDY

An important appendix outlines details which would be useful to those making further studies.

These include such things as the basis on which cases are selected, their prognosis without operation, and the

effects of treatment previously tried; the anæsthetic (local or general) used at operation, the site and extent of the operation, whether it was unilateral or bilateral and carried out at one session or two; the intelligence, memory, and power of concentration of the patient before and after operation, and changes in his mental tension; symptoms, after operation, of frontal-lobe injury such as irritability and lack of initiative; changes of personality, and bodily changes; fits; treatment after operation, particularly re-education and reablement; relapses, and the effect of insulin or other physical methods on patients showing signs of relapsing; results of follow-up at intervals for five years; definition of terms, and comparability of notes.

The report mentions that investigations on some of these points have been carried out or are now being undertaken independently in individual hospitals.

TRAINING FOR THE FAMILY

EXPERIENCE shows that when children are neglected their mothers are oftener incompetent than vicious; and the folly of sending a neglectful mother to prison, where she learns nothing which will help her to mend, has often been criticised. An experiment in which training will take the place of punishment has now been planned, and will be run by a joint committee representing interested individuals and societies, including the Society of Friends. The Elizabeth Fry Training Centre, as it is to be called, will receive mothers and their children for a period during which the mothers will learn how to look after their home and children properly.

In a letter to the *Manchester Guardian* of Jan. 22 several sponsors of the scheme, including the Lord Mayor of Manchester, appealed for financial help. As that newspaper pointed out in a leading article, this is an attempt to handle the difficulty radically and intelligently. Donations to the fund may be sent to the honorary treasurer, Elizabeth Fry Centenary Fund, c/o District Bank, Peter Street, Manchester.

A project which will help to forward the same end is being sponsored by the National Committee of Family Service Units. These units have been established to develop and carry on the work of the Pacifist Service Units in Liverpool and Manchester, which showed that personal help can produce a change—sometimes a lasting change—for the better in even the most feckless.¹ Many families were reinstated or saved from deterioration by such timely intervention. The new national committee has been formed by many interested people and several voluntary bodies, including the National Council of Social Service, the Family Welfare Association, the National Society for the Prevention of Cruelty to Children, the National Association for Mental Health, the British Federation of Social Workers, the Committee on the Neglected Child, and the Salvation Army. The Ministries of Health and Education, and the Home Office and the Assistance Board have promised their support.

The aim will be to provide a service which can be put at the disposal of departments and bodies for use in particular cases. The committee will first of all take over the responsibility for the work already begun in Liverpool and Manchester, and then will set up a new unit in London. As the chairman says in a letter to us, "The keynote of successful work in this field must be friendship, and the work will call for personal self-sacrifice of a high order." The committee hope to investigate the nature, extent, and causes of this kind of social subnormality; they believe that a few years will suffice to establish the facts, and they appeal for £15,000, which will support the existing centres during that time and cover the expenses of the new London unit. Information will be supplied by the secretary, Family Service Units, 85, Clarendon Road, London, W.11, and donations may be sent to the treasurer, Lord Balfour of Burleigh, at Lloyds Bank Ltd., 71, Lombard Street, London, E.C.3.

1. "Problem Families" 1945, by Pacifist Service Units, London; see *Lancet*, 1946, i, 928.

Medicine and the Law

Unlawfully Practising Dentistry

A MAN described as a "dental mechanic" was fined £1 on each of three summonses for unlawfully practising dentistry, and was ordered to pay two guineas for costs, at Frome petty sessions last month.

A witness gave evidence that she had a cracked upper plate and went to the defendant's shop where he fetched some plaster and took an impression; he told her that the charge would be £2 10s. She tried the new plate, but it was loose. He took another impression, but the result was still unsatisfactory, and later two more impressions were taken. The solicitor who prosecuted on behalf of the Dental Board explained to the bench that it is an offence under the Dentists Act, 1921, for a person to practise dentistry if he is not registered in the Dentists' Register set up by statute. The 1921 Act expressly states that the giving of "any treatment, advice or attendance as preparatory to or for the purpose of or in connexion with the fitting, insertion or fixing of artificial teeth" shall be deemed the practice of dentistry. The defendant said he had been in the business for 33 years. If the dentist had made the set correctly in the first instance he would not now himself be before the court. He had tried to do a favour, and this was his reward. He claimed to have been a practising dentist in 1921. This claim, of course, gave him no defence to the charges, as he had not taken advantage of the generous provision under section 3 of the 1921 Act which allowed the registration of persons who had been engaged in the practice of dentistry as their "principal means of livelihood" for any five out of the seven years preceding July 28, 1921.

The case illustrates once more the statutory privilege which Parliament has been willing to confer upon the dentist, as also upon the architect. It is strange how often the medical practitioner is accused of enjoying a like monopoly.

Public Health

Scarlet Fever in Nairobi

SCARLET fever is rare in the tropics. In Kenya there have been isolated cases; but no epidemic had been recorded until last year, when Fleming¹ observed 19 cases in a European school at Nairobi; the illness was mild, and there were no deaths. Beta-haemolytic streptococci of group A were isolated from the throats of all the patients. The recent return of children from overseas, and the consequent overcrowding of schools, may have contributed to the outbreak.

Infectious Disease in England and Wales

WEEK ENDED FEB. 1

Notifications.—Smallpox, 0; scarlet fever, 1135; whooping-cough, 1890; diphtheria, 176; paratyphoid, 1; typhoid, 6; measles (excluding rubella), 13,501; pneumonia (primary or influenzal), 1278; cerebrospinal fever, 83; poliomyelitis, 12; poliоencephalitis, 1; encephalitis lethargica, 2; dysentery, 61; puerperal pyrexia, 126; ophthalmia neonatorum, 52. No case of cholera, plague, or typhus was notified during the week.

Deaths.—In 126 great towns there were no deaths from enteric or scarlet fever, 6 (2) from diphtheria, 2 (1) from measles, 13 (4) from whooping-cough, 92 (9) from diarrhoea and enteritis under two years, and 148 (23) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 245 (corresponding to a rate of 25 per thousand total births), including 30 in London.

1. Fleming, A. McK. *E. Afr. med. J.* 1946, 23, 348.

In England Now

A Running Commentary by Peripaletic Correspondents

"THE good wishes of all go with them," says the account of the Royal departure. Most certainly this is so. After years of war-time restrictions and enforced insularity, the people of this country sail in fancy with the Royal family for the continent of sunshine and plenty, "the land of apricots and antelopes," where success waits upon the enterprise which freedom breeds.

The voyage to South Africa has excited extraordinary interest. Every stage of the preparations has been closely watched—the assembly of the fleet of cars, the shipment of the special train, and the rehearsals of embarkation at Portsmouth. We have read all the accounts, have listened to the broadcasts, and have shared in the excitement which the Princesses have enjoyed. The anatomy and physiology of the *Vanquard* is known to almost every man, woman, and child. Who does not admire Captain Agnew and the men he commands; who is not familiar with his cabin on the bridge, the galleys and guns, and the wardrooms and messrooms; who has not pried into the larders and pantries, and counted all those barrels of rum? We have even seen over the Royal apartments, and admired the loose covers and reading-lamps. We picture the family in their naval dining-room and know that they will fare well and enjoy their voyage. The bulletins of progress through the stormy Bay of Biscay were anxiously followed; now while they sail on under blue skies the happy music of the ship's band is wafted across to us in winter-bound Britain. Not only are we with them on the ship but we are awaiting them in sunny Cape Town.

Many of us would be glad to sail with them, perhaps to feel the sun once more after two almost summerless years, to taste again real food, not frozen and feigned but fresh and unfettered by coupons and points; or to escape for a while from a homeland of fuel crisis, austerity, and buff-coloured forms. Claustrophobia and insulaphobia are widespread. Who, if so bidden, would not hasten off to a convention in Europe, or make a tour of the American medical schools; who does not furtively glance at the advertisements in those adventure-some last pages of *The Lancet* and the *B.M.J.*, playfully imagining himself in the Dominions or Colonies living the full life under a smiling sun and a clear sky with a job to do and a fortune to seek? Lust for easy opportunity and adventure is compelling; in our flight of ambition we each shoulder the mantle of Cecil Rhodes and seek out the horizon.

When I was an A.M.O. at a private mental hospital there was a patient, a manic-depressive barrister, who took a dislike to me. When he saw me coming on my morning round he would half turn his face to the wall and address an imaginary court: "May-it-please-you-melud, gentlemen of the jury, this horrible monstrosity you see advancing towards you is indicted of the most terrible crime, to wit, of having . . ." The crime varied from day to day, but was generally of a kind not mentioned even by the Sunday newspapers. I used to stand and listen for a few minutes, fascinated by his eloquence and ringing scorn and by the amplitude of his facial expression—withering contempt, righteous fury, man-to-man satire, disgust. After a few minutes I would interrupt him, "Good morning, Mr. Doe," and he would turn to me with all the sunshine of his charm, "Ah, good morning, good morning, doctor, how are we today?"

I had an inside cabin on that troopship opposite the bathrooms. Nor did that enable me to get a bath when I wanted, all the chosen minutes between 7 and 8 were for the majors and colonels, and from 8 to 8.30 for the sacred ablutions of generals. In the hot weather they kept the door on the hook, which meant that I got their steam and another grievance, but there was one consolation—I could lie in my bunk and watch the reflexion of their faces while they shaved. Frowns and fury and the wrath of gods swept across those lathered countenances like gales on snowy tundras or thunderstorms on stubble. Sometimes they even articulated

words like "blast" and "damn" and had to calm down to do the upper lip. Generally speaking, the higher the rank the greater the disturbance. I even took notes, contemplating a thesis for my M.S.A., "The Phenomenon of the Morning Hate." But what reminded me of Mr. Doe was that if the next on the bath list made expectant noises without, the sunshine immediately broke through: "Sorry, am I a bit late? Sorry, old boy. Shan't be a minute."

Why do I now recall these two episodes from the far and middle distant past? Because one who is near and dear to me this morning said, "Why do you make those funny faces when you shave?" "But, my darling..."

"Andrew arrived whole, hale, and hearty at 5.30 A.M. today. He inherits his mother's blood-groups—rhesus-negative—but thanks to his heterozygous father all goes well." So ran my message to a medical friend announcing my son's arrival. The reply may be helpful to my many colleagues who are struggling to master the rhyme and rhesus of this hæmolytic disease of the newborn. Scotland's expert vouches for its scientific accuracy.

Man Andrew, it would seem to me
Your homozygous mother
Has genes which must be cde,
While heterozygous father
Is CDe and cde.

Throughout your anxious pregnancee
They knew, poor devils, you might be
Small cde, big CDe,
Or homozygous cde.

If number one, there might be free
Agglutinins to big CD
Which might precipitate (oh gee!)
Erythroblastic tragedee.

Thank God your rhesus pedigree
Is cde and cde.

(I think your father must agree
To this genetic family tree
Before I add my Q.E.D.)

Perhaps I am wrong. I treat all my patients as intelligent people who can look at themselves objectively, and with suitable explanations I discuss all the aspects of their complaints with them. They are paraplegics resulting from the war. One of them, a Pole, of the highest courage and command of English, called me to his bedside while he was having a rigor. He asked me to put him into the next world. I discussed the pros and cons of euthanasia with him at length, and, having covered the religious and common-sense aspects, wound up with my own feelings and the legal position, finally stressing his lack of confidence in me should the request be a failure. At this point, he looked up at me and said, "Doc, you've got hold of the wrong end of the stick. I want to be moved into the next ward."

Listening to A. A. Milne's *Other People's Lives* on the radio set me thinking on its personal application. Being new in practice I wonder at the interesting medical conditions some patients harbour without complaint. "Never let them touch it, Missis," was Dr. X's advice 30 years ago to an elderly lady with a malignant-looking goitre. "My heart's never regular," says a chronic fibrillator, "I take a bit of digitalis when I feel dizzy." Should I alter the routine of these perfectly satisfied patients?—Might I not turn them into medical successes but social failures?

Life's Little Compensations.—The Minister of Food has made an order to remove the price control of cherries. He also announces that the standards of strength of vinegar are the same today as before the war.

Letters to the Editor

SAUERBRUCH CINEPLASTIC AMPUTATION

SIR.—May I, as chairman of the meeting of the Standing Advisory Committee on Artificial Limbs, held at Roehampton on Jan. 14, submit the following observations upon the article by Mr. R. K. Magee in your issue of Dec. 21?

Our committee appreciate the advantages which this operation, when successful, can give to the patient, but there are certain drawbacks which have still to be overcome.

Cinematation of an amputation stump was first conceived by Dr. G. Vanghetti in 1897–98 after the return of Italians from the Italo-Abyssinian war. Following experimental work upon chickens the findings were first put into practice in 1900 by an Italian surgeon—Ceci, of Pisa. Further work was carried out by other Italian surgeons and later by Sauerbruch in Germany. The possibilities of the procedure were not generally accepted until the 1914–18 war when it was again used, more especially at several centres in Italy, and to some extent in Germany.

Several types of cinematation have been suggested, each varying in the method by which function is produced in the prosthesis, and in the particular motive force obtained from the musculature employed in the stump. The better-known methods include:

1. *The club*—a projecting portion of bone or muscle, covered with skin and employed to activate and retain the prosthesis.
2. *The loop*—formed by joining extensor and flexor tendons, covered with skin and similarly employed.
3. *The tendon tunnel*—somewhat similar to the loop method.
4. *The muscle tunnel*—a skin tunnel constructed through the belly of a muscle; in this tunnel was placed an ivory peg to which the prosthesis could be attached, and by which it could be activated.
5. *The pseudarthrosis motor*—a portion of the distal end of the bone in the stump being separated but having its tendons and musculature left intact to activate and control the prosthesis.

Results of the work carried out up to this date were given in Professor Putti's lecture, published in *The Lancet* of June 8, 1918, and in the *British Medical Journal*, together with published articles by Dr. Vanghetti and others. It appears that the muscle-tunnel method gave the more satisfactory results. A few cases were treated in England by this method after the first world war, but the results were for the most part unsatisfactory. The operation was revived during the late war by Sauerbruch in Berlin, and by Leibsche and others in Munich.

Acting upon a recommendation of the Standing Advisory Committee, following a combined committee meeting with some American surgeons who had visited Berlin and Munich, the Ministry of Pensions sent a delegation of surgeons and limb surgeons to Germany to investigate and report upon the results of this operation and on the type of prosthesis supplied to the patients who had undergone this treatment.

On their return the members reported that Sauerbruch, working in Berlin, was carrying out his original skin-tunnel method, and that the prosthesis supplied had not materially altered in design or usage. In Munich a more advanced technique was employed; the distal ends of the tunnelled muscles were freed from their insertions, and this gave a greater range of movement, with more power. The diameter of the skin tunnel had been considerably increased, allowing easier insertion of the ivory peg by the patient, and permitting better hygiene of the skin in the tunnel. Two well-known English surgeons witnessed the operative procedures on several patients at two centres, whilst a technical surgeon inspected the workshop where the prostheses were made and fitted.

A demonstration was given by about twelve patients who had been fitted with the usual prosthesis, the design of which had not been improved upon. The greater number of these patients were afterwards seen in the workshop, where it was found that they had taken off the prosthesis to go home, saying it was rather heavy and irritated the skin tunnel after some usage. Direct inquiries

were made in many centres regarding the period for which a prosthesis had been worn, how many skin tunnels had broken down, and how many patients had required reamputation. No records or data could be obtained.

The recent meeting of the Standing Advisory Committee unanimously decided that before any recommendation could be formulated it would be necessary to produce a better-designed prosthesis, as the weight of the present apparatus was considered to be excessive, while the artificial hand at present available was not satisfactory. The research department of the Ministry of Pensions was instructed to give this work the highest priority; some thought had already been given to the matter, and a prototype model of a prosthesis was shown to the members at the meeting. This model demonstrated how the hand could be taken off the arm quite easily, and several of the normal appliances at present issued to amputees could be fitted to the arm. These appliances would enable the wearer to do finer work than was possible with the Continental type of non-detachable hand. The normal flexor and extensor control would operate these appliances. Further work is being carried out, and the committee hope that with more efficient and lighter appliances a great range of function can be obtained from this type of reconstruction.

Liverpool.

T. P. McMURRAY.

PERITONEAL DIALYSIS

SIR.—Dr. Fine's comments (Jan. 18, p. 120) are of interest and importance. He rightly points out that in the case we reported (Nov. 23) recovery was due to the diuresis which followed and was possibly the result of renal decapsulation. Unless any treatment of uræmia is followed by restoration of renal function it must be accounted a failure. If peritoneal dialysis is not to fall into disrepute there must be some hope of recovery in the cases selected for treatment. In our case the known removal of a small amount of urea (7 grammes) by peritoneal dialysis was followed by a sharp fall in the blood-urea level and great clinical improvement before diuresis set in. We cannot help feeling that even if double this amount of urea were removed and unaccounted for because of gross leakage of the dialysing fluid the clinical improvement of the patient justifies Dr. Fine's assertion that "measurement of urea excretion is only a convenient way of measuring the excretion of all diffusible retention products." The clinical improvement of our patient suggested that more than urea was extracted.

Dr. Fine and his colleagues have used continuous peritoneal irrigation in preference to intermittent rinsing. We have felt that when continuous irrigation is used a channel may easily form between the entrance and exit tubes, and but little of the peritoneal surface may be available for dialysis. In recent cases we have run 2 litres of fluid into the peritoneal cavity in 15 minutes, the fluid being retained for 2 hours and then drawn off. Analysis at short intervals shows that the urea content of rinsing fluid reaches that of the blood at the end of 2 hours. Using this technique we have extracted 30 g. of urea in 18 hours and have found that the urea content of the rinsing fluid may actually exceed that of the blood, an observation which has not yet been explained.

We believe that the main dangers of peritoneal dialysis in order of importance are first, gross interference with water metabolism and chemical balance of the body fluids, and secondly, peritonitis. Many cases of anuria are already waterlogged by enthusiastic hydrotherapy, and the use of improperly constituted rinsing fluid may increase the generalised œdema. On the other hand, as Mr. Rob and Dr. Richardson (Feb. 1, p. 195) point out, hæmoconcentration may easily be brought about, with results perhaps less devastating than those that follow rapid absorption of water. There is no reason to suppose that a rinsing fluid suitable for all cases at all times can yet be devised, and it is our opinion that adjustments should be made if indicated by clinical or biochemical study. We feel this to be an argument in favour of intermittent as against continuous irrigation.

In our cases peritonitis has not been prominent and penicillin has now been excluded from the rinsing fluid lest it have an irritating effect on the peritoneum, which by causing exudation might interfere with free osmosis. All the precautions recommended by Dr. Fine, however,

must be taken into account. In some cases pain has been a prominent feature, and, rather than resort to morphine with its possible dangers in uræmic patients, we have used small quantities of 'Novocain' which have both a local and general effect.

With regard to the irrigating tubes, our experience runs parallel with Dr. Fine's—that rubber is unsatisfactory. Having tried steel we have recently used plastic polyvinyl, which is less uncomfortable, can be fitted more snugly to the abdominal wall, and is unlikely to cause dangerous pressure on intra-abdominal organs. The nature of the rinsing fluid may have more to do with the formation of adhesions than the chemical constitution of the tube. Much experimental work on the constitution, structure, and placing of the tubes, and on the nature of the rinsing fluid, still needs to be done.

While we believe with Dr. Fine and his colleagues that the peritoneum with its large surface is the ideal barrier across which to make intimate contact with the blood and body fluids, we are sure that Dr. Kolff's method deserves the closest attention by those interested in the treatment of uræmia by extrarenal dialysis. His method and apparatus, while brilliant in conception, seem to us cumbersome in application and therefore not likely to be universally adopted. The intimate contact with the blood-stream and body fluids which the artificial kidney and peritoneal dialysis allow has possibilities far beyond the treatment of uræmic states. Much experimental work and biochemical and clinical research must be undertaken before the method can be appraised and put on a footing safe enough for general adoption.

RONALD REID
J. B. PENFOLD
R. N. JONES.

Colchester.

NURSING AND THE DOCTORS

SIR.—While it is true that nothing can make nursing one of the easiest of the many careers open to women today, some of us are doing all we can to eliminate old-fashioned discipline as far as the repute of the profession and the safety of patients allows.

But may I point out how often doctors are responsible for adding unnecessarily to the difficulties of the nurse's life? The morning and evening routine of washing and bedmaking, the serving of meals, and the tidying of the ward must go on whatever happens, and it is not helpful to have the medical staff invading the wards when every pair of hands is needed for these humdrum but essential tasks. (Incidentally, it is pointless for the Medical Research Council to condemn the practice of uncovering wounds within an hour after ward cleaning if surgeons insist on doing rounds before 10 A.M.) Rounds are often prolonged into the patients' dinner hour, or even begun then. The nursing staff is then depleted, some having gone to their own lunch, and often the upshot is that the ward sister forgoes her own meal to attend the doctor.

Surgeons who curse the nursing staff in the theatre and hurl their instruments about may relieve their feelings in this childish way, but courtesy and tradition prevent the nurses from retaliating in a like manner. Senior members of the medical staff who have the status and salary of lecturer to the nurses sometimes reel off the same discourse they give to their medical students, or cut their lectures at the last moment. Here is an example:

At this hospital, about 25 miles out of London, attached to and partly staffed by a voluntary teaching hospital, a surgeon wished to give his lectures at 5 P.M. on the day that he operates. Since some of the nurses are on night duty I stood out for 6 P.M., so as not to curtail their sleep; and finally we compromised on 5.30 P.M. Learning at tea-time, one operating day, that the surgeon still had a partial gastrectomy to do, I asked whether I should postpone or cancel the lecture so that the night staff need not be called or the day staff spared from the wards. A message came back that the surgeon would be free by 5.30. The class assembled, some nurses who had had a day off returning from town for the purpose. At 5.55 P.M. the surgeon sent a message cancelling the lecture.

Certainly it is undesirable that nurses should have lectures while they are on night duty and on days off, but incidents of this kind help to make the recruitment

of sufficient staff impossible; and lack of nurses means lectures in off-duty time.

Again, we can all sympathise with the wish of the doctors to open more beds, but while there are barely enough nurses to fulfil existing commitments it is unfair to add to their load, especially when they are living under conditions which should not be tolerated now the war is over.

In this converted mental hospital student nurses seconded from their London training school are sleeping in two-bedded cubicles with inadequate privacy, heating, and sanitary arrangements. The vast wards keep them occupied in domestic work for a large part of their day. There are no social or cultural amenities, and no transport to the station; and no attempt is made to compensate nurses for the cost of taxis and train fares to London, or to adjust their pay so that it is comparable, when such expenses are paid, with that of their colleagues in the parent hospital, where they too were accepted for training.

It is new for nurses to be articulate about their conditions, and it is of course inconceivable that they should resort to the strike as a weapon; but for that very reason they should not be exploited. Doctors could press for the block system of training; and by their manners and general attitude could acknowledge nursing to be not an ancillary but a complementary profession to medicine. We do not, of course, forget or fail to appreciate the many doctors who have been good friends of the nursing profession and faithfully served its interests in training schools and on committees.

A SISTER-TUTOR.

BODILY CHANGES DURING ABREACTION

SIR,—An alleged example of somatisation during abreaction was described by Dr. Moody in your issue of Dec. 28. In 1934 the patient, who was suffering from somnambulism with aggressive behaviour, had had his hands tied behind his back during sleep, as a precaution. On waking in a dissociated state he had tried unsuccessfully to free his hands. In 1944 this incident was abreacted under narcosis, when indentations resembling rope marks appeared on his forearms.

The detail given is insufficient to exclude the possibility that these marks were produced mechanically. Since the patient was under constant observation he might not have been able to use a rope; but marks resembling rope marks can be made by tightly pulled folds of cloth. The patient is said to have tossed and turned on the couch with his hands behind his back. If he was wearing sleeves, could he not have pulled them tightly round his arms without intending trickery? Folds of a sheet could also be used to make marks like those made by a rope. These possibilities are not mentioned in the account of the case.

St. Benedict's Hospital, London, S.W.17.

M. WALKER.

THE COST OF MEDICAL TRAINING

SIR,—Among other matters to be discussed with the Minister of Health about the new health service should be the cost of medical education. It is generally admitted that the sons and daughters of doctors are peculiarly fitted to follow their parents' profession, and it is anticipated (rightly or wrongly) that there will be a general reduction in the income of general practitioners, as well as a loss of capital associated with loss of the right to buy and sell practices. It is already a great financial strain on a doctor to educate his children at a university, and, unless the Government is prepared, at this stage, to express the intention of financing the medical education of suitable entrants there will be great reluctance on the part of general practitioners to enter the new service. We are not suggesting, of course, that such grants should be limited to the children of doctors; they should be open to all suitable candidates.

The Goodenough Committee reported that in the years preceding the war about £700,000 was paid to university medical schools by the University Grants Committee and local authorities. But local support to students is obviously unequally distributed in different areas, some local authorities giving very little to any university students; and medical students as such have very few special scholarships allocated to them. Many local authorities

confine their grants to students from the authority's secondary schools. Unless there is a national scheme providing equal and adequate grants there will be an added difficulty in obtaining doctors to work in areas where their children's future is likely to be handicapped by poor educational facilities.

TREVOR HUGHES
ENID HUGHES.

Ruthin.

LYMPHOGRANULOMA VENEREUM

SIR,—Dr. W. E. Coutts (Dec. 14) gives some very interesting information on this subject. He appears to suspect that this disease, together with Castellani's "endemic funiculitis," is related to the condition that I described in 1941 as idiopathic thrombophlebitis, in that they are all due to the same virus. His reasoning seems to be on the following lines. The patients with thrombophlebitis observed by Lieut.-Colonel Manson-Bahr and Dr. Charters (Sept. 7) nearly all had venereal disease; and their findings pointed to a virus infection. Therefore the virus is probably that of lymphogranuloma venereum, which he believes to be associated with thrombosis of the spermatic veins, the thrombosis in these two types of cases indicating a common causation.

In my opinion Dr. Coutts's inference must be rejected for the following reasons:

1. In Manson-Bahr and Charters's series the outbreak may have been due to transmission of an as yet unknown virus by syringe infection, as with infective hepatitis. All the patients were askari, and were almost certainly under treatment.

2. I have seen more than two hundred cases of thrombophlebitis, or tropical phlebitis as I prefer to call it, and in none of these was there clinical evidence of lymphogranuloma venereum. In the few European cases I have on record this condition could be definitely excluded.

3. Thrombosis is a complication of many unrelated diseases and one cannot infer a causal relationship on this ground alone.

I think Dr. Coutts will agree to the unique character of the lesion when he reads Dr. Lendrum's description of it in a paper which should appear during the summer.

Luanshya, Northern Rhodesia.

A. C. FISHER.

THE OUTLOOK FOR PHYSIOLOGY

SIR,—In his interesting lecture of Jan. 18 Prof. Lovatt Evans touches indirectly on two points that seem to me to demand further consideration. First, why is not a preliminary course in pathology given to preclinical students in the London hospitals as it is given to those at Oxford and Cambridge? To arrive in the ward knowing a few rudiments of disease processes must be a distinct advantage to the new clinical student. Secondly, why is pharmacology taught so early instead of being left to the period of clinical instruction? I submit that it is putting the cart before the horse to attend, for example, a lecture on the action of digitalis before one has ever entered a medical ward and seen its effects on auricular fibrillation.

In short, is not pathology taught too late in the curriculum and pharmacology too early?

J. B. GURNEY SMITH.

STAMMERING AND HANDEDNESS

SIR,—In view of racial differences in the incidence of stammering and the fact that I have not been able to find any published report of its incidence in Greece, I examined 1133 pupils of the Greek elementary schools of Nicosia, Cyprus; 574 girls and 559 boys between the ages of seven and fourteen years. There were 21 cases of stammering (1.85%): 5 girls (0.44% of the total children and 0.87% of the girls) and 16 boys (1.41% of the total children and 2.85% of the boys). The sex-incidence of stammering was 3 boys to 1 girl (16 to 5). Among these 21 stammerers 5 were left-handed. Not one of the right-handed stammerers gave evidence of left-handed tendencies. Among the non-stammerers 48 (4.2% of the total school population) were left-handed. They fell into three groups as follows: left-hand writers 9, ambidextrous writers 6, and right-hand writers with characteristics of left-handedness 33. There was no history of physical trauma or infectious disease as a precipitating factor in the stammerers.

From the average ages of their respective classes and from their teachers' reports the standard of intelligence of the stammerers was assessed as follows:

Above average	5 cases
Average	5 "
Below average	11 "

The tendency to stammer appeared in all cases on attempting to pronounce *k*, *p*, *t*, and *f*; and in about a third of the cases stammering was caused on trying to pronounce *i* (with no consonant preceding or following), *v*, *m*, *l*, and *s*. By palpation of the epigastrium I found clonic and tonic spasms of the diaphragm in 14 cases. Other respiratory disturbances which I observed were reading and speaking during inspiration in 15 cases, hoarseness in 3, and shallow inspiration in 20. When the children read in unison with others, the stammering disappeared in 18 cases and diminished in 5. Tonic spasm of the lips was observed in 5 cases, movements of deglutition in 5, and movements of the whole body in 3, during reading and speaking.

All these investigations were made in the presence of normal pupils, in the usual atmosphere of the school-child. The teachers confirmed that all the children who stammered during investigation were stammerers in normal school life.

The incidence of stammering in these Greek-speaking Cypriot children (1.85%) is higher than in other European countries (Belgium 1.4%, Hungary 1.02%, Sweden 0.8%-1.0%) and in U.S.A. (0.87%). This finding contradicts the belief that the incidence of stammering is higher in races with a high cephalic index than in those with a low index, because in Greeks the cephalic index is low (Stephanos 1884, Gedeon 1931). Probably the differences in incidence of stammering among different nations are due to racial factors or to the difficulty in pronunciation of their languages. Thus, according to many investigators, stammering is unknown among the Chinese, whose language consists of monosyllables.

Nadoleczny (1926) found that the sex-incidence of stammering was 74 boys to 26 girls (3 to 1). My observations confirm this.

Travis (1931) reported many cases in which the stammering appeared as a sequel to the change of handedness; but in the present investigation 33 out of 53 left-handed children were at the beginning of their school life left-hand writers and changed to right-hand writers after training, without the slightest manifestation of stammering. This accords with the opinion of Seth and Guthrie (1935). However, there is a relationship between stammering and left-handedness, because the incidence of stammerers among these left-handed school-children (5 out of 53) is about ten times higher than among the right-handed pupils (1.5%). The explanation seems to be that left-handedness and stammering are two different manifestations which appear in a nervous child, neither of them causing the other.

Gutzmann (1928) found stammering in near relations of the stammerers in 26.8% of his cases, whereas Lampadarios (1923) reported 38.7%. I found it in 4 of my 21 cases; but in these cases the stammerer was in contact with a stammering relation (more often the father than the mother). So, possibly, stammering may be imitative rather than hereditary.

According to Seth and Guthrie (1935) the stammering occurs at all levels of intelligence but much more frequently among mentally retarded children. This statement accords with my observation that 11 of the 21 stammerers were of subnormal intelligence.

I wish to thank Dr. T. Dervis, O.B.E., chairman of the school committee of Nicosia, for permission to publish this letter.

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Nicosia, Cyprus.

KYROS CHRYSANTHIS.

VARICOSE VEINS

SIR,—I agree with Dr. Rowden Foote that varicose veins are a national problem. The figures in his letter of Jan. 11—the first figures, I think, published in this country—are startling: 5 million people in Britain incapacitated in some degree by a condition which in a large proportion of cases can be cured in a fortnight!

In these days of national drive for maximum production it is essential that this treatment be available. As Dr. Foote says, it is not realised that 1 in every 4 women over forty-five has varicose veins. (The proportion is not so high in men.) In the present state of the country, here is another opportunity for our profession to render a signal national service. These patients can be operated on and out of hospital in 48 hours, and back at work in a fortnight.

It seems to me that it is the duty of surgeons to show our profession that this is a fact, and to be ready to organise the necessary clinics for the diagnosis and the treatment. I suggest that the first step is for our teaching hospitals to set up separate departments for varicose veins and their complications in order to train men in their three aspects—medical (constitutional conditions such as anaemias, oedemas, and diabetes), dermatological (many patients first come to hospital with itching, dermatitis, eczema, and ulceration), and finally surgical, for the operations, injections, and various bandages.

When enough men are trained in this triple specialty, the other hospitals (or possibly the Minister of Health) can institute clinics staffed by this new type of specialist. Beds can be turned over three times a week (e.g., admission Sunday afternoon, operation Monday, discharge Tuesday noon, and repeat twice by Saturday noon). The treatment of varicose veins should not be relegated to the outpatient department or to the junior staff, but should be upgraded.

London, W.1.

HAROLD DODD.

SOLUBLE SULPHONAMIDE COMPOUNDS

SIR,—In his letter of Jan. 4 Dr. Banks discusses the advantages of a soluble, neutral (and therefore non-irritant) sulphonamide. May we observe that 'Albucid Soluble' (30% solution for intravenous injection) we present such a preparation? A solution of the sodium salt of sulphacetamide, this has a pH of about 7.4, and is thus non-irritant to the tissues. The high solubility and neutrality of buffered solutions of soluble sulphacetamide explain their efficacy in eye infections and inflammation of mucous membranes. When administered systemically, sulphacetamide has not so wide a range of therapeutic activity as several other sulphonamides, but its potency in some infections (e.g., *B. coli* infection of the urinary tract) has been established.

London, W.1.

BRITISH SCHERING LTD.

EX-SERVICE ADMINISTRATORS

SIR,—The note of warning from your peripatetic correspondent of Dec. 7 is all too timely, and is emphasised by the news that a number of members of the Indian Medical Service will not continue to serve under the new Indian Constitution. Every private sympathy will be felt for our colleagues who have had planned careers upset by events beyond their control. Unfortunately, they will be returning to this country at a time when the policy of the land is to recruit a large number of medical administrators. Willy-nilly, the older men must be regarded as potential Bevan-fodder as Senior Officers Used to Handling Men.

As long ago as 1943 the talk of senior officers in the Services was of a Nice Little Job in the State Medical Service to eke out their pensions: now, in addition, comes the indication that in some things the leisurely gait of the Indian scene may colour our lives. For the demobbed the picture is familiar: the old reverence for red tape, the inevitable ignorance of conditions of general practice in this country, and (in many cases) the lack of opportunity for recent clinical experience is likely to give us a cautious and uninspiring administrative framework calculated to discourage and destroy any attempt to produce a wholly civilian service of a new and different kind.

Apart from the unsuitability of the senior officer from the Service medical departments for the responsibility of administering a civilian medical organisation, it is well to inquire into the threat to the economic standards of the civilian medical practitioner. Retired officers are already in receipt of a pension designed to provide a suitable standard of living without other resources. This being so, their employment in the National Health Service, where they must inevitably act as a reservoir of cheap medical man-power, may be used by the Treasury as a lever to impose a lower scale of salaries on those of us who have to work for our living, and who need an appropriate rate of pay.

BURMA STAR.

SERVICE AND FREEDOM

SIR,—As it is often stated nowadays that in a Government service the independence of doctors must be crushed, their enthusiasm damped, and their merits ground down to a level of dull mediocrity, it is well to cite a few examples of the contrary.

Membership of the Indian Medical Service did not prevent A from bringing to the notice of the nearest military authority a glaring example of the suffering of the sick and wounded in Mesopotamia; nor did the threat of arrest by that authority stop him from neglecting all proper channels and going direct to a civilian who could and did take action that led to the appointment of the Mesopotamia Commission. That commission closed a black chapter in the history of the medical services, and laid foundations on which Maude and Marshall were able later to build their victories.

Nor did service in the I.M.S. prevent B from protest against a Government demand that he should operate on Mr. Gandhi in gaol—a protest so unanswerable that he was allowed to take Mr. Gandhi out of the gaol into his hospital.

If A and B did feel the curb, their independence had certainly not been crushed.

A Government service which, from an establishment of about seven hundred officers, produces three presidents of the Royal Society of Tropical Medicine and Hygiene, each of them a F.R.S., cannot be fairly accused of grinding its officers' merits down to a level of dull mediocrity. That one of these three embarked, as the cynics said, on the search for a third pension, but in fact upon a difficult and fruitful research into one of the long-hidden secrets of malaria, at an age when many are embarking for another, less fortunate, voyage, shows that Government service, even when prolonged far beyond the normal span, need not damp enthusiasm.

That stupid formality—I will not say stiff and starched, for his shirt was both—is inseparable from Government service is also a common statement, which my interview with the director-general, I.M.S., when seeking a commission, does not support. When he received me, the D.G.'s dress was a shirt and sock-suspenders; socks and trousers were added during the interview. Before his braces had been buttoned on to his trousers the D.G. said: "I'll have a wire sent telling you where and when to report." I'm pretty sure I have got the timing right, because he certainly had not put on his waistcoat before he shook hands and said goodbye.

This calls to mind a more historic incident, during the Indian Mutiny, when a young officer came without his sword to call on Sir Colin Campbell. Sir Colin, dressed in a towel, greeted him with, "Damn it, sir, you may come without your trousers, but you shall wear your sword." An incident which suggests that, even in those days of stocks and pipeclay, red tape had a high coefficient of elasticity.

Edinburgh.

J. B. DE W. MOLONY.

TREATMENT OF TUBERCULOSIS

SIR,—I have no desire to enter into a discussion on the merits of amphetamine or as to whether the teachings of Trudeau and Marcus Paterson obtain better results than are achieved by surgical interference. It frightens me, however, to think what emphasis may be placed by tuberculous patients, some doctors, and perhaps the lay press on the utterance of a distinguished radiologist when he says (for the second time): "We also know that by far the greater majority of the people who contract tuberculosis recover from it without the disease

being specifically treated or even recognised except by chance or mass radiography . . ."

Over many years, my patients have died of tuberculosis or, with treatment, partially or wholly recovered. Some, I am sure, recover on their own; but what multitudes fail in this and enter hospital too late to receive material assistance. Can Dr. Brailsford (Feb. 8) be thinking of phthisis (i.e., postprimary progressive tuberculosis of the lung)? If so, and if he can produce evidence for his statement, how eager we should be to have it.

But I suspect that by "the people who contract tuberculosis," he means the very many who undergo a primary infection and in most instances recover from it, except for the hard mineral elements which he is able to see in his X-ray photographs. If so, I believe, with respect, that he should by saying so avoid doing a disservice to this particular cause.

Colindale Hospital, London, N.W.9.

J. V. HURFORD.

BOVINE PLASMA FOR TRANSFUSION

SIR,—I should like to reply to your annotation on bovine plasma¹ and the letters of Mr. Edwards² and Mr. Hughes.³

Colloid Osmotic Pressure.—Your annotation suggests that the osmotic pressure of prepared calf plasma (P.C.P.) is less than that of human plasma. With this Mr. Edwards agrees, stating that calf serum when heated to 100° C exerts none, while Mr. Hughes thinks that heating will increase the osmotic pressure. Through lack of suitable apparatus I have been unable to follow the changes in osmotic pressure during the preparation of P.C.P.: clinically, P.C.P. seems to exert sufficient osmotic pressure to remain within the vessels, and its administration in hypoproteinæmic oedema is followed by diuresis. I do not doubt Mr. Edwards's statement that plasma treated by his method and heated to 100° C loses its osmotic pressure,⁴ but my method differs from his in the amounts of formol and ammonia added. It would be interesting if his experiments were repeated using my method of preparation.

Antigenic Properties.—From Mr. Edwards's letter and paper, heating to 100° C appears unnecessary, since agglutinins and hæmolysins are inactivated at 72° C. This is agreed, but some antigenic properties are retained after heating at this temperature. With formalised calf serum heated only at 72° C it is possible to induce fatal anaphylactic shock in guineapigs, and to bring about anaphylactic reactions in man. Mr. Edwards does not report any anaphylactic accidents in his cases receiving despeciated bovine serum. I attribute this finding to the fact that few of his patients received more than one transfusion of his bovine serum. Had he been treating, instead of surgical cases, patients suffering, for example, from nephrosis or hepatic cirrhosis and requiring repeated transfusions at intervals of 5–7 days, he might have observed typical anaphylactic crises, and obtained positive Prausnitz-Küstner tests.

I have evidence which suggests that my method may not entirely preclude the possibility of an occasional reaction in man to P.C.P., but I am certain that, while hypersensitiveness to repeated injections of bovine plasma heated only to 72° C is frequent, more than 1000 ampoules of P.C.P., many of them given at intervals to the same patients, have never produced a reaction of an undoubtedly anaphylactic nature: one reaction studied by me was due to sensitiveness to formol. I thus feel justified in stating that P.C.P. is not antigenic.

Fate of P.C.P.—I do not know the fate of P.C.P. in the body. Occasionally slight albuminuria (sulphosalicylic acid test), lasting a few days, has been seen after its administration. I consider it probable that most of it is metabolised in the body, and I hope to investigate this problem.

Toxicity.—Mr. Hughes adds to the criterion "non-toxic" a further criterion, the absence of the syndrome attributed to macromolecular substances such as gum-acacia. I have not investigated this point. I can only

1. *Lancet*, 1946, ii, 355.

2. Edwards, F. R. *Ibid.*, p. 437.

3. Hughes, R. A. *Ibid.*, p. 579.

4. Edwards, F. R. *Brit. med. J.* 1944, i, 73.

5. Gutfreund, H., Ogston, A. G. *Biochem. J.* 1945, 39, 186.

say that children, who have received multiple transfusions of P.C.P., have recovered uneventfully,⁶ and that rabbits, given repeated injections of P.C.P. (10 c.c.m./kg.) over many months at intervals of 5-7 days, have remained in normal health. The production, in these rabbits, of antibodies to injected red cells from *Macacus rhesus* was unimpaired.

Animal Plasma as a Substitute for Human Plasma.—I consider too ambitious the suggestion in your annotation that an acceptable plasma substitute must be as innocuous and as effective as plasma itself. A substitute is never as good as the real thing. I do not expect P.C.P. to eliminate the use of human plasma, although, because of its cheapness and ease of preparation, this might happen if it proved also to have as good a therapeutic action as human plasma, but I think that it can be of great value to doctors in those countries where there are no transfusion services.

Barcelona.

J. H. MASSONS.

PERSPEX SPECIMEN-BOXES

SIR,—We have been using 'Perspex' sheets to make containers for museum specimens for about a year, with the same good results as Mr. Fatti (Feb. 1). We are using a 7% solution of perspex in chloroform as cement for gluing the sides. The specimen, after fixation, is stitched on to a seventh sheet of perspex, about the same size as the side of the box, and to perspex struts glued on to this sheet in appropriate places. Straps of perspex bent in hot water or over a bunsen burner into the desired shape will often keep specimens in position without stitching. If the stitches and perspex straps are judiciously placed the threads are invisible in the mounted specimen. For small containers 2 mm. sheeting is used; for larger containers 4 mm. sheeting has been found more suitable.

Our chief technician, Mr. A. C. Dawkins, has developed this method, which has proved both economical and highly satisfactory.

Alder Hey Emergency Hospital,
Liverpool, 12.H. LEDERER
Pathologist.

MEDICAL ASPECTS OF MARRIAGE GUIDANCE

SIR,—A serious deterrent to free discussion of sex matters in marriage between doctor and prospective entrants, except of the more educated classes, is the candidates' ignorance of simple anatomical and physiological terms. Whatever may be the Old Kent Road's equivalents of "vagina" or "orgasm" the inhabitants, especially the women, are shy of using them to the doctor.

In America marriage-guidance workers start by establishing a vocabulary of terms, the use of which relieves both sides of embarrassment; simple line drawings are also helpful. It is better for the applicants for guidance to spend a little time learning a few words and facts than for the doctor to try to work with slang words which may be unfamiliar to the more "genteel" oases of Walworth.

Wokingham, Berks.

W. C. FOWLER.

MUMPS VIRUS

SIR,—Dr. McNicholl (Feb. 1) reports 2 cases of infective hepatitis following mumps.

After an epidemic of infective hepatitis in Gloucestershire in 1943, I drew attention to the association of infective hepatitis with an outbreak of stomatitis in a residential nursery.¹ In the past other epidemics have been associated with certain nasopharyngeal conditions, Glover and Wilson² describe an outbreak associated with sore throats, and McFarlan³ records an outbreak associated with measles.

In these circumstances I am very doubtful whether the virus of epidemic parotitis can reasonably be held responsible for both conditions.

Hereford.

J. S. COOKSON.

6. Ramos, R., Oppenheimer, W. *Rev. espan. pediat.* 1946, 2, 162.1. Cookson, J. S. *Brit. med. J.* 1944, i, 687.2. Glover, J. A., Wilson, J. *Lancet*, 1931, i, 722.3. McFarlan, A. M. *Publ. Hlth, Lond.* 1941, 55, 56.

SUPRASPINATUS SYNDROME

SIR,—Commenting on Mr. Armstrong's article (Jan. 18), Dr. Mayer (Feb. 1) remarks on the "almost uniform failure of ordinary conservative measures in cases with calcified deposits in the region of the supraspinatus tendon." My experience has been that these calcified deposits tend to disappear; I have yet to see one that does not respond to conservative treatment, and I would refer Dr. Mayer to an article by me in *Rheumatism* of April, 1946. Recently I have seen a case with massive calcification which had been treated with X rays without diminution of the deposit, which subsequently disappeared with repeated needling and infiltration with procaine.

Dr. Mayer might also be interested in Mr. Moseley's recent American monograph on *Shoulder Lesions*, in which he so aptly points out that "treatment of calcified deposits as in the case of so many other medical conditions depends largely on who controls the care of the patient and the conditions of practice under which that medical man works."

Redhill.

L. J. BARFORD.

Obituary

ARTHUR WHITFIELD

M.D. LOND., F.R.C.P.

IN contemporary dermatology no name was more respected in this country than that of Arthur Whitfield, who died on Jan. 31 at the age of 78.

He was essentially a King's man, in that his early education at King's College School was followed by study at King's College Hospital, where he was to complete his life's work as physician in charge of the skin department. After qualifying in 1890 he held appointments as house-physician and medical registrar at his own hospital over a period of three years. During this time he took the London M.D. and the M.R.C.P. There followed a period of study in Berlin and Vienna before he returned to the staff of the West London Hospital as an assistant physician. At that time it was usual for the skin cases to be seen by one or other of the general physicians or surgeons attached to a hospital, and a special dermatological department was almost unknown. Whitfield felt that this state of affairs could only be changed by demonstrating the importance of his subject. At the Royal Northern Hospital he was appointed dermatologist, and when he left for King's College Hospital in 1899 it was to fill the post of assistant physician with charge of the skin department. In 1905 he was elected to the fellowship of the Royal College of Physicians of London and a year later he became professor of dermatology at King's College.

The year 1908 saw the publication of his work on the causative rôle of fungi in the disease now officially designated tinea pedis. This article appeared in *The Lancet* and its date is important because it was not until two years later that Sabouraud published similar findings. Whitfield's name is of course associated mostly with this discovery and with the ointment which he later devised for treatment of the disease. But recognition of this fungus was no happy chance; it was the result of a habit of systematic microscopical examination which came of his general interest in the bacteriology and mycology of the skin. His observations on fungus infections of the feet were expanded in a paper in the *British Journal of Dermatology* in February, 1911, and at the Royal Society of Medicine in December of the same year. In 1913, stimulated by Almroth Wright's work, he opened a discussion in the dermatological section of the International Congress of Medicine on vaccine therapy in skin diseases, and in 1922 he was writing on sensitiveness to non-bacterial toxins and proteins. His work over many years on fungus infections in animals and their transmission to man was summed up in a paper at the Royal Society of Medicine in 1931. For the treatment of ringworm of the scalp he had been one of the pioneers of X-ray epilation. His views on the bacteriology of acne were set out in the *British Journal of Dermatology*

in 1934. On the histological side he produced noteworthy work on naevocarcinoma and on Paget's disease. Other useful contributions included his papers on erythema induratum, in which he discussed cases of this disease in middle-aged persons, his findings, with G. A. Harrison, on xanthomatosis, and his study of the Fox-Fordyce syndrome. Always looking out for something new, he demonstrated a form of impetigo due to *Demodex folliculorum*, and another form of dermatitis which he termed dermatitis colonica, and which he attributed to toxic absorption from the bowel.

Other appointments which came to Whitfield were those of professor of dermatology at the Royal Army Medical College, and dermatologist to St. Dunstan's. He was Lumleian lecturer at the Royal College of Physicians in 1921 and served as a councillor during the three following years. Both the French and Hungarian societies of dermatology elected him a corresponding member. Presidency of the section of dermatology of the Royal Society of Medicine in 1919-21 was followed by work as honorary secretary of the British Association of Dermatology and Syphilology in 1924 and as president of that body in 1927.

During all these years his energy and enthusiasm never flagged, despite a chronic and painful infirmity which often made movement difficult. This had undoubtedly been aggravated by his labours during the 1914-18 war when he helped his hospital by acting as general physician in charge of outpatients. This in addition to his appointment to the Prince of Wales Hospital for Officers, and evenings spent looking after the general practice of a great friend who had joined the Army.

"It is difficult," writes a colleague, "to name any one feature of his character as dominant, but unselfishness was one of his most prominent reactions to life. No trouble was too great to take when he found an enthusiastic class. Often his demonstrations were crowded by the presence of postgraduates from the Dominions and Colonies. To them he revealed the secret of his own success, for his first rule insisted on close and complete examination of the patient. With 'old patients' he was equally scrupulous, re-examining them time and again and always searching for new evidence which might modify his previous views.

"His wide knowledge of numerous subjects was a source of wonder to those listening to his expositions. The allied sciences were always studied carefully, and often he would suggest the wisdom of reading such-and-such a book on physical chemistry or on botany. The latter was perhaps his favourite hobby, and he spent many happy days as a practical gardener at his home in Beaconsfield. He was a good lawn-tennis player in his earlier life, and later enjoyed golf. But even in these games he was always questing for some physiological or anatomical or psychological reason for skill or lack of it."

Dr. Whitfield married Margaret, daughter of the late Charles Tuttle, of Rochester, N.Y., and she survives him. They had a son and two daughters.

RICHARD EAGER

O.B.E., M.D. ABERD.

Dr. Richard Eager, who died on Feb. 2, was born in June, 1881, near Ipswich, where his father was medical superintendent of St. Audrey's Mental Hospital. He was destined to follow in his father's footsteps, like him graduating at Aberdeen University and taking up a career as a psychiatrist. He took his M.B. in 1905 and his M.D. in 1912.

During the 1914-18 war he was a major in the R.A.M.C. and did important work at various neurological military hospitals on the psychological effects of head injury. He contributed various articles on the subject to the medical press, and their value was recognised when he was honoured with the O.B.E. In 1919 he returned to the Devon Mental Hospital where he had been an assistant medical officer since 1906. His war service had meant much to him and added a great deal to his professional knowledge, so that he was well equipped in 1922 to follow Dr. A. Davis as medical superintendent at Exminster.

As the head of a large hospital Eager showed his ability as clinician and administrator. His one passion was the welfare of his patients; it was both his career and his hobby, and nothing was allowed to stand in the way of what he considered was due to his patients. He set about modernising the hospital, equipping it with up-to-date plant and all that was needed to make it an efficient unit. This involved hard work and long hours, but he was doing what he wanted to do, and that for him was satisfaction enough. He was a pioneer in rehabilitation along the lines of occupational therapy, and he made his hospital one of the best-known for enlightened treatment. He was alive to the need for the early treatment of mental illness and believed that psychotherapy should be taken to the patients outside the hospital. Hence his keen interest in outpatient clinics and the establishment of one in the city of Exeter at a time when they were few and far between in the country. His passion for efficiency was manifested also in his desire for a highly trained nursing staff, and to this end he published his well-known *Hints to Probationer Nurses in Mental Hospitals*.

Eager spent fourteen years as a medical superintendent, every one of which was marked by his enthusiasm; so when he retired in 1936 as a comparatively young man it was inevitable that he should continue his life work in a private capacity. He joined the staff of the Royal Devon and Exeter Hospital as their first consultant in psychiatry, and built up a practice round his outpatient clinic. He retired only a few months ago.

Richard Eager had a forceful personality and a warm-hearted appreciation of his fellow men. He was kindly and obliging, especially to the young, whom he delighted to help. He was a popular superintendent, for he was fair and not afraid to champion the under-dog. His great characteristics were conscientiousness and tenacity of purpose. He carried out his schemes to their logical conclusions and nothing would turn him aside once he had set his heart on a certain line of conduct.

He loved good company and he will be missed by a large circle of friends who knew his quiet sense of humour.

He is survived by his widow, a son, and a daughter.

S. M. A.

RUDOLF JAKSCH

M.D. PRAGUE

Prof. Rudolf Jaksch, who died on Jan. 8 at the age of 91, belonged to the company of medical eponymists, for through his classical description of infantile pseudoleukemia published in the *Wiener Klinische Wochenschrift* in 1889 this condition became known as von Jaksch's disease. English readers will also recall his *Clinical Diagnosis*, which was translated from the sixth German edition in 1907.

Born in Prague, he was educated there and at Strasbourg, and after taking his medical degree in 1878 he held junior hospital appointments at Prague and Vienna till he was appointed privatdozent at Vienna in 1883. Four years later he was called to Graz as professor extraordinary for children's diseases. In 1889 he returned to Prague as professor and director of the second medical clinic at the German university, and he held this post till he retired in 1925. His interests in medicine outside pædiatrics were linked with medical chemistry, and he published important papers on the chemistry of the blood and urine. After the first world war he dropped his hereditary title of Ritter von Wartenhorst.

DR. EDITH GHOSH

"Amid the horrors of the famine of 1943 in Calcutta," writes H. I. W., "Dr. Ghosh's house was a haven of solace and culture. Many British Servicemen, including myself, used to go weekly to meet friends and to hear glorious music. She never asked questions about us, but was always a gracious, friendly, and unassuming hostess. Most of us knew little more of her than this—that she realised the difficulties of life for us at the time, and did what she could to lighten the weight of those heavy days."

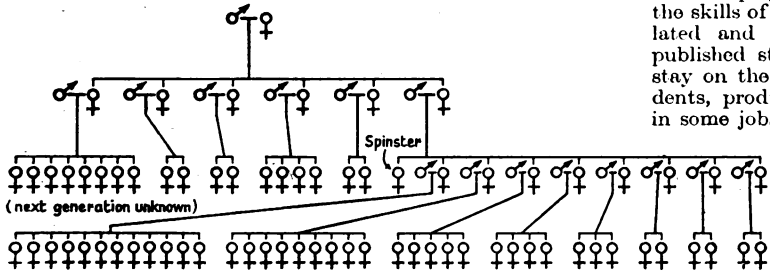
Notes and News

LADY TATA MEMORIAL TRUST

THE trustees of the fund invite applications for grants and scholarships for research in diseases of the blood, with special reference to leukaemia, in the academic year beginning on Oct. 1, 1947. Grants of variable amount are made for research expenses or to provide scientific assistants to senior workers. Scholarships are awarded as personal remuneration: their normal value has been £400 per annum for whole-time research, with proportionate adjustment for work on a part-time basis, where this has been approved. The grants and scholarships are open to workers of any nationality, and in any country in which it will be possible to make payments in the coming academic year. Applications must be submitted before March 31, 1947, and the awards will be announced in June. Further particulars and forms of application may be obtained from the secretary of the scientific advisory committee, c/o Medical Research Council, 38, Old Queen Street, London, S.W.1.

MONSTROUS REGIMENT OF WOMEN

THE sex-ratio in man is about 104 males to 100 females; but this figure naturally prevails only on a statistical plane. Small families commonly consist of sibs of one sex, possibly for a couple of generations or so, merely from chance. But Lienhart and Vermelin¹ have reported a French family in which 72 pregnancies produced 72 daughters in three generations. The genealogical table is incomplete, F3 not having been fully worked out (see figure). It is suggested that this is



72 pregnancies producing 72 daughters in three generations.

an instance of inheritance of an abnormality transmitted through the females, especially since none of the 15 husbands was consanguineous. But what is the abnormality? The first suggestion is that a lethal gene killed the male embryos at a very early stage (there is no history of abortion in the family); but this hypothesis is unlikely to explain the entirely female character of F2 and F3 (so far as it has been worked out). A second explanation is that the secretion of the genital passages or the constitution of the ovum is such as to cause death of spermatozoa carrying male sex. An experiment by Lienhart² seems to support this view. He treated rabbits' testes with X rays, with the result that the descendants were all does, suggesting that the Y chromosomes had been killed by irradiation. A third explanation may be based on work done by Vandell³ on a species of crustacea (trichoniscus), some of which produce only males, others only females, and others both sexes. L'Héritier and Teissier,⁴ working on drosophila, suggested that under certain experimental conditions the ova carried a "genoid" (F), which determined female sex. Consequently all the ova of the treated flies carried X (F), with the result that both the XX (F) and XY (F) gametes produced females. In the next generation an XY (F) female drosophila would produce two types of ova: X (F) and Y (F), the latter not being viable.

It is well known that when both parents have a sex-linked abnormality all the children inherit it. But in the present family it is unlikely that the 15 non-consanguineous husbands had the same sex-linked abnormality as the great-grandmother. Haldane⁵ has described *partially sex-linked inherited*

characters, in which there is a strong tendency for all males to be abnormal and all females normal, or vice versa. In the present family all the gametes determining male sex might be so abnormal as to be non-viable. Haldane considered that the X chromosomes had two parts: one determining sex and carrying genes determining the recognised sex-linked characters, such as haemophilia; and the other carrying the partially sex-linked characters, such as retinitis pigmentosa. One can imagine a further abnormality, so carried, preventing viability.

THE DISABLED IN AMERICA

IN view of the recent report of our own care of the disabled¹ it is interesting to see how Americans are tackling the same problems. The rate of employment of physically disabled in the United States has more than doubled in the year since a campaign was started to make all these handicapped people self-supporting. In October, 1945, an Employ the Physically Handicapped Week was founded by Act of Congress to advertise the campaign, and last year a second week of the kind was held. There are some 28 million people in the United States disabled by disease, accident, or war, of whom about 2 million received their injuries in the recent conflict. It has been estimated that 1 in 7 of the male working population is disabled to an extent requiring vocational reablement or special placing. The Act establishing the national "week" invites the participation of governors of States, mayors of cities, heads of government departments, as well as leaders of farming, scientific, professional, and other organisations. Ninety organisations of national scope, with membership ranging from a few thousand to several millions, are co-operating in the drive to employ the disabled. The U.S. Employment Service maintains 1800 local offices, where the skills of the handicapped and the jobs available are tabulated and matched. The Civil Service Commission has published studies showing that the physically handicapped stay on the job better than others, have fewer serious accidents, produce with determination, expect no favours, and in some jobs are more efficient than people without physical defects. The commission's "Operations Manual for the Placement of the Physically Handicapped" is widely distributed, and during one week each year publicity devices are used to carry the significant facts home to the employer.

This government-sponsored campaign has been a greater success than was at first expected. During October, 1945, the first month of the campaign, some 11,000 handicapped people were employed; and in August of last year nearly 20,000 found work. Some 85% of the handicapped now being employed served in the recent war.

INTESTINAL EXPLOSIONS

IT has long been known that the alimentary tract can produce explosive gas. Beatson¹ and McNaught² each mentioned a case in which a man's breath caught fire on blowing out a match, and Martin³ and East⁴ each reported a case in which a man belched while lighting his tobacco and singed his whiskers. The experimental ignition of flatus has also been practised. It is not surprising, therefore, that surgical electrical instruments have caused explosions within the intestinal canal. Lieberman⁵ reported a case of explosion of intestinal gas during diathermy of a rectal polyp; and last year Moutier⁶ reported to the Société de Gastro-entérologie de Paris that, as he was starting to perform an intrarectal electrocoagulation, and though he had taken the precaution of plugging the rectosigmoid junction, there was an explosion which caused the patient to collapse and gave her hiccups for a quarter of an hour. There was no tenderness of the rectum and no abdominal rigidity. Laparotomy two hours later revealed an extensive ecchymosis at the rectosigmoid junction. The patient recovered without sequelae. In the discussion which followed, suggestions were made that, in such operations, the intestinal gases should first be aspirated, and that an improvement in design of the instruments should eliminate the risk of sparks. It was stated that a legal judgment had

1. Lienhart, R., Vermelin, H. *C.R. Soc. Biol. Paris*, 1946, **140**, 537.
 2. Lienhart, R. *Ibid.*, 1938, **127**, 301.
 3. Vandell. *C.R. Acad. Sci., Paris*, 1939, **208**, 1682; 1940, **210**, 550.
 4. L'Héritier, Teissier. *Publ. Lab. Ecole norm. sup., Zool.* 1945, **1**, 35.
 5. Haldane, J. B. S. *Ann. Eugen., Camb.* 1936, **7**, 28 (cited by Cockayne, E. A. *British Encyclopaedia of Medical Practice*, London, 1937, vol. vi, p. 452).

1. See *Lancet*, 1946, ii, 839.
 2. Beatson, G. T. *Brit. med. J.* 1886, **1**, 295.
 3. McNaught, J. *Ibid.* 1890, **1**, 470.
 4. Martin, A. A. *Lancet*, 1902, ii, 991.
 5. East, T. *Ibid.* 1934, ii, 252.
 6. Lieberman, W. *Rev. Gastroenterol.* 1944, **11**, 259.
 6. *Pr. méd.* Oct. 12, 1946, p. 670.

previously been made in a similar case, the verdict going against the surgeon, and that therefore the patient or relations ought to be warned of the risk. It was also said that the explosive gas was not methane but a mixture of hydrogen and oxygen. In McNaught's² case the gas from the stomach was found, on analysis, to contain hydrogen 28%, air 9.2%, carbon dioxide 56%, and methane 6.8%.

Explosions can also take place inside the bladder. Kretschmer⁷ and Hambleton et al.⁸ have reported their occurrence during transurethral electroresection.

MORELL MACKENZIE

Mr. Scott Stevenson's book on the late Sir Morell Mackenzie¹ deals almost entirely with controversies centring on his treatment of the Emperor Frederick III of Prussia. He professes to give an authentic account of the whole unhappy story of this major episode in Morell Mackenzie's life, and does so fully and convincingly. It is a regrettable tale of professional wrangling, jealousy, and bitterness, on the whole best forgotten, but one from which the author thinks Mackenzie emerged with credit. From detailed analysis of the evidence he concludes that the accusations made by Mackenzie's German colleagues, also in attendance on the royal patient, and others, had no substance in fact. Mackenzie's first diagnosis certainly proved to be mistaken; but the mistake was an honest one. Though hasty and quick to resent reflections on his professional capacity, he was also generous and open-handed. It is a relief to turn from this unhappy story to his professional and social life at home. Here he earned the gratitude of patients by his skill and his understanding of those under his care. He founded the Hospital for Diseases of the Throat, and his treatise on diseases of the throat became a classic.

MEDICINE AND THE RENAISSANCE

"I HAVE no other means left for my maintenance but to turn physician," wrote the poor monk dispossessed by Henry VIII. One of the early effects of the Renaissance in England was the Reformation, bringing with it the destruction of 110 hospitals. It was only on his deathbed that Henry VIII made the "comprehensive agreement with the citizens of London which led to his posthumous, if unmerited, distinction as first founder of the 'Royal Hospitals'." But Sir Arthur MacNalty, in the Thomas Vicary lecture for 1945, now published as a little book,¹ has better things than this to tell of Tudor medicine; and he does it with his usual thoroughness and grace. That time of plagues saw the beginnings of public health, thanks to the wisdom of such men as Sir Thomas More, Sir Thomas Elyot, and Dr. Andrew Boorde; and the revival of medicine began with the introduction of examinations, in London by the Bishop or the Dean of St. Paul's aided by doctors and surgeons, and in the provinces by the Bishop of the diocese with such expert persons as he might think convenient. Sir Arthur's account brings to life the vivid, human, cruel times, and the men who lived and worked then to found modern medicine.

TWO FILMS FROM AUSTRALIA

THE Scientific Film Association screened recently two films presented to them through the New South Wales committee in postgraduate medicine, with whom they are operating an exchange scheme. *Neurological Sequelae of Deficiency Disease seen in ex-Prisoners-of-war* presents in simple manner a collection of cases received from Changi Camp. Examples of foot-drop, pot-belly, retrobulbar neuritis, nerve deafness, aphasia, and other disorders of motor and sensory nerves, of the types described in these columns,¹ are shown. (16 mm., sound, 27 min.)

Operation for Hydatid of the Liver is a first-class record in colour, showing clearly and without haste the outstanding features of an operation rarely seen in this country. Two small daughter cysts in the peritoneum are first removed, and then a huge liver abscess is cleared out. The two small cysts are

7. Kretschmer, H. L. *J. Amer. med. Ass.* 1934, **103**, 1144.
8. Hambleton, B. F., Lackey, R. W., Van Duzen, R. E. *Ibid.* 1935, **105**, 645.

1. Morell Mackenzie. By R. Scott Stevenson, M.D. Edin., F.R.C.S.E. London: W. Heinemann, Pp. 194. 15s.

1. The Renaissance and its Influence on English Medicine, Surgery, and Public Health. London: Christopher Johnson. Pp. 30. 5s.

1. See Cruickshank, E. K. *Lancet*, 1946, ii, 369. Burgess, R. C., *Ibid.*, p. 411. Mitchell, J. B., Black, J. A. *Ibid.*, p. 855.

opened, one being found to be dead and the other full of live hydatids; the small bladders are demonstrated, and then a single scolex is seen under the microscope. The commentary is good throughout, and the whole film a model of an unambitious operation record. (16 mm., sound, colour, 22 min.)

The New South Wales committee is collecting a library of medical films from overseas as well as encouraging home production. These two examples may lack professional polish, but they are far better than our amateur counterparts. The Australians seem to have achieved the happy mean between worthless records and highly expensive studio productions; we in Britain could learn a lot from them.

PLASTIC STOMACH-TUBE

Dr. FRANKIS EVANS writes: I can recommend a new type of Ryle's tube which is made of P.V.C. base plastic tubing. The ordinary rubber Ryle's tube can only be passed on a conscious patient, whereas the plastic tube is so made that varying degrees of rigidity can be obtained, depending on the temperature at which the tube is kept. At ordinary room temperature the plastic tube is sufficiently rigid for it to be passed into the stomach of the unconscious patient. This is of great benefit to both anaesthetist and surgeon. If the tube is to be passed on a conscious patient it need only be placed in warm water for a few minutes and it will be as soft and pliable as rubber. The tubes can be boiled repeatedly and show no signs of cracking or other deterioration. They have been made for me and can be obtained from Messrs. A. L. Hawkins, New Cavendish Street, W.1.

Royal Society of Medicine

No diary cards can be issued for the present, but meetings will be held as usual.

Royal Sanitary Institute

At a meeting to be held at the Town Hall, Llandudno, on Friday, Feb. 28, at 2.30 p.m., Dr. J. Glyn Jones will read a paper on Tuberculosis Under the New Health Services. On Friday, March 21, at St. William's College, York, at 2.15 p.m., Dr. Fraser Brockington will speak on the Work of Local Authorities under part III of the National Health Service Act.

Association of Surgeons of Great Britain and Ireland

The annual meeting of the association will be held at Oxford from July 3 to 5. The provisional programme includes a discussion on the Surgical Relief of Pain (excluding sciatica), to be opened by Mr. J. H. Kellgren, Prof. Geoffrey Jefferson, and Prof. J. Paterson Ross. There will also be a discussion on Ulcer and Cancer of the Cardiac End of the Stomach and Lower End of the Oesophagus, when the opening speakers will be Mr. P. R. Allison, Mr. T. Holmes Sellors, Mr. Vernon Thompson, and Mr. N. C. Tanner. Further information may be had from Mr. H. W. S. Wright, hon. secretary of the association, at 45, Lincoln's Inn Fields, London, W.C.2.

Penicillin Prescriptions under N.H.I.

The number of penicillin prescriptions under National Health Insurance was 52,850 last August, and incomplete returns for September show a rise of 4-5%, states Mr. A. W. Thompson, chief pharmacist to the Ministry of Health, in a bulletin to members of the Pharmaceutical Society. "As it is clear," he says, "that there will be more than 600,000 penicillin prescriptions during the first year, the additional cost to the Drug Fund must be over £70,000, unless the use of penicillin preparations substantially reduces the number of prescriptions."

Distribution of Drugs

Manufacturing chemists are perturbed by the terms of the Transport Bill, which affords them no exemption from the general ban on delivery by manufacturers' vehicles beyond a 40-mile radius. The manufacturers contend that drug transport is a skilled job, and that the ban will result in waste of time and space; they claim that drugs should be exempted as they were during the war and as meat is under the Bill. A deputation from the Wholesale Drug Trade Association was told on Feb. 6 at the Ministry of Transport that it was unlikely that complete exemption would be conceded; the Ministry thought that manufacturing and wholesale druggists would in practice have no difficulty in obtaining permits from the licensing authorities. The deputation expressed apprehension that there might be no uniform practice among these authorities.

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