NOVEMBER, 1950

THE ULSTER MEDICAL JOURNAL

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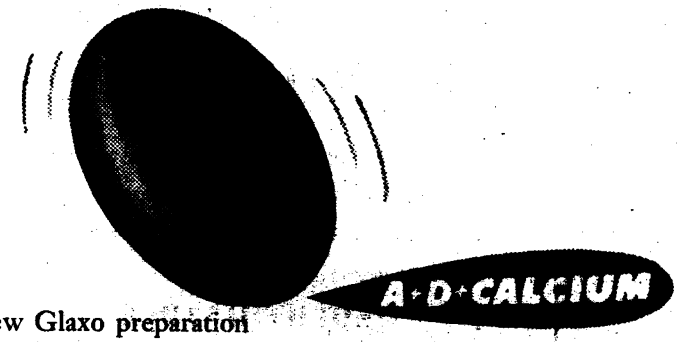

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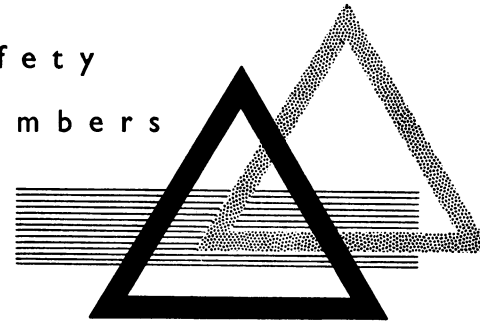

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—*Arch. Dis. Childh.*, 1944, *19*, 122.

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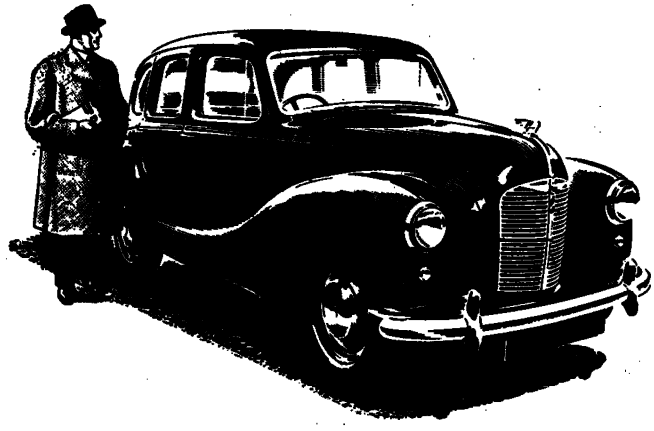

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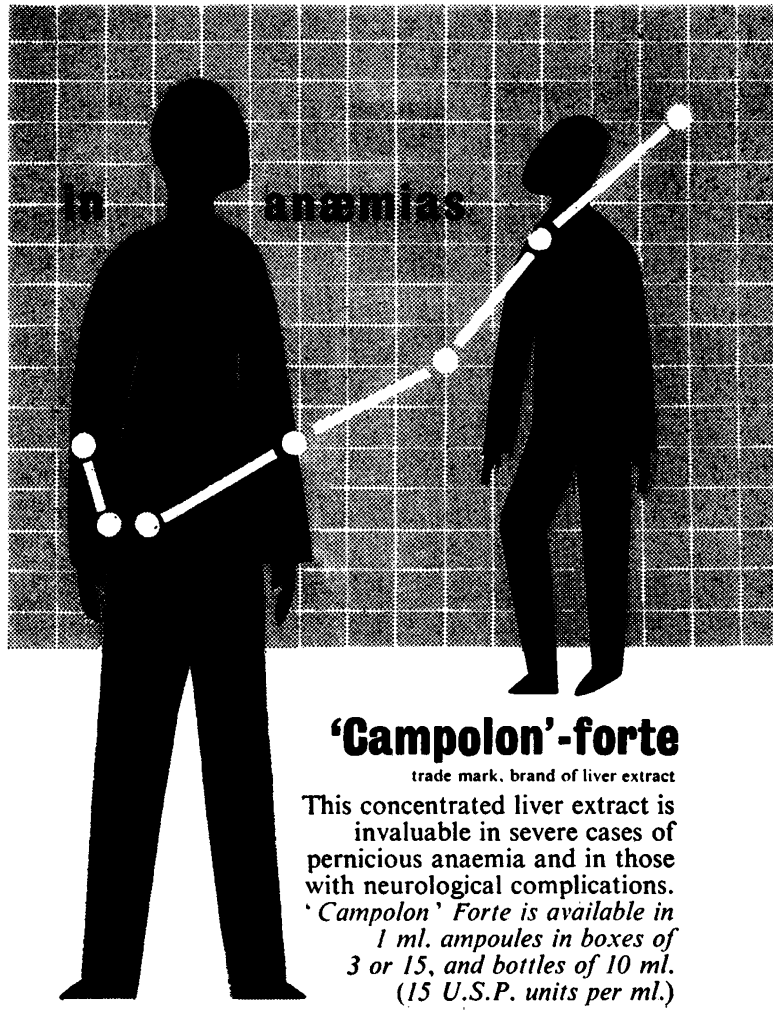

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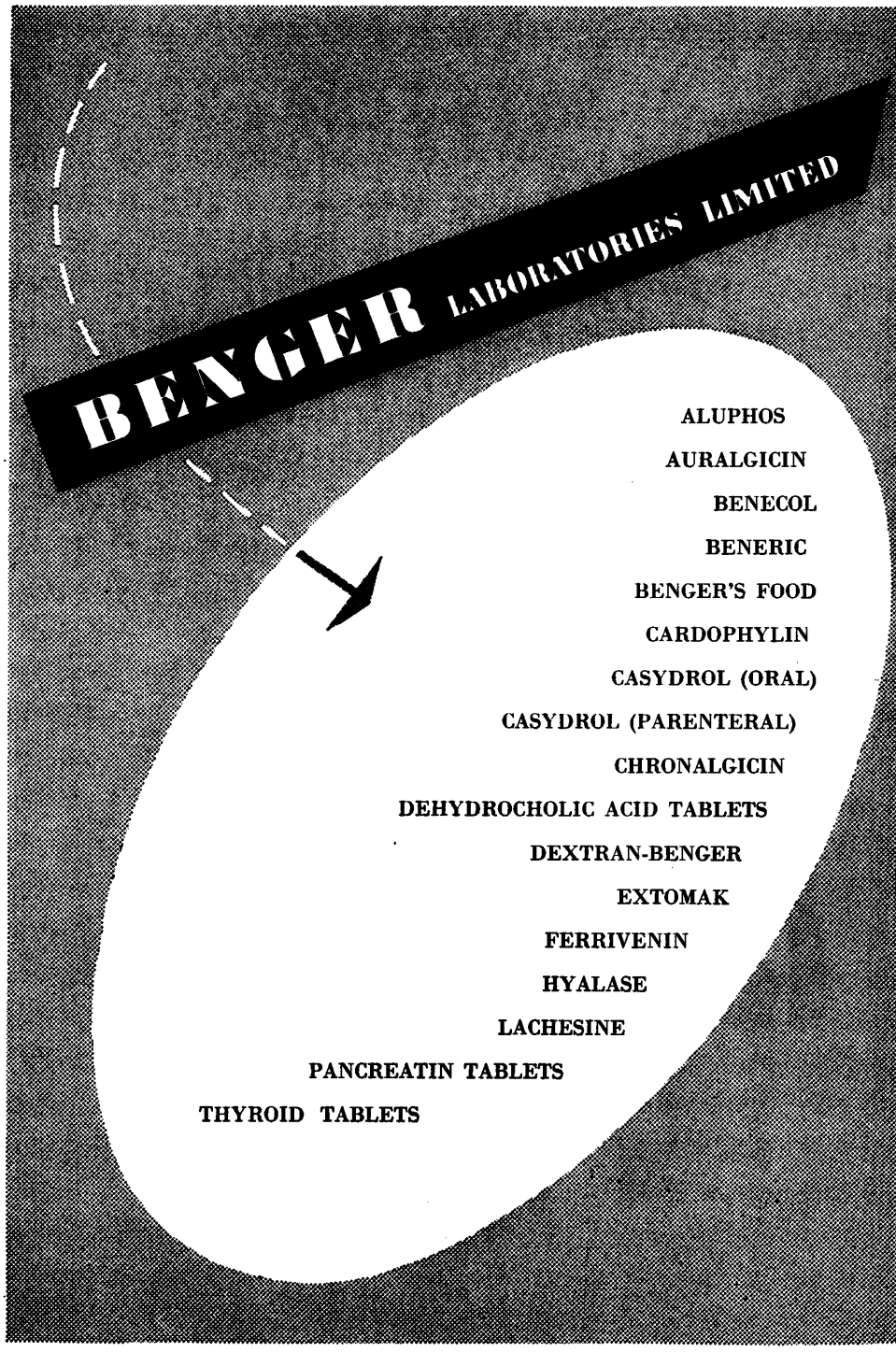

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REVIEW

AIDS TO MATERIA MEDICA. By George H. Newns, M.D.(Lond.), M.R.C.P.(Lond.).

This recent (fourth) edition of Dr. Newns' popular little "Aids" will, the reviewer feels, be as well received as have been its predecessors. The general layout of the book is similar, there being a simply presented yet valuable introduction, this being followed by the main body of the book which is divided into two parts. Part one is further sub-divided into two parts; the materia medica of inorganic substances, and that of organic substances. The reviewer was particularly impressed by the considerably expanded sections on Vitamins and Hormones, though with regard to the former the section on the B complex has been left somewhat incomplete by omitting to mention what is, perhaps, the most important fraction of this Vitamin—B12. It is also felt that, under the Hormone section, reference should have been made to the least toxic of the Thiouracil preparations, i.e, propyl thiouracil. The reviewer cannot agree with the statement on the dosage of Insulin—"5 to 100 units by subcutaneous injection," for it is felt that the amount of Insulin required under all conditions is so variable as to preclude an upper and lower limit; the dosage being ascertained by a process of trial and error, and according to the individual's metabolic upset. Further, it is the reviewer's experience that a person into whom 5 units of Insulin is injected may as well not have any Insulin injected at all.

The small pharmacological sections have been revised and brought up to date. They are interesting; salient points just being mentioned, and they add considerably to the usefulness of this little "Aids."

Dr. Newns can feel quite contented that he has compiled a work which will be well received both by students and practitioners, not only for its small price, but more so for its inherent value as a ready reference. J. L.

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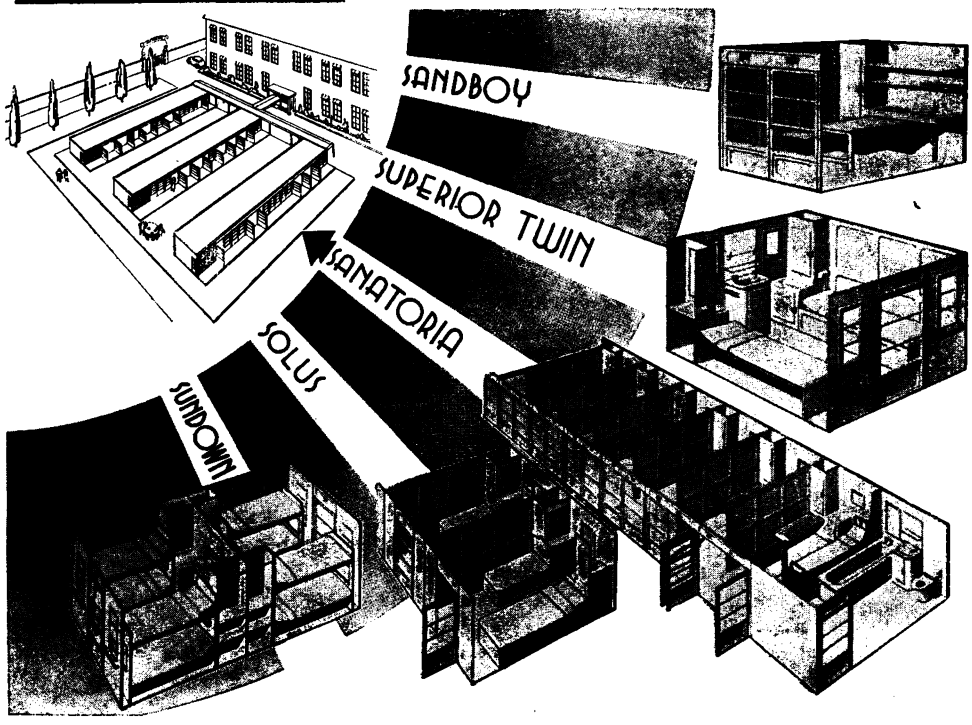

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THE ULSTER MEDICAL JOURNAL

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Under present difficult circumstances it is hoped to issue two numbers each year: on 1st May and on 1st November.

THE QUEEN'S UNIVERSITY OF BELFAST

LIST OF ADDITIONS TO THE MEDICAL SECTION MARCH-SEPTEMBER, 1950

PERIODICALS

Acta Medica Orientalia, 4-7, 1945-1948, (4v).
*American Journal of Medicine, 6- , 1949- .
*Anais Paulistas de Medicina e Cirurgia, 50- , 1945- .
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PELTON, W. J., AND WISAN, J. M. : Dentistry in public health (1949).
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MACKEE, G. M. : AND CIPOLLARO, A. C. : X-rays and radium in the treatment of diseases of the skin (4th edition, 1946).
SEQUEIRA, J. H., AND OTHERS : Diseases of the skin (5th edition, 1947).

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British Pharmacopœia, A general survey of the British Pharmacopœia (1949-?).
FLOREY, SIR H. W., AND OTHERS : Antibiotics (1949).

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Vol. XIX 1st NOVEMBER, 1950 No. 2

Hair and Some of its Clinical Significances

By SURGEON-CAPTAIN ROBIN HALL, V.D., M.B., B.CH., B.A.O., R.N.V.R.

Presidential Address to the Ulster Medical Society, Session 1950-51

FIRST of all, Ladies and Gentlemen, I wish to thank you and to say how very proud I feel of the honour you have conferred upon me by electing me as your President, the more so as, similar to my immediate predecessor, I too am occupying the chair of my father, but with shortcomings of which I am only too conscious, especially when I think of those who have preceded me during the long history of the Society and its parent, which started nearly a century and a half ago as the Belfast Medical Society in 1806.

My address to you to-night has been rather a thorn in my flesh, somewhat like Androcles and the Lion reversed, so you will appreciate the feeling of relief I will experience if you, Lions, prove good Samaritans during the process of removal of the thorn!

The subject I have chosen is one in which everyone at some time or other, is more or less interested, or shall I say concerned about, its absence or presence and distribution, and I hope that some of my observations may be not without interest to you.

I have often wondered if the forty-seven scholars of King James' time perhaps could not as truly have substituted for the heart the hair—the hair is deceitful who can know it—for indeed, as Mr. Pickwick said of another word, "it comprises in itself a difficult study of no inconsiderable magnitude," and this evening I will touch, as it were, only the fringe of what has been poetically called "woman's crowning glory"—an appellation which, in view of their successful invasions into so many spheres undreamed of by their grandmothers, one rather hesitates so to designate, and also lest thus early in my year of office, I be considered archaic and a mere *Laudator temporα acti*. Certainly I could be reminded that almost synchronous with winning the vote, woman in general began to shear her hair, perhaps an incongruous proceeding, bearing in mind that in ancient Rome shorn heads were the badge of slaves, and someone has remarked

upon a sinister connection between the Rape of the Lock and the result of letting woman have her head! Be that as it may, there is, even if it be considered as contrary to St. Paul's teaching, something to be said for cutting short or at least shortening, what is not infrequently a "headache" to woman, especially those who have to work where machinery may take upon itself the warlike role of a Red Indian by adding a scalp to its belt. In Germany, however, so unpopular with the authorities was shingling, that taxes were levied on women wearing short hair, but soon that tax had to be discarded by reason of the effective retaliation of the women in refusing to cook, and fashion, that much worshipped goddess, had once again free rein.

Mere Male also has not been free from the dictates of fashion in hair, often drawn by cartoonists of a couple of centuries ago, sometimes amusingly depicting the discomfiture of some pompous person inopportunely divested of the wig, and, I may add that, in those days, the wearing of a night-cap was not effeminate, but very necessary to protect the shaved head from cold when the oppressive wig was transferred to the dressing-table for the night, like a set of dentures; whereas in those days the female of the species seems to have fashioned her hair like a tower upon her head, and once fairly set, disturbed it not for days, indeed it has been said that it was not unknown for a nest of mice to have solved, at least temporarily, their housing shortage, unbeknown to the later horrified wearer.

Headgear is usually credited with being a cause of baldness, this, and some may say an inordinate conceit of the younger males in their still luxurious locks (and looks) and with the not-so-young not to be outdone, has brought about the open display of bare heads. Indeed this hatless fashion is affected by even some members of our own profession—a custom that would have shocked many of our old teachers.

Hair is perhaps the most distinctive characteristic of the biggest class of vertebrates :—

Danforth says that, whether hair be considered as a derivative of some cutaneous appendage in lower forms, or as something that has arisen *de novo* in the mammals, there is a considerable array of resemblances on the one hand, and of differences on the other, which makes it difficult to accept any of the theories that have been proposed.

Philogenetic individuality, such as is commonly attributed to the branchial arches, the eyes, or the limbs, apparently is lost, as far as hair is concerned, in the passing from the lower forms to the Mammalian and that in the findings of Meyer Lierheim (1911) show a decided difference in the number of hairs to the square centimetre in fœtuses of various species including man.

"The nature of hair, by custom implies the appearance or behaviour or habit of the head hair (i.e., whether it hangs straight, waves deeply or curls in ringlets), and has long been considered to be one of the deciding criteria in the classification of races. Whereas hair in general is a subject of anthropological interest, it is the head hair that has served as a practical criterion in the classification of human

races," and Trotter goes on to say that in classifying hair "developments have occurred in two directions :—(1) Toward making classifications of hair according to its apparent gross physical behaviour; and (2) Toward finding the anatomical basis for the different behaviours of the hair through a study of its microscopic characteristics."

Ancient history and literature contains many references to the form and colour of the hair. Most of us will recall the venerable Bede quoting Pope Gregory as saying in the sixth century, when abbot of St. Andrea, on seeing some fair-haired English children exposed for sale in the slave market at Rome: "Non angli sed angeli."

Herodotus divided Xerxes' army into straight groups and woolly.

Duclert. in 1888, quotes de Jotemps as stating in 1824 that the form of hair depends upon the form of the follicle, and he, himself, in his researches in sheep, concluded that the degree of curvature of the follicle is coincident with the degree of curl of the hair and that straightness or waviness is coincident with presence or absence of a medulla.

Bory de St. Vincent classified species into

1. Leotriques, a cheveux unis;
2. Oulotriques, a cheveux crépus, common in Negroes, not found in whites.

Weber pointed out that the hair of man is for the most part not cylindrical and that its cross-section is oval; however, the straight hair of a friend was found to be circular in cross-section, and hair of mulattoes, which was very curly but not woolly, had diameters which were almost twice as great in one way as the other. He gave the diameters of a number of hairs and for several of these he gave measurements taken at various places along the same shaft to demonstrate the variations.

Peter A. Brown sectioned hair of as many different varieties as he could obtain and suggested a division of mankind into three species :—

1. The cylindrical piled represented by an Indian;
2. The oval piled, represented by a white man;
3. The eccentrically elliptical represented by a negro.

In this idea of cross-section of hair as a racial criterion, he anticipated by a decade Prunier Bey.

In the meantime Geoffrey Saint Hilaire, wrote on the classification of races. His primary division was based upon the way hair is inserted—whether angularly or circularly, and two kinds of hair were listed, Lissé and Crépu.

Prunier Bey examined hair from twenty-four of the great human races and their off-shoots, both macroscopically and microscopically, and suggested that the more the hair is flattened the more it rolls up and, on the other hand, the more it is rounded the more it lies smooth and straight, and considered that "the differentiating character of the hair of human races lies in the form presented in transverse sections" and that the "form is pretty near constant in the same individual, except in the cases where there is a mixture."

Thomas Huxley adopted Bory de Saint Vincent's classification dividing races into the two large groups :—

Leiotrichi—people with straight or wavy hair; and

Ulotrichi—those with crisp, woolly or tufted hair.

Götte, writing in 1867, explained curling as depending on the shape of the follicle, which he described as being markedly curved in the negro as compared with the straight follicles of other peoples.

Nathusius considered that the nature of the hair is the result of "properties less superficial or accidental than the more or less flattened form of the hair," and that the form of the follicle, together with other structural characteristics of the skin, may determine the behaviour of the hair, also that the spiroid form of the hair follicle would be found in human skin bearing fuzzy hair.

Charles Stewart wrote regarding the position of the follicle in the skin of the Negro, "The position of the hair and follicle embedded in the skin of the negro, is much longer and curved, so that it commonly describes a half-circle. Consequently, the papilla at the base of the follicle either lies horizontally or is directed obliquely inwards towards the subjacent bone."

Stuart, in 1882, was in general agreement with this, but found the curve to be almost invariably a quarter-circle.

Haeckel's classification was similar to Huxley's, but with slightly more detail and comprised twelve human species.

In 1878, Topinard gave the nature of the hair as the fundamental character among the physical characters of race classification, the chief divisions of which were :—

1. Round in Section—straight hair;
2. Intermediary—wavy, frizzy;
3. Elliptical—woolly;

placing the races in one of these; secondary consideration having been given to skull and to skin colour, and in 1885 introduced the following five divisions :—

1. Straight—rectilinear—as a horse's mane;
2. Wavy—a long curve or incomplete spiral frome one end to the other;
3. Bouclé—a curve or rolling up manifested only at the extremity;
4. Frizzy—well executed spirals forming successive rings half inch or more in diameter;
5. Crépu or Laineux—numerous ringlets lying one upon the other, forming tufts or rolls like the wool of a sheep.

Broca considered that, in addition to the form of the cross section, the presence or absence of a medullary canal and the characteristics of the skin in which the hair is implanted is important. He separated the races into two groups on the basis of the nature of the hair—lissotriques and ulotriques and suggested the terms :—"droit"; "ondé"; "bouclé"; "frisé"; "laineux"; be used.

Ranke was critical in reviewing in 1890 the foregoing classifications, and concluded that hair as a means of distinguishing between races is just as inexact

as skin colour, but a useful criterion for distinguishing between the smaller race-groups.

Adolphe Bloch writes in 1896, observing groups from all races at the Paris International Exhibition in 1889, came to the conclusion that the lighter the skin the more developed is the hair in contour of the hair shaft equally, but that the presence of the erector pili muscle was somewhat contributory, whereas the presence of the sweat glands acting on the pre-formed cylindrical shaft as "rollers" was the real cause of the flattening.

Vigier and Bloch, in 1904, were in accord with the theory that the shape of the follicle is responsible for the nature of the hair. They raised the question as to whether the negro follicle is curved at birth, since the hair is not crépu then.

Toldt wrote on the classification of hair as regards the whole mammalian group, including tactile or sensory hairs as well as the sub-divisions of "protective" hair.

Danforth, writing in 1925, says, "Unfortunately no wholly satisfactory classification of hairs has been proposed, . . . due largely to the complete series of inter-grades that can be found between any two hairs." He drew attention to the twisting of hairs on their own axis, seen even within its follicle and considers it may be of greater significance anthropologically than the form of cross-section.

Hausman says that the gross qualities of human head hair en masse seem to be much more accurately characteristic of ethnological groups of mankind (or at least more definitely usable) than do microscopic individual hair shafts.

And Bernstein and Robertson, in an effort to find a means of differentiating the races by the hair, which would be simpler than determining the shape of the cross-section, showed that Mongoloid hair weighed the most, Caucasiod weighed less, and Negroid hair weighed the least.

Cooper wrote in 1930 that endocrines may control to more or less extent the growth of hair and the relative coarseness or fineness of the shaft, but that, so far, direct evidence that they influence the nature of hair is lacking.

Trotter, who has carried out much work on the subject, studied the form, size and colour of the head hair, in a group of American whites of both sexes. The form of the shaft (expressed in an index) was found to be more elliptical in young girls than in young boys, but after five years of age, no difference was found between the sexes or between different age periods. The size (cross-section area) likewise showed no sex differences, but a lesser area in the young (boys up to ten, girls up to fifteen years) than in the older groups, whereas the slight variations between the different age periods of the older groups, were insignificant.

In a Study of Hairs in the middle segments of fingers and toes, it was found (Danforth 1921) that there are marked racial and familial differences in number, which are easily demonstrable both in living and in microscopic material. Probably other parts of the body also show such differences in greater or less degree, although Trotter (1922) has shown that in the beard region they are extremely slight, if indeed they occur at all. But on the scalp, Friedenthal claims

that there are correlations between the colour or calibre of hairs and the total number present, the numerical difference between fine blond and coarse red being 140 to 88. These data are probably reliable, at least to the extent of indicating hereditary differences (since hair colour is hereditary) in the number of hairs on the heads of different individuals, so it appears that, in the human race, individual hairs of one person cannot in general be satisfactorily homologized with particular individual hairs of another person. This is probably true of unspecialized hairs in other mammals, and the production of more or less numerous hair follicles may be regarded as a rather generalized function of the developing skin, and the hair follicles themselves, should not be thought of as endowed with those special peculiarities which are commonly postulated to account for the resemblance between comparable parts in parent and offspring. On the contrary, at the evidence thus far presented, indicates that the production of hair follicles by the skin, is analogous to the production of leaves on the branches of a tree. The number actually produced is presumably dependent on a number of factors, one of the important ones being the size of the individual when the formation of new follicles ceases.

Danforth working on tactile hairs (vibrissæ) of a large number of mouse heads, found that they were arranged in a remarkably constant way—with 99 per cent. regularity as regards the vibrissæ above the eye, and a mere 3 per cent. irregularity at the angle of the mouth.

He says that various morphologists have homologized hair with cutaneous sense organs, placoid scales, dermal scales and feathers, as well as with certain parts of these structures. Other observers have maintained that one should speak of Hair not Hairs, and consider the pilary system as something *sui generis*. The acceptance of any one of the proposed theories leaves unexplained a mass of good evidence which supports the others, . . . and that there is no correspondence between hairs and any of the structures from which they are supposed to have evolved, or when the finer hairs are considered between the hairs of one mammal and those of another.

The general conclusion from this study is, that homology between two structures is dependent upon similarity of genetic factors involved in their production, and is consequently usually partial and not absolute.

Trotter found in studying hairs of the axilla, pubis and anterior crural regions in man, that the "growth period" and the "quiescent period" of the follicle are approximately the same length.

H. Bulliard, working upon hairs of the dorsum of the hand, found a longer rest period : the ratio of growth to rest being as seven is to ten.

A similar variation between the lengths of the two periods was found by Danforth, in studying the terminal hairs of ears and eyebrows, to be eight weeks for growth to three months rest.

Helen Dawson avers that the relative period of growth is to the rest period probably specific for classes of animals, but that further work should be done. Personally, I think that state of health, diet and changes of environment will

considerably influence, if not vitiate experiments. She has also found that the average period of rest in male, and in female cavies that have never been pregnant, is less than in those females that have been pregnant.

On the subject of pregnancy, I have observed that blonde women are less likely to tearing of the perineum at child-birth than are brunettes.

As regards the measurement of hairs, Trotter in 1924 advocates an ingenious method—injecting minute quantities of indian ink at the immediate vicinity of the follicle to be identified, keeping for reference a diagram of the groups, and using a small capillary tube graduated in millimetres, up which the individual hair is passed when measuring, and the end of the tube rested lightly against the skin of the animal. The length is recorded from week to week and note kept of any hairs that have fallen out.

Canities.

History records many instances of hair having turned white suddenly, and Brown-Sequard observed on several occasions, in his own dark beard, hairs which had turned white in a night, and these he epilated.

Prentiss collected numerous cases of sudden canities, which he published in 1890.

In 1851, a case was reported in the *Boston Medical and Surgical Journal*:—"A young man of 30 years of age, whose hair was scared white in a day; he was sick in a mining camp, was left alone, and fell asleep: On waking he found a grizzly bear standing over him!"

Ludwig has known eyelashes to become white after smallpox; and these and the eyebrows are reported to be decolourized sometimes in neuralgias of the isolated branches of the trigeminal nerve; everyone is familiar with the local patches of white which may occur in the region of distribution of a nerve that has been injured.

White hair is usually evidence of advancing years, but it may arise in cases of sudden or prolonged grief, impaired health, neuralgia or other local disease, or in association with overwork. Premature grey hair in or before the third decade is usually hereditary.

When not contra-indicated, administration of thyroid occasionally restores the colour and it is said, though I have not tried it, that para-amino-benzoic acid restores the colour.

In my experience, it is usually found that hair which turns white early is more likely to remain on than where baldness commences before the grey gets an opportunity to occur.

Transient Yellowing of White Hair During Rheumatic Attacks.

This condition I have noticed in a number of patients, and one case in particular I will mention, where there was absolutely no question of any dye being used. She, a well-built, fair-complexioned, active, married woman, a multipara, who for a number of years had suffered from attacks of rheumatism, ultimately affecting

the heart-muscle which (in conjunction later with gall-stones) was the cause of her death in her sixty-seventh year.

On several occasions at intervals of years it was observed that when her rheumatic pains were most present, her normally white hair (of which colour she had become very proud, since it became so in her thirties) became yellowish at the roots, and as the rheumatism was relieved, gradually the hair resumed its white hue, only to recur again and pass off similarly with further rheumatic attacks.

In the literature I find a case, though not quite similar, mentioned in the "Journal complementaire du dictionaire des sciences médicales," in 1818, of a woman whose hair, naturally fair, assumed a tawny red as often as she was affected by a certain fever, and turned to its natural colour as soon as the symptoms abated.

Luetic Thinning of the Hair

Harrison says that examination of the scalp in the secondary stages of syphilis often shows the characteristic alopœcia in which the hair of the beard and eyebrow may also take part; and that the most noticeable form of alopœcia is that in which the hair falls in irregular patches, and the back of the scalp assumes a moth-eaten appearance.

In my students days patients showing the later manifestations of syphilis, such as tabes dorsalis, were more numerous than they are now with the more universal facilities for thorough treatment, and with the realization by the patient of the necessity for subsequent tests long after the signs of the disease are evident to him: and as regards the hair of many of them seeking treatment, not for any scalp or hair condition, but for what proved, on examination, to be the later ravages of the disease, I was rather impressed by the character of the head hair. In many cases it presented not the thinning at the crown or temporal regions usual with advancing years, but a thinning from the forehead back to the vertex—the hairs standing up rather comparably to a thinned-out plantation of trees on a hill-top. It was usually found that in these cases they had been treated fairly early, but on the early signs of the disease becoming not evident or inconvenient to the patient, treatment had ceased too soon.

I do not say that it occurs in every case, but when it does I look upon it as a clinical sign very suggestive of a history of the disease having been contracted some considerable time ago. I may add that no skin condition was present on the scalp.

Dark Eyebrows in Auburn-Haired Phthisical Patients: An Unfavourable Prognostic Sign.

This darker colour of the eyebrows of auburn-haired phthisical patients was a sign to which my father, the late Robert Hall, drew attention in his cliniques in Belfast Infirmary and Whiteabbey Sanatorium. The first time I heard it was when he had taken me, as a young schoolboy round the Sanatorium wards with him on our way to visit friends living in the vicinity, and I remember his drawing

the attention of his new house physician to it in a patient with early pulmonary tuberculosis. His remark that it was an unfavourable sign made a deep impression on my mind. Subsequently, as a student in his class and later as his house physician, I often heard him mention it and say that it did not necessarily betoken the presence of the disease, but that the constitution of a patient so endowed is soil that is not resistant to pulmonary tuberculosis when once having gained a hold, and in his experience of upwards of sixty thousand cases of phthisis, he found it an unfavourable prognostic sign. He never published the observation, which I venture to call "Robert Hall's Sign," and to publish it now after he has passed on is the reason I have chosen HAIR as the subject of my address to you to-night.

I thank you for having borne so patiently with me, for I feel, like King Charles the Second, in that I have taken an unconcionable time in coming to the end!

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Vision and Medicine

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Opening Address to Students, Royal Victoria Hospital, Belfast Winter Session 1950-51

IN addressing this meeting of the staff, students and friends of this great institution, I am deeply conscious of the many orators who have occupied this rostrum, and of my own inadequacy to emulate their efforts. But I fully realise that there are three duties incumbent on me to-day. Firstly, to offer a welcome to those students who have joined our hospital since the last opening day; secondly, to place on record the present state of that branch of our Medical School domiciled here; and thirdly, to endeavour to hold your attention for a brief period, on a topic sufficiently ophthalmological to justify my speciality and sufficiently medical to maintain your interest for that time.

There are some who are attending the opening of a session for the first time, although by now they may perhaps consider that they are already hardened walkers of the wards. On behalf of the staff of this hospital, it is my pleasant duty and privilege to welcome you formally as the acolytes of a profession whose roots stretch far into antiquity, whose present covers humanity all over the world, and whose future is already in your keeping. I charge you in all sincerity to guard it as a sacred trust, so that you who will occupy this rostrum in the future, may hand on the torch untarnished and unsullied.

What is a profession? It is a pool of knowledge in the keeping of a body of men—knowledge which is common to all, though it may not be possible for any one to compass the whole. By basic training, by the handing on of traditions, and by special study, the recruit to the profession is inducted. The blossoming of the profession comes, as a study of its history reveals, at times when its organisation is efficient, when its freedom is assured, and when secrecy of ideas is abandoned.

A study of the Hippocratic Oath reveals that in the time of Hippocrates a civilization existed in which these criteria were satisfied. But the Dark Ages set in, and it was only in the twelfth century, when Greek medicine was long forgotten, that the Guild System brought medical matters into prominence once more, particularly in Italy, where the schools of Salerno and Florence were famous.

An interesting sidelight on the medical world of those days is found in the life of Dante the poet, who in the days of his youth aspired to high political attainment. An essential qualification for this was membership of one of the great guilds in the city of Florence. He was affiliated to the Guild of Physicians and

Apothecaries, which included also the merchants of spices and drugs, and those of jewels, paintings and books. A voracious reader with an invaluable gift of concentration, a story is told how he became immersed in a new book outside an apothecary's shop and browsed on for hours totally unaware of an uproarious city festival that was happening in the street behind him. According to his own account, he nearly read his eyes out, and had for a time to fall back on darkness and the application of cold water—to what part of his anatomy he applied the latter is not recorded. It is, however, pleasant to know that he maintained all his social and civic intercourse, and that it was the wonder of his contemporaries how he studied without cessation, but yet no one would have suspected from his style and youthful company that he was studying at all. That he had to pay up for this later was only to be expected, and Boccacio relates that Dante was so much given to sitting up late over his books that both his household and his wife despaired and grieved thereat.

We are told that in the hospitals of that city he witnessed the progress of all sorts of diseases, of dropsy, fever, leprosy and convulsions. He studied the nature of the drugs and compounds suited to each disease. The art of dissection, the secrets of embryology, and the use of surgical instruments no longer remained a mystery to his receptive mind. Magnifying glasses, spices, jewels and pigments of every description—pearls, diamonds and even emeralds formed but part of the *armamentarium* of this mediæval genius. You may consider that these last are a study now abandoned, but the historian of five hundred years hence, reading of the use of aniline dye derivatives and of drugs with such names as aureomycin, may conclude that even in the mid-twentieth century we found it necessary to burden the developing mind with jewels and pigments.

The cause of the breakdown of the guild system is a study in itself, but it would seem that the profession lost the common touch and became bedazzled by such studies as those just enumerated.

Next we find the apprentice system replacing the former method. Here the aspirant to medicine bound himself to an apothecary or barber-surgeon, and from them learnt by observation and practice all that he needed to know about his art. As an example of the sort of thing that then went on, we find that Dean Swift makes his hero Gulliver serve four years with Mr. James Bates, 'an eminent surgeon in London,' and later proceed to study physic at Leyden for two years and seven months, 'knowing it would be useful in long voyages.'

We are all familiar with the history of the barber's pole as the sign whereby the doctor's establishment was recognised in an illiterate era, and of its origin as a support for the rags that were stained by the common practice of bloodletting. History does not record whether the sturdy apprentices of the past did not use the pole to hook in victims or to bludgeon them, once ensnared, into anæsthesia. Secrets not revealed by time and perhaps more justifiable than the outstanding secret of medical history—the concealment of the midwifery forceps by three generations of the Chamberlain family, a deed that will make obstetricians of all the ages blush for shame.

But in the eighteenth century knowledge was beginning to grow too rapidly for the methods of education then in vogue, and the advantage of allowing the student to draw from the knowledge of many rather than the few made itself manifest. Medical schools began to grow in importance. Dr. Widess in his "Account of the Schools of Surgery, Royal College of Surgeons, Dublin," recently published, gives a lively and interesting account of the origin and growth of the Dublin College and the many great figures of Irish Medicine who were associated with it. Among these, as an ophthalmologist, I was particularly interested to read about Arthur Jacob, who entered as a student in 1811 and remained on the strength of the school till 1867, being Professor of Anatomy and Physiology for forty-one years. The membrana Jacobi, as the layer of rods and cones was once known, was discovered by him in 1819. In 1827 he described an ulcer of peculiar character which attacks the eyelids and other parts of the face, a condition which we now call rodent ulcer, and previously known for many years as Jacob's ulcer. A contemporary records, as one of Jacobs few weaknesses, his notion that he alone of all the professors should always give the introductory lecture at the commencement of the session at the College School.

In the first half of the nineteenth century many fundamental principles of present-day medicine were being discovered, and from then also date many of the professional organisations that give shape and coherence to the edifice that is known as medicine to-day. Shortly after the middle of the century parliament passed the Medical Act of 1858, under which the profession in this country has developed and prospered and given the community benefits as they arose in surgery, medicine, ophthalmology, radiology, and in the many spheres in which the public looks to medicine for guidance and help. This Act, by a blending of liberty and control, enabled British Medicine to reach a pitch where it led the world without being at any time an undue appendage of the body politic.

The first vestiges of a medical curriculum in Belfast followed quickly on the establishment of the Royal Academical Institution in 1810, when, in 1818, Dr. James L. Drummond was appointed to the Chair of Anatomy and Physiology. It was not until 1829 that further planning was begun, and the Faculty of Medicine was established in 1835. At this time it was estimated that some three hundred medical students left Ulster annually to study in other colleges.

In 1849, the Faculty transferred to form part of the newly established Queen's College, Belfast, of the Queen's University in Ireland. This University subsequently gave place to the Royal University of Ireland, of which Q.C.B. was a constituent college. The curious may observe the arms of these Universities in Sir William Whitla's window, now placed in an advantageous position at the end of the main hospital corridor. The present Queen's University of Belfast, at whose inception the Medical School was thus so important a constituent, dates from 1910.

The wards and out-patient departments of the Royal Hospital in Frederick Street, and since 1903 of the Royal Victoria Hospital, has been the scene of much, I might say the bulk of that give and take, of that stimulus and counter stimulus, of that correction and criticism which is the basis of medical education as we know

it. I remind those who now for the first time take part in these activities, that they will get from an institution such as this a return exactly proportionate to their interest and work. Under new conditions we must contrive to maintain and enhance the good name earned for our school by our predecessors. Difficult days may lie ahead, but a determination to excel in good work on the part of every one of us will be a sure passport to success in uneasy times.

At the outset of the session it is customary to refer to the depletion of our ranks by retirement and death. We are much saddened by the loss that our hospital, profession and community has sustained in the untimely death of Mr. G. R. B. Purce, known to us as a pioneer surgeon and master-craftsman and distinguished for his abilities in many fields, the originator in our school of thoracic and cardiac surgery—a diligent student whose zest for work was endless. A trusted and beloved colleague, he has left behind a memory that will ever remain an inspiration to all who knew him.

The death of Mr. Howard Stevenson, our senior consulting surgeon, following a tragic street accident, deprived us of a much-loved colleague and one who devoted a life-time of service to this hospital. His skill and deftness as a surgeon was the pride of generations of Queensmen the world over. He brought to every situation with which he was confronted that perspicacity and alertness of mind that were such outstanding features of his disposition. Many of us remember with gratitude the encouragement so graciously extended to the faltering novice in his art. His old-world charm and courtly manners marked him as one of a generation fast disappearing.

I should like also to pay tribute to the memory of Dr. J. W. Heney. Though not known to the present generation of students, Dr. Heney was for many years a leading anæsthetist in this hospital, where his skill and teaching ability were highly appreciated. At the height of his career, stricken by an incapacitating illness, he faced irretrievable disaster with great fortitude. Memories of his pleasant personality are retained by his former colleagues and students who regret that the benefits of his experience and knowledge are no longer available.

Two of our colleagues have reached the consulting staff: Mr. R. J. McConnell and Mr. H. P. Malcolm. We wish them many happy years, and hope we shall long enjoy the benefit of their ripe experience and sound judgement.

It is not customary to mention present members of staff in an opening oration, but you will permit me to refer to one who has been laid aside by sudden illness, namely Mr. J. R. Wheeler, and I am sure it is the wish of every person in this assembly that I may convey to him their sincere good wishes for a very speedy recovery.

Vacancies on the staff have been filled by the appointment of Mr. J. W. S. Irwin and Mr. J. A. W. Bingham as surgeons, Mr. Connolly as neuro-surgeon, Dr. George Gregg as physician to the Physiotherapy Department, and Mr. Norman Hughes as plastic surgeon. To these gentlemen I extend the hand of fellowship on behalf of my colleagues on the staff.

And now, I wish to instance a few aspects of visual sensation that I believe are

of interest, including some of those intriguing phenomena described as entoptic, where the observer appreciates sensations that have their origin in his own eye. I intend to use these as a method of focussing attention on some aspects of medicine in our time, hoping that such a method is appropriate to the present occasion. Sir William Osler, in the year 1901, was able to summarise in forty-five pages the development of medicine in the nineteenth century. Volumes would be required to recount the expansion that has since occurred. Proof of the outstanding success that has attended the craft of medicine is to be found in the manner in which the various civilized communities regard as indispensible for themselves and for their individual members the blessings that can now be provided—summarised by Osler as the prevention of disease, the relief of suffering and the healing of the sick. Such popular approval is a relatively new feature, won for us by our predecessors during the last hundred years. Sir Richard Burton, whose disguise was that of an Indian haji or medicine-man, in his account of his pilgrimage to Al-Madinah and Mecca in 1853, speaks scathingly of European medicine in Egypt, and remarks, "There it is about as efficient as in India—that is to say, not at all." But even in 1853 new learning was being spread, which was foundation matter for phenomenal subsequent developments.

For several decades our profession has sought that easy access to our services should be available to all, and we as a profession had our proposals for a National Health Service dating back over thirty years. Our ideas as to how the details should be worked out have not been met in several important respects, but I have not as yet heard voiced the opinion that it is beyond the wit of man to devise the ideal scheme.

It is one of our aspirations that in such an ideal scheme the trivial beginnings of disease should be sorted out, and the maxim that an ounce of prevention is worth a ton of cure should be put into practice. This notion lies behind the phrase 'positive health,' a conception now rather in the eclipse. I think it would be a pity to let it as an ideal sink through overloading and frustration by administrative detail. We should encourage the people to look on the doctor as one who, under tolerable working conditions, has his immense contribution to make even to those just below par and no more—the 'twilight health' of the advertiser.

An example of this, which other departments must be able to parallel, is our experience in the ophthalmic department, where we frequently find grossly under-sighted individuals who claim to have perfect vision. In these cases it is not so much a case of making the sick well as of making the well fitter to stand the strain of living in modern society. On the other hand, there are those who are worried either by the occurrence of trivial symptoms which may be somewhat similar to those which have had alarming sequels in friends or relatives, or by the introspective discovery of physiological effects not hitherto appreciated. Sir David Brewster wrote a paper on one of these effects—muscæ volitantes—a form of floating spots before the eyes. It is one of the classic documents on the subject, and he finished it by saying, "Nor has science performed one of the least important of her functions when she enables us either in our own case or that of others to

dispel those anxieties and fears which are the necessary offspring of ignorance and error."

It is in noting visual sensations too that the introspective often find scope to indulge their vice. Perhaps vice is hardly the correct word, for an informed interest in the mechanism of sight and of entoptic phenomena leads to a better knowledge of the physiology of vision as a whole. Donders, the elucidator of astigmatism, writing in 1864, mentions that he had formerly written a detailed essay on the employment of entoptic investigation in the diagnosis of defects of the eye. He adds, and we must accord him the sympathy granted to one whose contribution is demoded by a new technique, "Now that (thanks to the valuable invention of Helmholz) the ophthalmoscope is in our hands, the importance of the entoptic mode of examination for diagnosis is thrown completely in the shade." The mode however remains of great interest and it is possible that in the future the investigation of these subjective phenomena will play a bigger part in the diagnosis of ocular pathology than it does at present.

My interest, in the first example, was elicited by a subjective experience. You must imagine yourself wakening up on a dull winter morning, the first light is coming past you from a window above your head, and as you open your eyes momentarily you regard a white ceiling. For an instant on the ceiling there appears a spider-like figure. You say to yourself, liver—or elephants, and then, if you have a clear conscience, you begin to wonder where you have seen that figure before. If you are a professor of medicine, or if you have been looking at it regularly for about twenty years, you will probably realise that what you have seen is the projection of the blood-vessel system of the retina. About 120 years after him you have rediscovered Purkinje's figure. He described in 1825 his finding that when a light is thrown on the side of an eye in a darkened room, the subject perceives a pattern of shadowy lines, an outline corresponding to his retinal vessels, which is believed to be due to an after image. The value of the observation was underlined in 1855 when Muller deduced from it that the percipient tissue of the eye is the outer layer of the retina.

From this we note how close to us lies the raw material for advances and how simply an informed person may pick up a pebble on the shore of the ocean of knowledge. The phenomenon I have described must have occurred over and over again in the course of the centuries before Purkinje, and no one acquainted with retinal anatomy and the ability to put two and two together existed. Purkinje described his figure well before the fundus had first been viewed with the ophthalmoscope, but the existence of the blind spot was known in his time, having been described by Marriotte in 1668. In his historical note on Purkinje, Sir Stewart Duke-Elder remarks: "His history, however, is a tragedy which does not stand alone in the annals of science. In his earlier years he laboured assiduously, under considerable difficulties, in the attic of his house; and then, in 1839, being presented with the first State Physiological Institute in the world, his work ceased." Sir Stewart concludes: "It is only rarely that the true spirit of science thrives in an atmosphere of luxury."

The same criticism cannot be laid at the door of Herman von Helmholz, who one hundred years ago this year was the first man to describe the ophthalmoscope. This great man made many contributions to our knowledge, but to what wide realms of fruitful research this particular one has led, not only in the field of ocular pathology, but of many other forms of endoscopy. At the International Congress of Ophthalmology, held in London this year, the centenary was celebrated by the issue of a booklet commemorating the event by the German Ophthalmological Society, and Mr. Harold Ridley of St. Thomas' Hospital brought the century's work to a fitting climax by demonstrating for the first time colour television of the fundus of the eye—a remarkable achievement.

Let me revert now to another winter day, or rather night, and you are cycling along a dark country road aided by a weak paraffin bicycle lamp. You think that the wick requires adjusting, and you dismount, and in trimming the wick allow the quadrangular patch of light to fall on the central portion of your retina. Then you remount the bicycle, and as you pursue your way you see a dark shape projected in space before you. If you have just recently completed your second medical examination, you realise what this large black object, this after-image, is, and you are struck by the manner in which its size can vary. If you accommodate, that is look at a point close in to you, the image is seen approximately the size of the flame which was the cause of the sensation. But if you relax your gaze and look into the far distance, you see the image magnified immensely, reminding you of the size of a cinema screen. You have judged the size of the image by proprioceptive stimuli from the muscles of accommodation. In the case of an after-image then, the perception is affected by the state of the body when it receives the first impression both as regards size and colour. I think it is possible that when a new development takes place in the field of medicine our interpretation and attitude to it is in similar fashion coloured by the theories and techniques which it replaces.

An example of this is to be drawn from the history of ophthalmic medicine in the early nineteenth century. The German school, following Professor Beer, classified ophthalmias or inflammations of the eye according to their presumed causes; the French and British schools attempted to classify according to the seat of the disease, so that where the latter spoke of conjunctivitis, iritis and keratitis, the former spoke of ophthalmias—scrofulous, rheumatic or catarrhal. Other varieties recognised were erysipelatous, variolous, morbilious, scarlatinous, herpetic, arthritic, syphilitic, scorbutic and intermittent. In the light of new knowledge that has come to us many of these terms are now outmoded, and according as we approach the facts from one side or the other, we tend to get an imperfect picture of the truth, which is to be found in a blend of both views. The use, however, of a term such as scrofulous or catarrhal in a loose manner is a carry over from an outmoded school of thought, and the use of such words may delay the recognition of disease entities, emerging for the first time in the light of new conceptions and new classifications.

Our knowledge of the part played by the faculty of binocular vision in the physiological functioning of the eyes has grown in conjunction

with the growth of neurology and orthoptics, and we now realise the importance and value of stereopsis or the possession of this faculty in full. We recognise that the possession of parallel visual axes and our type of macula enable us to achieve a very special method of orientating ourselves in our surroundings, one which was even more useful to our ancestors in arboreal days than it is to us in our artificial and pampered circumstances.

It is but natural that possessed of this faculty men should endeavour to depict representations of those scenes which they consider memorable, either for their beauty or their historic significance. The artist, in doing so, is accustomed, unless he is ultra modern, to lay out his picture in foreground, middle distance and background, and the viewer gazing at the picture is able to take in the meaning, although the representation is very different from what actually occurs in nature. The effect is gained by perspective or optical illusion and by the viewers fallacious belief that our vision has a photographic ability to take in a landscape at a glance, whereas when an object in space is regarded by an individual possessing normal binocular vision the eyes move so that the visual axes intersect at the object, forming an image on each macula. The images of all other objects so fall that they give rise to double vision, as seen by the periphery of the field of vision, and it is from this double vision that impressions of contour and depth are gauged. Thus it is that by dint of viewing the natural scene from two points of view simultaneously we get a more informed knowledge of reality. It is not an undue stretch to apply this thought to the field of medicine and to claim that those who follow clinical practice achieve, or have an opportunity of achieving, the synthesis that leads to more complete understanding. They do this by approaching their cases from two different angles. The first is the diagnostic approach—a purely intellectual effort—and the second the therapeutic. This one covers a wide domain, ranging over the answers to the questions : "What is the patient to be told about his disease?; "What is he to be told he must do about it?" and "What is needed in the way of advice, drugs and hospital or other facilities?"

A knowledge of diagnosis is of course a requisite second to none in the profession of medicine. Dr. Clarke-Kennedy defines it as essentially a clinical assessment as a basis for prognosis and a guide to the immediate treatment of the patient. But it is just because the approach from what I have called the therapeutic angle must be unerring that it is an essential part of the student's training to walk the wards. The book-learning, the theoretical basis of current practice, must be learned and digested, but the management of cases must be learned as the naturalists say, "in the field"—by the observation in action of those skilled in the art. Let me carry my analogy a little further, and say that to derive satisfaction from one's work in the medical sphere, it is necessary, having acquired the dual art of diagnosis and case-management, to keep these two aspects both functioning in proper alignment. Those who desire culture for its own sake, or as an intellectual pursuit, eschewing responsibility, would do well to give the medical career the go-by, for a medical qualification is like binocular vision, a tool meant for use; and just as an eye that loses its function soon gets out of line, and the result is an

obvious squint, so a medically qualified person who fails to keep abreast of advances in diagnosis on the one hand, and does not accept responsibility in the exercise of his profession on the other, is liable to find that his knowledge such as it is, is a burden to himself and of little use to anybody else.

I would like to emphasise the necessity that is on us to accept responsibility. It is not for the medical man, exercising his function in the manner that has been handed down from his predecessors, to "pass the buck," and the training that is laid down for the medical man in his under-graduate and early post-graduate days is designed to fit him, step-by-step, to accept responsibility commensurate with his seniority.

It is this acceptance of responsibility that the patient looks for from his doctor. The future will show whether he can be equally well served by the employee of a third party, as he was when he himself employed the practitioner of his choice, and the bargain was as that between a willing buyer and a willing seller. Many believe that undue attention is being given to the material goods of which it is our function to dispose, and that the doctor in his role of counsellor and friend is often taken too much for granted. For our part we can only continue to provide the service if we keep before us a philosophy such as that expressed as follows by King Asoka, the Indian ruler of early days :

"I am never satisfied with the adequacy of my exertions or the promptitude of my decision of cases. Work I must for the public benefit, and the object of all my exertions is simply to acquit my debt to living beings so that I may make some of them happy in this world, and that hereafter they may attain heaven."

To another Indian, a sojourner in our city, I am indebted for a fitting series of definitions : To know what must be done—that is Wisdom; To know how to do it —that is Skill; To know what must be done and to do it—that is Service.

In seeking for ourselves satisfaction in a life which consists of items of service to individuals we are on sure ground, for we are following what the Master said was second only to the greatest commandment of all.

With the advance in scientific knowledge, it is nowadays improbable that, like Newton at a fair, we shall buy a piece of prismatic glass and from it derive material for an epoch-making discovery on the nature of light, nor is it probable that, like Helmholz, the "stout Cortes" of the scientific world, we shall construct an ophthalmoscope out of a few coverslips and open up a new world. Our tools have become more complicated and the techniques required are such that no individual can hope to master more than a few. It is in the performance of difficult and highly skilled procedures that the advancing edge of knowledge now marches. In the ophthalmic field there is the investigation of the new technique of television of the fundus oculi, there are the refinements now being devised for slit-lamp microscopy of the posterior portions of the eye, there is the application to ocular therapeutics of new antibiotics as and when they are released. In all these lines of investigation we find the expensive instrument, the difficult technique, the small field of study and yet the possibility that some fundamental discovery may be made. I think this typifies our situation to-day. We have in our hospital service

what is admittedly an expensive instrument. The techniques we follow, both therapeutic and administrative, require enthusiasm, patience and industry to acquire, and this of necessity restricts the field of the individual. The broad outlook in medicine which was possessed by Sir William Osler is now most difficult to achieve. And yet we must make the effort to achieve it if this vast new paraphernalia of modern medicine is not to bog down of its own weight. We have a synthesis to achieve—the mingling of the humanity of the old physicians with the science of the modern age.

I believe that the generation of teachers under whom I was privileged to study achieved this synthesis in no small degree. Only insomuch as your generation and mine succeeds in holding aloft the torch we have inherited will our profession retain its honoured place in the community.

Few of us would like to think that medicine as it exists to-day is anything more than the chrysalis of what we hope for. The fulfilment of the perfect structure will be given to those who know the facts—the experience of the past, and who are alive to the ideals or the hopes for the future. In addition, they must have the energy to devote their lives and efforts to seeing their ideals realised.

With this goal in view, I would say to you who are at the outset of your career: Spread your interest over all the subjects of the curriculum. It is possible that the one you touch on most lightly may become, if not your bread and butter, your mainstay and your intellectual hobby; and it may be that some other interest, perhaps non-medical altogether may be the key that will unlock doors hitherto barred and bolted to mankind.

Secondly, I would say read biographies and read some medical biographies. Most of us have too little knowledge of the possibilities of our profession to be able to dispense with these. They are mostly written by doctors, and the experience we bring to them shows up the high lights in the experiences of our predecessors, and enables us to savour these experiences more thoroughly. I recently found out, in re-reading Osler's Life by Harvey Cushing, how much more there was in it than I suspected on my first reading, although I thought it then and still think it one of the most enriching books in medical or any literature.

Finally, I would say, Remember that you have a life to live, that however much you may be determined to make a success of your medical career, you have also your part to play in the society in which God placed you.

Cherish your links with your non-medical friends. Do not let the heady draught of science spoil for you the joys of the widest possible communion with your fellows. Let our aim be to see life steadily and see it whole. If we do so it may be our privilege to throw the light of our knowledge in many dark places, remembering as we do so the words of the motto made use of by the ophthalmologists of Ghent—"Vitam dat qui lucem"—He who gives Light gives Life.

Influenzal Meningitis To-day

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Recent advances in the treatment of Meningitis due to Hæmophilus Influenzæ have focussed increasing attention on this infection, and our figures at The Northern Ireland Fever Hospital suggest that there is a real as well as an apparent increase in the incidence of this disease.

History

In 1938, Kane reported to the Ulster Medical Society a total of seven cases of influenzal meningitis which had been recognised in the hospital since its opening in 1906. In the years 1946-1949 seventeen cases have been treated, and these are the subject of this report. During this period, of 90 cases of meningitis in children under three years of age admitted, 17 (18.8 per cent.) were due to hæmophilus influenzæ: the others being tuberculous 32, meningococcal 31 and pneumococcal 10. This year (1949), out of 26 cases of meningitis in children under three years, 6 have been due to hæmophilus influenzæ (i.e., 23 per cent.).

Most authors place hæmophilus influenzæ third or fourth in order of frequency of infecting organisms in childhood, but Zinsser (1939) from Boston Children's Hospital, found it the commonest form of meningitis in years in which cerebro-spinal fever was not epidemic.

The organism was first isolated by Pfeiffer in 1892 from the sputum of patients suffering from influenza, and was considered by him to be the ætiological agent of that disease. It is unfortunate that it has not been renamed. Cases of influenzal meningitis were reported as clinical curiosities from time to time, and the disease had a spontaneous mortality of between 92 and 100 per cent. (Alexander et al 1942), but it was not until 1931 that an attempt was made to develop a specific therapy. In that year Pittman described rough and smooth forms of the organism which could be easily differentiated on culture. The rough forms were relatively non-pathogenic, and occurred naturally in the human naso-pharynx, but the smooth forms she showed to be pathogenic to man and animals. The smooth form of the organism she also found had, like the pneumoccus, a polysaccharide capsule, and by use of precipition and agglutination tests she sub-divided the smooth forms into six groups, now known as Pittmans a, b, c, d, e, and f groups. Organisms isolated from meningeal infections most commonly belong to group b. In the present series only six organisms were typed, and all these were group b.

In 1933, Pittman described the use of a horse anti-serum produced from type b organisms, but she and other authors (Huntingdon and Weikes-Weiss, 1936) at that time found the serum of little value clinically in spite of good results in animals. In 1939, Alexander produced a rabbit serum which was more promising,

and later, using sulphonamides and rabbit serum in combination, she reduced the mortality rate to 22 per cent. in eighty-seven consecutive cases.

In 1945, Gordon and Zinnemann suggested the use of penicillin in influenzal meningitis, having found that eighteen strains of the organism isolated from the meninges (sixteen of which were Pittman b) were all sensitive to penicillin. At the same time, McIntosh and Drysdale reported a case of influenzal meningitis in a child of 2½ years cured by the use of penicillin and sulphonamides. The same authors, the following year, reported another case in which the organism was insensitive to sulphonamide, but sensitive to penicillin, which was cured by prolonged intrathecal and intramuscular treatment.

Increasing numbers of cases were reported from then in the British literature. Varying schemes of treatment and dosages of drugs were recommended, and all combinations of rabbit serum, sulphonamides and penicillin had their advocates. In 1946, streptomycin was released for use in this country under the guidance of the Medical Research Council. The sensitivity of primarily isolated strains of the organism to the drug encouraged great hopes, but it was soon found that drug resistance often developed with alarming rapidity (Smythe, 1948; Wilson, 1948).

One series of cases in which streptomycin resistance was not encountered has been published (Ounsted, 1949), but most workers consider that streptomycin in combination with one or more of the other known therapeutic agents is the best line of therapy.

In Northern Ireland, we have not used rabbit serum, but we have had excellent results with a combination of intrathecal and intramuscular penicillin and streptomycin and oral sulphonamides, thirteen consecutive cases so treated having recovered.

Present Series

The first case in the series, a female child of 18 months, was admitted on 31st July, 1946, with a two-day history of fever, irritability and vomiting. On the day of admission, she developed slight neck rigidity, and this was the only physical sign detected in hospital apart from slight injections of the fauces. Temperature was 101°, and lumbar puncture gave a turbid fluid, under increased pressure containing a predominance of polymorphs and a few gram negative bacilli. These were not identified as hæmophilus influenzæ at that time, and the child was treated as a meningococcal meningitis with oral sulphonamide and intramuscular penicillin (the role of penicillin in cerebro-spinal fever had not been established at that time). Her temperature fell to normal on 4th August, 1946, and the child appeared well, so that all treatment was stopped on 5th August, 1946. On 7th August, 1946, her condition was much worse, her colour was bad, she was very irritable, resented handling and meningism was very marked. Lumbar puncture gave a turbid fluid containing a large number of hæmophilus influenzæ on direct smear and culture. Systemic sulphonamides and penicillin were recommenced, and the child's general condition improved slowly for a few days but then remained static. Cerebro-spinal fluid obtained on 14th August, 1946, still contained a few organisms on direct smear, but was sterile on culture. The next day an irregular

pyrexia developed without any appreciable change in the general condition. On 19th August, 1946, (the 21st day of illness) 25,000 units of penicillin were given intrathecally, and this was repeated on the six succeeding days.

There was little change in the child's condition, and her temperature had not settled at the end of this time when all treatment was stopped. The next day, however, her temperature was normal and she started a fairly rapid improvement. Apart from varicella, which developed on 31st August, 1946, her convalescence was uneventful. In retrospect, this child had either a high degree of natural resistance or a very sensitive infecting organism to have recovered on such haphazard treatment.

The second case, a female child of seven months, had been ill for one week on admission. She had vomited on her third day of illness, rigidity and convulsions had occurred on fifth, sixth, and seventh days. Her blood culture was positive, and hæmophilus influenzæ were very numerous in her cerebro-spinal fluid. Streptomycin was made available for treatment, and the bacteriological department of Queen's University co-operated with us in daily estimations of cerebro-spinal fluid and blood levels of streptomycin and daily estimations of the organism's sensitivity. Intramuscular and intrathecal streptomycin were given, and some improvement occurred both generally and bacteriologically for the first two days —although culture of the cerebro-spinal fluid was positive, the number of organisms present on direct smear were much reduced. On the third day, clinical and bacteriological relapse occurred, and the organism was shown to have developed streptomycin resistance. A vain attempt was made to save the situation with penicillin and sulphonamide, but the child died on her twelth day of illness.

Case three was intended as a control for case two, and was treated from the start with penicillin intrathecally and systemically and oral sulphonamides. A slow response was obtained, and the cerebro-spinal fluid was sterilised after seven doses of intrathecal penicillin (25,000 units per day), which was then continued daily for a further six days, when intrathecal medication was stopped. Clinical and bacteriological relapse occurred three days later, and this time the condition showed no response whatever to treatment, and the child died two days later.

In view of the disappointing results in cases two and three, it was decided to try subsequent cases on a combination of both types of treatment, this having been suggested by the Medical Research Council in 1947. This has been done with 100 per cent. success, and in the thirteen cases so treated, there have been no relapses (the dosage used has been 25,000 units of penicillin intrathecally daily and 25 or 50 mg. streptomycin intrathecally daily and 20 mg. of streptomycin per pound body-weight per day, intramuscularly given in six-hourly doses). The number of intrathecal doses of penicillin and streptomycin required has not yet been decided. Three of our cases over 1 year of age have made excellent recoveries after only four daily intrathecal doses. Wilson (1948) recommended, in streptomycin treated cases, that intrathecal medication should be continued for seven days after the cerebro-spinal fluid was sterile, but in all our cases treated on this combined regime, no positive culture has been obtained after the first intrathecal dose.

Organisms may be seen on direct smear of the cerebro-spinal fluid on the second and occasionally on the third day of treatment, but they have not been cultured. At present it is on clinical estimation of progress and microscopic examination of the cerebro-spinal fluid that intrathecal treatment is stopped. The intrathecal medication causes some meningeal irritation and increased cellularity, but, in our experience, the cells thus produced are mainly lymphocytic while the response to the infection is predominantly polymorphonuclear.

Since the institution of "combined therapy" one case, which was not treated by it died. The onset of the meningitis is of interest and the following is a clinical summary :—

A male infant of 7 months was admitted to another hospital for circumcision, when it started to vomit, and two days later developed foul relaxed motions. It was sent to Purdysburn as gastro-enteritis. On admission, it was not dehydrated, but had slight neck rigidity and looked ill. A lumbar puncture gave a clear fluid under normal pressure containing protein 50 mg. per cent., no cells, and sterile on culture. No parenteral infection was found and it was treated dietetically as a gastro-enteritis. Two days later it had a temperature of 103°, its motions were green fluid, and it had marked neck rigidity. Lumbar puncture yielded a turbid fluid containing what, microscopically, were believed to be meningococci. The child was treated with oral sulphonamide, and the next day, before the culture was known to be positive for hæmophilus influenzæ, the child had died.

Post-mortem—Dr. Morison found "thick creamy pus in the subarachnoid space over the vertex on both sides anteriorly and extending on the inferior surface as far as the optic chiasma. The posterior part of the hemispheres, and especially their inferior surfaces, were remarkably free from exudate." Histologically, Dr. Morison commented—"though extensive, the exudate is probably acute, and there may have been no exudate on the day of admission." A blood culture was, unfortunately, not done in this case as it might well have shown a pre-existing septicæmia.

Clinical Features.—The diagnosis of influenzal meningitis presents many problems, not the least being the fact that, in young infants and children, classical meningeal signs are often absent.

Age Incidence.—Bradford (1944) in Mitchell-Nelson's Text-book of Pædiatrics, considers the peak incidence to occur between 6 and 12 months, and says the disease is rare under 2 months and infrequent over four years, but in the present series, and indeed in most reported series in England, shows almost equal numbers occurring between 6 and 12 months and 12 and 18 months. Our figures are :— Under 12 months, 7 cases (youngest 5 months); 12 to 18 months, 6 cases; 18 to 24 months, 2 cases; over 2 years, 2 cases.

Lindsay et al (1940) suggests that this age incidence occurs because, "at the period of maximum susceptibility, maternal immunity has been nearly dissipated, and there has been insufficient time for acquiring natural immunity." Cases in older children have been recorded, e.g., Zinnemann (1946) collected twenty cases,

one of which was 5 years of age; and Rivers (1923), in America, referred to influenzal meningitis in adults.

One of the difficulties in early diagnosis is the age at which the disease occurs, but an even greater difficulty is the varied clinical picture by which the disease may manifest itself.

At one extreme, Lindsay et al (1940) mentioned two cases of children who died in less than twenty-four hours with purpura and adrenal hæmorrhages—the typical Waterhouse-Friderichsen syndrome of meningococcal septicæmia. Another case, accompanied by purpura, was described by Huntingdon and Weilks-Weiss in 1936. Other cases occur in which a puzzling " P.U.O." is only diagnosed on lumbar puncture.

Recently more attention has been paid to the presence of an extra-meningeal focus of infection preceding the onset of meningitis. Smythe (1948) found a very high percentage of cases had a septicæmia at the time of admission to hospital. Huntingdon and Weilks-Weiss (1936) had ten cases out of fifty-four with pneumonia and otitis media before the onset of meningitis, and, although Alexander (1942) thinks otitis media is an uncommon precursor of influenzal meningitis, she does agree that an upper respiratory track tract infection is common in the prodromal period.

In the present series, eight had definite evidence of respiratory tract infection on admission, and two had otitis media. Out of these cases, hæmophilus influenzæ were grown from two throat swabs and one post-nasal swab. No hæmophilus influenzæ were recovered from the aural discharges.

The upper respiratory tract infection proceeds abruptly or gradually into the meningitic phase, the only common signs of which in infancy are fever, irritability alternating with drowsiness, vomiting in most cases, and occasionally convulsions. With an open fontanelle, increased tension is the earliest sign of meningitis to be found. In one of the cases in this series the family doctor was asked to see the child because it was irritable and had a lump on its head—this proved to be a bulging fontanelle. If the fontanelle is not open, the classical signs of meningitis are late in appearing and in these cases the irritability, disturbances of consciousness and vomiting must make one suspicious.

In older children the diagnosis is less difficult, as they can often indicate headache and in the absence of Kernig's sign (which is most unreliable in childhood), Brudzinski's neck sign is of great value, and is often present before any appreciable neck rigidity.

A feature of the illness is the loss of colour associated with this infection. The complexion is usually muddy, and in spite of marked pyrexia, it is rare to see the patient flushed.

The importance of early diagnosis cannot be overstressed, as in the case of any acute infection, an early start to treatment gives a greatly enhanced prospect of recovery, but one can, unfortunately, only agree with Lindsay et al (1940) when they say, "lack of leading symptoms and signs because of the age of these patients makes the diagnosis difficult and often delayed."

SUMMARY.

Seventeen cases of meningitis due to hæmophilus influenzæ, fourteen of which recovered, are reported.

The incidence of the infection is discussed.

A combination of 25,000 units of penicillin and 25 to 50 mg. of streptomycin intrathecally daily with one mega unit of penicillin and 20 mg. per pound body-weight of streptomycin intramuscularly daily and oral sulphonamide is advocated for treatment. All thirteen cases so treated recovered.

The clinical features, age incidence and the association of extra-meningeal infection is discussed.

I am indebted to Dr. Kane, Medical Superintendant of the Northern Ireland Fever Hospital, for permission to publish these cases and for direction and control of the therapy; to Dr. Tinsdale, Bacteriologist, Northern Ireland Fever Hospital, for the bacteriology; and to Dr. Morison, of the Institute of Pathology, Belfast, for the post-mortem report.

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REVIEW

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THIS American text-book is stated to be written mainly for students and covers embryology, anatomy, physiology and pathology as well as diagnosis and treatment.

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Cancer Mortality in Northern Ireland

By E. A. CHEESEMAN, B.SC.(ECON.), PH.D.

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I.—INTRODUCTION

THE Health Advisory Council for Northern Ireland (1946) has drawn attention to the very great increase which has occurred in the cancer death rate during the last hundred years. When the Council's memorandum was prepared, the crude rate was four times larger than it was in the decade 1851-60. More recently, the Registrar-General for Northern Ireland (1949) has emphasized that until 1931, the annual number of certified cancer deaths was always less than that attributed to all forms of tuberculosis, whereas, since 1931 the reverse has been true. The annual number of registered cancer deaths continues to increase while that of registered tuberculosis deaths continues to decrease.

Three factors were suggested, by the Health Advisory Council, which could have contributed to the increase in the cancer death rate—an ageing population, improvement in diagnosis, and better certification of cause of death. To these possibilities a fourth must be added—a real increase in the risk of an individual dying from a malignant growth. It is not easy to separate the effects of these contributory factors, but within certain limits the effect of the ageing population can be ascertained, either by comparing like age groups or by some process of age standardisation of mortality. Further, a more precise evaluation of the certified mortality trends can be made by considering the specific parts of the body affected. From a detailed study of cancer mortality in relation to age and site, the Registrar-General for England and Wales (1940) concluded that "Recent research has tended to show . . . that the causative factors of cancer are complex and the occupational and social conditions have very different relations with cancer mortality according to the site of growth selected for study . . . ." Some years later, Stocks (1947) studied the regional differences in cancer mortality of specified sites; he found striking differences for some sites (e.g., the stomach and respiratory organs), and also revealed that whereas in some instances (e.g., cancer of the lung) certified mortality was increasing, in others (e.g., cancer of the uterus in females and cancer of the œsophagus in relatively young males), it was decreasing; while for a number of sites no material change occurred over the last twenty years.

In an important contribution to the literature, Crabtree (1941) studied the familial incidence of the disease and tentatively concluded that the incidence of fatal cancer was excessive among the parents and siblings of women with cancer of the skin, breast and cervix. This, he suggested, was also true for the parents

and siblings of men with skin cancer when the condition developed at a relatively early age. On the other hand, the familial incidence of cancer of the lip did not differ appreciably from the average, although that of cancer of the lung was considerably below average. He pointed out that skin cancer should not necessarily be classified as hereditary, since a common environment of the family could result in a similar excessive mortality, but it did seem likely that female breast cancer might possibly be of hereditary origin.

TABLE I.

Northern Ireland—average annual death rates from cancer (all sites) classified by age and sex in the periods 1925-27 and 1936-38.

Age Group in Years	Average annual number of deaths registered per million of the population				Death rates in 1936-38 as percentages of those in 1925-27	
	1925-27		1936-38			
	Males	Females	Males	Females	Males	Females
Under 40	65	117	78	98	120	84
40—	916	1,657	861	1,307	94	79
50—	2,539	3,397	2,672	3,233	105	95
60—	4,949	4,909	4,699	4,984	95	102
65—	6,362	5,524	7,318	6,510	115	118
75 and over	7,262	5,398	8,531	7,208	117	134
All Ages	1,062	1,229	1,246	1,372	117	112
40 and over	3,217	3,501	3,628	3,759	113	107

Stocks and MacKay (1946) reviewed the recent trend of mortality in England and Wales and certain interesting comparisons can be made with data which are available for Northern Ireland. In England and Wales, male cancer mortality increased at ages 65-74 until 1931-35, and then decreased slightly. Female mortality in the same age group was materially unaltered between 1921-30 and 1931-35, but thereafter it fell. In Northern Ireland, both sexes at these ages had an increased mortality between the two periods 1925-27 and 1936-38 (Table I). Unfortunately, the absence of a reliable population age distribution, since that of the 1937 census of population, makes it impossible to examine mortality at specified ages in Northern Ireland for more recent periods. At ages of 75 years and over, a maximum mortality level was reached for both sexes in England and Wales in the period 1935-39. Again at the same ages in Northern Ireland an increase in the registered mortality of both sexes was evident between 1925-27 and 1936-38. It would appear that in England and Wales, among old members of the community, mortality reached its peak in the thirties—this may also be true of Northern Ireland, but we cannot produce the evidence for or against such a hypothesis until the population figures for the 1951 census become available. In the light of the mortality trends at ages over 65, Stocks and MacKay concluded that "the fictitious increase in total cancer attributable to more complete

diagnosis for certain sites has now ceased to have any important effect on the total cancer rate . . . ." It follows that probably such "fictitious" trends will be present in the pre-war mortality experience in Northern Ireland, and it is unfortunate, but unavoidable owing to the absence of reliable population figures, that the examination of the mortality statistics, which form the main part of the present study are limited to that period.

The difficulties of interpreting the vital statistics of cancer have been commented upon frequently elsewhere. McKinnon (1950) goes so far as to say that "It is clear in the everyday practice of both the clinician and the pathologist that, in deaths from cancer, the primary site cannot always be specified, it is not infrequently highly speculative, uncertain and even quite erroneous. It is equally clear to the clinician and the pathologist that the incompleteness and unreliability of specification of the primary site vary widely with age, sex, site, time and place." Even though this statement implies rather a greater degree of "speculation" on the part of the pathologist than probably exists, the fact that the available data do not distinguish between the clinician's and the pathologist's certifications results in such imperfections as those enumerated by McKinnon being a feature of the mortality statistics. In an earlier paper on cancer mortality in Ontario during the years 1921-47, McKinnon (1949b) focussed attention on the age group 40-69 years amongst women. In that age group, in his data, female registered mortality did not materially change over the twenty-seven years of his study, whereas in other age groups and in all age groups for men, mortality increased. He inferred that since the unchanging female rates largely reflect the experience of a group in which the rates were probably more comparable, over a period of time, than in any other, it was likely that "there has been no material change in the cancer problem in these, or by implication, in any other age groups throughout the period." He excludes from his generalisation the "controversial increase in pulmonary cancer in the male" and suggests that otherwise the increases in mortality, particularly in the older age groups, are reasonably attributed to changes in diagnostic and certification practice. The Northern Ireland rates shown in Table I might be interpreted in favour of such a hypothesis. The greatest relative increases in registered mortality were a feature of old age and although female mortality between ages 50 and 64 changed little and at 40-50 fell quite appreciably, this is unlikely to invalidate such a theory. However, it is doubtful whether one can, on such meagre evidence as exists for Northern Ireland, "by implication" assume that the increases in the older age groups were, in fact, wholly due to improved diagnosis and certification—there may be a real increase in the risk among older members of the community.

Whatever the cause of the observed increase in registered mortality in Northern Ireland, the available statistics do show that either we have not been fully aware of the problem in the past or that the size of the problem is, in fact, increasing. Whether the increase is "real" or "artificial," the more we know about the site, sex, age group and parts of the body affected, the better are we

equipped to combat the problem. The following analysis of the available material has therefore been made in the hope that some useful knowledge will be gained from the information which at present lies hidden in the official mortality statistics. The Health Advisory Council (1946) urged that "every effort must be made to find a radical cure for the disease, and, pending this momentous achievement, to use all available means to reduce the toll which is now being taken by malignant growths." To see the way in which such effort is to be directed in Northern Ireland it is necessary, if possible, that some indication should be given of where the greatest risks lie.

II.—Cancer Mortality Analysed According to Site of Growth.

(a) *Method of analysis.*—An adequate analysis of mortality data from any cause of death must take into account the age distribution of the community. If we are to avoid being misled by the changes in mortality which occur solely as a result of differences in the age distribution and size of the compared populations, whether these refer to the same community at different points of time or to different communities at the same point of time, then we must either compare similar age groups or else carry out some process of standardisation for age differences. For either approach, reliable age distributions of the compared populations must be available. Unfortunately, the last such distribution for Northern Ireland is that resulting from the census of population carried out in 1937. The present analysis has, therefore, been limited to a study of mortality in two periods, 1925-27 and 1936-38, the average annual number of deaths in each period being related to the cenus populations of 1926 and 1937 respectively. This limitation does mean that the study is primarily limited to a pre-war experience over a period during which diagnostic and certification practice was probably changing (page 160), but in the absence of more recent reliable population figures, no alternative is available.

Between the two periods studied a decennial revision (1931) of the International List of Causes of Death was made. It is considered that this revision is unlikely to affect any of the conclusions drawn, since comparison with the preceding revision (1921) reveals no differences in classification likely to affect the grouping of affected sites used in the present paper.

The average annual crude death rates from cancer of various specified sites in each period, 1925-27 and 1936-38, are shown in Table II. The rates are limited to ages 40 years and over, since the number of deaths occurring below that age is, in most instances, very small.

Cancer of the lip and of the tongue have not been separately tabulated for women, although they are shown for men, because the number of female deaths is small. In the three years 1925-27, only one female death was ascribed to cancer of the lip and eleven to cancer of the tongue; in 1936-38 the figures were nine and nineteen respectively. The remaining parts of the body, which have been tabulated, have been selected because of the numerical importance of cancer deaths attributed to them. Sites to which relatively too few deaths were attributed

to permit the calculation of reliable rates have been grouped together as "other sites."

TABLE II.

Northern Ireland—average annual death rates from cancer classified by sex and part of the body affected in the periods 1925-27 and 1936-38.

Ages 40 and over.

Part of Body Affected	Average annual number of deaths registered per million of the population			
	1925-27		1936-38	
	Males	Females	Males	Females
Jaw	113	28	70	29
Lip	88	—	99	—
Tongue	159	—	114	—
Intestines	343	376	561	545
Liver and Gall Bladder	274	313	185	232
Oesophagus	87	84	117	98
Pancreas	59	41	88	88
Rectum	263	145	247	185
Stomach*	978	788	1,020	779
Lung†	47	31	207	88
Larynx and Trachea	42	28	46	36
Uterus	—	430	—	471
Ovaries	—	63	—	112
Breast	—	546	—	547
Prostate and Bladder	173	—	307	—
Skin	121	105	112	98
All Other Sites‡	470	523	455	451
	3,217	3,501	3,628	3,759

*including duodenum and pylorus.

†including bronchus and pleura.

‡composition of this group is different for each sex.

—indicates site irrelevant or data insufficient.

The crude death rates of the two periods are not strictly comparable, since it is known that between 1926 and 1937 the population of Northern Ireland became older and larger; thus with a cause of death such as cancer we should expect more deaths in the second period than in the first, even if the actual risk of dying had not changed. The influence of the older population in this respect has been eliminated in Tables III and IV, for men and women respectively, by comparing, for each sex and site separately, the number of deaths registered in 1936-38 with the number which would have been expected had the age specific death rates, for that site and sex, been the same in 1936-38 as they were in 1925-27. A detailed explanation of the calculations involved in these tables and of similar calculations in later tables (VI and VIII) is given in Appendix I. For any specific site and sex the relative change in mortality, irrespective of the change due to a differently

age constituted population, is thus indicated by the ratio of the registered to the expected deaths in 1936-38. The absolute numerical contribution of any one site to the increase in cancer deaths of all sites in either sex, irrespective of the increase due to the older population in the later period, is indicated by the absolute difference between registered and expected deaths attributed to the site concerned in the second period, 1936-38.

It might be argued that the limitation of the tables to deaths of persons aged 40 years and over may weigh unfavourably against female cancer of the ovaries, uterus and breast, since five to ten per cent. of all female cancer deaths attributed to these sites occurred amongst women under the age of 40. However, the majority of the deaths under 40 years of age occurred in the age group 30-39 and if the ratios of registered to expected deaths are re-calculated for these three sites to include this earlier age group, the only material difference which occurs between the revised ratios and those tabulated refers to cancer of the ovaries. For this site, the tabulated ratio is 179 per cent.; if the age group 30-39 is included the

TABLE III.

Northern Ireland—cancer mortality among males aged 40 and over classified by part of body affected in the periods 1925-27 and 1936-38.

MALES — Ages 40 and over standardised

Part of Body Affected	Number of Deaths Registered		Number of Deaths Expected	Difference (Registered —Expected)	Ratio Registered as percentage of Expected Deaths
	1925-27	1936-38	1936-38	1936-38	1936-38
Intestines	198	345	223	122	155
Lung*	27	127	30	97	423
Prostate and Bladder	100	189	113	76	167
Oesophagus	50	72	55	17	131
Pancreas	34	54	38	16	142
Lip	51	61	57	4	107
Larynx and Trachea	24	28	26	2	108
Stomach†	564	627	631	− 4	99
Skin	70	69	78	− 9	88
Rectum	152	152	169	−17	90
"Other Sites"	271	280	300	−20	93
Jaw	65	43	72	−29	60
Tongue	92	70	102	−32	69
Liver and Gall Bladder	158	114	179	−65	64
All Sites	1,856	2,231	2,073	158	108

*including bronchus and pleura. †including duodenum and pylorus.

"Expected" deaths for a specific site in this table were found by applying the age specific male death rates of 1925-27 for that site to the age distribution of the 1937 population.

ratio falls to 166 per cent. The relative position of this site in the order of ratios is unchanged, so that the limitation of the analysis to 40 years of age and over makes no difference to the broad conclusions drawn.

TABLE IV.

Northern Ireland—cancer mortality among females aged 40 and over classified by part of body affected in the periods 1925-27 and 1936-38.

FEMALES — Ages 40 and over standardised

Part of Body Affected	Number of Deaths Registered		Number of Deaths Expected	Difference (Registered − Expected)	Ratio Registered as percentage of Expected Deaths
	1925-27	1936-38	1936-38	1936-38	1936-38
Intestines	240	374	266	108	141
Lung*	20	60	22	38	273
Ovaries	40	77	43	34	179
Pancreas	26	60	29	31	207
Uterus	275	323	295	28	109
Rectum	93	127	103	24	123
Oesophagus	54	67	59	8	114
Larynx and Trachea	18	25	19	6	132
Jaw	18	20	20	0	100
Breast	349	375	378	− 3	99
Skin	67	67	73	− 6	92
Stomach†	504	534	558	−24	96
"Other Sites"	334	309	367	−58	84
Liver and Gall Bladder	200	159	218	−59	73
All Sites	2,238	2,577	2,450	127	105

*including bronchus and pleura. †including duodenum and pylorus.

"Expected" deaths for a specific site in this table were found by applying the age specific female death rates of 1925-27 for that site to the age distribution of the 1937 population.

(b) *Comparison of the sex trends of cancer mortality.*—Owing to the method of calculating the number of expected deaths in the period 1936-38, the actual levels of the ratios of the registered to the expected deaths of any site cannot be compared between the sexes. On the other hand, we can see, for each sex, which sites contributed to the increase in registered mortality (sites with ratios of more than 100 per cent.) and which sites did not (sites with ratios of less than 100 per cent.); it will be apparent that for each site the level of the ratio in 1925-27 is 100 per cent. Of the parts of the body common to both sexes, there was good agreement between the general relative trends of male and female registered mortality, although exceptions occurred in the case of cancer of the jaw and cancer of the rectum.

Mortality ascribed to cancer of the jaw decreased considerably among men between 1925-27 and 1936-38, the ratio of registered to expected deaths in the last period being 60 per cent. Amongst women, little or no change occurred. However, this particular form of cancer is not an important cause of death, and in view of the smallness of the experience it may well be that no significance can be attached to the differential sex trend, but it is of interest to note that cancer of the jaw and the lip in England and Wales fell rapidly amongst males of all ages from 1911 onwards (Stocks and MacKay, 1946).

Rectal cancer mortality fell by 10 per cent. among men, but increased among women by 23 per cent. It is unlikely that either of these changes is based on sufficiently large experiences to be technically significant. A detailed examination of mortality rates in England and Wales by Bradford Hill (1945) revealed a fall in cancer of the rectum among women and very little change among men.

(c) *Main features of the changes in mortality between 1925-27 and 1936-38.*— The most striking feature of the tables is the exceptionally large increase in mortality attributed to cancer of the lung, particularly among men, for whom registered mortality in the later period was over four times as great as it was in the earlier, compared with an almost threefold increase among women, quite apart from any increase due to the older population in 1936-38. Mortality between the two periods increased by over 40 per cent. for cancer of the intestines and pancreas in both sexes, cancer of the prostate and bladder among men and cancer of the ovaries among women. On the other hand, registered mortality from cancer of the liver and gall bladder decreased considerably for both sexes (by 36 per cent. for men and 27 per cent. for women), but, apart from cancer of the tongue and jaw among men, no other site showed a decrease in mortality of more than 20 per cent.; after due allowance for the older population.

If these mortality changes were reflections of improved diagnostic and certification practice, to the exclusion of all other factors, one would first expect to find an upward trend in the rates attributable to internal sites of malignant growth. Thus the increase in registered mortality from cancer of the intestines, lung and pancreas in both sexes and cancer of the prostate and bladder in men and of the ovaries in women is compatible with such an explanation, although the stability of cancer of the stomach mortality and the decline in mortality attributed to cancer of the liver and gall bladder are not. It might be argued, however, that the decreases in mortality due to cancer of some internal sites such as have occurred might be explained in terms of better diagnosis of the primary site of growth, which, in turn, might be a further contributory factor to the increases in mortality ascribed to other internal sites. For example, the increased mortality certified as cancer of the intestines and possibly the pancreas, and the decreased mortality certified as cancer of the liver and gall bladder might arise in part or in total from a transference of deaths from the latter to the former during the eleven years under review.

Mortality attributed to cancer of external sites, where they have been separately

tabulated, was in most cases fairly constant over the eleven years, (for example, cancer of the skin in both sexes, cancer of the breast in women and cancer of the lip in men). Such external, or easily accessible sites, are less likely to be affected by improved diagnosis and certification and it seems probable, therefore, that the problem is fairly constant in these specific instances. The apparently inconsistent results of cancer of the jaw and the rectum have already been discussed (page 165).

However, an explanation of the increase in the total cancer mortality rate cannot be sought only from the relative changes in mortality attributed to the various sites; large relative increases in mortality attributed to sites not frequently affected will produce only relatively small increases in the registrations of cancer deaths compared with similar mortality increases in sites frequently affected. In both sexes the greatest numerical contribution to the increase in total cancer mortality between 1925-27 and 1936-38 was made by increased registrations of cancer of the intestines and cancer of the lung. In the period 1925-27, 198 male and 240 female deaths were certified as cancer of the intestines, and in each case these figures represent about 11 per cent. of all cancer deaths in that period among persons aged 40 and over. By 1936-38 the ratio of registered to expected deaths increased by 55 per cent. among men and 41 per cent. among women, resulting in an increase in intestinal cancer deaths of 122 men and 108 women over and above the increase due to the older population in the second period. On the other hand, cancer of the lung was relatively unimportant as a certified cause of death in 1925-27, when 27 male and 20 female deaths were registered, representing about 1.5 per cent. of all male and 1 per cent. of all female cancer deaths at ages 40 and over. The very large relative increase in mortality attributed to this site has already been noted; this has resulted in the increase in lung cancer registrations becoming second in importance to the increase in intestinal cancer registrations between 1925-27 and 1936-38—in the period 1936-38 there were 97 male and 38 female deaths more than in 1925-27, excluding any increase which might have occurred due to population changes.

Cancer of the prostate and bladder amongst men is also worthy of comment in this context. The ratio of registered to expected deaths increased between the two periods by 67 per cent., and in the later period the expected number of deaths exceeded the observed by 76. Further, at the other end of the scale the ratios for cancer of the liver and gall bladder indicate a heavy fall in mortality, resulting in a decline in the number of deaths so described—this almost balanced the increase due to cancer of the prostate and bladder amongst men and was greater numerically than the increase due to cancer of the lung among women.

Cancer of the stomach, which numerically is one of the most important sites affected—approximately 20 per cent. of all female and 30 per cent. of all male deaths from cancer are so described—changed very little over the period reviewed. The ratios in 1936-38 were 99 and 96 per cent. for men and women respectively Similarly, cancer of the breast among women was fairly stable, having a ratio of 99 per cent. in 1936-38. The absence of any decline in mortality from breast cancer

has also been noted by McKinnon (1949a) in respect of women between the ages of 20 and 69 in Ontario and he discusses its probable implications in relation to his hypothesis mentioned earlier (page 160).

From the striking features of the foregoing analysis it would appear that much of the increased mortality attributed to some internal sites might be accounted for by more precise diagnosis of primary affected sites, with the resultant decrease in other sites due to the consequent transference of deaths. If this is so, then the fact that cancer of the lung has increased relatively more among men than among women requires some special explanation.

(d) *Lung cancer.*—The increase in lung cancer has been observed in other countries. Dorn (1934) commented upon the phenomenon in the United States of America, where between 1914 and 1930 mortality increased by nearly four times. Stocks (1947) noted that in England and Wales over the last twenty years lung cancer has increased "six- or seven-fold amongst men and half that extent among women." A similar study in Zurich from 1906 onwards revealed a similar increase among men, although among women the increase was relatively slight (Schinz *et al*, 1946). In Denmark, mortality was roughly at the same level for each sex in the early thirties, but by 1945 males outnumbered females in the ratio of three deaths to one (Clemmesen, 1947) and evidence has been produced to suggest that in Copenhagen the true ratio is more probably in the region of eight to one.

Various hypotheses have been suggested in attempts to explain these increases. Clemmesen and Busk (1947) suggested that the greater part of the increase was probably a reflection of better diagnosis and that the sex difference might be explained by under-certification of lung cancer among females in bygone years, when some of the deaths which should have been assigned to lung cancer were possibly attributed to other respiratory diseases and, in support of this thesis, they cite the fact that male mortality from lobar pneumonia is twice as great as female mortality. However, in Northern Ireland, even in 1936-38, the numbers of certified deaths due to lung cancer were very small compared with the number due to lobar pneumonia. The sex ratio of the latter would thus hardly be a sufficiently sensitive index of such a transference of deaths as suggested by Clemmesen and Busk. Thus, although their thesis might be acceptable over a long period, it seems unlikely that such a transference of deaths could have occurred in such recent times in Northern Ireland, during so short a period as that now under review.

Kenneway and Kenneway (1936) suggested that any combination of the following might play a part : an actual increase in mortality and/or an improvement in diagnosis and/or a change in the fashion of diagnosis. With regard to diagnostic practice, they noted that only a very moderate increase in lung cancer occurred amongst medical men—"an occupation where the availability of existing methods for the detection of cancer is presumably at a maximum." Since the war, the same authors (1947) have cited further evidence against the theory

of improved diagnosis being the sole factor in the increase in lung cancer mortality. They record the higher incidence of lung cancer in urban as compared with rural areas, the fact that no obvious relationship exists between lung cancer and social class and the fairly low level of such mortality amongst workers in agricultural occupations, as being pointers towards a causative factor such as the smokiness of the atmosphere. However, they are careful to indicate that these features of the mortality must be considered side by side with the relative facilities available for diagnosis, but it is interesting to note that Stocks (1947) found a significant negative correlation ($r = -0.69$ with standard error 0.12) between the lung cancer death rate and the hours of sunshine for twenty large towns in England and Wales. His correlation was not significantly altered when the differing social conditions of the towns were taken into account. From this and other evidence he suggests that "either smokiness of the atmosphere is an important factor in itself in producing cancer of the lung or that sunshine is an important factor in preventing its incidence."

Finally, it would appear, from recent work in the United States of America, that the habit of smoking is probably a contributory factor to the increased incidence of lung cancer. Wynder and Graham (1950), from a survey based mainly on the smoking habits of 605 male patients with proved bronchial carcinoma and 780 male hospital patients without cancer, concluded that "excessive and prolonged use of tobacco, especially cigarettes, seems to be an important factor in the incidence of bronchiogenic carcinoma." Levin *et al* (1950) came to similar conclusions from more restricted data and cautiously stated that "the data suggest, although they do not establish, a causal relation between cigarette and pipe smoking and cancer of the lung and lip respectively. The statistical association may, of course, be due to some other unidentified common factor between these types of smoking and lung and lip cancer."

From the Northern Ireland mortality experience, as in other countries, the strongest argument against attributing the whole of the rise in registered mortality of lung cancer to better diagnostic and certification practice would appear to be the sex difference in the rate at which mortality has increased (page 165). It would seem reasonable to expect that better diagnosis and, as Bonser (1934) adds, "greater interest in this type of cancer" would apply equally to the two sexes. That such has not been the case suggests, at the very least for men, that a true increase in the risk of dying from lung cancer has occurred. In fact, prevailing opinion can be summed up in the words of Turner (1949): "There is general agreement that the increased incidence of bronchial carcinoma is real and not merely apparent from better facilities for diagnosis."

III.—Distribution of Cancer Mortality by Geographic and Administrative Areas.

The analysis of the mortality statistics by geographic locations of the deceased's normal place of residence (classified as one of the six counties or two

county boroughs) and by type of adminstrative area (classified as aggregate of county boroughs, other urban districts and rural districts) can only be attempted for total cancer mortality (i.e., all ages and sites combined). The deaths are not tabulated by age or site of the malignant growth for subdivisions of the country. The effect of differently age-constituted populations in the different areas tabulated and in the different three-year periods will, as before, invalidate the comparison of crude mortality rates; the ratios of registered to expected deaths have, therefore, been calculated and are given in Tables VI and VIII, while for information, the crude rates are shown in Tables V and VII. The basis of the calculations of expected deaths in Tables VI and VIII is somewhat different from that in earlier tables; in this section, the expected deaths have been calculated for each sex separately, by applying the age specific death rates during 1925-27 in the country as a whole to the age distributions of the populations of the sub-divisions of the country, both in that same period and in the period 1936-38. Thus the ratios of each sex can be compared both between areas and between periods, but in each case the comparison of two ratios is involved.

In both periods the male ratios were higher than the average for the whole country in the two county boroughs Belfast and Londonderry, and in County Armagh—in the first period this was also true of County Down. On the other hand, the female ratios of Londonderry County Borough were very much below the average for all women in Northern Ireland—79 compared with 100 per cent. in 1925-27, and 83 compared with 104 per cent. in 1936-38. Amongst the women of Belfast, mortality was higher than the average for all women in the country and this was also true of women in the counties of Antrim, Armagh and Down

TABLE V.

Northern Ireland—average annual death rates from cancer (all sites) classified by sex and region in the periods 1925-27 and 1936-38.

ALL AGES

Region	Average annual number of deaths registered per million of the population				Death rates in 1936-38 as percentages of those in 1925-27	
	1925-27		1936-38			
	Males	Females	Males	Females	Males	Females
County Boroughs—						
Belfast	994	1,173	1,252	1,355	126	116
Londonderry	898	821	1,089	942	121	115
Administrative Counties—						
Antrim	961	1,333	1,194	1,399	124	105
Armagh	1,219	1,376	1,370	1,351	112	98
Down	1,159	1,352	1,291	1,603	111	119
Fermanagh	1,030	1,028	1,456	1,413	141	137
Londonderry	1,061	1,202	1,168	1,227	110	102
Tyrone	1,192	1,188	1,147	1,281	96	108
Total	1,062	1,229	1,246	1,372	117	112

TABLE VI.

Northern Ireland—cancer mortality (all sites) classified by sex and region in the periods 1925-27 and 1936-38.

ALL AGES

Region	Number of Deaths Registered		Ratio Registered as percentage of Expected Deaths		Difference Between Ratios (1936-38) −(1925-27)
	1925-27	1936-38	1925-27	1936-38	
			Males		
County Boroughs—					
Belfast	583	772	122	131	9
Londonderry	56	73	108	118	10
Administrative Counties—					
Antrim	267	344	85	98	13
Armagh	196	223	101	109	8
Down	352	397	105	106	1
Fermanagh	93	126	77	102	25
Londonderry	150	168	85	92	7
Tyrone	240	226	90	84	−6
All Males	1,937	2,329	100	108	8
			Females		
County Boroughs—					
Belfast	773	945	110	113	3
Londonderry	60	72	79	83	4
Administrative Counties—					
Antrim	396	425	103	101	−2
Armagh	233	221	103	97	−6
Down	438	520	104	112	8
Fermanagh	86	109	74	96	22
Londonderry	171	173	88	89	1
Tyrone	234	238	87	90	3
All Females	2,391	2,703	100	104	4

"Expected" male (or female) deaths used in calculating the ratio "registered as percentage of expected deaths" were found by applying the age specific male (or female) death rates of 1925-27 for the whole of Northern Ireland to the age distribution of the 1926 and 1937 male (or female) population, in each of the specified regions.

in the first period and in County Down in the second period. One gets the impression that in both periods cancer was more important as a registered cause of death in the eastern than in the western areas, but this is essentially a generalisation, probably more true of the first period than of the second, to which the relatively high male ratios for Londonderry County Borough are obvious exceptions. This generalisation and the exceptions suggest that the mortality was probably greater in the urban areas than in the rural areas and Table VIII confirms this—the ratios for the rural areas were minimal throughout and in the second period, for both sexes, there is a marked gradient in the mortality which decreased with decreasing degree of urbanisation.

The most striking features of the registered mortality are the mortality ratios for County Fermanagh. There, the male ratio increased by 25 per cent.—from 77 to 102—while the corresponding increase in female ratios was 22 per cent.—74 to 96. The next largest increase occurred among the men of County Antrim, where a rise from 85 to 98—13 per cent.—was recorded. Since all other changes between the two periods were of the order of 10 per cent. or less, a possible explanation of the very large increase in County Fermanagh is that in the middle twenties cancer, as a cause of death, was considerably undercertified compared with other parts of the country, whereas by 1936-38 this was possibly no longer the case. This hypothesis would be compatible with the very low ratio in the first period, which, in fact, was the lowest of the eight geographical regions in each sex, and the higher level in the years 1936-38, when the Fermanagh ratio was placed fifth among males and females.

In all areas (except in County Tyrone) shown in Table VI, mortality amongst males increased between the two periods, although in some cases the changes were very slight. Female mortality increased everywhere except in the Counties of Armagh and Antrim, but again, apart from County Fermanagh, already mentioned, the changes were not dramatic. From Table VIII, it is clear that the contributions to the increased mortality have come mainly from county boroughs and rural districts; in both sexes the other urban districts had a lower ratio in the later period than in the earlier. This was particularly marked in the case of males; the ratio of the aggregate of urban districts outside county boroughs fell from 125 to 109 per cent.

The result of these changes in mortality has been that the difference between "urban" and rural mortality is less marked now than it was formerly. Barclay and Kermack (1940), discussing the excessive urban mortality from cancer in Scotland, concluded that "the implied effect of social and industrial environment in stimulating tumour growth is in harmony with the known facts regarding occupational and social cancer, and emphasizes the importance which the control of adverse environmental factors may have in the reduction of cancer incidence."

TABLE VII.

Northern Ireland—average annual death rates from cancer (all sites) classified by sex and type of area in the periods 1925-27 and 1936-38.

ALL AGES

Type of Area (aggregates of the following)	Average annual number of deaths registered per million of the population				Death rates in 1936-38 as percentages of those in 1925-27	
	1925-27		1936-38			
	Males	Females	Males	Females	Males	Females
County Boroughs -	985	1,138	1,236	1,314	125	115
Other Urban Districts -	1,187	1,282	1,155	1,403	97	109
Rural Districts - -	1,083	1,284	1,279	1,412	118	110
All Areas - -	1,062	1,229	1,246	1,372	117	112

TABLE VIII.

Northern Ireland—cancer mortality (all sites) classified by sex and type of area in the periods 1925-27 and 1936-38.

ALL AGES

Type of Area (aggregates of the following)	Number of Deaths Registered		Ratio Registered as percentage of Expected Deaths		Difference Between Ratios (1936-38) −(1925-27)
	1925-27	1936-38	1925-27	1936-38	
			Males		
County Boroughs -	639	845	121	129	8
Other Urban Districts -	289	306	125	109	−16
Rural Districts - -	1,009	1,178	86	96	10
All Males - -	1,937	2,329	100	108	8
			Females		
County Boroughs -	833	1,017	107	110	3
Other Urban Districts -	370	435	108	106	−2
Rural Districts - -	1,188	1,251	93	98	5
All Females - -	2,391	2,703	100	104	4

"Expected" male (or female) deaths used in calculating the ratio "registered as percentage of expected deaths" were found by applying the age specific male (or female) death rates of 1925-27 for the whole of Northern Ireland to the age distributions of the 1926 and 1937 male (or female) populations in each of the specified types of area.

From the Northern Ireland figures, this implies either that the environmental influence was less strong in 1936-38 than it was some eleven years earlier, or that between 1925-27 and 1936-38 the environments of town and country became more alike. It is doubtful whether the latter alternative, operating over so short a period, could have any noticeable effect on mortality and thus it seems possible that environment played a less important role in the second period than it did in the first. Such a suggestion would appear to be valid when it is considered that a large part of the increase in mortality was due to cancer of the lung—a cause of death which does not appear to be strongly associated with domestic environmental conditions (Registrar-General for England and Wales, 1938, and Stocks, 1947).

SUMMARY.

1. An examination of the official cancer statistics of Northern Ireland, restricted to mortality in the two periods 1925-27 and 1936-38, has been made in an attempt to learn more about the increase in certified cancer mortality in recent years, which has been reported here and elsewhere. The only available data imposed serious restrictions on the extent of the analysis, since an examination by site, sex and age was only possible for the country as a whole. Examination by regions and type of area could be made only in terms of total cancer mortality for each sex.

2. Evidence has been produced to show that the greatest numerical contribution to the increase in registered mortality was due to deaths certified as cancer of the intestines and lung in both sexes and to cancer of the prostate and bladder in men. A considerable reduction in mortality attributed to cancer of the liver and gall bladder both in men and women has been revealed.

3. The data suggest that the increase in total cancer mortality was largely a feature of the older age groups, particularly among females.

4. The greatest relative increase in mortality occurred in cancer of the lung—between 1925-27 and 1936-38 a fourfold increase among men and a threefold increase among women were observed, excluding increases due to the ageing population.

5. Levels of mortality from all forms of cancer varied considerably between the counties and county boroughs in both the triennia examined. In both periods mortality was at a maximum in Belfast County Borough. Although male mortality was higher than the average for the whole country in Londonderry County Borough, female mortality was considerably below average in each period.

6. Certified mortality increased between the two periods in all counties and county boroughs, except among men in County Tyrone and women in the Counties of Armagh and Antrim. The greatest relative increase (of 20 to 25 per cent.) occurred in County Fermanagh and this was largely due to the very low mortality level in the mid-twenties. It is probable that the observed increase in that county was due to undercertification in the first triennium.

7. In each period mortality was lowest in the rural areas, in spite of the fact that the greatest relative increase between the two periods occurred in such areas. In 1936-38, mortality in county boroughs was higher than in either the other urban districts or the rural areas and, as in the rural districts, in county boroughs mortality increased during the twenties and thirties. In 1925-27, mortality in "other" urban districts was at a maximum, but mortality in these areas fell—considerably in the case of male mortality—between 1926-27 and 1936-38. It seems likely that the urban excess of mortality is tending to decrease, and possibly this is not entirely due to an increasing similarity between urban and rural environmental conditions—that is, the environmental influence on the total cancer mortality rate was possibly less in the later period than it was in the earlier.

8. It is possible that some of the increases reported in mortality between the periods 1925-27 and 1936-38 were due to improved methods of diagnosis and wider interest in cancer of specific sites. Pointers to such a conclusion are the known improvements in diagnostic methods, the low but increasing rural rates, the very low initial level of registered mortality in County Fermanagh, the unchanging level of breast cancer in women, the fairly constant level of mortality attributed to most external sites and the increase in certified cancer

of the intestines, taken in conjunction with the decrease in certified cancer of the liver and gall bladder, and possibly prostate. If the increase in registered mortality of cancer of the intestines was complementary to the decrease in that of the liver and gall bladder, then the major contribution to the observed increase in the total cancer death rate was made by certified lung cancer. For reasons given earlier, it seems probable that there has been a real increase in the risk of dying from cancer of the lung and it would seem appropriate that the reasons for that increase should be sought from a rigorous survey of patients suffering from this form of cancer. It seems unlikely that more can be gleaned from mortality aspects alone.

ACKNOWLEDGMENT.

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APPENDIX I.

Methods used in calculating the numbers of "expected" deaths used in the tables.

(a) An example of the calculation, for expected male deaths due to cancer of the stomach in Northern Ireland in 1936-38, is as follows :—

Age Group in Years	Male Population 1926	Registered Deaths from Cancer of the Stomach 1925-27	Death Rate 1925-27	Male Population 1937	Deaths from Cancer of the Stomach Expected in 1936-38
(a)	(b)	(c)	(c)/(b) (d)	(e)	(d)×(e) (f)
40—	66,227	61	0.0009211	67,742	62.3972
50—	59,082	132	0.0023342	57,377	128.1917
60—	21,284	108	0.0050742	26,601	134.9788
65—	32,537	183	0.0056244	38,901	218.7948
75 & over	13,173	80	0.0060730	14,340	87.0868
			Total "Expected" Deaths = 631.4493		

(b) For other specific sites, for males, the age distribution of male deaths attributed to the specified site in 1925-27 was substituted for column (c), and columns (d) and (f) were recalculated. (Table III).

(c) For specific sites, for females, the age distributions of the 1926 and 1937 female populations were substituted for columns (b) and (e) respectively; the age distribution of female deaths attributed to the specified site in 1925-27 substituted for column (c), and columns (d) and (f) were recalculated. (Table IV).

(d) For the expected number of deaths used in the ratios of tables VI and VIII a similar calculation was performed, except that the age grouping in column (a) covered the complete age range from birth onwards, and for males (or females) the age distribution of the 1926 male (or female) population in the whole of Northern Ireland was used in column (b), and the age distribution of all male (or female) cancer deaths in Northern Ireland in 1925-27 was used in column (c). The age distribution of the male (or female) population of the specified region or type of area in 1926 or 1937 was used in column (e) and columns (d) and (f) were calculated as before.

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Anuria following Treatment with a Multiple Sulphonamide Preparation

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THE following case is reported because of the rarity of this complication with the multiple sulphonamide preparations.

The patient, a well-nourished muscular male of 54 years, was admitted on the 8th June 1950 to the Belfast City Hospital with the following history. He had been treated by his outside doctor for a respiratory infection with "sulphatriad." Treatment was begun on 31/5/50 with 1 gm. of the compound, and he received 1 gm. four-hourly until 6/6/50, when he developed severe left-sided renal colic. On the morning of 7/6/50 he had further left-sided pain, and passed a small quantity of blood-stained urine; he passed no more urine on that day, but in the evening his doctor withdrew about a half-ounce of dark-brown urine with a catheter. He was then vomiting frequently. The illness took place during an exceptionally warm spell of weather, and the patient admitted that he had sweated profusely and that his intake of fluid had been small.

On admission, his blood urea level was 112 mg. per cent. A cystoscopic examination was carried out, and it was found possible to pass ureteric catheters along the ureters for a few centimeters only; however, a considerable quantity of amorphous debris was removed from the lower ends of the ureters. The patient was then given large quantities of fluids by mouth, and alkalies orally and intravenously. Secretion of urine began and increased to normal in a few days. Blood urea value on 13/6/50 was 46 mg. per cent. An intravenous pyelogram on 29/6/50 showed no abnormality of the kidneys, ureters or bladder.

The use of compound sulphonamide preparations was shown by various workers (Lehr, 1945-46-47-48; Frisk *et al.*, 1946; Ledbetter and Cronheim, 1948) to have certain advantages over the use of single members of the sulphonamide group :—

1. Total sulphonamide concentrations which are bacteriostatic could be obtained, without having a sufficient concentration of any one member to give rise to sensitization.
2. The quantity of an individual sulphonamide which can be dissolved is unaffected by the presence of other members of the sulphonamide group. The bacteriostatic effect, however, is equivalent to that of the total amount of sulphonamide present. Hence a bacteriostatic effect can be achieved with insufficient of any one member present to cause precipitation in the renal tract.

3. Hagerman and Sjögren (1946) used a mixture of sulphonamides in the treatment of gonorrhœa, with the aim of obtaining higher blood sulphonamide levels without endangering the renal tracts.
4. Ledbetter and Cronheim (1948) claim that, as well as reducing the danger of crystalluria, the use of sulphonamide mixtures will obviate the danger of alkalosis from the dosage of alkalies required to prevent crystalluria when single sulphonamides are used.

The occurrence of anuria in this case emphasises the fact that the use of compound sulphonamides does not eliminate the necessity to administer alkalies and copious fluids. Indeed the manufacturers, although they are not aware of any previously reported case of anuria with "sulphatriad," recomment in the literature supplied with the drug that alkalies and copious fluids should be given.

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REVIEW

INDUSTRIAL HEALTH. An Introduction for Students. By R. Passmore and Catherine N. Swanston. Pp. 110. E. and S. Livingstone. 1950. 4s. 6d.

THIS little volume contains a series of eight lectures given to the authors' students in Edinburgh. It can in no sense be regarded as (nor is it claimed to be) a text-book of Occupational Medicine. Some may consider that it attempts to sketch too much for the undergraduate but it is clearly quite inadequate for the doctor who hopes to enter industry. Occupational diseases are rightly relegated to the minor role they play in industrial medicine although the section "on taking an occupational history" might well have been expanded and more precise advice proffered.

For those who come to this subject for the first time this book has many stimulating ideas which should provoke the serious reader to further thought. Students for the D.P.H. and nurses already in industry will find the main features succinctly though dogmatically stated. Executives and shop stewards will learn here something of the contribution which medicine can make to the problems of Management and Labour.

It is a pity that an adequate bibliography, or at least a guide to further reading, is not included. Prof. F. A. E. Crew has written the foreword. J. A. S.

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REVIEW

INDUSTRIAL HEALTH. An Introduction for Students. By R. Passmore and Catherine N. Swanston. Pp. 110. E. and S. Livingstone. 1950. 4s. 6d.

THIS little volume contains a series of eight lectures given to the authors' students in Edinburgh. It can in no sense be regarded as (nor is it claimed to be) a text-book of Occupational Medicine. Some may consider that it attempts to sketch too much for the undergraduate but it is clearly quite inadequate for the doctor who hopes to enter industry. Occupational diseases are rightly relegated to the minor role they play in industrial medicine although the section "on taking an occupational history" might well have been expanded and more precise advice proffered.

For those who come to this subject for the first time this book has many stimulating ideas which should provoke the serious reader to further thought. Students for the D.P.H. and nurses already in industry will find the main features succinctly though dogmatically stated. Executives and shop stewards will learn here something of the contribution which medicine can make to the problems of Management and Labour.

It is a pity that an adequate bibliography, or at least a guide to further reading, is not included. Prof. F. A. E. Crew has written the foreword. J. A. S.

Hypersplenic Anæmia relieved by Splenectomy

By M. G. NELSON, M.D., M.R.C.P., M.R.C.P.(I)., D.T.M. & H.

Clinical Pathologist, Royal Victoria Hospital, Belfast

CONSIDERABLE interest has recently been aroused in the group of conditions characterised by anæmia, granulocytopenia and thrombocytopenia occurring alone or in association and accompanied by splenomegaly and a hyperplastic marrow. The triad of cytopenia, splenomegaly and hyperplastic marrow constitutes what might be called the 'hypersplenic syndrome.' This triad may be found in a number of diverse disorders in which splenomegaly is a constant finding. It has been noted in chronic infections such as syphilis, malaria, kala azar, brucellosis and Felty's syndrome; in portal hypertension and Banti's syndrome, and in lipoidal infiltrations, such as Gaucher's disease.

The evidence throughout this group seemed to point to the basic effect produced in the blood by the enlarged spleen, but lack of complete knowledge of the physiological functions of this organ has prevented full understanding of the pathogenesis. There are two possible hypotheses to explain the observed phenomena, and these have given rise to two schools of thought which might be broadly termed the "Hormonal" and the "Phagocytic." The former conception is that a pathologically hypertrophied spleen due to any cause produces a hormone which acts on the bone marrow, and depresses the maturation or release of the primitive cells of the erythrocytic, granulocytic and thrombocytic series. This hormone is considered to be elaborated by the reticulo endothelial cells of the spleen and its effect may be general, producing a pancytopenia or, selective producing a granulocytopenia, thrombocytopenia or anæmia. This theory has many supporters, particularly Naegeli, who applied the term 'hypersplenism' to the syndrome, and in this he has been ably supported by Dameskek (1947). The second theory envisages an increased phagocytic activity of the spleen produced by reticulo endothelial hypertrophy due to any cause. The reticulo endothelial cells engulf and destroy the blood cells more rapidly than they can be replaced by the marrow. Histopathological evidence of increased phagocytic activity has been adduced by Wiseman and Doan (1942).

Although cases of this type are uncommon, yet the satisfactory response which results from splenectomy in these cases prompted me to put on record this case of intractable macrocytic anæmia associated with a progressive splenomegaly, which had an excellent clinical and hæmatological response to splenectomy.

The patient, M. K., an unmarried woman of 54 years of age, was first seen in the medical out-patient department of the Royal Victoria Hospital on 11th August, 1948, because of loss of energy, breathlessness, palpitation and swelling of the ankles. These symptons were of gradual onset, had been present for a year, and had become progressively more noticeable. She also complained of a constant

pain in the right side of her abdomen which had been present for about one month, and this was associated with loss of appetite. The only relevant findings in the past history of this patient was that she had received injections in the United States of America in 1920 for a 'blood condition.' She did not know the nature of the 'blood condition,' but thought that the injections were arsenic, and closer enquiry revealed that the spacing and courses of these injections resembled those of anti-syphilitic arsenotherapy.

On examination, the patient was grossly anæmic but not jaundiced. She was small in stature and of a sallow complexion with pitting œdema of the lower limbs. There were no enlarged superficial lymph-glands. The nails were ridged and flattened and the tongue was smooth and moist. The skin exhibited a maculopapular rash with numerous scattered lesions which were most marked on the trunk. In colour, these spots varied from lilac to brown and in size, from a lentil to a sixpence. Some were raised and a few formed definite soft, sessile tumours soft to the touch and pigmented on top. The appearance of the tumours was suggestive of a diagnosis of von Recklinghausen's neurofibromatosis, and this was confirmed clinically by the dermatologists. On physical examination, the liver and spleen were both found to be grossly enlarged and palpable, but nothing abnormal was found on examination of the other bodily systems. Because of her history, the patient was seen in the venereal diseases department, where it was considered that the nature and distribution of some depressed scars on her back were consistent with a clinical diagnosis of syphilis, and serological tests for syphilis appeared to confirm this, as the Kahn reaction was doubtful, and the Wassermann positive.

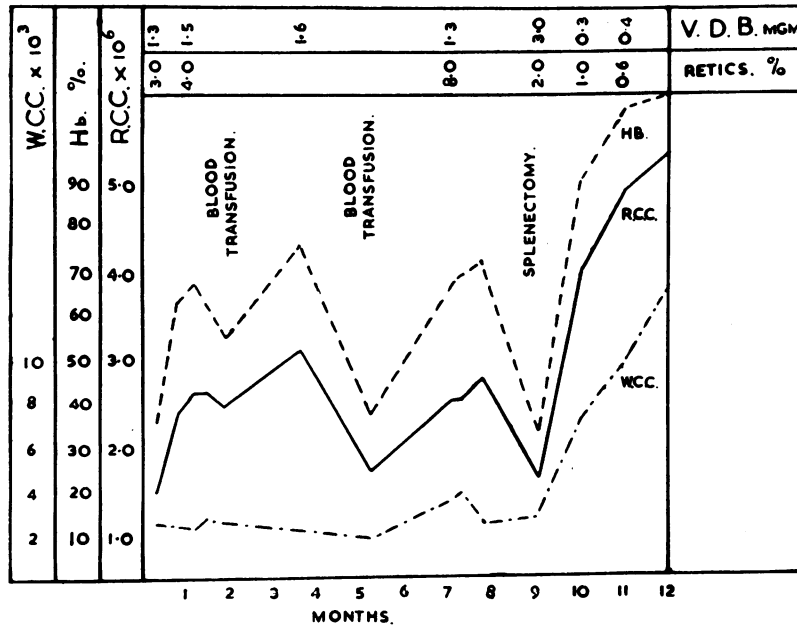
The initial examination of the peripheral blood revealed a gross anæmia (hæmoglobin = 36 per cent. Haldane = 5.1 g./100 ml., R.C.C. = 1,410,000/c.mm.); macrocytosis (M.C.V. = 94 c.μ.); leukopenia (W.C.C. = 2,500/c.mm.); hyperbilirubinæmia (Van-den-Bergh = 1.25 mg/100 ml.); a reticulocyte count of 3 per cent. The peripheral blood smear showed macrocytosis, anisocytosis and polychromasia, but no primitive red cells were seen. These findings were suggestive of a diagnosis of Addisonian pernicious anæmia, but a fractional test-meal revealed the presence of free acid in the stomach. This, together with the fact that the initial blood examination showed 3 per cent. reticulocytes, was considered to weigh heavily against the diagnosis of pernicious anæmia. Unfortunately, a bone-marrow biopsy to determine the presence of megaloblastic hyperplasia was not carried out prior to treatment.

A diagnosis of aplastic anæmia (toxic pancytopenia), resulting from arsenotherapy, was considered unlikely because of the twenty-eight year interval since the last arsenic injection, but the possibility that the anæmia was of syphilitic origin was explored by testing the response of the anæmia to a therapeutic trial of anti-syphilitic drugs. Accordingly, the patient was given three intramuscular injections of 0.1 grams of bismuth and a course of penicillin consisting of six mega units spread over ten days. This therapy produced no hæmatological improvement.

The patient then received an adequate course of parenteral liver therapy combined with oral iron, and on this therapy the hæmoglobin rose from 36 per cent. to 63 per cent. in 14 days but this was associated with a constant reticulocytosis without any significant crisis. This response was satisfactory, but the absence of a reticulocytosis was unusual and the therapy complicated by combined oral iron and parenteral liver. Because macrocytic anæmias with free acid in the stomach usually respond more satisfactorily to oral folic acid than parenteral liver, a course of 15 mg. of oral folic acid daily was given for fifteen days without any further hæmatological improvement. When on this treatment a bone marrow biopsy was carried out which showed a markedly hyperplastic marrow due to normoblastic proliferation and megaloblasts were not seen.

The patient was discharged from hospital on weekly injections of liver extract and daily oral iron. She was seen from time to time as an out-patient between November, 1948, and June, 1949, when it was noted that the splenomegaly was increasing and the hæmoglobin, despite adequate therapy, was not being maintained, so that, on two occasions, blood transfusions were required. Thus, this patient was under observation for some eleven months, during which time she was on hæmatinic therapy without significant benefit. Although the anæmia in this case was consistently macrocytic, the evidence for the diagnosis of Addisonian pernicious anæmia was incomplete, viz., presence of free acid in the stomach, inability of liver therapy to maintain the blood level.

Following an attack of herpes zoster in April, 1949, she was re-admitted into the Royal Victoria Hospital in June of the same year. When the hæmatological records of this patient were reviewed, it was seen that she had a persistent anæmia



not maintained by hæmatinic therapy, a hyperplastic marrow, splenomegaly, hyperbilirubinæmia, and a constant reticulocytosis. These findings were suggestive of a hæmolytic anæmia. That this hæmolytic anæmia was of mild degree and unlike either congenital or acquired hæmolytic anæmia, was evident by the mild degree of the reticulocytosis; by the absence of crisis, by the absence of spherocytosis; by the normal osmotic fragility of the red cells, and by the repeatedly negative Coomb's test (anti-human globulin test). It was considered that hypersplenic anæmia seemed to be the most probable diagnosis, and accordingly, following pre-operative preparation by the transfusion of four pints of compatible blood, a splenectomy was performed. The hæmoglobin, eight days after the splenectomy, was 90 per cent., and this level has been maintained and improved since then. This improvement has been associated with a rise in the red cell and white cell counts; a normal bilirubin level in the blood; and a normal reticulocyte count.

The spleen, when examined after removal, was greatly enlarged and weighed 1,500 gm. The histological pattern of the spleen was well preserved. There was a general increase in the cellularity of the pulp with thickening of the sinusoidal walls. This increased cellularity was in part due to a proliferation of reticulum cells of the pulp and also of the lining cells of the splenic sinusoids which were unduly prominent. Follicular aggregations of reticulum cells without giant cell formation were evident, both in the lymph follicles and in the perifollicular zone. These resembled similar lesions found in the spleen in Brucella abortus infection, but in this case the agglutination test for brucellosis was negative. The lymph follicles throughout the spleen were rather small. Hæmosiderosis was marked throughout the pulp, but erythrophagocytosis was not conspicuous.

Comment

The hæmatological findings and response to splenectomy in this case satisfy the criteriæ laid down by Doan (1946) for splenic blood dyscrasia or hypersplenic anæmia, namely :—

1. Diminution of one or more of the circulating elements of the blood.
2. Normal or increased bone marrow activity.
3. Splenic enlargement.
4. Complete, rapid, clinical and hæmatological recovery following splenectomy.

The histological findings in the spleen after removal were those of a diffuse hyperplasia of the reticulum cells, with nodular 'pseudofollicles' of reticulum cells in relation to the lymph follicles, and there was no histological evidence of syphilitic involvement of the spleen. These findings are similar to those described by Haam & Awny (1948) in ten cases of splenic panhæmatocytopenia.

The relationship of syphilis to the clinical condition in this case, if any, is difficult to evaluate. This is further complicated by the results of the serological tests for syphilis before and after splenectomy.

		Kahn		W/R.	
26/ 8/1948	...	+2	...	++	
6/ 1/1949	...	+1	...	++	
21/ 3/1949	...	+2	...	++	
1/ 6/1949	...	+1	...	++	Splenectomy
7/ 7/1949	...	—	...	—	
3/ 8/1950	...	—	...	—	
5/10/1950	...	—	...	—	

It is possible that the positive results found with the serological tests for syphilis may have been false, and associated with the hæmolytic anæmia found in the hypersplenic syndrome. Information on this point, in the literature, is lacking, but false positive Wassermann results have been reported in hæmolytic anæmia by Rubenstein (1948). In this department, of eighteen cases of hæmolytic anæmia, where syphilis was excluded, false positive W/R results were found in three, doubtful results in two, and negative in the remainder. Our own findings have tended to suggest that these false serological results are associated mainly with periods of crisis which did not occur in this case. However, the coincidental reversal of the positive serology to negative associated with the removal of evidence of active hæmolysis following splenectomy suggests a possible relationship between these findings.

Summary

A case of hypersplenic anæmia with panhæmatocytopenia, splenomegaly and hyperplastic marrow, showing an excellent response to splenectomy is described.

References.

Rubenstein, M. A.: *J. Lab. clin. Med.*, 33, 753; 1948.
Dameshek, W.: "The spleen and hypersplenism," New York, 1947.
Doan, C. A., and Wright, C. S.: *Blood*, 1, 10; 1946.
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REVIEW

BRONCHIOGENIC CARCINOMA AND ADENOMA. With a Chapter on Mediastinal Tumours. By B. M. Fried, M.D.

An extremely well produced book, with only a few typographical errors. The reproductions of X-ray film and microphotographs are particularly good; an extensive, bibliography is given at the end of each section. Every aspect of carcinoma is meticulously discussed, the chapters on pathology, metastases, and the combination of carcinoma and tuberculosis being very good.

Bronchiogenic adenoma is very well done. The comparison to an iceberg, as regards the endo-bronchial and extra-bronchial portions, is very apt, with reference to endo-bronchial methods of dealing with the tumour.

Doctor Fried is a physician, and so does not discuss details of surgical treatment. He gives the accepted contraindications. Regarding treatment by radiation, there is some evidence nowadays that the results may be somewhat better than he has indicated.

A book to be recommended. G. R. B. P.

		Kahn		W/R.	
26/ 8/1948	...	+2	...	++	
6/ 1/1949	...	+1	...	++	
21/ 3/1949	...	+2	...	++	
1/ 6/1949	...	+1	...	++	Splenectomy
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Nervous Sequelæ of Blood Transfusion

By R. J. KERNOHAN, M.D., M.R.C.P., M.R.C.P.(I)., D.P.H., D.C.H.

THE occurrence of cerebral complications following blood transfusion is rare. It is difficult to assess the part played by transfusion, but a likely factor is an alteration in the coagulability of the blood.

A case of cerebral thrombosis following blood transfusion is described below, followed by a short review of the post-transfusion nervous complications which have been described in the literature.

CASE REPORT.

A boy, aged 11 years, was admitted to hospital on 19/6/50. He showed extreme pallor of the skin and mucous membranes. The main complaints were lassitude and dyspnœa on exertion. He had been very pale for many years and during this period he was taking iron by mouth in adequate dosage.

The other members of the family were healthy, and a twin sister was alive and well.

On examination, he was very anæmic. The throat was healthy. There were no enlarged lymphatic glands. The B.P. was 110/70. The pulse rate was 100 per minute and regular. A loud systolic murmur was audible at the apex. There was no enlargement of abdominal viscera.

X-ray chest showed clear lung fields. There was slight generalized cardiac enlargement. The tuberculin test was negative. The W.R. reaction was negative. Blood examination: Hb. 26 per cent.; R.B.Cs., 2,600,000; W.B.Cs., 6,300; Colour index, .8; Reticulocytes, .1 per cent. Van Den Bergh test was normal. Examination of sternal marrow smears revealed no abnormality.

It was concluded that the child was suffering from a severe refractory iron-deficiency anæmia.

On 22/6/50 one half of a pint of packed red blood cells was administered over a period of six hours. He felt well after the transfusion, and the Hb. was raised to 60 per cent. and the R.B.C. count to 3,600,000. Six days after transfusion he developed a severe headache and he vomited several times. He was irritable and complained of severe photophobia. On the following day, 29/6/50, he had a left-sided convulsion which commenced with twitching of the left side of the face. The twitching was followed by a tonic stage with clenching of the teeth and cyanosis. There was no involuntary micturition and no biting of the tongue. He was unconscious for five minutes, and after the attack he was confused. Lumbar puncture was performed and examination of the C.S.F. revealed no abnormality. He had two further epileptiform attacks on 30/6/50 and on 3/7/50. After the third convulsion he remained semi-comatose and had a left-sided hemiplegia.

He was transferred to the neuro-surgical unit of the Royal Victoria Hospital.

A left-sided percutaneous arteriology was performed, and this suggested a space occupying lesion in the anterior part of the right temporal lobe, but the findings were indefinite. He gradually improved during the next four weeks except for a left homonymous hemianopia, which has persisted.

Comment.

Numerous nervous sequelæ have been ascribed to blood transfusion. Cerebral thrombosis was reported by Hesse (1934) in a patient 42 years old, following gastrectomy. Blood transfusion before and after the operation was not followed by any side effects. Two weeks after the operation a third transfusion was given because of considerable anæmia (Hb. 29 per cent. R.B.Cs. 2, 260,000). A rigor developed ten minutes after completion of the transfusion. Next morning a paralysis of the left arm was evident. The paralysis gradually recovered.

Polayes and Morrison (1932) described a case in which transfusion was followed by intense headache, syncope, convulsions, stupor and transient hemiplegia—a disturbance they attributed to cerebral hæmorrhage or embolism. Thermitte, Mouzon and Susic (1938) described the case of a man of 42 years in whom the sequel to transfusion was extreme excitement, followed by left hemiplegia. A year later hemiplegia was still complete and he had recurrent Jacksonian attacks. Glaser, Epstein and Landau (1937) transfused an eight-day-old infant; during the procedure death occurred from subtentorial hæmorrhage. In all these examples an intracranial vascular lesion is the likely explanation.

Convulsive seizures, succeeded by coma, have been described by Brines (1928). Bodley Scott suggests that these are due to circulatory disturbances accompanying anaphylactoid reactions.

More difficult to explain are Landry's syndrome appearing on the seventh day (Cain and Bernard, 1932); Korsakow's syndrome. (Tzanck and Weismann-Netter, 1929).

In the case described above it is difficult to explain the delay of six days between transfusion and the onset of cerebral symptoms. The most likely cause is considered to be cerebral thrombosis, and there can be little doubt that transfusion was the precipitating factor. The exact pathogenesis is uncertain. There was a marked increase in the Hb. and R.B.C. count, and presumably the coagulability of the blood was materially altered.

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The Pulse of the Ancient Chinese

By Colin Johnston Robb.

In the medical profession the things common to every-day practice are akin to those commonly connected with other professions and callings, regarded as just something well-known without any reflection on their past. The phenomenon of the arterial pulse is one of these; but when did the system of taking the pulse begin? This form of diagnosis is truly lost in the mists of antiquity. We turn to the home of ancient culture, China, for an early answer, and find that the celebrated philosopher, Pien Chio, who lived circa 225 B.C., was an expert in pulse-taking. Pulses were regarded as the yang and the yin of the system, for they were held to indicate the differences in the amount of blood and air in the organs.

In the normal body the yang and the yin principle was in unison, the pulses being said to be in harmony. Since those now very remote days more than 160 volumes have been written about the pulse and its state. In the medical world of ancient China it was considered that the best time for taking the pulse was in the morning and the patient was warned during all times of pulse-taking to be calm and cool in order to exercise complete control over his or her emotions and to render respiration regular. The most skilled physician was he who possessed the most sensitive finger.

The Chinese doctor of old placed his middle finger on the top of the radial artery, adding his index finger, and following it by the ring finger, the thumb being rested on the dorsum of the carpus. Three places were palpated on the radial artery of each side, each denoting a different pulse. The first was registered under the finger ring and the second under the middle digit, while the third was taken by the index finger. Each pulse was tested under light, medium, and lastly, firm pressure. The nature of the intermissions missed were noted. After fifty beats a single intermission was considered normal. An intermission after forty, thirty, twenty and ten beats were taken to note that the four organs were deprived of vital air, and under these circumstances death was said to follow within four, three, two and one years.

Each organ had its pulse proper, but possessed also an opposite pulse that varied with the seasons of the year. It was also held that the normal pulse varied with the accompanying constellation, the time of day and the sex, age and general constitution of the patient. A pulse on the right side was considered to be connected with the stomach and spleen, while that on the left was linked with the liver and gallbladder. So, in antiquity remote, pulse-taking was as common in the practice of medicine as it is to-day.

Valvulotomy for Mitral Stenosis:

Preliminary Report on a Successful Case,

By J. M. BARBER, M.D., M.R.C.P.(EDIN.) ; T. B. SMILEY, M.C., M.B., F.R.C.S.(ENG.) ; AND ROBERT MARSHALL, M.D., F.R.C.P.(LOND.), F.R.C.P.I.
Royal Victoria Hospital, Belfast.

SIR LAUDER BRUNTON (1902) suggested that the only proper and logical approach to the problem of mitral stenosis was "to lengthen the slit." This suggestion has now been carried into effect. Allen and Graham (1922) and Pribram (1926) published single unsuccessful cases. Souttar (1925) described a case which survived the operation and was said to have been improved. He employed his finger to dilate the mitral ring, making his approach via the left auricular appendage. After an initial encouraging case, Cutler and Beck (1929) had six patients who died soon after operation. Brock (1948 and 1949) showed that it was possible by direct surgical methods to relieve congenital pulmonary valvular and infundibular stenosis. More recently (1950) he developed the technique of dilating the stenosed mitral valve with a finger passed through the left auricular appendage. In a minority of cases Brock found it necessary to cut the valve along one or both commissures, using a specially designed flat knife.

Several American teams are at present engaged in tackling this problem. Bland and Sweet (1949) employ an anastomosis between the inferior pulmonary vein and the azygos vein. In Paris this operation has been done by D'Allaines and his team (1949). Harken (1948 and 1950) has tried the creation of an artifical atrial septal defect in some cases, and direct operation on the mitral valve in others. Smithy (1949) did seven mitral valvulotomies with two deaths. Murray (1949) has attempted to resect one cusp of a stenosed mitral valve, replacing it by a portion of cephalic vein. In Philadelphia Bailey and his colleagues (1949 and 1950) have operated on more than a score of patients.

SELECTION OF CASES FOR SURGERY.

Since only the mitral valve can so far be reached by the surgeon, the most suitable case is one with mitral stenosis of severe degree and no other significant valve lesion.

The following factors are important :—

1. *Active Rheumatic Fever* :—Most cases are over thirty years of age. Baker (1950) excludes cases under seventeen years, because of the danger of another attack of carditis.
2. Enlargement of the left ventricle is usually a contra-indication, whether it be caused by aortic or mitral incompetence. It should be stressed that a soft early

diastolic murmur down the left sternal border may be due to pulmonary incompetence, especially in the presence of pulmonary hypertension. Mitral incompetence is a definite clinical entity. It is indicated by an apical systolic murmur and two important fluroscopic signs. These are, enlargement of the left ventricle and paradoxical expanion of the left auricle during ventricular systole.

3. *Pulmonary Hypertension* :—Cardiac catheterization should be carried out. Only in this way can pulmonary hypertension be proven. The cardiac output is also calculated. Its response to mild exercise can be tested.
4. *Auricular fibrillation* :—If this has become established it usually means that the optimum time for operation has passed (Baker, 1950). It increases the danger of embolism from displaced intra-atrial clot. Nevertheless, its presence is not an absolute contra-indication, especially if it is known to be of recent onset.
5. *Congestive Heart Failure* :—It is the aim to operate before this occurs. If early and reversable it would not appear to be a definite contra-indication.

To sum up the type of case for whom surgery can do most—usually over the age of thirty—increasingly severe exertional dyspnœa, with or without attacks of pulmonary œdema and hæmoptysis—normal sinus rhythm—lone mitral stenosis —electrocardiogram showing right ventricular hypertrophy—fluroscopy—slight cardiac enlargement confined to the left auricle and right ventricle—pulmonary hypertension on cardiac catheterization.

Case History : A. F., a man of 47 years. Occupation—supervisor in the building trade. Rheumatic fever at the age of nineteen. At the age of thirty-seven a duodenal ulcer had perforated. Frank hæmoptysis on three occasions in 1948, 1949, and in January, 1950. In the first attack he lost about a pint of blood. Dyspnœa on exertion had commenced six years ago. This progressed to such a degree that he had to obtain sedentary work with his firm. This in turn became too much for him, when he could not mount the flight of stairs to the office. During the ten months before operation he had been in hospital on three occasions. Attacks of nocturnal dyspnœa were the immediate cause of each admission. These were associated with the expectoration of copious amounts of blood-flecked sputum.

On examination, jugular venous pressure was normal throughout the period of observation. There was no œdema. Blood pressure was 110/80. The apex beat was tapping in character. On auscultation, there was an apical presystolic murmur, a loud first heart sound, faint systolic murmur (strength one), and a rumbling mitral diastolic murmur. At the base of the heart the second sound was widely split. A soft early diastolic murmur of pulmonary incompetence was occasionally audible. Normal sinus rhythm was present. Electrocardiography showed right ventricular hypertrophy and bifid P waves. On fluroscopy increased pulmonary blood flow was noted. There was moderate enlargement of the right ventricle and left auricle. The left ventricle appeared normal. Paradoxical expansion of the left auricle in ventricular systole was carefully excluded. No intracardiac calcium was seen.

Cardiac Catheterization : Pressure in the right ventricle was 43 cm. of saline above the sternal angle. Right auricular pressure was not raised. Cardiac output at rest was 4.9 litres per minute.

The patient was placed on a low sodium diet and digitalized. On this treatment and at rest in bed periodic attacks of pulmonary œdema occurred. These continued in spite of injections of mersalyl. At the end of such an attack hilar congestion was seen on the X-ray screen.

Operation.

Mr. T. B. Smiley was assisted by Mr. W. S. Hanna and Dr. Nelson. Dr. Maurice Brown anæthetised, pentothal, gas, oxygen and curare being administered.

A left sub-mammary incision was made and the pectoral muscles reflected upwards. The third cartilage and rib were resected a far into the axilla as possible. The pleural cavity was opened and the lung retracted, to expose the pericardium. The phrenic nerve was dissected free and retracted forwards. The pericardium was then opened in the shape of a flap hinged anteriorly. An enlarged auricular appendage presented under a grossly distended pulmonary artery. A purse string suture was placed round the base of the appendage and a clamp then applied. The appendage tip was opened just enough to admit the index finger. Unfortunately, the appendage was not sufficiently large to allow the finger to be inserted before the clamp was released. It was, therefore, necessary to release the clamp simultaneously with the insertion of the finger into the auricle. The mitral valve was found, and by palpation it was noted that there was a lot of calcium on the medial commissure. No calcium was noted on the lateral commissure, which was slit-like. No regurgitation was noted. The index finger was pushed through the stenotic opening, taking care to avoid damaging the anterior cusp, which would have produced regurgitation. A tearing sensation was felt. The lateral commissure opened to the valve ring, and the finger was pushed through as far as the proximal interphalangeal joint. Although a knife was available, it was felt to be unwise to use this on the medial commissure in view of the excess calcium deposit. The finger was removed from the auricle and the clamp again applied. Not more than 15 ccs. of blood escaped during the procedure. Immediately the finger was removed it was noted by several observers that the pulmonary artery and the auricle were much less tense. The pericardial flap were sutured and the wound closed. During the operation the patient's condition remained very good and did not give cause for any undue anxiety.

In cardiac surgery it is essential to have good team-work, and we were fortunate in having the enthusiastic co-operation of Sister Duncan and Nurse Ebbitt as well as many other helpers.

Post-Operative Course.

Pain at the site of the incision interfered with coughing. Accumulation of thick, sticky secretion in the bronchi led to collapse of the right upper lobe. This quickly cleared after intratracheal suction. A similar process in the left lung interrupted convalescence.

No attacks of paroxysmal dyspnœa have occurred since the operation. Four weeks after surgery the patient walked 100 yards without undue dyspnœa, and now, two months after operation, can walk considerable distances in complete comfort. The systolic and mitral diastolic murmurs can still be heard.

On fluroscopy, no definite change has been detected. This is not surprising in view of the minimal degree of cardiac enlargement then present.

Summary.

A case of mitral stenosis with paroxysmal attacks of pulmonary œdema is described.

Mitral valvulotomy was successfully performed. Considerable improvement in exercise tolerance was noticed, and nocturnal attacks of dyspnœa were abolished. Careful and prolonged observation will be needed to assess the full effect of surgery in this case.

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REVIEW

NON-GONOCOCCAL URITHRITIS. By A. H. Harkness, M.R.C.S., L.R.C.P. Pp. 395. 52s. 6d.

Since the antibiotics and the sulpha drugs have come into general use, the complications of gonorrhœa are becoming rarities and non-gonococcal urithritis is being more widely recognised, the publication of this excellent book is timely. Each chapter has exhaustive references. Forty-six pages are devoted to "Reiters Disease," which is a more frequent complaint than is generally recognised. There are 167 illustrations, 75 of which are in colour. It can be recommended to anyone interested in venereology, as an up-to-date text-book for the diagnosis and treatment of Urithritis. H. E. H.

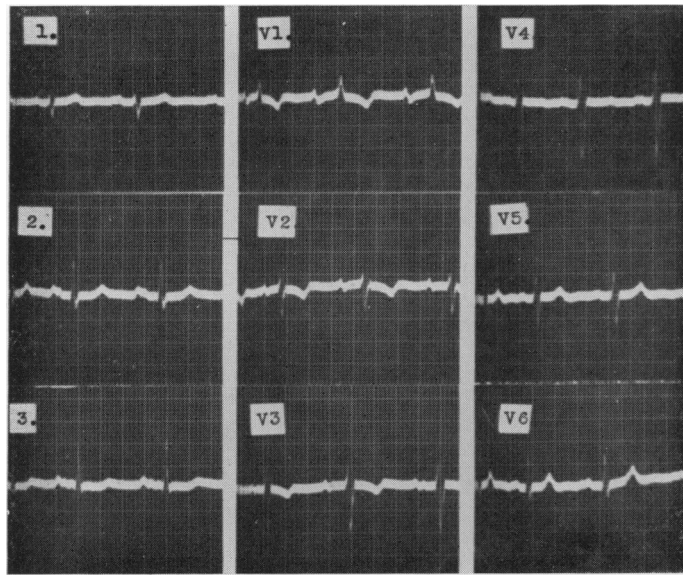

FIG. 1
Bifid P waves.
Right ventricular hypertrophy.

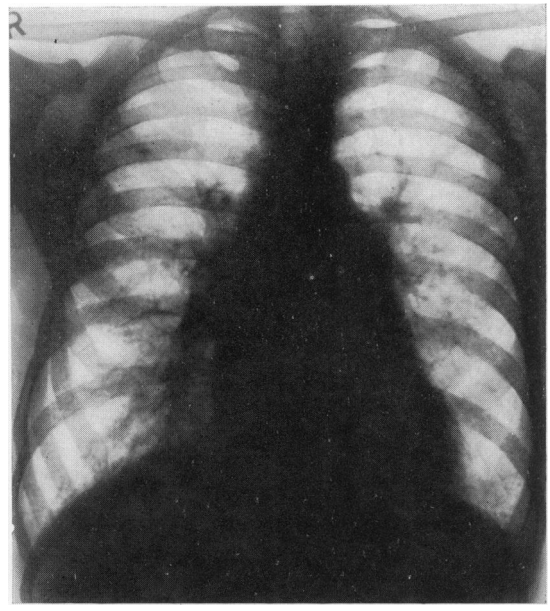

FIG. 2

Increased pulmonary vascular markings. Left auricle seen below pulmonary artery on left border of heart.

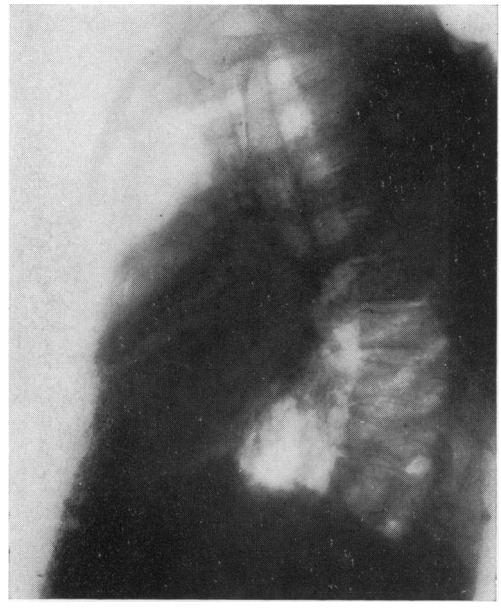

FIG. 3
Left anterior oblique film.
Moderate right ventricular enlargement. Left ventricular outline is within normal limits.

FIG. 4
Right anterior oblique film.
Slight enlargement of the left auricle.

REVIEW

AIDS TO MATERIA MEDICA. By George H. Newns, M.D.(Lond.), M.R.C.P.(Lond.).

This recent (fourth) edition of Dr. Newns' popular little "Aids" will, the reviewer feels, be as well received as have been its predecessors. The general layout of the book is similar, there being a simply presented yet valuable introduction, this being followed by the main body of the book which is divided into two parts. Part one is further sub-divided into two parts; the materia medica of inorganic substances, and that of organic substances. The reviewer was particularly impressed by the considerably expanded sections on Vitamins and Hormones, though with regard to the former the section on the B complex has been left somewhat incomplete by omitting to mention what is, perhaps, the most important fraction of this Vitamin—B12. It is also felt that, under the Hormone section, reference should have been made to the least toxic of the Thiouracil preparations, i.e, propyl thiouracil. The reviewer cannot agree with the statement on the dosage of Insulin—"5 to 100 units by subcutaneous injection," for it is felt that the amount of Insulin required under all conditions is so variable as to preclude an upper and lower limit; the dosage being ascertained by a process of trial and error, and according to the individual's metabolic upset. Further, it is the reviewer's experience that a person into whom 5 units of Insulin is injected may as well not have any Insulin injected at all.

The small pharmacological sections have been revised and brought up to date. They are interesting; salient points just being mentioned, and they add considerably to the usefulness of this little "Aids."

Dr. Newns can feel quite contented that he has compiled a work which will be well received both by students and practitioners, not only for its small price, but more so for its inherent value as a ready reference. J. L.

No attacks of paroxysmal dyspnœa have occurred since the operation. Four weeks after surgery the patient walked 100 yards without undue dyspnœa, and now, two months after operation, can walk considerable distances in complete comfort. The systolic and mitral diastolic murmurs can still be heard.

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MONTHLY OBSTETRIC MEETINGS

At a meeting held on the 21st March, 1950, Mr. H. L. Hardy Greer took the chair. Mr. Gavin Boyd presented the Royal Maternity Hospital Report for 1947. He emphasised the difficulties which had to be met in producing such a report. The recommendations of the Royal College of Obstetricians and Gynæcologists had been a help in this respect, and the report followed the plan suggested by their committee. The speaker summarised the main features of the report, and compared them with similar reports from ten other hospitals in Great Britain for the same year. Dr. W. A. B. Campbell then presented the Pædiatric section of the report. An extensive discussion on the report ensued. A Cæsarean section rate of 9.86 per cent. and a forceps rate of 21.69 per cent. called for special comment from the chairman, and he emphasised various measures which should be adopted in order to reduce them.

A meeting was held on the 26th April, Mr. H. L. Hardy Greer being in the chair. Mr. W. Campbell presented extracts from the Jubilee Maternity Hospital report for 1947, and compared them with the corresponding figures from the Royal Maternity Hospital.

Dr. J. Patterson described a case of ruptured uterus. The patient had a normal delivery in her own home eleven months after myomectomy had been performed. She collapsed one hour after delivery and was admitted to hospital, showing signs of intraperitoneal hæmorrhage. No abnormality was detected on vaginal examination. On opening the abdomen, a rupture of the posterior wall of the upper segment was discovered and a subtotal hysterectomy was performed. The patient had an uneventful recovery. In the ensuing discussion, several speakers stressed the extreme rarity of rupture occurring through a myomectomy scar, and the good fortune of the patient in surviving such a catastrophe following delivery in her own home.

At a meeting held on the 31st May, Mr. H. L. Hardy Greer took the chair, and Dr. Michael Solomons opened a discussion on "Long Labour." Cases of prolonged labour offer a serious problem in judgement to the obstetrician. He must endeavour to avoid unnecessary Cæsarean sections without increasing the maternal or fœtal risks. The speaker is investigating all cases of prolonged labour occurring in the Rotunda Hospital, Dublin, during his term as Assistant Master, and, for this purpose, he has chosen the arbitrary figure of forty-eight hours in labour. In one year there have been ninty-five such cases (2.4 per cent. of all deliveries), and of these, only five had previously been delivered of a viable child. In ninty-one cases the fœtus presented as a vertex, in two as a face, in one as a brow, and in two as a breech. Spontaneous early rupture of the membranes appeared to be associated with long labour and was found in seventy-nine of the cases (83 per cent.). Probably as a consequence, intrauterine infection was more frequent, the morbidity rate being 17 per cent. compared with the hospital

average of 2 per cent. Sixty-two cases were delivered by forceps (nine difficult), twenty-three normally, eight by Cæsarean section and two by breech extraction—in only one case was post-partum hæmorrhage encountered. There were no maternal deaths, but the corrected fœtal mortality was 12.6 per cent.

The speaker considered that every patient who has been in labour for twenty-four hours should be reassessed. The age and parity, the character of the pains, the time of rupture of the membranes, and the fœtal heart-tones were important. Broadly speaking, two types of case may be visualised :—

1. A patient, having poor contractions and slow progress, who is not distressed —a vaginal delivery may be expected.
2. A patient, having irregular strong contractions and no progress, who is very distressed and crying for analgesic drugs—a section will be required.

Dr. J. P. C. Purdon reviewed the cases of prolonged labour occurring in the Royal Maternity Hospital, Belfast, during 1947. He stressed the difficulty in deciding the time of onset of labour in these very cases—there was discrepancy in the time given by the patient, the nursing and the medical staff, and in some of the cases under review three different times were quoted. There was also difficulty in determining the time of rupture of the membranes, a high leak being a frequent finding. It was difficult, even in most experienced hands, to exclude minor degrees of disproportion, particularly when the vertex was in the occipito-posterior position. Two types of uterine action may be recognised. In the hypotonic type, vaginal examination under anæsthesia, hot vaginal douche, intravenous glucose and pitocin all have their uses. In the hypertonic variety, sedatives are necessary and pitocin is dangerous—rectal paraldehyde has been found of use. A lively discussion followed the opening papers.

A meeting was held on the 28th June, 1950, and Mr. H. L. Hardy Greer took the chair. Dr. F. G. Grant described a case of tuberculous meningitis which had been successfully treated by streptomycin during pregnancy, with a satisfactory outcome for mother and child. He reveiwed the literature, and found little reference to tuberculous meningitis in pregnancy. Streptomycin had altered the prognosis and he was against termination of pregnancy or sterilisation in these cases.

At a meeting held on the 20th September, Mr. H. L. Hardy Greer being in the chair, the statistics for the two Belfast Maternity Hospitals were discussed in detail, and no paper was presented.

REVIEW

STERN'S APPLIED DIETETICS. Revised by H. Rosenthal, B.S. Pp. xx-293. Third Edition. Price 38s. net.

This book recently revised should be useful for a quick reference to those with a good knowledge of nutrition. The text is simple, and the various sections well set out, but many of the ideas and diets included are impractical here, owing to the difference in food habits, and difficulty in supply.

The book contains up-to-date information on calories and other nutrients, but lacks material on hygiene, cooking, processing, and storage of food in relation to nutritive value. F. K. A.

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REVIEWS

WORTH AND CHEVASSE'S SQUINT. The Binocular Reflexes and the Treatment of Strabismus. Revised by T. Keith Lyle, C.B.E., M.D., M.Chir., M.R.C.P., F.R.C.S., Surgeon to the Royal Westminster Ophthalmic Hospital, London. Eight Edition. Baillière, Tindall & Cox. Pp. xii + 318 with 208 illustrations. Cr. 4to. 35s.

As 'Worth's Squint', the standard work on the subject, had become to some extent obsolete on account of the growth of knowledge of the subject and of refinement of terminology, the seventh edition, which was issued in 1939, was rewritten by the late Dr. Bernard Chevasse, whose contribution to this branch of ophthalmology was considerable. The new edition now issued has been revised by Mr. Keith Lyle, who is Surgeon and Medical Officer in charge of the Orthoptic Department at the Westminster Branch of the Moorfields, Westminster and Central Eye Hospital, London.

As the sub-title indicates, this book sets out the present-day knowledge of the binocular reflexes. Of particular interest, and that not alone to the ophthalmologist, are the introductory chapters dealing with the phylogeny of binocular vision. This also applies to the chapters dealing with ontogeny—the development of the individual binocular apparatus under the influence of structural development on the one hand, and the rewards of use on the other.

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HANDBOOK OF MEDICINE. Wheeler & Jack. Revised by Robert Coope, M.D., B.Sc., F.R.C.P. Eleventh edition. Edinburgh: E. & S. Livingstone, Ltd. 1950. Pp. XVI + 648. 20s.

This well-known handbook, which first appeared in 1894 and which has, during the intervening years, been extremely popular with students in many medical schools, has been largely re-written by Dr. Robert Coope of Liverpool. The publishers can be congratulated on obtaining the services of a writer and teacher of his calibre to bring the book up to the standard necessitated by the rapid advances in Medicine and its ancillary sciences in the last decade. The text is clear, concise, and easily read, and the superstructure of medicine is carefully built on firm foundations of anatomy, physiology and pathology. Dr. Coope's intention is that the handbook should be the companion of the student in his early years of clinical training. It can very well be the good companion of more senior students and qualified doctors also. An investment of one pound on this book will surely pay generous dividends of instruction and enjoyment. It is well bound, the type is good, and the diagrams and illustrations are models of clarity. It is as up to date as can be expected nowadays and faithfully accomplishes what it sets out to do. It can confidently be recommended as a useful addition to any medical bookshelf. J. C. D.

AIDS TO HISTOLOGY. By G. H. Bourne, D.Ph., D.Sc. Pp. viii + 158. Baillière, Tindall & Cox. 5s.

This is the fifth edition of this introductory book on histology. The defects from which it suffers are probably inherent in all the works in this series. Conciseness has been considered sometimes more important than clarity. It has several good features, the chief of which is that a large part has been devoted to the connective tissues. The central nervous system has been dealt with summarily, as is befitting its place in an introductory book. The diagrammatic illustrations are of considerable help in following the condensed text. M. G. McG.

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REVIEWS

THE RESULTS OF RADIUM AND X-RAY THERAPY IN MALIGNANT DISEASE. From the Christie Hospital and Holt Radium Institute, Manchester. Compiled by Ralston Paterson, Margaret Tod, and Marion Russell.

THIS is the Third Statistical Report from this Institute and covers the years 1940-44 inclusive assessed at five years, and 1934-38 assessed at ten years

The report commences with a general survey of the results of treatment in malignant disease and follows the lines of those already published and now well known.

An attempt to analyse the five-year results of treatment is made in the second part (1940-44) and to present them in such a way as to interest everyone who is looking for information about the efforts to control cancer, but who have no special knowledge of radiotherapy. The third part is concerned with the ten-year results (1934-38) on cases already dealt with in a previous report.

In Part one a survey is carried out by site on those forms of cancer which, in the main, are accessible to treatment by Radium and X-rays. There is a short commentary on the cancers of each site which are admirable in form and very fair in the assessment of the value of radiation therapy.

In Part two, the results obtained during the five-year period are set out in such a way as to enable radiotherapists to assess the relative merits of the various techniques employed. This part is necessarily more technical than the first part.

The five-year results are set out in a series of interesting tables and the pathology of the various lesions is briefly discussed. The various stages of the disease which are commonly accepted are mentioned and the probability of cure or palliation is gone into.

The book as a whole is an attempt to summarise the results of a team of workers in the special field of cancer therapy. The general impresion is that the very high standard set and maintained at the Christie Hospital and Holt Radium Institute is showing a steadily rising improvement in results which compare more than favourably with those of any other centre. There is no attempt to claim too much for radiation therapy and where results are unsatisfactory they are plainly stated.

The data employed in producing the tables in this book point to a very large number of cases treated and an admirable follow-up system without which the book could not have been written.

The authors are to be congratulated warmly on the splendid results achieved, the clear and simple language in which the book has been written and the clarity of their statistical tables.

This book will not only be of the greatest value to all radiotherapists, but will be of much interest to every surgeon who has to deal with cancer.

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F. P. R.

LORD LISTER : His Life and Doctrine. By Douglas Guthrie. Pp. 128. Illustrated. Edinburgh : E. & S. Livingstone. 1949. 15s.

THIS is not only a biography of Lister, but it is an excellent introduction to some of the great milestones in medical history. It will be most interesting reading for all students of medicine and its kindred sciences, and particularly for those of the Edinburgh and Glasgow schools, because it gives such an intimate picture, not only of Lister, but of his many distinguished seniors and contemporaries.

R. W. M. S.

REVIEWS

THE RESULTS OF RADIUM AND X-RAY THERAPY IN MALIGNANT DISEASE. From the Christie Hospital and Holt Radium Institute, Manchester. Compiled by Ralston Paterson, Margaret Tod, and Marion Russell.

THIS is the Third Statistical Report from this Institute and covers the years 1940-44 inclusive assessed at five years, and 1934-38 assessed at ten years

The report commences with a general survey of the results of treatment in malignant disease and follows the lines of those already published and now well known.

An attempt to analyse the five-year results of treatment is made in the second part (1940-44) and to present them in such a way as to interest everyone who is looking for information about the efforts to control cancer, but who have no special knowledge of radiotherapy. The third part is concerned with the ten-year results (1934-38) on cases already dealt with in a previous report.

In Part one a survey is carried out by site on those forms of cancer which, in the main, are accessible to treatment by Radium and X-rays. There is a short commentary on the cancers of each site which are admirable in form and very fair in the assessment of the value of radiation therapy.

In Part two, the results obtained during the five-year period are set out in such a way as to enable radiotherapists to assess the relative merits of the various techniques employed. This part is necessarily more technical than the first part.

The five-year results are set out in a series of interesting tables and the pathology of the various lesions is briefly discussed. The various stages of the disease which are commonly accepted are mentioned and the probability of cure or palliation is gone into.

The book as a whole is an attempt to summarise the results of a team of workers in the special field of cancer therapy. The general impresion is that the very high standard set and maintained at the Christie Hospital and Holt Radium Institute is showing a steadily rising improvement in results which compare more than favourably with those of any other centre. There is no attempt to claim too much for radiation therapy and where results are unsatisfactory they are plainly stated.

The data employed in producing the tables in this book point to a very large number of cases treated and an admirable follow-up system without which the book could not have been written.

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The clinical uses of Streptomycin take up the great portion of the book in section three. Tuberculosis is especially well catered for, and attention is drawn to the influence of the pathology of the lesion in determining response to treatment. Stress is laid on the indication for treatment before necrosis has occurred. Development of resistance by the organism often coincides with deterioration of the patient, and subsequent improvement in any case is due to the natural defences of the patient. The uses of Streptomycin in non-tuberculous conditions are not so well nor uniformly covered, and several of the chapters are non-committal.

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AIDS TO MEDICAL TREATMENT. By T. H. Crozier, B.Sc., M.D., D.P.H. Second Edition. Pp. viii-439. Price 7s. 6d. net.

THE recent advances in therapeutics have left the student, and often his teachers, in some bewilderment.

For this reason Dr. Crozier's excellent and concise book will be generally welcomed.

He and his contributors have covered the whole field of medical treatment in an admirable manner, and in view of the present publication delay, it is remarkable that he has succeeded in incorporating the most recent methods of treatment. He has wisely avoided long lists of remedies now out of date, and has only included these of proven value.

The contributions by specialists in their various fields enable the reader to obtain a working knowledge of the treatment of diseases not commonly seen in general hospital wards, thus saving much reference to special text-books. One of the many valuable chapters in the book is that dealing with the simpler nursing procedures, a knowledge of which is essential for the young practitioner.

By incorporating a section showing the detailed diets required for certain metabolic and other diseases, the author has filled a gap so often left in similar text-books, as this important aspect of treatment is often insufficiently taught. Dr. Crozier is to be congratulated on the manner in which he has presented his facts and on the touches of light humour which enliven his pages.

It is a book which should prove an invaluable aid to students, both for examination purposes and for practice. J. T. L.

AIDS TO HYGIENE FOR NURSES. By Edith M. Funnell, S.R.N., D.N. Pp. 244. Illustrated. 4th Edition. Baillière, Tindall & Cox. 5s.

"AIDS to Hygiene for Nurses" is one of the most useful of the "Aids" series.

The information presented is more than sufficient for any canditate entering for the Preliminary State Examination. The book is clearly arranged and interesting to read.

The chapters on food is concisely explained and particularly the part dealing with Vitamins is so arranged as to be clearly visualized. The inclusion of Occupational Hygiene is a welcome addition.

Some of the illustrations at the end of the book are of doubtful value. "Disinfectants," as used to denote chemical agents only, is rather misleading.

The tutors in Northern Ireland would appreciate a paragraph on the regulations governing Milk Production in Northern Ireland. K. H.

HUMAN PERSONALITY AND ITS MINOR DISORDERS. By William Harrowes. E. S. Livingstone. 15s.

FROM such an ardent disciple of Adolf Meyer an interesting and instructive book was to be expected, and these expectations have not been disappointed. Too many books on Psychiatry become uninteresting and unreadable because of the obstruse and highly technical language used, but the author has been at pains to simplify the expression of his opinions and has succeeded in producing a book which will reward careful study.

The setting out of the first thirteen chapters is interesting and provocative, while the Neuroses are dealt with in a comprehensive reveiw in the later chapters.

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ELECTROENCEPHALOGRAPHY. A Symposium on its Various Aspects. By W. Grey Walter, Denis Hill, W. A. Cobb, D. Whitteridge, G. D. Greville & M. E. Heppenstall. Edited By Denis Hill, M.B., F.R.C.P. and Geoffrey Parr. With a Foreword by Prof. E. D. Adrian, O.M., F.R.S. Macdonald & Co. 78s.

THIS is the first comprehensive text-book on Electroencephalography. The authors' object is to produce a guide for clinicians who will use electroencephalography as an aid to diagnosis. The technical aspects which, for medical men without training in electronics, hold so many terrors, are covered in the first sixty pages. This is not easy reading.

Dr. Grey Walter is responsible for most of this book, and has contributed chapters on technique, normal rhythms and epilepsy. There is one criticism which, I fear, holds true for many papers on electroencephalography, that is the impression given of the value of the electroencephalogram in the diagnosis of epilepsy. In the reviewer's opinion, specific diagnostic features occur only in about 10 per cent. of records at the most. Mild abnormality has little value for the particular patient whose welfare is the clinician's lot. A little practical help in the use of photic stimulation and intravenous Cardiazol in the diagnosis of epilepsy would have been of interest to many.

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This is a specialized book and cannot be of much value from a general physician's point of view, and, in any case, makes difficult reading mainly on account of the subject's jargon. However, it is invariable to anyone who is actively engaged in this field of study and not the least of its attractions is the profusion of references. J. H. D. M.

OPHTHALMIC OPERATIONS. By Seymour Philps, F.R.C.S., Surgeon-in-Charge of the Eye Department, Saint Bartholomew's Hospital, London; Surgeon to the Moorfields, Westminster and Central Eye Hospital, London. Baillière, Tindall & Cox. Pp. xii + 402 with 511 illustrations. Cr. 4to. 50s.

THIS beautifully produced text-book of eye surgery is valuable as a notable exposition of current methods practised in British hospitals. A feature of the book is the excellence of the illustrations, which have been drawn by the author or photographed either by him or under his supervision. These make very clear the already lucid description given in the text.

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The value of this book to the practising ophthalmic surgeon lies in the author's constant vigilance to maintain asepsis and to point out flaws in technique which may, through contamination of a clean wound, spoil an otherwise perfect operation. Others will be interested in his advocacy of dry heat for sterilising sharp instruments, and their optical control by use of a microscope with a low power objective kept for the purpose in the theatre.

Mr. Philps sets out in detail the techniques he himself prefers, and refrains from confusing the issue by lengthy discussion of alternative methods. The reader is thus left in possession of recommended procedures which have proved in constant use to give satisfactory results.

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