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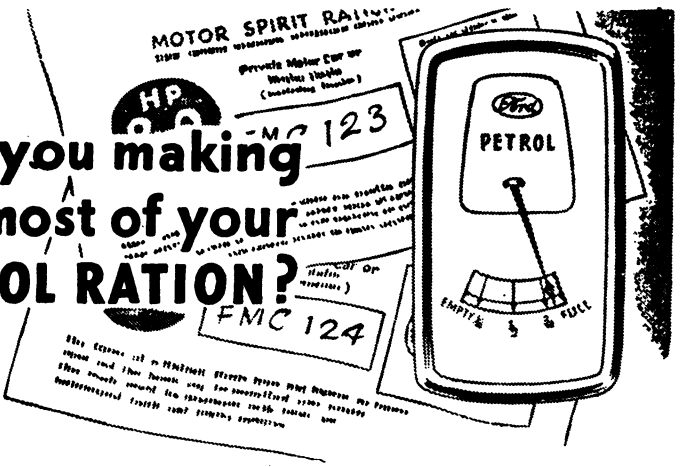

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References: British Medical Journal, November 16th, 1940, page 679.
The Lancet, November 16th, 1940, page 627.
Practitioner, January, 1941, page 27.

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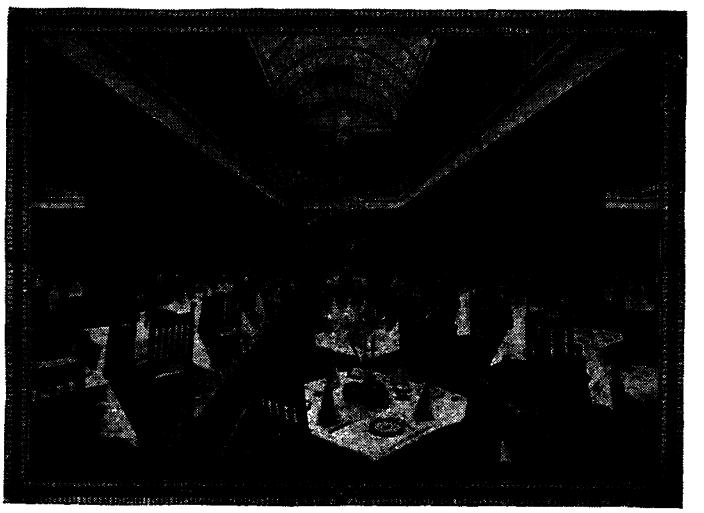

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Ulster Medical Journal

The Editorial Board regrets delay in the publication of this issue of the Journal, owing to circumstances over which they have no control.

CONTENTS

Fellows and Members of the Ulster Medical Society receive the Journal free.
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THE ULSTER MEDICAL JOURNAL

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DATES OF PUBLICATION

For the duration of the present war it is hoped to issue two numbers each year: on 1st April and on 1st October.

THE ULSTER MEDICAL SOCIETY

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Dear Sir (or Madam),

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The subscription to the Society is one guinea for Fellows and Members living in the country; two guineas for Fellows living in Belfast; and one guinea for Members living in Belfast who are not qualified more than seven years. The payment of a sum of twenty guineas entitles one to election to Life Membership.

May we, therefore, appeal to you to join the Ulster Medical Society, and so enable us to widen its influence and sphere of usefulness still further? Please make application to the Honorary Secretary, which will ensure your name being put forward for election to membership of the Society.

If you do not wish to become a member of the Society, will you consider entering your name as a subscriber to THE ULSTER MEDICAL JOURNAL? The subscription is five shillings per annum, payable in advance to the Honorary Treasurer.

We remain,

Yours faithfully,

THOMAS S. HOLMES, M.B., F.R.C.S.ENG., *President.*

H. HILTON STEWART, M.D., M.R.C.P.LOND., *Hon. Secretary.*

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THE
ULSTER MEDICAL JOURNAL

:: PUBLISHED ON BEHALF OF THE ULSTER MEDICAL SOCIETY ::

Vol. X 1st APRIL, 1941 No. 1

The Incidence of Abortion at the Jubilee Hospital, Belfast

By THOMAS S. S. HOLMES, M.B., M.CH., F.R.C.S.ENG., F.R.C.O.G.

Presidential Address, Ulster Medical Society, Session 1940-41

FOR my presidential address to the Society I have chosen a subject which, although having a certain suggestion of impropriety, is none the less of such importance that I have no hesitation in enlisting your interest in it.

Over the last number of years the incidence of abortion shows a steady increase. In the Gynæcological Flat of our Belfast Union Infirmary, in which there are forty-seven beds, the number of our abortion cases in the year has increased from under four hundred (in 1926) to over one thousand. As one of the nursing sisters remarked to me a few days ago, abortion is certainly our "big line." This state of affairs to us at present engaged in a great war is one of considerable gravity; compare for a moment the loss in still-birth and neo-natal death. In 1939 in the Maternity Flat there were 1,508 births: 96 infants were still-born; there were 55 neo-natal deaths, a total of 151. The most frequent causes of still-births and neo-natal deaths were extreme prematurity—little removed from abortion, maternal toxæmia, malformations, and development defaults. From abortion in 1939 we had an immediate total loss of 1,020. Allowing for considerable further losses of children before they reach adult life, it is still evident that the greatest loss of potential citizens of the country occurs from abortion; a still-birth or neo-natal death is regarded as a major disaster; it should be realised that an abortion at the third month is not a detail to be scarcely worth mentioning, but has the same significance as a neo-natal death—the loss of a potential citizen.

In this address I shall consider two types of abortion only :—

1. Those induced—the criminal abortion.
2. Those due to some pelvic or general pathology.

The criminal abortion, that is an induced one, is diagnosed by direct evidence of injury—lacerations, perforations, or foreign bodies in the cervix, or by definite history of operation, interference, or drug-taking. It is surprising how many of

these women will give to a discreet and kindly nurse a complete history of the details and cost of an abortionist's operation, or the nature and dosage of a drug taken. I think this is due to the fact that they have no sense of wrong-doing in the matter. Just as it is not unusual for a young woman, normally pregnant, to present herself at the hospital to be operated on for her condition, and expresses much surprise that her request is not granted.

Special enquiry is always made in any case of abortion admitted with a temperature—the infected case is always a suspect.

The methods of induction are with drug or instrumental induction. The most popular drugs are—

1. QUININE—stated to be infallible, if taken in sufficiently massive doses. One patient who had used this drug successfully on several occasions stated that she took the drug until she had temporary paralysis of arms and legs : at that stage she aborted.

2. SMITH'S ERGOPIOL—Taken three or four times daily—three tablets t.i.d., three or four tablets t.i.d., four tablets t.i.d. four-hourly : alleged to be successful in most cases.

3. LEAD PLASTER—One case aborted, but developed acute lead-poisoning.

4. PUL. FERRI ET ALOIS—With a permanganate of potash tablet at night. Method, two pills daily with pot pessary at night.

5. PENNY ROYAL AND STEEL—Dr. Martin's female pills.

Transition stage—slippery elm bark as a pack in vaginal vault, alleged to dilate cervix and start contractions, or a piece of bark inserted in cervix has same action as sea tangle tent.

The operations of the abortionist here seem to be limited to two methods : passing a sound into the uterus, or injection of soap and water through the cervical canal. These individuals must be possessed of considerable manipulative skill, as in cases where the history is very definite, obvious trauma is rare, and the cervix does not even show the marks of a volsullum, so this very essential instrument in intra-cervical manipulations is not used.

To do anything of a deterrent nature about these things is incredibly difficult. I have been in touch with the C.I.D. people here over very many cases : indeed, I will tell you presently of some illustrative cases in the law in Northern Ireland. It seems to me that there is no chance of a conviction unless several policemen and a couple of reputable doctors are actual witnesses of the crime.

When acutely ill and afraid, I have known very many of these women give meticulous and convincing evidence of their operation. When questioned by the police, they will completely deny their former story, attributing it to the delirium of their illness. Even if they do repeat their story to the police, with unsupported evidence—and so often in the absence of trauma, unconvincing medical evidence—conviction seems impossible. For instance, a young woman who consulted a midwife, who was a recognised abortionist, for the treatment of a short period of amenorrhœa, was treated by the nurse by intra-uterine injection. Unfortunately the pregnancy was in the fallopian tube, which ruptured after the second treatment.

After operation, the patient in her convalescence gave details of her case to the police. The nurse was duly arrested and came before the Grand Jury. The defence offered was that the nurse had been consulted re douching for leucorrhœa, a proper treatment, and no suggestion of pregnancy. The Crown exhibits were a Higginson syringe, fitted with a long, narrow vaginal nozzle. Evidence supported the patient's statement, insomuch as there had been an infection of the pelvis and pelvic abscess drained through posterior fornix. The Grand Jury returned no bill, so that the nurse was never brought to open court.

Another case showing difficulty of obtaining evidence is as follows: A young married woman of thirty years of age, thought to be suffering from a ruptured tubal pregnancy, was admitted to hospital. She had all the signs of this condition, and was very desperately ill. At operation, two large perforations of the fundus of the uterus were observed, with an ovum herniating through one of them. The uterus was removed, and the woman made a rapid recovery. The police were notified by the hospital authorities, and on repeated occasions questioned the woman; on all occasions she definitely and very firmly denied any form of operative treatment, and stated that the trouble was due, not to operation, but to the fact that she had strained herself lifting a tub. If you are willing to accept this story of the extraordinary effect of strain on the pregnant uterus, you can see the specimen in the museum at Queen's University.

At times, too, one sees examples of extraordinary determination on the part of a very crude abortionist. I have removed from the uterus of a five-months pregnancy a piece of lath eight inches long and half an inch broad. The cervix was apparently uninjured, and after abortion the patient never had a temperature. No history could be elicited.

One other story of the abortionist, this time of poetic justice. A lady who for many years had run a lucrative practice as abortionist here, had the misfortune to be convicted, and served a term of imprisonment. On her release, in the ordinary course of nature she missed a couple of periods—her age was the mid-forties. Just to make sure, she passed an instrument on herself, perforated her uterus, and died of an acute septicæmia. She was not pregnant. This time the mills of the Lord ground exceeding small.

Considering the tendency to the increase of the conditions, I wonder if the existence of this hospital may not be to some extent responsible for this. The abortionist has only to induce the condition, have the matter so arranged that the patient is sent to hospital, and the responsibility of her recovery, or the reverse, rests on us—an unpleasant thought, but with some degree of fact. We have had very many cases investigated by the police. Quite a number of known abortionists are kept under police observation, but the difficulties of evidence have made the convictions few, but we still have hope.

The second group—due to some general or pelvic pathology—should present a more encouraging outlook. In the social class to which Poor-law patients belong, the conditions of life as to housing, food, and overcrowding, must be a strong predisposing factor. Abortion does not occur in any comparable proportion in

countrywomen or in the well-fed and well-cared-for higher social grades. A constant diet of white bread and tea, deficient in the vitamins, so essential in reproduction, with any other predisposing conditions, will make abortion very likely. The most common of the predisposing factors are rapidly repeated pregnancies, especially if associated with any degree of kidney toxæmia, or nephritis. Syphilis as a predisposing factor is of recent years negligible; not a half per cent. of our cases show a positive Wasserman reaction. Predisposing causes are deep cervical lacerations with chronic cervical infection, and retroflexion with vault prolapse, causing congestion of veins. The most important of these conditions is without doubt the cervix. For the safer development of a pregnancy it is essential that there should be no gross interference with its integrity. I have noticed in cases who have had a high amputation of cervix, and subsequently became pregnant, that abortions may be considered inevitable. In deep lacerations there is the same loss of protection, and the outlook cannot be improved by the presence of chronic infection.

As to the question of endocrine deficiency, I have no doubt it is a factor; its estimation is difficult, and its treatment by endocrine expensive and experimental, and the results in a small series of cases unconvincing.

TREATMENT.

In a case of hæmorrhage without dilation of the cervix, absolute rest is the essential treatment. Small doses of morphia or bromide may help. I have not found vitamin E or lutine extract makes any appreciable difference. If bleeding stops, the treatment is rest for one week after it has stopped. One pregnancy in ten of these cases will go on to term. Although immediate results are good, we find that many of the cases are readmitted after a few weeks, with abortion inevitable. If in addition to hæmorrhage the cervix is dilated, or any part of an ovary enlarged, the uterus is at once emptied, by use of a flushing curette. I consider digital emptying insufficient, as it leaves the patient liable to further bleeding, and with increased risk of sepsis. Where infection is present, the patient is at once put on prontosil treatment. This we have found of very greatest value; indeed, since its adoption there has been a striking drop in the death-rate of our septic cases.

In 1936 (474 cases)—we had 58 septic cases : 22 severe : 6 died.

In 1937 (637 cases)—59 septic cases : 15 severe : 5 died.

In 1938 (742 cases)—60 septic cases : 3 only severe : 1 died.

It was in 1938 that prophylatic prontosil treatment was started.

It is the practice of, I think, the majority of gynæcologists not to subject any patient with a septic abortion, and with a raised temperature, to any form of operation procedure. I cannot persuade myself that it is a good thing to leave indefinitely in the uterus a mass of stinking and infected tissue; better I think is the chance of recovery from a single dissemination from curettage, than in continued absorption for many days or weeks. This opinion of mine I fear will fill the souls of my colleagues with indignation, but it is my considered opinion based on many years experience.

Sciatic Pain

By RICHARD TURNER, M.D., M.R.C.P.(LOND.), LIEUT.-COL., R.A.M.C.

THE problem of sciatic pain is a complex one. Justification for this paper lies in the belief that it is insufficiently understood and that on the whole there is a widespread laxity in accurate diagnosis, with the inevitable corollary that treatment may be inappropriate or inadequate.

There is no need to emphasise the frequency of such pain. Most cases are treated by the general practitioner, but many are referred to general physicians, surgeons, orthopædists, or neurologists, or to those who specialise in various forms of physiotherapy.

What matters from the point of view of the patient is that anyone undertaking treatment should have a comprehensive appreciation of the problem and be capable of carrying out the treatment indicated or at least of referring him to someone who can.

Before trying to be constructive, it would be as well to give reasons for dissatisfaction with the usual state of affairs. In the first place, the term "sciatica" is loosely used for almost any pain down the back of the lower limb. It implies that the sciatic nerve is directly involved in some pathological process. Actually in a majority of cases this is not so, and the pain is referred from some structure in the posterior ilio-lumbar-sacral region. It would be better to say that the patient has pain down the thigh and leg, for that at least is true, and in actual fact may represent all that is known, rather than imply prematurely that the precise cause of the pain is understood.

No harm is done if it is realised that "sciatica" is not a diagnosis, but unfortunately all too often the matter is not carried further. The patient is labelled "sciatica," put to bed in the acute stage, given warmth, analgesics, and possibly a counter-irritant, until he is fit for some form of physiotherapy.

Sometimes it is mentioned that an injection of oxygen or saline into or around the nerve sheath may be beneficial, and occasionally it is recommended that an epidural injection is worth trying and may give marked relief. Many, however, are not aware of the precise indications and details of technique of such procedures. If the patient does not improve by the end of a few weeks, or as we all know, sometimes months, he is referred for a specialist opinion—usually to a neurologist or orthopædist—where disorders in these two specialities are excluded or treated. If that fails, he is likely to be sent hopefully once more for physiotherapy, or possibly, and a little ashamedly, in the case of a woman with predominant backache, to that haven for one who has done the rounds of the departments of a general hospital—gynæcological O.P.s, or if of dubious mental balance, to that other haven—the psychological department.

Most of us will remember being taught the first thing to do in sciatica is to exclude all possible forms of pressure on the nerve, especially neoplastic, and

perhaps most of us carried away the impression that the one thing not to forget is to do a rectal examination. Actually of course such cases of pressure are rare, and a careful history and physical examination should arouse suspicions that something more serious is afoot. Moreover, if treatment fails to relieve in the way expected, the whole position must be reviewed and accessory methods of investigation may be required.

The problem of sciatic pain does not consist of excluding pressure on the nerve and then treating on general lines.

Next, the frequency of the various causes of such pain tends to be misrepresented by specialists, and therefore in most text-books and papers and much teaching.

In special departments and clinics there is a constant danger of losing breadth of view, and this may be disastrous for the average patient. No one appreciates this better than the general practitioner. Moreover, it is always easy to be biassed by over-enthusiasm for some special lesion or treatment. To give two examples :—

A few years ago it was realised that one of the hitherto unrecognised causes of intractable sciatic pain was backward displacement of a ruptured intervertebral disc. There is no doubt at all of the importance of accurate diagnosis here, for successful treatment is usually dependent on laminectomy, and such operative relief is dramatic. Quite recently a surgeon attached to a well-known neurological unit in England wrote an article describing his experiences of such cases ! In his summary he made the remarkable statement that in his opinion most cases of "ordinary sciatica" are due to lesions of the intervertebral disc. Now, this is manifestly absurd and could be refuted by almost any doctor.

Again, there is still a tendency in many orthopædic centres on both sides of the Atlantic to find an orthopædic cause for most patients with sciatic pain either in the nature of a bony abnormality of the complex lumbo-sacral region or from involvement of the sacro-iliac joint.

Now, most if not all the signs quoted in support of this latter diagnosis may equally well result from a lesion involving other tissues in the neighbourhood. For example :—

Tenderness over the joint—

Local tenderness may be a guide to the situation of the lesion, but the sacro-iliac joint is deeply situated and inaccessible to direct palpation. Any painful lesion in the overlying tissues will give rise to tenderness over the joint.

Lasègue's sign or straight leg raising—

Straight leg raising is clearly no more a specific test for the sacro-iliac joint that it is for stretching the sciatic nerve, as is so often assumed. Moreover, the ham-strings, hip-joint, buttock, and lower back are also involved, and a painful lesion in any of these structures will be made manifest.

It would be possible to detail a number of other examples of the way in which lack of clear thinking or breadth of view leads to disappointment in results of treatment, through faulty diagnosis.

In the same way, examples may be given as regards lack of balance in treatment. Epidural injection of saline solution has been hailed as the best pain-relieving measure. In the right cases, and fortunately these happen to be amongst the most acute and painful of all, the effect is dramatic. In the wrong case it is of no avail. However, usually the right case can be selected from clinical examination alone.

Again, there are enthusiasts who advocate manipulation for all cases. In those who should be treated by epidural injection the pain will be aggravated. In patients with an undiagnosed posterior rupture of an intervertebral disc it has been known to cause paraplegia. In tuberculous arthritis of the sacro-iliac joint the danger is obvious.

This is not to decry the value of manipulation. In suitable cases it is invaluable and highly gratifying. It is merely a particular application of the general law that accurate diagnosis must precede safe and successful treatment.

Finally, there is reason to believe that the commonest cause of sciatic pain (fibrositis) is that least recognised, the easiest to treat, and the most productive of quick results. It is no exaggeration to say that these particular people can be cured in minutes, hours, or days instead of weeks, months, or longer.

The literature on sciatic pain is extensive. Almost always on hearing a discussion, reading an article or section of a book, one feels better for it, with perhaps mixed feelings. On the one hand a feeling of satisfaction that something new or a new point of view has been acquired, and on the other a feeling of regret that had this knowledge been appreciated before, our patients would have benefited.

The examination of many books and papers has been disappointing. Books on general medicine and surgery and on orthopædics and neurology have almost without exception failed to describe the picture as a whole and failed to mention some of the types of case that occur in practice, together with some of the most useful forms of treatment.

Papers, mostly American and mostly in orthopædic journals, are also disappointing and indeed confusing and bewildering—not because they describe new or obscure lesions, but because they seem to make a whole truth out of a part and because they simply do not tally with one's own experience or that of colleagues.

Orthopædic lesions, especially in the form of congenital or acquired structural abnormalities which, though well recognised, would seem to occur in but a small proportion of the patients in orthopædic clinics in these islands, are stated to account for a majority of cases of sciatic pain—not of specially selected material, but of all cases. It is the same with treatment. All sorts of complicated procedures and operative techniques are described, and it is stated that most of these are successful to varying degrees in varying periods of time.

Now the important point is this—the cases described have symptoms and signs precisely similar to the patients we all see. There is the same distribution of pain, the same scoliosis and leg signs, exactly the same. Astonishingly high X-ray figures may be quoted in support of various anatomical defects said to be the cause of the pain.

Sometimes arthritis or subluxation of the sacro-iliac joint is held responsible for a similarly high percentage of cases, though diagnosis rests much more on surmise than actual evidence.

Occasionally some novel lesion such as spasm of the piriformis muscle is held to account for a majority of cases.

However, most patients with sciatic pain, whether from special clinics or not, can be and are cured more rapidly and more simply in a way which precludes such lesions from being the cause of pain. One is left with the impression that save for a few tips and reminders and the hitherto unrealised explanation of a possible cause of an occasional difficult case, it would be better to forget and continue with accustomed practice.

So far this has not been very constructive, and an attempt will be made to justify these comments by summarising the experience of an intensive clinical study of patients drawn from the various departments of two general hospitals, including many which had gravitated to the physiotherapeutic departments, a special clinic, and some referred direct from local practitioners, together with nearly fifty additional cases during the present war between the ages of roughly 20 and 50 and in whom trauma might be expected to play a relatively large part.

Before the war I was most fortunate to work in London with an orthopædic surgeon, because amongst other things he taught me how to examine a patient properly, and it gives me more confidence to criticise where a physician should tread warily.

The material examined has been representative, and includes a considerable number of the most long-standing and obstinate cases of all.

No statistics are given, because not hundreds but thousands of cases must be analysed before accurate representative figures are possible. (My own figures show approximately forty-five per cent. due to fibrositis, twenty-five per cent. due to ligamentous strain, and twenty per cent. to true neuritis.)

Individual cases are not quoted, because it has been thought better and more useful to describe the composite picture in each group.

Classification of Sciatic Pain.

I. Sciatic neuritis.

II. Compression of the nerve :

- (a) Within the spinal canal—
  - Tumour of cord or cauda equina.
  - Prolapse of inter-vertebral disc.
- (b) Within the inter-vertebral foramina.
- (c) Within the pelvis.

III. Referred pain.

- (a) Fibrositis of muscle.
- (b) Injury to muscle, aponeurosis, ligament, from strain or contracture following strain or from faulty posture, or a tight ilio-tibial band.[2]

(c) Injury to lumbar and upper sacral joints :

Infective arthritis.

Traumatic arthritis.

Spondylitis ankylopoietica.

Subluxation.

(Lumbar arthritis may also cause direct pressure on nerve-roots).

IV. Miscellaneous group.

Syphilis. Diabetes. Alcoholic neuritis.

Subacute combined degeneration of the cord.

Varicosity of venæ comites nervi ischiadici.[3]

He who would treat sciatic pain successfully must arm himself with certain fundamental requisites which are not difficult to come by :

1. An understanding of the possible causes and mechanisms in the production of the pain, based on an appreciation of the anatomy of the structures involved.
2. The ability to make a thorough orthopædic and neurological examination and appreciate the significance of abnormal physical signs.
3. The ability to interpret X-ray films in three planes and stereoscopic views, or co-operate with someone who can.
4. The ability to perform the various forms of local injection, epidural injection, and to manipulate this part of the body rationally or, again, work with someone who can.
5. Finally he must be willing and able to call for the assistance of an orthopædic surgeon for the treatment of certain types.

It is true that a good orthopædic surgeon could deal with most cases, but his special qualifications are rarely needed, and a majority of cases will always be seen first by other doctors, any of whom with sufficient keenness and care may acquire the requisites mentioned.

Emphasis must be laid on the fact that most cases of sciatic pain give rise to a very similar clinical picture. An exact analysis of the pain is rarely of much help in the differential diagnosis of the actual cause of the pain. This is specially so in the referred group. It is useful to differentiate between high and low sciatic pain. The latter originates below the lumbo-sacral joint and the lumbar spine is quite normal on physical examination. If pain is apparently confined to the area supplied by the common peroneal nerve, the lesion is probably in the neighbourhood of the piriformis muscle at the great sciatic notch.

Moreover, whatever the actual cause of the pain, whether it is a true neuritis, compression of the nerve, or referred pain, the associated physical signs such as muscle spasm, difficulty in bending down to touch the toes or raise the leg with knee straight, and scoliosis, are very similar or identical. There are, however, means of arriving at an exact diagnosis.

Sciatic Neuritis.

Sciatic neuritis implies an inflammation of the nerve or its sheath, and in days gone by, when operation was sometimes performed to expose the nerve and incise

the sheath, this inflammation has been actually observed. The pain, of familiar distribution, tends to be constant, though aggravated or relieved to some extent by changes in posture. The pain too is usually down the whole course of the nerve and is severe. Any movement which causes stretching of the nerve—and this can be done with little movement of other structures—will aggravate the pain.

There is usually marked tenderness on palpation over the course of the nerve, whereas in the other forms this is slight or absent. Unless the pain is of very recent origin, the ankle jerk will be definitely impaired or absent. This occurs too in compression, but not in referred pain. The knee-jerk will be normal or slightly increased, and if decreased then either the anterior crural system is involved or some other condition altogether (e.g., syphilis, subacute combined or alcoholic neuritis) is present. There is one other useful test. If the patient sits facing the observer, raises the leg on the bad side till pain is just produced, and then lowers it just sufficiently to relieve it again, and the head is then flexed towards the chest—in neuritis (and sometimes in compression) the pain will be markedly and definitely aggravated. Incidentally, if compression can be excluded, this is an additional point in favour of doing an epidural, because it is likely to be successful. This sign is explained by stretching the nerve through pulling on the spinal cord.

Finally, there is an important negative test which will be better appreciated when discussing referred pain. There is no local tender area in the erector spinæ or glutæi (unless, of course, one happens to be pressing over the course of the sciatic nerve).

The treatment of this type of pain, and of this type only, is by epidural injection of saline solution, containing one per cent. procaine, into the sacro-coccygeal foramen.

The technique is simple, and is of course used for anæthesia in surgery.

The patient lies on the affected side (this is important, as it influences the distribution of the fluid), semi-prone and with knees flexed. The sacro-coccygeal foramen is located with the finger. It is situated about two inches above the tip of the coccyx, bounded above by the concave lower border of the sacrum and at the sides by the two lateral tubercles. After preliminary local anæsthesia down to the periosteum a long, fine, pliable lumbar puncture needle is inserted at right angles to the skin, midway between the two lateral tubercles, until bone is just touched. It is then withdrawn slightly, rotated through ninety degrees so that it can be pushed upwards through the foramen (i.e., parallel to the skin) and inserted for about one inch. Suction is made with a syringe to ensure that an unusually low dura has not been pierced (when C.S.F. would appear). 40 to 100 c.c. of the sterile solution is then gently injected. Excessive pressure must be avoided and the injection stopped if any but slight pain is produced. This explains the value of local and not general anæsthesia. After the injection a piece of elastoplast is placed over the puncture mark and the nerve is gently stretched by straight knee raising.

I have never seen any untoward effects, but paraplegia has occasionally been reported, presumably from infection or a vascular accident. The important points

are probably an aseptic technique, the avoidance of the knee-elbow position, testing for a low dura, and not using undue pressure.

A little-appreciated point is that this method is most successful in the acute, and therefore most painful, stage.

Once again it must be emphasised that success will only be achieved in appropriate cases, and this explains the disappointment of enthusiasts who after a few successful cases thought that a cure-all had been discovered.

In cases of low sciatica apparently due to neuritis, better results may be achieved by making the injection round the nerve-sheath at the great sciatic notch. This injection is rather more difficult.

The upper border of the notch is situated three to four inches lateral to the top of the inter-gluteal cleft and three to four inches above the tuber ischii (depending on the size of the patient). The nerve passes downwards and outwards from here to lie mid-way between the great trochanter and the tuber ischii. It is best to mark out the course of the nerve on the skin and make the injection about one inch below the notch. A fine 6-inch needle is passed at right angles to the surface, and when the nerve is reached an electric feeling will be experienced down the limb. One c.c. is injected very slowly, and after a pause fifty to one hundred c.c. more.

These methods of treatment are more efficacious than the customary treatment by rest followed by physiotherapy alone.

In all probability infection is the main ætiological factor in sciatic neuritis, though most often this cannot be proved. It is always worth while dealing with an obvious focus of infection, but perhaps the best rule is to make a special search, including X-ray of the teeth if there is a recurrence of symptoms after apparent cure.

Concentrated vitamin B_1 should be given in all cases where it is suspected that the nerve is degenerating. After a preliminary course of intra-muscular injections it may be continued in tablet form or as Bemax and Marmite.

Compression of the Nerve.

Pressure on nerve-root, plexus, or trunk causes pain only in areas supplied by these structures (as opposed to referred pain), motor and sensory changes are to be expected, and the ankle-jerk is diminished or absent. Compression by new growths will not be discussed. Sciatic pain is not often the initial symptom, and it has already been pointed out that with reasonable care they should rarely be difficult to diagnose.

Only two types of pressure will be discussed, that arising from posterior protrusion of a ruptured inter-vertebral disc, and pressure within the inter-vertebral foramen.

Posterior Rupture of the Inter-vertebral Disc.

About thirty years ago a case of injury to the spinal cord caused by rupture of an inter-vertebral disc during muscular effort was described in Scotland.[4] Less than twenty years ago a similar protrusion was recognised at operation as the cause of intractable sciatic pain.[5]

It is only during the past few years that the condition has become at all widely

recognised and the method of radiological diagnosis appreciated. Occasionally instances of rupture following gross trauma had been described.

Last year an American surgeon gave a lecture in London describing the results of no less than three hundred cases operated on at the Mayo Clinic.[6] The following description is based on three personal cases and a study of the literature which this stimulated :—

The inter-vertebral discs[7] are made up of three components.

1. Cartilage on the upper and lower surfaces of adjacent vertebræ.
2. The annulus fibrosus, an outer fibro-elastic rim containing—
3. The nucleus pulposus, a resilient semi-fluid substance which represents the remains of the notochord.

The anterior and posterior longitudinal ligaments help to retain the disc. Under normal conditions of strain the disc may bulge beyond its normal confines, but under abnormal stress or strain it may project into the spinal cord or press on a nerve-root.

At operation, after adequate exposure following laminectomy, the lesion is seen as a bulge covered by the posterior longitudinal ligament, or an œdematous nerve-root may have to be retracted before the protruded portion of the disc is seen.

Masses protruding backwards in this way have been previously described as loose cartilages, fibromas, or various forms of chondroma. It is now believed they are all in reality examples of herniation of the disc, sometimes with secondary degenerative changes.

The protruded material may be œdematous and sometimes freely movable, and these two features may account for the intermittency of symptoms, which is not uncommon.

There is frequently a history of injury, such as weight-lifting or a fall, or of repeated minor injury. Perhaps an initial injury may weaken the posterior longitudinal ligament, and sometimes the annulus fibrosus too, and the actual protrusion occurs subsequently. Certainly it is common for patients to complain of lumbago preceding the sciatic pain.

The main feature about the pain is that it is intractable and fails to respond to all the customary forms of treatment. There is low back pain with sciatica, always recurring and accentuated by any action such as exertion or coughing, sometimes bad at night and making the patient get up and walk about; and he tends to walk with a limp. Paræsthesiæ may occur. There will be difficulty in bending down or raising the leg, a flattening of the lumbar curve with muscle spasm, and the ankle-jerk is diminished or absent. These features are not of course pathognomonic.

Other minor neurological signs may be present, but if they are at all extensive a true intra-spinal neoplasm is more likely to be present. Occasionally there are signs of spinal compression.

The condition should always be excluded in cases of intractable sciatic pain with some of these features.

It is usually stated that a lumbar puncture is useful for the purpose of examining the protein content of the C.S.F. which is often raised. Actually such a rise is just

as likely to occur in sciatic neuritis, and was absent in two of my cases of ruptured disc.

The much more important observations concerning the possibility of spinal block can be made when the lumbar puncture which must precede radiology is made, and lumbar puncture in these cases, as I have experienced, may be very difficult and also painful for the patient.

Diagnosis is made by X-ray after the injection of five c.c. of lipiodol into the theca. This is not the place for details of technique, but the ideal though not essential way is to have a tilting table and a quick change-over switch to take the pictures whilst screening, which is done in the prone position. If a protrusion is present, a characteristic filling defect will be observed as a lateral indentation of the opaque shadow opposite an inter-vertebral disc and often absence of filling of the affected nerve-sheath. A straight X-ray is usually normal, but may reveal a diminished inter-vertebral space.

The commonest site of all is the lumbo-sacral junction and next the disc between lumbar 4 and 5.

Treatment consists in removal of the offending fragment or fragments. The results are claimed as excellent, and this is usually true, but doubt has been cast on the possible after-effects, not yet by any surgeon, but by "that dispassionate spectator of therapeutic triumphs, the medical referee."[8] It is also possible that prolonged pressure may result in degeneration of the nerve. However, this may well take too long from the point of view of the suffering patient.

The introduction of intra-thecal radio-opaque oil should not be made haphazardly, but only in specially selected cases after the failure of all methods of diagnosis, and, needless to say, no patient wants to be submitted to an unnecessary laminectomy, so this should only be performed when pain is intractable.

One other point of interest is worth mentioning. If an epidural injection is made on one of these patients there may be a marked increase of pain during the injection. This may be a useful diagnostic point. It is clear that if there is already pressure on a nerve-root, increasing the pressure in the neighbourhood will increase the pain.

It has also been reported that sciatic pain may be produced from hypertrophy of the ligamenta flava, with pressure from behind giving rise to a similar defect on lipiodol examination.

Pressure Within the Inter-vertebral Foramina.

It is an anatomical fact that the inter-vertebral foramina in the lumbar region decrease in size, whereas the nerve-roots which pass through them increase in size as one passes down the spinal column. That is to say, the fifth lumbar nerve-root is the largest and has to pass through the smallest of the foramina at the lumbo-sacral junction, and is therefore the most likely to suffer from pressure effects in the foramina.

It is clear that anything which causes a diminution in the size of the inter-vetebral disc., e.g., arthritis, degeneration, or rupture, will result in a subluxation of the inter-articular facets and so diminish the size of the inter-vertebral foramen and may cause root pain. The plane of the inter-articular facets in the lumbar

region is widely variable. In some individuals it is more anteroposterior than lateral and this results in a less stable joint. Occasionally a posterior displacement of the body of the fifth lumbar vertebra occurs and in the lateral X-ray it can be seen that it overhangs the top of the sacrum.[9] This too will result in a decrease in the fifth lumbar inter-vertebra foramen.

There is no need to describe all the various congenital anomalies which may occur in this part of the body. These two examples will suffice to show the way they may result in pressure effects. Such effects may sometimes be aggravated by trauma or faulty posture associated with poor muscular tone, debility, obesity, unsuitable occupation or perhaps some toxic factor.

It would seem that this type of pressure has been exaggerated in frequency and importance, especially in the United States. This impression is based on experience in these islands and from a comparison of the literature. There is no doubt that not only do such anomalies frequently exist without any symptoms but that rather than cause any direct pressure effect they more often predispose to injury. This is true of all the various congenital anomalies which occur in this region.

Arthritis may also cause sciatic pain directly or reflexly. A lateral view taken at forty degrees (to the film) is necessary to show the inter-articular joints clearly.

As yet another example of the exaggeration or lack of balance in describing the causes of sciatic pain might be mentioned an address given in England about twelve years ago by Professor Putti of Bologna.[10] He had been describing some work on anatomical variations in the lumbo-sacral area and went on to say that he had been able to demonstrate that most cases of sciatica which occurred, and he did not mean selected cases, were due to pressure on the nerve-root in the inter-vertebral foramen. He described how they should be treated by rest in bed for some weeks followed by a plaster jacket for some months. A study of this paper suggests that many of the cases described were precisely similar to those which can be relieved far more quickly by far simpler means and shows no recognition of the more common ætiological factors in sciatic pain.

Again it must be emphasised that bony abnormalities may cause pain by direct pressure, but usually such anatomical variations from normal predispose to injury rather than act as primary causes. The lumbo-sacral region consists of a complex system of joints, muscles, and ligaments, all of them susceptible to injury, and more so if there be some congenital or acquired structural abnormality.

Once compression of the nerve has been suspected on clinical grounds it should be confirmed by radiological examination. Treatment will consist in the necessary operative measures directed to the relief of the pressure.

Referred Sciatic Pain.

We now come to the largest group in the ætiology of sciatic pain, that in which the nerve is not directly involved at all, but the pain is referred from some peripheral structure in the lumbo-sacro-iliac region. The important point to realise is that all these various structures—muscle, ligament, aponeurosis, fascia, and joint, are all supplied by the posterior primary divisions of the lumbar nerves, and pain arising in any one of them may be referred reflexly throughout the distribution of the lower

lumbar nerves to the back of the thigh and outer part of the leg, that is to say, may give rise to what is known as sciatica. Moreover, there will be the signs already described—muscle spasm, difficulty in flexing the spine, straight knee raising, and perhaps lumbar rigidity or scoliosis.

Pain may be referred from :—

Fibrositis of muscle or fascia.

Injury to muscle, aponeurosis, ligament or fascial contractures following strain. Faulty posture.

Injury to joints. Arthritis.

Certain generalisations appertain to this group.

Wasting may be present from disuse, but there are no objective motor or sensory changes and the ankle jerk is normal.

It cannot be over-emphasised that a lesion in any one of these structures may give rise to very similar pain. Although it is true that up to a point certain patterns can be recognised for particular sources of referred pain, in practice exact analysis is of little assistance.

Pain is not confined to areas supplied by the sciatic nerve and indeed characteristically involves areas beyond the boundaries of sciatic distribution and is frequently difficult to localise. The patient may be able to indicate the source of his pain roughly and localised tenderness is usually present, though dependent on the accessibility of the lesion. Tenderness can never indicate the precise source of the pain, because clearly the lesion may lie anywhere beneath the palpating finger in muscle, fascia, ligament, or joint.

Reference has already been made that many of the tests used in physical examination must involve other structures than the one it is fondly hoped is being specifically tested. Nevertheless a complete orthopædic physical examination and correlation of the facts deduced will enable the observer to localise the lesion very closely.

Fortunately a most useful and instructive method of localising the lesion has been introduced by Steindler.[11] The patient is examined to determine the point of maximal local tenderness in the back which gives rise also to the sciatic radiation. This place is marked with a skin pencil and a bleb raised with one per cent. procaine (novocaine) solution. Through this bleb a long fine needle is passed in the appropriate direction until the point is struck where the local pain and the previously experienced radiation are produced. If now one c.c. of the procaine solution is injected the local pain and the referred pain will disappear, at least for an hour or two, as will the physical signs which resulted from the muscle spasm. If these five criteria are realised it is reasonable to assume that one has actually reached the source of the pain. In a majority of all cases of referred pain this can be achieved.

The work of Lewis and Kellgren[12] on referred pain is interesting in this connection. These observers, having noted the above facts on, e.g., a patient with a fibrositic lesion in the erector spinæ muscle of one side, injected an irritant solution (hypertonic saline) into the identical position as far as could be judged, on the opposite side. An identical pain with similar radiation was produced and both were

relieved by subsequent injection of procaine. They then mapped out areas of referred pain all over the body and found that they did not correspond with the expected dermatomes. They also found that localisation is more accurate in superficial lesions and deeper ones are accompanied by characteristic though more diffuse pain. This work is instructive and a most useful contribution to the study of referred pain. Once its significance has been appreciated, however, it will be found that in the clinical elucidation of the individual case of sciatic pain more information is to be gained by physical examination and localisation by the needle technique than by an exact analysis of the pain.

It is becoming more widely known that localisation can be achieved by the technique mentioned. It is less widely known that the method is an excellent means of treatment. A single injection of procaine may result in complete and permanent relief in cases of fibrositis, and in cases of adhesion or fascial contracture may allow manipulation and stretching with restoration of full movements. Sometimes, and especially in long-standing cases, the injection must be repeated two or three times. This is probably due to the vicious circle first described by Leriche. It applies, too, in cases of minor injury, yet with prolonged disability. The injured tissues stimulate the sensory nerve-endings and impulses pass up the afferent nerves. Efferent autonomic impulses arise and produce local vasodilation and the effusion stimulates the sensory nerve-endings further, so that the fibrinous exudate continues. Procaine injection breaks the circle.

Fibrositis of Muscle.

This is not the place to discuss the general problem of fibrositis.[13] The diagnosis and treatment of sciatic pain due to this lesion in muscle is of particular interest and importance because such cases are common, so simple to recognise, and yet so often not recognised, or mis-labelled sacro-iliac or lumbo-sacral strain, and because they are so easy and satisfactory to treat.

Symptoms may come on gradually or instantaneously, for no apparent reason, or associated with chill, focal sepsis, or strain, and may or may not be preceded by lumbago. Detailed examination is unnecessary, for if suspected, and if local tenderness of muscle with reproduction of the radiation is found, it is always worth while to inject, and if this fails then the position can be reviewed.

In a majority of patients with referred sciatic pain there is an area of localised fibrositis usually in the erector spinæ or glutæi, and dramatic relief will result from local injection.

In long-standing cases, and pain may have been present for several years and yet respond, there may be much stiffness and perhaps postural deformity and disuse muscular wasting. This will require heat, massage, movements, and active exercises to complete the cure. Whereas such cases usually took weeks or months of attention by the physiotherapy department, including much painful massage of often hypothetical fibrositic nodules, by means of injections they can often be relieved in minutes, days, or if long-standing, a week or two.

Once more it is emphasised that diagnosis must be accurate and localisation exact or there will be disappointment. Considerable time and patience may be required

in the gluteal region, and the individual should be examined in different positions until the lesion is uncovered and made accessible to the palpating finger. Deep pressure is frequently necessary.

Injection therapy is not efficaceous in diffuse cases without definite localised tenderness, and large infiltrations in the hope of hitting off the lesion are rarely successful. In my experience infra-red radiation combined with gentle massage and rubbing with lin. methyl sal. is better than other forms of physiotherapy such as diathermy, short wave, or ionisation.

There may be a temporary acute exacerbation of pain a few hours after the injection, and the patient should be warned of this and given something to tide him over it.

During the period of maximal anæsthesia the limb should be stretched and put through full passive movements.

Referred Pain following Strain.

In patients with a history of trauma and no evidence of pressure or neuritis some form of manipulation is likely to be required. A far more thorough examination is needed than in the straightforward cases of fibrositis, and radiology should be a routine preliminary before manipulation.

Sometimes no definite history of strain can be obtained when the physical signs and response to treatment suggest that pain and limitation of movement are due to adhesion formation. Injury may result in strain of muscle, especially at its periosteal attachment, or of ligaments, and contracture and adhesions are the usual accompaniments of neglected cases.

In the acute stage rest and support are clearly indicated, but this must not be carried out too long without at least passive movements to prevent such after-effects. However, in the very acute cases which sometimes follow minor injury such as swinging at golf or tennis, manipulation may be dramatically successful (as may local injection and active movement by the patient).

Most patients are seen in a subacute or chronic stage.

A complete orthopædic examination means in the standing, sitting, prone, supine, and lateral positions, ensuring that the individual is methodically put through every movement, including movements of the hip joints. A note is made of every movement which is limited (usually by pain) and the position in which the patient is lying at the time. By this means, and sometimes with the aid of the injection diagnostic technique, localisation of the offending lesion can be made. It is not always possible to make such precise localisation, but subsequent manipulation on the lines suggested by the physical examination is usually successful.

Localised tenderness is generally present somewhere between the lumbo-sacral joint and the great sciatic notch and pressure frequently reproduces the radiation.

Manipulation.

If radiology has failed to reveal any contra-indication, a full relaxing anæsthetic should be administered. The patient is then examined to see how much movement was limited by painful muscle spasm, and in some cases whether or not the lumbar spine is fixed.

Gentle but firm manipulation, in the appropriate directions only, as indicated by the previous examination, is next performed until full range of movement is restored. A definite "give" or the sound and sensation of tearing adhesions is usually apparent during this procedure.

The next day he may feel sore if adhesions have actually been broken down, but not otherwise, unless undue force has been employed. However, it is absolutely essential to put him through full range of movements. Thereafter relaxation by radiant heat followed by progressive passive movements and active exercises is of great importance. Indeed the manipulation is only the first step towards restoration of full range of movements, normal posture, and wasted muscle. It may have to be persisted in for several weeks, but the results of patience, perseverance, and constant encouragement are highly gratifying. Complete cure can often be obtained in cases of even many years standing.

Radiology.

Every patient with sciatic pain that has not been accurately diagnosed and successfully treated, as well as every patient before manipulation, should be submitted to X-ray examination in at least two planes and focussed on the suspected region.

Search should be made for bony disease or deformity and the joints examined for malposition or arthritis. Special attention is paid to the inter-vertebral discs and notches. The inter-vertebral facetal joints can only be seen properly in the forty-degree lateral view.

Stereoscopic pictures of the sacro-iliac joints must be taken if necessary. Congenital defects are noted as a possible predisposing factor in strain and rarely as the means of direct pressure.

The Sacro-Iliac Joint.

This joint, more sinned against than sinning, has been the subject of much study. Far too often and too readily has it been accused of undemonstrable arthritis, strain, or subluxation, though undoubtedly on occasion each of these may occur.

The so-called sacro-iliac tests can easily be exposed as non-specific and the benefits resulting from treatment to move, replace, or ankylose the joint can often be otherwise explained.

There is no doubt from daily practice and armchair study that such diagnoses are often loosely made on inadequate evidence, and it is possible to demonstrate on actual cases so labelled a different lesion and a simpler path to cure.

This is not to decry genuine cases nor creative study, but it is to appeal for reason, for balance, and for established fact.

More perhaps than any other has this joint suffered from the unscientific and sometimes dangerous hands of bonesetters whose reputation is made by such instances of sciatic pain as are relieved by manipulation.

True subluxation may occur and possibly with but minimal material evidence, though change in position of the posterior superior iliac spine and X-ray confirmation may be demonstrable.

The proof that many cases so diagnosed are examples of fibrositis or the effects of ligamentous strain lies in the localisation of the pain and response to other methods of treatment.

A paper on manipulation of the sacro-iliac joint appeared in the last number of this Journal,[14] and the following criticisms are tentatively suggested :—

The tests here described for sacro-iliac motion are demonstrably dependent on tilting of the pelvis about an horizontal axis through the symphisis pubis. In a normal subject the changes in apparent length of limb do occur and are due to movement of the lumbar spine and lumbo-sacral joint. If the joint were locked in any way one would expect, if anything, more, not less, apparent lengthening or shortening. Under no circumstances could the tests be specific for the sacro-iliac joint, because the pelvis is not fixed and movement of the spine manifestly takes place.

Sciatic Scoliosis.

Sciatic scoliosis may occur in any one of the various forms of sciatic pain. It is not a diagnosis. Only intractable cases which have been neglected and in which the scoliosis is itself responsible for the symptoms should be considered as problems for treatment directed to this end.

The occurrence of scoliosis in sacro-arthrogenetic pain has been exhaustively studied in America.[15]. These papers should be consulted by those interested and for information on difficult cases of referred pain with this and associated postural deformities. On the whole it would seem that such detailed analysis, though useful for a basic understanding of the problem, is of less practical help as a prelude to treatment.

Patients in whom other methods of treatment have failed and in whom the scoliosis may be the actual cause of pain and disability are amongst the most difficult of all, and require much painstaking treatment.

The first step is suspension by means of a halter fitting on to the chin and occiput and fixed to a block and tackle. If pain disappears or is much relieved a plaster jacket should be applied (whilst in the position of minimal necessary suspension) from axillæ to trochanters, over a vest and with suitable padding of bony prominences. Actually the best apparatus is one in which the pulley is fixed to leather bands which pass under the axillæ too. By this means most of the weight is taken by the arms, but full extension of the spine is obtained as well. A fresh plaster may be necessary in a few weeks to obtain further reduction, and after two to three months of symptom-free life the plaster can be replaced by a celluloid jacket. This will have to be worn for several months more before he can get about without support. The patient is, of course, ambulant throughout.

This treatment is indicated in all forms of arthritis of the spine and will, for example, in spondylitits anklopoietica enable the patient to "seize up" in a good and painless position.

Arthritis.

The diagnosis of arthritis usually rests on radiological examination, and may affect any of the joints in the lumbo-sacro region and may be of specific, e.g., tuberculous, osteoarthritic or infective (unknown ætiology) types.

Only one type—spondylitis ankylopoietica—will be discussed here.

Spondylitis Ankylopoietica.

This condition is not very rare and gives rise to severe disability, and sometimes to sciatic pain. Five examples have been seen in young soldiers during the present war, three of them in Belfast. The causative agent is quite unknown but presumably infective. The blood sedimentation rate is raised during the active stage. It is particularly distressing because nothing can be done to arrest its relentless progress apart from ensuring skilled orthopædic aid to provide suitable support.

There are two points of special note. The limitation of movement of the lumbar spine is obvious, but in no way relaxes under anæsthesia, and in time involves not only the lumbar region but the whole spinal column. Secondly, there are no X-ray changes in the spine, for at least several years, but sclerotic changes appear in the sacro-iliac joints much earlier.

Diagnosis in the advanced stage is easy, but early recognition is important so that deformities can be prevented.

Summary.

Sciatica should not be used as a diagnosis, because it in no way indicates the actual lesion and is, therefore, no guide to treatment.

Reasons are given for dissatisfaction with certain features in diagnosis and treatment.

Most cases can be divided into three main groups—

1. Sciatic neuritis.
2. Compression of the nerve or its roots.
3. Referred pain.

Details of differential diagnosis and the appropriate treatment are given with special reference to local injections, epidural injection, and manipulation.

Skill in the diagnosis and treatment of most cases of sciatic pain is not difficult to attain.

Attention is drawn to cases of referred pain from fibrositis of muscle.

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A comprehensive list of references on many of the subjects discussed is given by Pitkin and Pheasant in the *Jour. Bone and Joint Surgery,* Jan., 1936.

The Care of Asthma Patients

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THERE is little doubt that most doctors regard the outlook for their asthmatic patients with pessimism. Often the available literature has been sifted and the recommended treatments faithfully carried out, and yet the patient is no better. Small wonder if the busy practitioner, surrounded with patients for whom he really can do something, pushes aside the idea of further attempts at curative treatment for asthma, and is content to rely almost on symptomatic remedies.

The writer has been privileged to see large numbers of these cases during the past twelve years, and, although he has been appalled at the large amount of misery caused by the severer forms of this complaint, he has gradually come to regard the prognosis for the majority of patients with optimism. Perhaps one-fifth suffer from an obscure type of asthma which at present resists all efforts at treatment, but in the remaining four-fifths the severity and frequency of attacks can be greatly diminished and quite a number cease having attacks altogether.

The specialist, concentrating his energies in a limited field, has unique opportunities for observing the results of various forms of treatment, and he gradually becomes enthusiastic about some and rejects others. With the increase in knowledge and experience, certain principles emerge, so that he can, as it were, hand back to the general practitioner certain methods in a simplified and greatly improved form. His services will always be required for the difficult cases, but we are approaching a stage at which the general practitioner can deal effectively with straightforward cases, especially when no specialist advice is available.

It would be impossible in this brief article to deal comprehensively with the subject, but it may be of interest to discuss briefly some of the points which seem to the writer to be important, and to go into more detail here and there.

Success depends very much on minute attention to detail, and especially on *recognition of those factors which are really concerned in causing this disorder.* This point cannot be stressed too strongly, because failure will almost inevitably follow if an important "cause" is ignored.

Other essentials are thorough investigation, precise classification of cases, recognition and elimination of associated diseases, and effective attention to environment, diet, and general routine. In allergic cases really potent extracts both for investigation and treatment and skill and persistence in using them are absolutely essential. The intelligent patient must be taught about his disease just as one should instruct the diabetic and dyspeptic patient.

THE HISTORY.

Of all investigations a well-taken history is the most useful, but the art of taking a really good history depends on experience. The patient should, of course, first tell his own story, but well-planned leading questions should follow, so that,

when the history is complete, one has an accurate idea of the type of asthma and even of its cause. (When did the first attack occur? Its mode of onset? How frequently do attacks occur? What was the longest period of freedom from attacks? Does the incidence of attacks vary with season or changes of locality? Do any dusts or animal emanations upset? Eczema or urticaria? Family history? Sputum : copious, scanty, or absent? Appearance of sputum? The nose : sneezing, post-nasal discharge, frequent colds, or operations? The digestion? Previous illnesses?)

The answers to such questions usually show clearly whether or not allergy is a likely factor or whether chronic infection plays a part. Frequent colds or post-nasal discharge suggest chronic sinus infection, and the constant presence of sputum suggests an associated bronchitis.

Classification.

When a patient gets attacks only at certain seasons or in certain localities, it is obvious that external factors play an important part in precipitating attacks, and he is said to suffer from "extrinsic" type of asthma, and skin tests almost invariably show hypersensitiveness to pollens or dusts. In other cases the precipitating cause is inside the patient (e.g., infective, reflex, or metabolic), there is little variation with season or environment, and skin tests usually fail to show significant reactions. These cases are said to have the "intrinsic" type of asthma. Others again turn out to be sensitive to some food or drug and still others show a mixture of these types.

Hypersensitiveness to Aspirin.

Asthma patients who are intolerent of aspirin seem to form a special group, and although they have been frequently described, their significance is still too frequently missed by clinicians and especially by nose and throat specialists.

After the ingestion of ordinary doses of aspirin, very violent asthma ensues, and in unusually sensitive cases death has ensued after as little as five grains. The curious thing is that a majority have nasal polyps, and many report that aspirin had no abnormal effects until about the time that the polyps developed.

Alexander Francis has pointed out that when an asthmatic patient has (a) hypersensitiveness to aspirin, (b) nasal polypi, and (c) a low blood-pressure, nasal operations do vastly more harm than good, and should be avoided at all costs. Anyone with an extensive experience of asthma can, unfortunately, amply confirm the truth of this.

Skin tests with aspirin practically never show positive reactions, nor do these cases often show significant reactions to other allergens. As a rule, all forms of curative treatment are futile, and one must be content with using palliatives.

The Nature and Causes of Asthma.

The dyspnœa of asthma is due mainly to bronchiolar spasm, but, in addition, the secretion of tough, rubbery sputum, swelling of the mucosa of the bronchi, and obstruction of the circulation of blood in the lungs accentuate the trouble.

Bronchiolar spasm may be produced reflexly by irritation of a sensitive area (e.g., by polyps or sepsis in the ethmoid region of the nose) or by the local action of histamine-like substances produced, for instance, by anaphylactic shock or by absorption of pollen or other allergens in hypersensitive subjects. Chronic infection in the sinuses or bronchi may produce asthma by both methods, i.e., reflex asthma by irritation of a sensitive area; and allergic asthma caused by the development of hypersensitiveness to the products given off by the bacteria. The syndrome of asthma is probably an exaggeration of a normally useful mechanism, and it is probable that this disturbance of function has arisen as a result of various errors of living. When these errors are corrected, the disturbance often disappears. The body has to cope, nowadays, with conditions which are often drastically different from those of primitive times. Improved transport and city life expose us to a much greater variety of infections, and the digestive system has often to deal with a diet which is novel, unbalanced, or grossly excessive in relation to energy output. Sharp axes and strong fences result in a vast increase of pollen in the air, and thousands of new fabrics, dyes, chemical cleaners, and insecticides expose us to a highly novel sort of house-dust.

It would seem that all asthmatics are unduly "responsive," so that a stimulus, either chemical or physical, which would pass almost unnoticed by a normal subject, produces marked bronchiolar spasm, etc., in the less stable asthmatic. For instance, the touch of a cold metal probe on a sensitive spot on the nasal septum may produce profuse lacrymation or a reflex cough. Also, a small intravenous dose of histamine or similar spasm-producing drug insufficient to affect the bronchi of normal subjects will, in the asthmatic, produce a brisk, transitory attack of asthma. Probably, if we took a few thousand people of all types, we could grade them according to their "responsiveness" with, at one extreme, the abnormally responsive, shading gradually into the average type, and merging perhaps at the other extreme in a group of unusually unresponsive individuals.

There are indications that, in the same way, individuals of the general population could be graded into extremely allergic, slightly allergic, normal, and (conceivably) at the other extreme, abnormally non-allergic. Some individuals are extremely allergic (or hypersensitive), but escape asthma because they are not particularly responsive. When a person is both hyper-responsive and hypersensitive he will almost certainly get asthma. At present we can lessen hypersensitiveness, but can do little to lessen abnormal responsiveness beyond giving nerve sedatives. Theoretically calcium should be helpful, but in practice it is disappointing. However, with advances in physiology, it may become possible to cure asthma by attacking from this angle.

Each clinician's views on asthma are determined largely by his experiences with certain striking cases, by his previous training and personal contacts, by the literature to which he has access, by the climatic conditions in which his patients live, and by his ability to accept new ideas. Hence the confusing diversity of ideas on the causes of asthma. On the one hand are those wrong-headed individuals who seize on some fact, true in a limited way, and, ignoring many other equally

important facts, attempt, willy nilly, to explain all cases on one hypothesis. On the other hand are the ultra-conservative individuals who resist new ideas and who often are in a position seriously to hold up progress. A critical attitude is very necessary in medicine, but it is just as serious an error to ignore some truth as to try to explain everything on one hypothesis. The allergic theory was for a time ridiculously over-emphasised to the exclusion of other possible factors and, in Great Britain, it seems never to have recovered from the reactions which followed. Even now one finds large hospitals and some teaching centres without any real facilities for the investigation of this aspect, and in some quarters it seems hardly decent to mention the subject.

It would be interesting to know why this attitude has arisen in a country where many of the most important basic discoveries about allergy were made and where much splendid research is still being done. When one reads some of the writings of those who belittle the significance of allergy, one can only conclude that faulty reagents were used or that the technique of testing was poor.

Tests for Hypersensitiveness.

When it is impossible for the patient to go to a specialist, the general practitioner can generally make the necessary investigations and even do some of the more important tests for allergy without much trouble or expense. It should be realised that, although the specialist may have hundreds of reagents for investigating difficult cases, a majority of patients react with almost monotonous regularity to a few specially important substances such as house-dust, feathers, horse-dander, cat-hair, dog-hair, orris root (in face powders), linseed, and to pollens (especially grass pollens, e.g., timothy or rye grass). Using only these few reagents, the doctor will occasionally miss something of vital importance, but generally these few tests will tell him most of what he should know regarding the patient's idiosyncrasies to inhaled allergens. Tests are done either by the intradermal or by the "scratch" method, but for the general practitioner, the latter method is incomparably better because it is harmless, simple, requires no expensive apparatus, and one can use quite crude (and cheap) reagents. Intradermal tests are more delicate, but they require several syringes, specially fine needles, sterile extracts, and sterilising facilities. In the hands of beginners the intradermal method can be very dangerous.

Success in testing depends on the use of really potent extracts and on good technique, and the beginner will find it well worth while to learn this from someone already adept in the art. Commercial extracts are sometimes feeble or inert and, unless one can make sure of their dependability, it is better to prepare a few good "home-made" reagents.

Take, for example, house-dust, which is probably the most important known allergen. A thimbleful of dust from a vacuum cleaner will supply enough material to test hundreds of cases. It should be sifted through a small wire kitchen strainer, washed in anæsthetic ether, soaked in toluol for twenty-four hours (this removes more fat and kills bacteria), washed again in ether, allowed to "dry," and stored

in a well-corked phial. A drop of soda solution ($\frac{N}{100}$ NaOH) is put on a little scratch on the skin, and a tiny pinch of dust as large as a pinhead is worked up into a paste with a drop of solvent on the scratch. Within ten minutes, dust-sensitive patients experience intense itching, and a small, white, irregular urticarial wheal appears. Normal individuals show no reaction, but it is a fairly powerful reagent, and it is interesting to note how frequently patients with chronic nose or chest troubles react to house-dust. It is also instructive to compare this crude and cheap preparation with the commercial house-dust extracts, some of which are not only inert but are actually mildly irritant to the skin of all normal subjects.

The active principle of house-dust is unknown, but the dust of different houses varies in "activity," and it is worth doing rough trials with the dust of several houses in order to get a good one. Moisture seriously impairs the "activity" of the dust, but if it is kept quite dry it will keep for years. The other reagents are treated in much the same way, but cat-hair, for instance, should be minced up with clean sharp scissors, and it will generally be found that old feathers from a pillow or quilt will be more satisfactory than freshly plucked ones. For these rough tests it is unnecessary to distinguish the species of feathers.

Skin tests for food allergy are rather less informative and, as a rule, "elimination diets" give more information. However, it is always worth testing with raw egg-white, whey from milk, wheat flour, oatmeal, bean, and perhaps nuts. Liquid extracts of foods tend to deteriorate rather rapidly, and it is far better to use the fresh, crude substance and to apply iodine immediately the test is concluded.

If likely patients were properly tested only with a sample of house-dust, the clinician would get invaluable information, but once skill has been acquired, a larger set of reagents will be found useful, and, of course, the whole subject should be studied in one of the text-books on asthma.

The Nose in Asthma.

In every case the nose should be thoroughly examined if possible by an experienced rhinologist, and it is generally advisable to have the sinuses X-rayed, as disease of even a few cells can produce drastic results in unusually responsive cases. It is vitally important not to mistake for sepsis the œdematous and polypoid changes which are seen frequently in these cases. Sometimes these changes are due to allergic effects, but many seem to be due neither to sepsis nor allergy, and further research on the subject is badly needed. Surgery should never be considered except to deal with definite infection with frank pus or perhaps to improve a grossly obstructed airway. When there is any doubt, operation should be postponed until there has been time to observe the effects of changes of season or environment, and, of course, skin tests should always be done to exclude allergy.

Physicians with opportunities of seeing large numbers of asthmatic cases cannot avoid being horrified at the frequency with which drastic operations have not only failed to afford relief, but have left the unfortunate sufferer considerably worse off. Among these failures are numbers of aspirin-sensitive individuals who should never

have been operated on. Fortunately, rhinologists are becoming much more cautious, and some are actually ahead of the physicians in their conservatism.

Asthma in Children.

The prognosis for children is much more favourable than for adults, partly because there has been no time for permanent tissue changes, and partly because allergic factors are more obvious and more clearly defined. But with children it is more than ever necessary to take a general view of the problem, and it will be found that adjustments of diet, environment, and general routine are of more importance than drugs or injections. For instance, in infants the effects of adrenalin are often disappointing, but if the acidosis which is usually present is treated with a purge and liberal fruit juices and sugar, the attack will respond to adrenalin at once. Older children often fail to respond until the digestion is functioning perfectly, and it often needs much persistence to get patients to understand what is meant by a wholesome diet. Excess of starchy foods and sugar seems to be badly tolerated. Rhythmic exercises to music in the fresh air, swimming, and instruction on correct posture and breathing will work wonders, and it is gratifying to find how frequently the sallow, stooped, skinny, and timid invalid changes to an almost aggressively healthy youngster with healthy colour, good posture, and a good appetite. Apart from the physical benefits, these measures have an excellent psychological influence.

Treatment.

A famous admiral once said that, in naval warfare, one should hit first, hit hard, hit often, and hit everywhere, and this can well be applied to the treatment of asthma. Failure is sometimes due to lack of persistence or intensity in attack or, as has already been emphasised, to the ignoring of an important factor. When all data have been collected, they should be scrutinised carefully before any decision is made about treatment. In some cases no likely cause can be found, and yet, when errors of diet, environment, and routine have been eliminated, the attacks cease.

When allergy is a factor, it is just as important to deal with the environment as to carry out desensitisation. House-dust is generally one of the important allergens, and this can be lessened only if the rooms (and especially the bedroom) are emptied and simplified. Old dusty bedding, carpets, and furnishings must be discarded, and an absolute minimum of furniture retained. It is the very fine dust which is harmful, and soap and water will be found much more effective than a vacuum cleaner, which retains only the coarser particles. Floors should be scrubbed every day at first and all projections wiped with a damp cloth, but after a week or so most of the dust will have been removed, and a thorough wiping with a damp floor-cloth is sufficient twice a week. The boards may be polished, and only small rugs which can be easily removed and beaten should be allowed. Feathers are so frequently a source of trouble that some substitute should be found for them in bedding, cushions, and quilts. A rubber mattress and pillow are ideal, but expensive.

When specific desensitisation is necessary, one should test the extracts for potency before embarking on treatment. If a drop of the strongest strength produces only

a feeble reaction, it is useless to proceed. If it reacts strongly, the course of treatment will probably be successful, but care will be necessary to avoid giving overdoses. The directions sent out with extracts are sometimes altogether too sketchy, and beginners should get full details from a text-book. Patients vary greatly in their power of assimilating the doses, and one had to be guided largely by the size of the reaction which occurs one half-hour to one hour after the subcutaneous injection of the extract. Each dose produces a rise in the patient's tolerance, so that normally, by the twentieth dose, one is able to give more than one thousand times the first dose. The local reaction gives a valuable indication of the relation between the patient's tolerance and the dose injected.

Non-Specific Therapy.

The astonishing "natural" cures which occasionally occur after febrile illnesses suggest that non-specific therapy may be used much more extensively in the future. Although its mode of action is obscure, it is well worth trying in those cases where specific desensitisation is not suitable. The latter treatment is, of course, infinitely more reliable, and at present there appears to be no way of foretelling in which cases non-specific therapy will help. Peptone, vaccines, milk, and tuberculin probably all act in a non-specific way.

Drugs.

If the real causes are defined and attacked, there is little need to use drugs except as palliatives for the acute attacks. It is sometimes forgotten that the effective dose of adrenalin varies greatly in different individuals, so that four minims (of the 1 :1000) may be excessive for one and sixteen minims insufficient for another. One should always use the smallest dose which will give relief, and it should be injected as often as necessary. Even now one finds nurses who look on adrenalin as a remedy to be administered only as a last resort. The inhalation of adrenalin (1 :100 or stronger) is most effective, and often obviates the need for injections. Adrenalin in oil ("slow adrenalin") is sometimes very useful in prolonged attacks.

Morphine is useful early in the attack, but only those with extensive experience seem to realise what a lethal drug it is if used when the patient is exhausted and cyanosed by a prolonged attack.

Adequate doses of iodides are sometimes astonishingly helpful at all ages, but if given for prolonged periods they should be given alone and not mixed with lobelia, etc., which are often not well tolerated. The taste may be disguised with liquorice or other simple flavouring.

Special Asthma Clinics.

Scattered cases of asthma tend to be uninteresting: collected, classified, and studied under good conditions they become priceless clinical material. It becomes worthwhile to assemble the necessary apparatus and to train the technical assistants and nurses who can do most of the detailed investigations, so that the physicians are left free to concentrate on the clinical aspects. Time is saved by the use of brief pamphlets on diet, adrenalin, dust, and general routine, and large clinics gain greatly in efficiency by preparing extracts and vaccines on the spot. Other depart-

ments find the clinic useful for special investigations on contact dermatitis, eczema, and obscure nose and chest troubles, and it soon becomes a centre for research and instruction.

Some of the research problems are too difficult for the unaided clinician, and they will be solved only when clinician, pathologist, and physiologist effectively join forces.

Lack of funds for research is obviously a major difficulty, but each year enormous sums are spent on symptomatic and proprietary remedies for asthma, and it would be good economy for the asthmatic individuals to divert some of their expenditure into research. Perhaps it may be possible to organise them effectively so that they can help more actively.

In conclusion, one might repeat that the lot of patients with severe, chronic asthma is a hard one and that they are deserving of much more attention. Pessimism which leads to inactivity and an attitude of *laissez-faire* is to be strongly depreciated because, even with our imperfect knowledge, much can be done for the majority of patients.

Progress in the future will be facilitated by the establishment of more special asthma clinics, by well-planned research, and by the organisation and instruction of the numerous asthma patients who could do much more to assist.

NEW DRUGS

THIAZAMIDE, which has recently been made generally available, was introduced for clinical trial under its laboratory number "M&B 760." It resembles Dagenan—M&B 693 in chemical and physical properties. The anti-pneumococcal and anti-streptococcal activity of THIAZAMIDE is slightly lower than that of "M&B 693," but in staphylococcal infections THIAZAMIDE is claimed to be the rather more active of the two. It is also better tolerated than "M&B 693" and provides an alternative chemo-therapeutic agent for use in gonococcal, meningococcal, pneumococcal, and other infections.

A pamphlet gives details of the *in vivo* and *in vitro* activity of THIAZAMIDE against a number of micro-organisms, and includes particulars of clinical indications, dosage, absorption, and excretion. Members of the medical profession may obtain copies of this pamphlet on request to Pharmaceutical Specialities (May & Baker) Ltd., Dagenham.

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OPACOL, a British preparation of sodium tetraiodophenolphthalein for oral administration, now has an established place among the most reliable and most widely used contrast media for X-ray visualisation of the gall-bladder.

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The Depressive Phase of Manic-Depressive Insanity

By Robert Thompson, M.B., B.Ch.(Belf.), D.P.M.(Lond).

Resident Medical Superintendent, County Mental Hospital, Armagh.

Introductory.

It is to the genius of Kraepelin, whose death in 1926 must have spared him the pain of encountering Nazism, that we owe both the title and our present conception of manic-depressive insanity. This conception embraces far more than the clinical close relationship which sometimes exists between states of mania and states of melancholia. A good deal, in fact, was known about this relationship before Kraepelin's time, and its importance has, I believe, been considerably overstressed. A small percentage of patients undoubtedly exhibit in their lifetime attacks of both mania and melancholia. A still smaller percentage exhibit alternating cycles of the two conditions with few or no remissions. A mild elation is not infrequently observed at the termination of a melancholic attack, and transitory periods of depression may occasionally be observed during the course of an attack of mania. When all this is said, however, the fact remains that in the great bulk of cases no such relationship is evident, and the diseases progress with utterly dissimilar symptoms along entirely different courses. On symptomatology alone, therefore, there would, I fear, be little justification for the conception embodied in the term "manic-depressive." Kraepelin, however, probed more deeply into the problem, and his great contribution, and, in my opinion, justification for his conception, lay in his elucidation of what he termed the "fundamental states" common to both conditions. Although we can to-day, in the light of much fine work done on the psychology of the child, considerably amplify Kraepelin's viewpoint of the abnormalities of temperament which he terms "fundamental states," yet his description[1] of these four states which he calls the "depressive temperament," the "manic temperament," the "irritable temperament," and the "cyclothymic temperament," must remain a classic in the literature of psychological medicine.

In the paper which follows I propose to limit myself to a consideration of the purely clinical aspects of the depressive phase of manic-depressive insanity, or, as it is more commonly known, melancholia.

Melancholia.

Melancholia holds an almost unique position amongst diseases in that it is characterized by only one essential symptom—mental or emotional depression. The fact, however, that there is only one symptom essential to diagnosis often makes the latter a very difficult problem. Two crucial questions present themselves; firstly, whether depression is or is not present, and, secondly, whether such depression is of such a character as to justify a diagnosis of melancholia. An attempt will be made to answer both these questions in the course of the consideration of the symptomatology of the condition, and, to facilitate this, I

will consider three degrees of severity, cases of mild degree, those of moderate severity, and those of severe degree.

Cases of Mild Degree.

Cases of melancholia of mild degree are more often seen, in the first place, by general practitioners or by specialists in other branches of medicine than by mental specialists. These cases are probably amongst the most anxious with which any physician can be called upon to deal. Although the symptoms complained of may vary to an astonishing extent, an immediate and exact diagnosis is imperative, and, following the diagnosis, the physician must face the even more difficult task of deciding upon the correct line of treatment.

Patients suffering from a mild degree of melancholia may be divided into three classes; (a) those who appreciate the fact that they are mentally depressed and are willing to acknowledge it; (b) those who suspect that mental depression is at the root of their trouble but wish to conceal this fact; (c) those who are genuinely unconscious that mental factors have anything to do with their feelings of ill health.

(a) Diagnosis in this class is not, as a rule, difficult. There are, however, several pitfalls which should be avoided. It is scarcely necessary to point out that the mere statement from a patient that he is suffering from mental depression is insufficient to warrant a diagnosis, although care should be taken before such a diagnosis is set aside. The subject will be gone into more fully at a later stage, but here I would just remark that some patients, with perhaps a slightly hysterical "make up," seize upon the term "mental depression" in much the same way as they more frequently make use of "paralysis" or "heart disease." Again, the depression complained of may be simply a feeling of not being in robust health such as the early sufferer from tuberculosis, the anæmias, malignant disease, etc., may experience. In my opinion, however, in the past too much emphasis has been laid upon the possibility of overlooking a physical cause. In practice one rarely has any doubts as to the rôle of a physical cause after the usual physical examination, while if a decision is deferred, as may be requested by the relations, until more detailed examinations are carried out, vital time may be lost and unwarrantable risks incurred. Even in the presence of a definite physical cause, e.g., high blood-pressure, gynæcological abnormalities, conditions of sepsis, etc., the assumption, so often made, that the mental state is dependent upon these is fraught with much fallacy and danger.

Likewise the revelation by the patient that he has recently experienced some acute form of stress, e.g., financial or domestic calamity, must not tempt the physician to assume that he is dealing with a mere aftermath of such calamity which presumably may be regarded as temporary. The essential fact in melancholia of any degree is to establish its presence. The question of cause, physcial or mental, is, at the outset, a very secondary matter.

(b) A considerable number of sufferers from early melancholia will come under the second category, that is, they appreciate that a changed mental state has a

great deal to do with their feeling of ill-health, but are unwilling, for many reasons, to acknowledge this. The main reason is probably the fear that such a disclosure will lead to a diagnosis of a mental illness or of "insanity." These patients therefore usually complain of a variety of physical symptoms, e.g., headache, insomnia, various derangements of digestion, menstrual troubles, high blood-pressure, etc. In point of fact the physical symptoms complained of are in the majority of cases well founded. While melancholia of any degree may exist without the slightest evidence of any physical derangement, in a large percentage of cases it produces some or all of the above symptoms. Sleep is almost always considerably disturbed in the early stages of the disease. The patients usually complain either of inability to get off to sleep or of waking very early. Disturbing dreams and nightmares are frequent. The digestive system is also frequently upset. Appetite is poor and capricious, the tongue furred and constipation almost constant. As a consequence loss of weight almost invariably follows, but, of course, as an early symptom this can rarely be of value.

Some disturbance of the menstrual function is frequently met with, the commonest, in my experience, being amenorrhœa, especially in girls and young unmarried women. A number of these patients had been subjected to varying treatments, including the insertion of huge pessaries for supposed malposition of the uterus.

Headache is often complained of, but by "headache" these patients usually mean that dull oppressive feeling which is in reality mental depression. A true sharp persistent headache is in fact quite a rarity in mental disease, and if present should seriously suggest a revision of the diagnosis.

From the foregoing it will be clear that a diagnosis in these cases can only be arrived at by an appreciation of the emotional condition of the patient. Although the patient may actually deny being depressed, that suggestion of increased mental tension which depression causes is unmistakeable to the practised observer. It is essential to bear in mind that these patients will talk freely and connectedly and have a full grasp of all their business and social relationships. There will be no obvious delusion, no mental confusion, no loss of memory. In a long conversation, however, the increased mental tension referred to is rarely absent. One misses the normal, spontaneous, fleeting changes of expression, and the most thorough physical examination somehow fails to give the expected relief.

(c) Patients who are completely unconscious of the fact that a depressed state is at the root of their trouble may deceive the physician by their obvious sincerity. Such patients have often made up their minds that some physical abnormality is the main source of all their trouble, and they frequently merely consult their doctor in order to be recommended to a specialist in some particular field. The latter has almost perforce to carry out a detailed examination, and the finding of some slight abnormality only completes the confusion. The tragedy of many of these cases is that so much vital time is lost that a suicidal attempt is made before anyone realises that the trouble is basically mental.

Melancholia of Moderate Severity.

In melancholia of moderate severity the diagnosis is usually obvious unless in fact the patient fears being sent to a mental hospital and makes an effort to conceal his symptoms. In melancholia of this degree the patient, as a rule, finds it much more difficult to conceal his emotional depression, and the latter has frequently so warped his judgment that depressive ideas—amounting in many cases to delusions—are given expression to. The patient, for example, fears he has cancer or heart disease, believes all his investments will fail, thinks his children will become mentally affected, ascribes all his symptoms to some youthful indiscretion for which he states he can never be forgiven, etc. It is essential, however, to bear in mind that depressive ideas are not necessarily elicited in any stage of melancholia and that their absence should never, in itself, weigh against a diagnosis being made.

Melancholia of Severe Degree.

Whereas cases of mild degree of melancholia pass imperceptibly into those of moderate degree, the latter also pass imperceptibly into those of severe degree. In the latter condition restlessness is often a prominent feature. The patient paces up and down the room, refuses to stay in bed, rubs his hands, picks at his skin, gives vent to moaning sounds. Delusions, when elicited, are usually strongly marked and are not, as is so common in the other two varieties, merely pessimistic exaggerations, but are frank delusions of calamity or unworthiness. The patient, for example, often states that something dreadful is going to happen, that his children have all been killed, that he has lost all his money, that his bowels are completely stopped. At the same time he frequently appears to be in a condition of acute fear or dread, with anxious or frightened expression and rapid pulse. Delusions of unworthiness, e.g., that he has committed some unpardonable sin, may be present, but are more frequently encountered at a much later stage. The same remark applies to two other signs so beloved of the textbooks—the furrowed brow and slow stooping gait.

In a certain percentage of cases the acute attack appears to rob the patient of all volition and he either answers in monosyllables or refuses to speak altogether. It is essential to bear in mind that melancholia in this guise is always of the acute variety, and that a patient who has remained immobile and mute for days or weeks, may make, when the opportunity arises, a determined and well-planned attempt at suicide.

Differential Diagnosis.

A number of mental conditions may superficially resemble melancholia. An immediate precise diagnosis is, of course, only essential in the milder forms of the disease—the type of case which one may see in the consulting-room. In acute psychotic conditions, where the obvious course is certification or the placing under continuous nursing supervision, an immediate exact diagnosis is neither called for nor always perhaps possible.

Dementia præcox sometimes begins with a depressed phase, but apathy or

indifference is much more characteristic of the emotional picture than real depression. A history of eccentric behaviour, bizarre acts, sullen moods, impulsive or violent outbursts, will go far to strengthen the suspicion of a primary dementia. A point that is often immediately helpful is that melancholic patients are usually described by their relations as being most conscientious and reliable before their illness—often the mainstay of the home or business—whereas in the case of dementia præcox the early history is rarely satisfactory, and the subject is described as being unreliable, morose, sullen, given to moods, or at best a solitary, hypersensitive individual. It is well also to bear in mind that melancholia is not at all infrequently encountered in the adolescent period—from 15 years upwards.

There are some conditions, often called anxiety states or anxiety neuroses, which are not fundamentally different from an early stage of melancholia. Where a degree of more or less permanent emotional depression is present one is driven to adopt the graver diagnosis.

Functional cases with a large element of hysteria may on occasions superficially resemble melancholia. Speaking generally, however, it will usually be found that where the hysterical element is at all prominent the illness is a source of interest to the patient, who often becomes quite animated in disclosing the various symptoms. The suggestion of real suffering, so characteristic of melancholia, is absent. In exceptional, but not so very infrequent cases, the two conditions co-exist.

Confusional states usually develop with some abruptness. In a fair percentage of these cases a predisposing cause can be found, e.g., alcohol, drugs, febrile toxæmia. If the case is seen before confusion has become marked the resemblance to melancholia may be striking, but on close examination the patient is found to be more dull and listless rather than depressed, and to be unable to give a really coherent or complete account of himself.

Depressive delusional or paranoid states may be indistinguishable from melancholia even after months of observation. The condition, however, is a comparatively rare one.

In middle-aged men the possibility of a depressed form of general paralysis must, of course, always be kept in mind. A routine Wassermann is the only way to avoid a mistake, as the physical symptoms may not be at all distinctive, and in any case are particularly difficult to estimate in non-co-operative patients.

In middle-aged subjects also the possibility of a cerebral tumour should not be entirely dismissed. Apart from focal signs or changes in the fundus, an organic origin of a mental condition is strongly suggested by symptoms pointing to a "reduction" of the personality, e.g., the carrying out of any unusual or bizarre action, neglect of routine duties, amnesic episodes, etc.

In patients from 55 years of age upwards, and in exceptional cases below this age, the illness is frequently associated with a grave degree of arterio-sclerosis, with or without kidney involvement. In many of these cases the illness proceeds inevitably to a fatal termination in from a few months to one or two years. The physical symptoms at first are never alarming, but later increasing weakness draws

attention to the cardio-vascular degeneration. The mental condition, as a rule, remains intractable to the end.

Course and Prognosis.

Recovery from melancholia of even mild degree is exceptional under two to three months. The importance of the "time factor" in the recovery from mental illness is well exemplified in this disease, where it would almost seem that irrespective of any treatment that has yet been devised a minimum time limit for recovery is fixed. An appreciation of this is of more than academic importance and its bearing on treatment is obvious. It will prevent, for example, undue pessimism on the part of either doctor or relations in the early stages of the illness, and what is perhaps equally important, will prevent an unfortunate patient from being subjected to a series of ever-changing treatments. While recovery may normally be expected to take place somewhere between the third and the seventh month, a not inconsiderable percentage will make complete recoveries before the end of the second year's illness, and in exceptional cases recovery may be delayed as long as five or seven years, or longer. In fact as long as a case of melancholia remains apparently uncomplicated the hope of recovery can never be abandoned.

Apart from the question of the duration of the illness the probability of ultimate recovery must be considered. In a straightforward case—where the diagnosis is not in question—where the bodily health is satisfactory, and where immediate provision can be made for suitable environment and treatment, this must be regarded as very favourable, so favourable that one is usually justified in giving a hopeful prognosis from the outset. It will, of course, be appreciated from the foregoing that, as a rule, a much more guarded prognosis must be given in patients over 55 years of age.

The possibility of a second attack in the near or remote future is a question which is very often raised by the relations. Curiously enough, this question is usually asked in the early stages when there is as yet no sign of recovery from the immediate attack. Only rarely is it repeated when the patient has regained full health and vigour. That some patients have more than one attack of melancholia is, of course, a commonplace to any psychiatrist. In a considerable experience, however, of this disease I am satisfied that the percentage of patients in whom a relapse ultimately takes place is not very large. Also one must take into account the undoubted fact that many patients emerge from this illness with a much fuller understanding of themselves, and with, therefore, mathematically speaking, a smaller probability of developing a mental illness than at any time in their lives. Their personalities have, so to speak, become more strongly integrated.

In considering the future of a patient who has made a complete recovery from an attack of melancholia, it may happen on rare occasions that grave questions will be put to the physician, such as, for example, the desirability of marriage, children, occupations, etc. While I realise that other views have been expressed, it has always been my personal practice, which I have so far not regretted, never

to place any obstruction in the way of these patients to their leading a normal, full life. Such a life is unquestionably, from the psychological point of view, the healthiest, and the best guarantee against future trouble, whilst a restriction, perhaps lightly imposed on a doubtful scientific basis, may prove a handicap against which the strongest will struggle in vain.

Treatment. General Considerations.

When faced with an undoubted case of melancholia, whether of mild or more marked degree, the first question which demands an immediate answer is—what reserve of volitional control has the patient got, or, in plainer language, what is the risk of a suicidal attempt?

In acute cases one assumes, whether or not the patient gives expression to suicidal ideas, that there is no reserve, and one takes the necessary steps to have the patient under continuous nursing supervision night and day. In well marked though less acute cases one will again usually endeavour to play for safety, and this type of case can frequently be persuaded, often with excellent results, to enter a mental hospital as a voluntary patient. It is in the comparatively mild type of case, where perhaps the patient is carrying on fairly competently with his work, in which the greatest difficulty arises.

In trying to arrive at a decision in these cases one takes into account a number of factors, but in the end the decision is probably arrived at by a kind of intuition. The older psychiatrists used to place great importance upon what they called the degree of "insight" into the illness, by which they meant how far the patient understood his illness. In the cases we are now considering this will not be of much help, as these patients will be able to discuss their illnesses quite rationally and will not give expression to any delusion. The apparent intensity or "depth" of the depression is, of course, always taken into account, but must be interpreted cautiously, as there is often considerable variation in the degree of depression and one may be interviewing the patient in one of his better periods. The most helpful consideration is probably the general demeanour of the patient taken in conjunction with his replies to certain questions. One asks, for example, "What do you feel like in your worst moments?" "How bad is the worst depression you have experienced?" etc. If the patient admits of suicidal thoughts at such times one can further enquire what degree of control he felt he had over such thoughts. If the patient will make no reference to suicide, it is often, though perhaps not always, advisable to put the matter bluntly and to ask whether suicidal thoughts ever entered his mind, and, if so, how far he dwelt upon them. One should, of course, immediately emphasise to the patient that such thoughts and ideas are the invariable accompaniment of all depressed states, that in themselves they signify nothing, and that their early disappearance may be confidently anticipated.

If, after examination, one can decide that volitional control seems adequate, and that the patient may safely be treated as an out-patient, it is then usually wise to insist on seeing him at least twice weekly. In this way one will note any trend

for the better or worse and take action accordingly. There is, in my opinion, no certain means of knowing whether an apparently mild attack will remain as such or will eventually and inevitably, despite any treatment, deepen into an attack of severe degree. Such patients, therefore, must be taken in hand firmly and must remain under the very definite control of their doctor, so that changes of air and sea voyages are ruled out.

Psychological Treatment of Melancholia.

The psychological treatment of melancholia is to some extent influenced by the degree of severity of the case with which one is dealing. In all types of case, however, I would strongly advise against any attempt at mental probing, or so-called "analysis." The physician, in fact, must be constantly on his guard not to allow the patient to make unnecessary disclosures of the intimate details of his life. The self-depreciatory attitude which mental depression evokes in the majority of patients convinces them that they are "failures," and consequently they search painstakingly in the past for some act of commission or omission which will account for such failure. Hence in order to be relieved of the intolerable burden of depression they will reveal, if allowed, every intimate detail of their lives, a procedure which is as unhealthy, psychologically, in the mentally affected as it is in the most normal. It is in all cases quite sufficient to allow the patient unhurriedly to explain his major worries and anxieties. Following this it is essential immediately to impress upon the patient that he is suffering from one of the commonest of all forms of nervous trouble, that it has no connection whatever with any real or imaginary delinquency in the past, and that with patience and his co-operation he may look forward to a complete recovery from all his symptoms. It will be necessary, in fact, to repeat these assurances, in varied form, very frequently throughout the illness.

Treatment of Melancholia of Moderate or Severe Degree.

Melancholia of this degree is almost of necessity treated in a mental hospital, public or private. In practice one usually finds innumerable objections to this course put forward by the relations, and sometimes, unfortunately, it is not possible to overcome these until the unsatisfactory progress of the patient adds convincing argument. Many people sincerely view with great anxiety the association of their relation with other mental patients, think that such association will exert a profound psychic shock, and believe that if recovery should take place the memory of such an experience will never fade. I can only state that from a considerable experience of both public and private mental hospitals I have found such fears to be almost entirely groundless. It has to be kept in mind that a well-administered mental hospital is a highly complex organization solely adapted for the care and treatment of mental illness. Not only are suitable buildings and grounds required, both of which have evolved from years of patient study, but the building up of an experienced and capable nursing staff is a matter which will take, with reasonable good luck, anything from ten to twenty years. No one but those in daily contact with mental illness can appreciate the wealth of knowledge a capable mental nurse

can bring to the assistance of both patient and doctor. It is by means of this knowledge, only acquired by years of enthusiasm for the art and some sacrifice, that the restless, agitated patient is made to feel at home, that the sleepless patient finds he can obtain sleep, and that the patient resigned to apathy and despair finds his interest in the outside world reawakening.

Following admission to a mental hospital a preliminary rest in bed is most important. The actual duration of such rest must be assessed individually in each case, but should rarely be shorter than two weeks. Patients exhibiting considerable exhaustion or very acute depression or restlessness will usually benefit from much longer periods. During this period the patient gets an opportunity to become familiar with his strange surroundings, is usually able to build up to some extent physically, and the psychological effect of confinement in bed does something to convince him that he is the victim of an illness and not of some mysterious visitation like "insanity."

It is scarcely necessary to state that at this time and usually until complete recovery takes place the patient must be under continuous nursing observation both by night and by day. This is often ideally accomplished in an open dormitory where the patient can be under continuous observation without anything to draw attention to this. The presence of other patients, instead of acting as a shock, soon provides interest and variety, and, in my experience, is a decided aid to sleep.

The most generally useful drug in melancholia, particularly in restless or sleepless patients, is bromide of ammonia. This is usually prescribed in from ten- to fifteen-grain doses three times daily, and it can often be usefully combined with one of the citrates of iron. If this is found insufficient to produce a fair night's rest an occasional potent hypnotic should be given. Generally speaking, however, with skilled nursing the question of sleep soon ceases to be a problem, and it is always unwise to appear too directly concerned with it before the patient.

Following what appears an adequate period of rest in bed the patient is allowed to move about in association with other patients. Here I would emphasize the importance of not rushing matters too quickly. Much as I appreciate the value of occupational therapy, it must be kept in mind that a recently depressed patient is not a fit subject for concentrating upon various tasks and crafts. At the same time solitary brooding by himself should not be encouraged. It is here that the ingenuity and art of the good mental nurse will find full scope in devising, and not too obviously, simple tasks, hobbies, and interests. The milder indoor and outdoor recreations, e.g., croquet, clock golf, billiards, bagatelle, etc., are also very useful, while short country walks, simple exercises in the open air, car drives, etc., fill up the remainder of the day.

Most important perhaps of all, the psychological atmosphere must be one of ease and optimism, and hence there must be no suggestion of compulsion, dragooning, or the meticulous complying with exacting rules and regulations. The same remarks could be equally applied to the staff. Where there is carping criticism from higher officials, pin-pricking or mistaken over-zealousness, the

resulting tension and lack of spontaneity creates an atmosphere in which recovery cannot be hoped for.

Treatment in Convalescent Melancholia.

Melancholia in its various stages of recovery may present some difficult problems. As soon as the initial acute stage of depression has been overcome the patient frequently asserts that he is now completely recovered and asks to be discharged or granted certain liberties and privileges. The obvious improvement in the patient's condition, coupled with the sometimes striking change in his demeanour, may lead the unwary and occasionally the most experienced to the conclusion that recovery is now complete. The patient's attitude is now often positive and impatient, but betrays a background of irritability and restlessness. The problem even when fully recognized cannot of course be solved by a simple blank refusal of the patient's requests. Such an action would only arouse antagonism and would indefinitely postpone further progress. I have found that most mental patients appreciate the argument that they have been through a serious illness, that a nervous breakdown is a much more serious matter than most bodily illnesses, and that therefore it is essential to make sure that their recovery is fully consolidated before taking risks of further strain. In addition, one can usually grant small concessions which involve no nursing risk, but which are sufficient to reassure the patient that his improved state is having adequate recognition.

When recovery is actually complete, this restless, irritable stage disappears, and by contrast the patient now co-operates cheerfully and willingly and is at pains not to make undue demands. Recovery in melancholia when once begun is often comparatively rapid, so that in a few weeks a noticeably depressed patient may display all the signs of complete recovery. These are—a uniformly cheerful and contented demeanour with no sign of depression at any time in the twenty-four hours, full natural sleep every night, natural and spontaneous interest in all his surroundings, disappearance of all tension in manner and speech, good appetite, and, in most cases, an increase in the body weight. When this stage has been reached the question of discharge must then be faced. Here I would strike a note of warning against timorous procrastination. The psychiatrist must have the courage of his convictions, and failure to recognise true recovery may have as disastrous consequences as failure to recognize symptoms of non-recovery. A rule I have often found useful when recovery is complete is to fix a date of discharge two or three weeks hence. The fixing of the date removes all anxiety from the patient, while it gives a further short period in which to make certain that the recovery will be maintained.

Physical Treatment in Melancholia.

In spite of much patient research work it has to be admitted that the physical treatment of mental illness does not yet rest on any sure basis. In melancholia the only physical abnormality I was ever able to detect with any degree of consistency was a fairly marked degree of secondary anæmia. In some cases this had progressed to a stage where a diagnosis of pernicious anæmia had to be excluded.

The correction of this anæmia is, of course, an important part of treatment, as are also, in most cases, measures calculated to increase the body weight. Having said this, however, I would strike a note of warning against undue activity in other forms of physical treatment. Focal sepsis, for example, can usually be found somewhere in every mental patient, as in most sane people, and yet I am convinced that to subject a mentally ill patient to dental and sinus procedures, colon lavage, vaccine therapy, etc., often does irreparable harm and rarely results in any benefit. The same remark can usually be applied to the various forms of electro-therapy, ultra violet radiation, etc. The proper place for such procedures is in the definitely convalescent patient who can co-operate willingly and cheerfully with what is being done, but even here great care has to be exercised, and unless the patient appears enthusiastic it is best to leave well enough alone. On more than one occasion I have had the mortification of seeing a promising recovery completely interrupted by such over-activity.

Middle-aged and elderly patients who are found to exhibit cardio-vascular degeneration, in varying degrees, with or without a raised blood-pressure, are often, I think, considerably benefited from rather prolonged periods of rest in bed.

The newer methods of treatment by insulin shock and convulsant drugs must, I think, still be regarded as *sub judice*. In any case they would scarcely be immediately applicable to a disease which, if properly handled, gives as gratifying a response to treatment as almost any major illness to which flesh is heir.

(1) "Manic-Depressive Insanity and Paranoia." Translated by R. Mary Barclay.

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A New Method of Detecting Pulmonary Tuberculosis

By B R. CLARKE, M.D.
Superintendent, Forster Green Hospital, Belfast

DURING recent years a method of detecting disease, which the Americans have called "case-finding," has attracted increasing attention. The principle of the method is that cases of diseases are sought among the general public, by making a complete survey of every member of the community. The method has also been applied to particular sections of the community, such as military or naval recruits, medical students, student nurses, corporation or factory employees. There is, of course, nothing new about case-finding, this method being applied by every port quarantine doctor who makes a complete inspection of a ship's company to exclude cases of cholera, plague, or small-pox. The trained eye can readily detect these diseases by a rapid inspection, but, unfortunately, tuberculosis can not be diagnosed in this simple way. Therefore case-finding methods in pulmonary tuberculosis depend on the application of special scientific tests, and if the method is to be of practical value, the test chosen must be inexpensive, painless, and of rapid application. Before examining the various new methods of case-finding in pulmonary tuberculosis, one should consider why that procedure is necessary.

The diagnosis of tuberculosis by conventional methods is ineffective, in spite of the great scientific advances of the present century. When one considers the excellence of the modern X-ray film, the technical perfection of the isolation of the tubercle bacillus by concentration, by culture, and by animal inoculation, and the great value of the various tests for detecting tissue destruction (Arneth count, blood sedimentation measurement, and monocyte-leucocyte ratio estimation), it would appear that the early diagnosis of pulmonary tuberculosis should cause difficulty only rarely. Unfortunately the fact is far different, and the early case is still an exception in the tuberculosis dispensary and the sanatorium. This is well recognised by the lay public as well as by the medical profession, and there is a very definite tendency to blame the doctor every time a case of phthisis fails to be diagnosed before the disease is far advanced. This is unjust, for, under present conditions, the majority of cases are far advanced before they seek any medical advice. Numerous causes combine to produce this unsatisfactory state of affairs, a few of which may be enumerated.

The patient with early phthisis rarely feels ill, and the disease may even have a stimulating effect. Also the common early symptoms, cough, sputum, and slight chest pain, are very common conditions and so do not cause concern.

Economic conditions also contribute, as illustrated by the remark of an English physician a few years ago: "A poor man cannot afford to have early phthisis." Another reason for the failure to seek early medical advice is the special social stigma which attaches to tuberculosis. Parents are reluctant to admit that one of their children has a disease which may injure the matrimonial and other prospects of the remaining members of the family. When the Press reports the statement of a medical authority that one should never marry into a tuberculosis family, this

does not make early diagnosis any more popular. I think it is a common experience of doctors that strenuous attempts to establish an early diagnosis of tubercle may be resented. There is a strong inclination to accept a single negative sputum result as proof that the patient is free from tuberculosis. Many doctors have made themselves unpopular by insisting on repeated sputum tests, and one hears the remark, "Dr. So-and-so wanted to prove she had it." Whatever the reasons, the present situation is that most cases of tuberculosis fail to be diagnosed at an early stage. As a Belfast doctor put it to me not long ago, "I never see the phthisical patient until the lung is breaking down." The following figures illustrate the unsatisfactory nature of the "new cases" diagnosed at the present time :—

Hamilton, Ontario, has a low death-rate from pulmonary tuberculosis, only about one-third that of Belfast in proportion to the population. Yet it was found in the year 1933 that only fifteen per cent. of the patients admitted to the Mountain Sanatorium at Hamilton were in the early stage of the disease, while sixty-two per cent. of the admissions were in the advanced stage.

The Cheshire Joint Sanatorium receives patients from a large area of the north-west of England. In 1933 six per cent. of the admissions were in the first stage; sixty-two per cent. in the intermediate stage; thirty-two per cent. in the advanced stage. In 1940 the corresponding figures were four per cent. in the early stage; fifty-four per cent. in the intermediate stage; forty-two per cent. in the advanced stage. Thus the proportion of advanced cases had actually increased between 1933 and 1940.

Dr. J. R. Gillespie has kindly supplied some figures from the dispensaries of the Down County Council. Between 1913 and 1917 thirty-nine per cent. of the new cases were in the early and intermediate stage; sixty-one per cent. in the advanced stage. Between 1935 and 1939 thirty-eight per cent. were in the early and intermediate stage; sixty-two per cent. were in the advanced stage. Thus there has been no improvement in the type of case appearing at these dispensaries during the past quarter of a century.

Bentley quotes the London County Council figures for new cases, stating that only approximately twenty per cent. are in the early stage when first diagnosed.

These figures indicate clearly that the present state of affairs as regards diagnosis is highly unsatisfactory. It may, however, be argued that this is a matter of small importance, as tuberculosis is a comparatively hopeless disease and not really influenced decisively by treatment. The argument might be put forward that the really early cases do recover spontaneously if they are going to recover at all, and that sanatoria at present fulfil some useful function by segregating advanced infectious cases and by allaying the pangs of the public conscience. Such a view appears to be held by many public health authorities, as they have shown little or no interest in a really energetic drive for early diagnosis. Even the question of X-ray examination of house contacts with T.B. positive cases has been faced in very few areas.

There are, however, good reasons for believing that case-finding would produce valuable results.

(1) As regards prevention of infection, the earlier diagnosis would have far-reaching and immediate results. Patients could be instructed without delay how to avoid infecting others, and grossly infectious cases could be removed from the crowded barrack-room, forecastle, or workshop where they are now spraying tubercle bacilli all round them. Many of the folk who will become inmates of sanatoria in 1941 and 1942 are at present healthy people, who have the misfortune to be sharing a workshop bench, a bedroom, or even a bed with an undiagnosed infectious case of pulmonary tuberculosis.

(2) As regards treatment, there are two methods which may influence the disease decisively—strict rest in bed for several months and artificial pneumothorax. Both these methods of treatment act efficiently only in the earlier stages of the disease.

Several methods of case-finding have been tried, and none are without disadvantages. As already mentioned, it appears that the method which is to be applied successfully on a nation-wide scale must be cheap, painless, and of rapid application. These considerations exclude several methods of case-finding which would be admirable in theory. For instance, a blood sedimentation estimation would be a very valuable case-finding procedure, as the great majority of cases of active tuberculosis would show an abnormal reading. However, the procedure would arouse objections, and it would be suspected that the Wasserman reaction was being tested also (incidentally this would not be a bad idea, if practicable). An attempt at case-finding by the collection of sputum from all persons who could produce it would also fail, as it is unlikely that the necessary co-operation could be achieved. On the other hand, the public has now a great faith in X-ray examination as a method of detecting disease, and such a procedure would arouse much less objection.

(1) X-ray photography on a full-sized film of all adults, either annually or at longer intervals, is quite impracticable at the present time. The cost of taking an X-ray photograph of every adult in Belfast would not fall short of £100,000. However, this cost could probably be reduced by more than half by taking paper films, instead of celluloid films. Incidentally, in the opinion of the tuberculosis section of the New York Board of Health, the paper film is practically equal to the celluloid film, for the purpose of detecting tuberculous infiltration.

(2) A second method of making an X-ray survey is by screening only, followed by X-ray photograph of the suspicious cases picked out. Dr. Sparks* considers that a radiologist could screen one thousand patients a week, but I personally would not care to screen anything like this number. There are several objections to the application of the screening method on a large scale. It would be dangerous to the operator, relatively slow and definitely inferior to photography as regards results.

(3) Miniature radiography, a new technique, overcomes many of the practical difficulties of a mass survey.

The principle is the photography with a special camera of the X-ray image on the fluorescent screen. This was attempted within a few weeks of Röntgen's discovery, but the method was not perfected until 1936. A Brazilian worker, de Alreu, solved

*Sparks, J. V.: "X-ray Examination of Militiamen," *British Medical Journal*, 24/8/40, p. 266.

the problem after eighteen years of research. There are now twenty-five complete units for screen photography working in Brazil, and the method has been introduced in England, Australia, U.S.A., and Germany. With the modern fast photographic film, improved fluorescent screens, and a very large photographic lens, it is now possible to photograph the adult chest in a quarter of a second. At present the usual distance between the X-ray tube and the screen is twenty-four inches and this causes considerable distortion of the image. In spite of this, the method has proved already of great value as a means of detecting abnormalities in the lungs and heart. The idea is to pick out the abnormal films and to make a medical examination, including a full-sized X-ray film, of the suspicious cases. It is not suggested that a diagnosis of the disease should be made on the miniature film alone. Miniature chest radiography has immense advantages. Two hundred to three hundred cases can be dealt with per hour at a cost of approximately one penny each. The miniature films are usually cut into strips of twelve photographs and stored in albums without taking up much space.

The interpretation of the miniature films can be done with a magnifying lens, but the usual method is to use a special projector. This is the only part of the work which need be done by a doctor, and naturally it requires experience of chest radiology. It is recommended that two radiologists should inspect the films together and, according to a German physician, a rate of five hundred per hour is possible.

Miniature radiography is clearly much the cheapest and most rapid method for a mass X-ray survey. Probably a unit could deal with at least five thousand cases in a five-day week, and so could survey all the Belfast shipyard workers in a few weeks. From the point of view of the individual, an X-ray survey would be much less resented than a procedure involving pain or inconvenience, such as vaccination, anti-typhoid inoculation, tuberculin skin tests, or blood tests obtained by puncture. In the case of women patients it is not even necessary to remove all clothing covering the chest, an important point if one has to deal with a large number of women of all classes.

Complete outfits for miniature radiography are now manufactured in England. For example, Stanley Cox Limited supply a unit known as a Pulmograph, consisting of a complete X-ray unit, an electrically-operated camera unit, and a stand supporting the camera unit and X-ray tube. The cost of this outfit is approximately £1,100 to £1,200.

The method of mass X-ray survey has been applied extensively to soldiers and civilians in various parts of the world. Many difficulties and problems must necessarily follow in its trail, but these would be well compensated by the progressive reduction in the tuberculosis death rate and ultimately by the improvement in national health. The successful working of the scheme, including the investigation and observation of the suspect cases, would entail much extra work for the medical profession, but I am convinced that the results would justify the expenditure of money and labour. I would like to quote the experience of the Metropolitan Life Insurance Company, which has for ten years conducted an X-ray survey of its eleven thousand employees. The results claimed are an eighty per cent. reduction in new

cases for ten years; the predominance in early cases in contrast to the rest of the population of the U.S.A., where such cases are in a minority; twice as many arrested or discharged cases from sanatoria as those in the rest of the country, and an improvement in the chances of resuming work.

The co-operation of employers and trades union officials has been secured in New York city. It should not be difficult to achieve the same co-operation in Ulster. There is already a great interest in the prevention of tuberculosis amongst employers of labour, and they would view favourably a scheme which would result in an improvement of the health and efficiency of their workers. Trades union officials and the workers would also welcome the scheme, provided they were assured that no unfair victimisation would result from its operation. The necessary technical work would best be carried out by teams of photographic specialists, in collaboration with radiographers. The reading of the films and the careful investigation of the suspect cases would be the task of the medical profession.

REVIEW

SURGERY OF MODERN WARFARE. Parts I, II, & III. Edited by Hamilton Bailey, F.R.C.S. (Pp. 160 in each part. Illustrated. Price 12s. 6d. net per part). Edinburgh: E. & S. Livingstone. 1940.

THESE books form part of a symposium on war surgery, of which further parts, uniform in size and price, will be published from time to time. Mr. Hamilton Bailey has a team of no fewer than sixty-five contributors, a veritable galaxy of talent, for the production of these very readable volumes. Perhaps inevitably, such a team has proved too unwieldy, for inconsistencies, individual enthusiasms, and a general lack of balance are evident, especially in Part I. The discrepancies in this common stock of knowledge may, however, be of value, in that they allow latitude for the development of the reader's own ideas. This seems an advantage, for experiences with closed-plaster and chemotherapy are daily altering our ideas on the healing of wounds.

Part I considers the general and special features of war wounds, and their treatment. It makes most instructive reading, and, with the above qualifications, is excellently done. One would like to have had a more detailed chapter on the important subject of burns, but this section has suffered from over-compression.

Part II contains the sections on wounds of the trunk and of blood-vessels. The chapters on thoracic and abdominal injuries are by most distinguished and authoritative writers, and should prove exceedingly valuable. There is also a remarkably practical section on the exposure of blood-vessels, where the author, in dealing specifically with the living subject, weans us successfully from our long-held conceptions of these procedures in the cadaver. Page 188 contains a number of diagrams illustrating simple local anæsthesia, and the insertion of a self-retaining catheter. These diagrams might instruct the final-year student, but are surely out of place in the present work.

Part III has sections on wounds of peripheral nerves, of tendons, of hand and foot, of bones and joints, and on the methods of immobilising the limbs. This whole volume is full of interest to the general surgeon, the chapter on tendon injuries being particularly delightful. Again, over-compression is all too obvious. For example, the text on wounds involving the knee and hip-joint is squeezed into the space left on only thirteen pages, after diagrams, chapter headings, bibliographies, and so on, have taken their inevitable and irreducible toll. Inequality, too, is well exemplified by comparing the small and unattractive drawings, which inadequately explain the methods of applying extension to the limbs, with the excellent photographs which illustrate the use of Cramer wire, and are so instructive and complete that they might almost have replaced the textbook on that subject.

The publication of further parts of this symposium will be awaited with interest, and will be the more welcome if the small objections one finds to the first parts cannot be levelled at those to come.

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Paracentesis Tympani

By KENNEDY HUNTER, M.B., F.R.C.S.EDIN., D.L.O.

PARACENTESIS TYMPANI or, better, myringotomy, means the incision of the tympanic membrane. It was first advocated and used by a Parisian charlatan named Eli, who flourished in the latter part of the eighteenth century. It had its first legitimate employment at the hands of Himley and Cooper during the beginning of the nineteenth century. The indications for the operation at this time were legion, and included practically all forms of deafness. It is now restricted to cases of suppurative otitis media, and occasionally catarrhal otitis media when accompanied by an exudate in the middle ear which does not absorb.

The indications may be enumerated as follows :—

1. Acute purulent otitis media with bulging of the whole tympanic membrane.
2. Acute purulent otitis media involving the attic region as shown by bulging of Shrapnel's membrane and the upper posterior segment of the tense membrane.
3. Suppurative otitis media with resolution delayed by insufficient drainage produced by a small and inadequate perforation.
4. Subacute catarrhal otitis media characterised by inflamed and infiltrated membrane and the presence of fluid in the middle ear.
5. Acute exacerbation of a chronic suppurative otitis media with physical signs of pus retention anywhere in the middle ear.

The chief indication is the bulging drum of acute suppurative otitis media, the bulging being due to the pressure of serum, sero-pus, or pus against the least resistant wall of the middle ear. Owing to the attachment of the handle of the malleus to the drum at its centre, the periphery bulges more than the centre, so, in a case where the whole drum is involved, all the anatomical landmarks are obscured and the membrane looks like a red convolvulus.

If the exudate has collected slowly and has been present for some days, the redness gives place to a yellowish pink colour; this is, I think, partly due to the colour of the pus and partly to ischæmia of the drum vessels produced by pressure.

The middle ear is divided into several pouches by the ligaments of the ossicles and folds of mucous membrane, so that the bulging may be localised to one part of the drum.

The objects of the operation are, first, to provide adequate drainage and so prevent extension to the mastoid air cells; second, to preserve hearing by procuring quick resolution of the inflammation and so reducing intra-tympanic adhesions to the minimum.

The incision in the drum heals rapidly, sometimes too rapidly, thus necessitating a second incision. If the drum is allowed to rupture spontaneously, the perforation

is usually small, the drainage poor, so that resolution is slower and more time is given for adhesions to form; also, the opening closes more slowly or may not close at all, as instead of a clean incision through living tissue, the rupture takes place by a process of necrosis, so that the blood supply round the perforation is poor.

The operation is usually performed under general anæsthesia, nitrous oxide gas or ethyl chloride, occasionally under local anæthesia if there are contra-indications to general.

The incision is made through a speculum, and the point of the knife must be in full view during the incision; this begins in the postero-inferior segment and is curved upwards between 1½ mm. behind the position of the handle of the malleus to the top of the postero-superior segment. The incision is made from below upwards, and not from above downwards, for very definite reasons. The drum and the inner tympanic wall are placed very obliquely to the long axis of the meatus; the drum forming obtuse angles with the roof and posterior wall of the meatus and very acute angles with its floor and anterior wall—in other words, it slopes downwards, inwards, and forwards. The inner tympanic wall is likewise directed from above downward and strongly inward.

If the incision is made from above downwards, owing to the inward slant, the knife is likely to cut its way out, making only a short incision, or in endeavouring to prevent this by carrying the knife inward, injury to the inner tympanic wall, especially the stapes, is more likely, whereas, when it is commenced at the lower margin of the drum, the incision is made while withdrawing the knife. Cutting in this way, the knife is moved constantly away from the danger-points.

Following incision, there is always a moderate hæmorrhage into the canal; this blood soon clots, and it is important to remove this clot, otherwise it may seal the incision; this is easily done with a cotton wool applicator. The initial clot being removed, there is usually no recurrence.

Operative Dangers.—A few cases have been reported of acute suppurative labyrinthitis and meningitis as the result of injury to the stapes or inner tympanic wall. Other possibilities are division of exposed facial nerve, injury to an abnormally placed and exposed jugular bulb. Injury to the chorda tympani nerve probably occurs frequently, but no after-effects are noticed.

During the three and a half years 1935-1938, I performed about seventy-three operations for acute mastoiditis following acute otitis media. During the same period I performed about one hundred and fifty cases of primary paracentesis for acute otitis media; of these, only three cases required mastoid operation.

With the advent of chemotherapy, I think in the future this number will be even smaller.

I put this forward as evidence of the value of paracentesis in acute suppurative otitis media.

A Note on the Fractional Test-Meal in Duodenal Ulcer

By R. W. M. STRAIN, M.D., B.SC., MAJOR, R.A.M.C.

TABLE I.

UNCOMPLICATED DUODENAL ULCER.

	Sex	Highest Acidity Time	Highest Acidity as N/10 HCl	Reappearance of Bile	Disappearance of Starch
1.	M	1¼ hours	86/60	1½ hours	Never
2.	F	2¼ ,,	98/90	Never	,,
3.	F	2¼ ,,	50/30	,,	,,
4.	F	2 ,,	75/62	Always	,,
5.	M	2½ ,,	56/48	1¾ hours	,,
6.	M	1¼ ,,	100/55	Never	,,
7.	F	1½ ,,	65/40	¾ hour	,,
8.	F	2½ ,,	75/55	2¾ hours	,,
9.	M	2 ,,	65/50	2½ ,,	,,
10.	F	1¼ ,,	70/56	1¾ ,,	,,
11.	M	1 ,,	24/18	Never	,,
12.	M	1¾ ,,	50/40	Always	2 hours

TABLE II.

DUODENAL ULCER WITH STENOSIS.

	Sex	Highest Acidity Time	Highest Acidity as N/10 HCl	Reappearance of Bile	Disappearance of Starch
1.	F	¾ hour	70/60	1¾ hours	2½ hours
2.	F	1 ,,	60/35	Never	Never
3.	M	2 ,,	65/55	1½ hours	2 hours
4.	M	1¼ ,,	46/40	½ hour	1½ ,,
5.	F	2¼ ,,	40/Nil	Never	Never
6.	M	1½ ,,	85/80	¾ hour	2¼ hours
7.	M	1 ,,	42/34	1 ,,	1¾ ,,
8.	M	1¾ ,,	80/60	1½ ,,	Never
9.	F	2¼ ,,	48/38	Never	Never

THE records of cases of duodenal ulcer proved at operation in the Royal Victoria Hospital, Belfast, have been examined over a period of seven years to determine the fractional test-meal findings.

Only twelve cases were found in which there was no previous history of failed medical treatment, hæmatemesis, stenosis, or other usual indication for operation.

These cases were therefore selected as representing the duodenal syndrome as it is found in the medical rather than the surgical wards, except that there is the final operative proof of uncomplicated ulcer.

The fractional test meal findings are summarised in Table I.

In the second series of cases, pyloric stenosis has been proved at operation. The corresponding analyses are shown in Table II.

These tables show that :—

1. In the series under review, duodenal ulcer is just as common in women as in men.
2. Simple duodenal ulcer is accompanied by late hyper-acidity usually but not always.
3. Failure of bile to appear or of starch to disappear does not necessarily indicate stenosis.
4. With the onset of stenosis there is a tendency for the acid curves to return to normal or sub-normal and even for free hydrochloric acid to disappear.
5. Pyloric stenosis is not excluded by the reappearance of bile or the disappearance of starch.
6. At no stage does the normal fractional test-meal exclude the presence of a duodenal ulcer.

REVIEW

FRACTURES AND OTHER BONE AND JOINT INJURIES. By R. Watson-Jones, B.Sc., M.Ch.Orth., F.R.C.S. Second edition. (Pp. 724. Illustrated. Price 50s. net). Edinburgh : E. & S. Livingstone. 1941.

THE first edition of this book earned the highest praise, and was acknowledged as an English classic on the treatment of fractures. It is a fine, and amply merited, compliment to the author that a second edition should be called for within one year of the first appearance of the book.

Mr. R. Watson-Jones, influenced by the penetration of war to our very homes, has entirely re-written the chapter on open and infected fractures and war wounds, and has included recent developments in chemotherapy, blood and plasma transfusions, the treatment of wound shock, and closed-plaster technique, and the technique of amputations.

For the rest, the text of the first edition remains largely unchanged, and still forms the main bulk of the book. Most surgeons are already well acquainted with the sustained excellence of the work, and with its magnificent illustrations. No better book on this subject could be recommended, and undergraduate, general surgeon, and orthopædic specialist will all find its pages fascinating and instructive.

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Radiological Observations on the Colon

By Douglas Boyd, M.B., D.M.R.E.

Honorary Radiologist to the Mater Infirmorum Hospital, Belfast; The Belfast Hospital for Sick Children, and the Benn Hospital

Radiology of the colon is at times a spectacular pastime, because unfortunately the only successful way of demonstrating many forms of pathology is to go contrary to nature, and, as might be expected, the bowel objects to such procedures. In other words, one takes the retrograde path and attempts to outline by barium enema what one would have been very glad that nature could herself have demonstrated with barium by the oral route.

At the very beginning I want to emphasise two very important matters. Firstly, carcinoma of the colon can very rarely be demonstrated by follow-up films. Certainly it can never be excluded by such methods. I have known even the very grossest of lesions fail to be demonstrated in twenty-four- and forty-eight-hour films, and such is universal experience. To rely on follow-on films to demonstrate carcinoma of the colon is to deliberately invite diagnostic disaster.

The second point is that new growths in the sigmoid and in the walls of the rectum are often very difficult and in some cases impossible to record radiologically, because of overlapping shadows and other anatomical and radiological reasons. Co-operation with the surgeon is essential, because the proctoscope and the sigmoidoscope will reveal what radiology may have entirely failed to demonstrate.

A great deal of the fascination of the radiologist's work is that he never knows what he is going to find. Interesting anatomical abnormalities are of quite regular occurrence, and many pathological changes are radiologically spectacular. An important source of speculation and research is, why did a certain type of lesion give the particular symptoms complained about by that patient? A great deal of the radiologist's diagnostic work is concerned with excluding a number of causes for some complex group of symptoms and at the same time keeping a weather-eye going, as it were, for pathology or variations of development of all types and in all near-by regions.

If time is in any way short, it may be a relief to find the diagnosis staring one in the face, as it were, but there is infinitely more satisfaction, and very much more anxiety, if one only arrives at a correct or nearly correct conclusion after an arduous search, or even arrives at the diagnosis by the exclusion of other conditions or in some such indirect manner.

It is unfortunate that a barium enema is one of the most uncomfortable and unpleasant forms of radiological examinations. It sometimes is all over very quickly and very easily, but it is not always so. By no means does every enema go according to plan!

For some curious reason when preparing this paper I have been mentally very reluctant to describe what is called the normal colon.

This instinctive opposition may be psychologically and physiologically sound, because really we do not know what is the normal colon. There is great personality in bowels! The colon really does reflect changes in the psychological outlook of the owner! I have never been quite clear what was meant exactly when it was said that "his bowels moved with compassion," but one cannot study the alimentary system and fail to realise the tremendous influence that the mind has upon the entire tract.

I have not yet given any barium enemas to cats, and I cannot confirm or disapprove the famous experiments of Cannon on peristaltic movements on cats of male and female variety. Describing his famous experiments in 1911, he writes: "In some animals peristalsis was perfectly evident, and in others there was no sign of activity. Several weeks passed before I discovered that this difference was associated with a difference in sex. The male cats were restive and excited on being fastened to the holder; but the female cats, especially if elderly, submitted with calmness to the restraint, and in them peristaltic waves took their normal course."

I wonder if one might describe the normal colon as one which never gave the patient any trouble. In other words, a colon which existed with as little indication of its working as the normal heart, excepting only the exhibition of what I might term the recto-sacral reflex, at times convenient to the pleasure of the owner.

Such a colon, to the radiologist, is laid out with all the appearance of harmony. The haustrations preserve a very reasonable regularity with a clear symmetrical formation. There are no regions of flattened haustra, there are no parts of spasm, and the saw-toothed irregularity of irritation is absent. There may be abnormal loops or, far better termed, *unusual* loops, and even the suggestion of kinks, but many such conditions may not disturb functioning, and so we have no right to describe as pathological such departures from what we are pleased to call the normal.

The commonest disturbance is a functional unbalance. In these days it is almost a rarity to find a colon unaltered by some condition, and some of the advancing stages of functional unbalance are almost universal.

The change due to imbalance of the normal neuro muscular mechanism has been described as spastic colitis, the hypertonic colon, muco-membraneous colitis, mucus colitis, nervous diarrhœa, constipation, the greedy colon, the dyskenetic colon, the deranged colon, colo-spasm, and a host of other terms.

Kantor was the first to recognise that in a phase of the condition there was a decreased and not increased tonus, and to suggest the use of the term the "unstable colon."

The normal colon has been described as having even and clear-cut segmentation. The deranged colon exhibits no such regularity of character and no such symmetry

of purpose. In the earlier stages during the periods of increased tonus there is an increase in the depth of the haustrations, a narrowing of the central canal, and a tendency towards a developing uneven formation.

A fairly constant sign at the earlier stages is a duplication of the haustrations in the longitudinal axis, producing the appearance of two segments on one side facing a single segment on the opposite. Some inches of the bowel may then develop haustrations of such depth that barium in the extreme outer parts may be isolated. I have seen barium isolated in such a way described as diverticula. Later sections of commencing saw-toothed irregularity begin to develop and there are regions of spastic narrowing.

In the atonic periods, in the earlier stages of relatively short duration but later increasing in duration and ultimately predominating, there is a broadening of the central canal and a flattening of haustrations. Finally there is a development of an atonic colon with a dilated cæcum.

The rate of emptying is very variable and with the same patient is inconstant. Almost invariably these people complain of constipation. I want to emphasise these words—*they complain of constipation because very few of them in the proper sense of the word are constipated.*

If examination is made following an aperient, the barium meal may pass to the rectum even within so short a period as four hours. Such intestinal hypermotility suggests a rapidly emptying bowel, but is merely a trap for the unwary, because in these patients films at twenty-four, forty-eight, and seventy-two hours so very often find little or no change in the original four-hour distribution. I believe that very often the initial rapid distribution is because the large colon is empty at the time the barium arrived into it from above. Certainly very many of these patients with deranged colons may be grouped under the heading the chronically empty colon, or be said to be suffering from aperient colitis. Both diseases are the same, and almost invariably are *contracted by inoculation by the Press!* The disease is contagious and is known to run through the family group!

I mention it here because there is a matter of great importance attached. You will have heard how the bulk of these sufferers have for the greater part of the time, in the earlier stages of the derangement, when there is every prospect of cure, a colon which is hypertonic and irritable. These are the worst possible colons for a diet of coarse residue roughage, and yet this is the treatment so often prescribed.

The cycle to be broken down is a bowel emptied by aperient—lack of content for the gut to grip upon—delay—dehydration—formation of hard fæcal masses with irritation of the bowel-wall, and so further interference with muscular co-ordination and generally periods of spasm. At this stage the patient, impatiently awaiting a delayed evacuation from a colon which is practically empty, takes another aperient. The result may or may not be satisfactory from the limited viewpoint of the patient—they are so delightfully vague in the use of such a word!—and then the whole cycle starts again.

Alvarez may be correct when he surmises interference *with the gradient of gut*

tonus. It is interesting that many of these cases get reverse peristalsis in which fæcal masses may be carried from rectum or sigmoid back to the cæcum.

I would say that diverticula in all probability is the next commonest condition to be found in the colon.

Colonic diverticula were mentioned first in Matthew Ballies' "Morbid Anatomy" in 1794, but it is only comparatively recently that the disease has found prominence in medical publications. For instance, it is authoritatively stated that prior to 1913 none were diagnosed prior to operation. In the latter part of 1913 and in early 1914 Quervain, Hurst, and Case all reported pre-operative diagnosis of the condition in each instance by X-ray. The list of authors contributing reports in the years following is simply overpowering.

The mere presence of diverticula without inflammation sufficient to bring the patient for investigation is extremely high. Beer states that over one-third of the aged have diverticula, and Roberts is most emphatic that every pot-bellied individual over 60, particularly if there is a history of long-standing constipation and lower abdominal discomfort, is likely to have multiple diverticula of the colon.

A solitary diverticulum with evidence of inflammation is rare. It may be suspected by a sharply localised region of irritable gut, or demonstrated as filled with barium or partly filled with barium and fæcal matter.

It should be remembered that, not infrequently, the narrow stems connecting the diverticula with the lumen of the gut may be blocked by œdema and prevent the entrance of barium; and a region of spastic irritable gut, particularly in the descending and sigmoid regions, together with localising discomfort by the palpating hand of the radiologist, is almost invariably due to diverticulitis.

In other instances grape-like clusters of diverticula may be festooned along sigmoid and descending colon. They also occur in the cæcum, but rarely.

Acute paresis of the descending colon is an interesting condition. Some years ago I noticed that it not unoften happened that a patient was sent for investigation with symptoms of obstruction. The radiological investigation found in some cases little other than a gas-filled, rather broader and almost relaxed-looking region of descending colon. Inquiry made me suspect very strongly that some of the patients, prior to the attack of obstruction, had passes a small renal calculus, and gradually I came to realise that disturbance of the left side of the colon low down could follow a left renal colic.

While it is well recognised that almost any acute abdominal crisis such as abscess, obstruction, acute hernia, and renal colic may be the cause of acute pyloric spasm, the pathway between kidney and colon may not receive the recognition which it deserves clinically. Once recognised, one watches for referred symptoms, and so very often something in the history will give a clue.

Sometime the reflex is reversed. A localised inflammatory condition, generally due to diverticulitis, may produce a symptom complex of frequency of micturition, *due to irritation of the bladder* and pain in the left flank of a colicy nature, and the whole picture suggest a urinary calculus. Close questioning of one of these

patients gave the information that the worst of his pain, duration intermittently about three weeks, was in the morning on his way to work. His bowels opened regularly after breakfast and just once or twice he had slight diarrhœa. The enema-can was ready almost before the negative result of the renal film and a few minutes found the region of diverticulitis.

I have been curious to find a pathway. There is a definite neural "link-up." Branches of the right vagus run to the posterior wall of the stomach, left kidney, and left colon. The sympathetic supply to the left kidney is aortic plexus and semi-lunar ganglion, while a prolongation of the aortic plexus supplies the sigmoid and upper part of the rectum.

It is not infrequently impossible to distinguish radiologically or even surgically between certain forms of diverticulitis and carcinoma. If I may quote from one of the more recent textbooks on radiology: "It is the difficulty if not the impossibility of distinguishing between certain forms of diverticulitis and neoplasm which makes the whole problem of diagnosis so difficult and so great a source of anxiety."

Carcinoma may be complicated by diverticulitis or diverticulosis. The picture in cases of hypertrophic diverticulitis is indistinguishable from new growth in a fair number of cases and repeated examination may be necessary to decide if irregularity is due to invading neoplasm, or inflammation arising from diverticulitis. Certain factors may incline the diagnosis one way or other, but under certain circumstances one can only say, "I suspect this is malignancy, but I am not certain," and await either the results of further investigation or an opportunity of repeating the radiological examination after a period of treatment.

In malignancy the picture is constant. In diverticulitis the tumour mass has a tendency to be variable.

In carcinoma bleeding is not infrequent. In diverticulitis bleeding is limited to a comparatively small number of cases.

In carcinoma the mucosal pattern shows considerable destruction. In diverticulitis such destruction is not so marked.

In carcinoma the obstruction tends to be early and complete. In hyperplastic diverticulitis the obstruction tends to be late and incomplete.

The question of tenderness on deep palpation is one of considerable interest. It is a fact that a limited number of intelligent patients may communicate an appreciation to the radiologist of the nature of the discomfort caused by a very deep and forceable type of palpation, best carried out under the fluorescent screen.

Pain, often of the mild toothache type, is caused by palpation over a hyperplastic mass of diverticulitis. With a new growth one gets the impression that there is a numb pain, a very much lesser degree of sensitivity, and a much more mobile tumour, but there are so many qualifications necessary to such statement and the whole field of visceral sensation is one of so much divergence of opinion and of difficulty, that I hesitate almost to refer to the matter at all. I can only say that such help at times may be of real value, and I want to stimulate interest in anything which may, even occasionally, be of diagnostic value.

War Gases: Their Pathological Effects and Treatment

(No excuse is offered for printing the following notes, in view of the expressions of those in authority that "gas" will be used by the enemy in an attempt to overcome our resistance.)

WAR gases usually are classified primarily into non-persistent and persistent. The non-persistent gases may themselves be gases, or they may be solids which when liberated are rapidly converted into gas or smoke, which is quickly dissipated, leaving the area free from pollution. Persistent gases are solids or liquids which on being exposed to the air *change to gas only slowly*.

The medical classification of war gases on the other hand is based on their effects :

(a) Lachrymators, which act on the eyes.

(b) Nasal irritants, which act on the nose.

(c) Asphyxiants, which act on the lungs.

(d) Vesicants, which act on the skin and mucous membranes.

(e) Hæmolytics, which act on the blood-cells.

(f) Paralysants, which act on the nervous system.

THE LACHRYMATORS.

These were the first toxic gases used in the Great War of 1914-18; they are chemical substances having a specific action on the eyes; they produce a copious flow of tears and temporary blindness. In the low concentrations met in the open, lachrymation is the only effect produced, but in enclosed places, such as deep trenches, dug-outs, and cellars, concentrations can accumulate and produce serious casualties.

The three principal lachrymators or tear-gases are :

(1) Chlor-aceto-phenole—C.P.A. solid and non-persistent.

(2) Ethyl-iodo-acetate—K.S.K. liquid and persistent.

(3) Bromo-benzyl-cyanide—B.B.C. liquid and persistent.

The symptoms produced by these three substances on evaporation soon disappear on removal of the patient from the contaminated area; quick relief is produced by irrigation of the nose and conjunctival sacs with warm saline solution, or even with warm water.

In strong concentrations of these gases, further effects may make their appearance by irritation of the respiratory passages and lungs; a burning feeling is experienced in the throat, with discomfort in the chest, and if the patient is not taken away from the gas-contaminated area, nausea and vomiting may result.

C.A.P. may, in addition, act as a skin irritant, and it is stated that persons with dry skins who do not sweat may develop an obstinate dermatitis if often exposed to the vapour.

The Nasal Irritants.

These are solid arsenical compounds which at ordinary temperatures readily form a very fine almost invisible particulate cloud or smoke. The principal nasal irritants are :

(1) Di-phenyl-amine-chlor-arsine (D.M.).

(2) Di-phenyl-chlor-arsine (D.A.).

(3) Di-phenyl-cyano-arsine (D.C.).

The gases produced by these substances cause a violent sensory irritation even in low concentrations. The symptoms are acute pain in the nose and accessory sinuses, with a sense of "fullness" in the head, with repeated sneezing. A burning sensation is experienced in the throat, a tightness and pain in the chest, a feeling of "grittiness" in the eyes with pain and lachrymation; there is aching in the gums, and often this may proceed to nausea and vomiting. Acute mental distress is a marked feature of patients suffering from these gases.

The irritant effects are transitory, and in the great majority of cases a brief period of rest, away from the contaminated area, is all that is necessary to effect recovery; but nasal irrigation and gargling with a five per cent. solution of sodium bicarbonate will relieve the irritation of the nose and throat.

A peculiarity of these gases is the apparent slow development of their symptoms. Even if the patient is taken away from the source of the gas, the symptoms continue to increase in severity for some time before they begin to subside.

The Asphyxiants.

The most important members of this group are :

Chlorine.

Chloropicrin.

Phosgene.

Diphosgene.

The first two substances are of low toxicity when compared with phosgene and diphosgene; the ease with which they are detected by their irritancy makes it unlikely that they will be used by an enemy.

All four substances produce an inflammatory reaction on the trachea, bronchi, and lungs, followed by œdema with œdema fluid passing into the lung alveoli, causing an obstruction to the oxygen exchange in the pulmonary vessels.

Of these four substances, phosgene (COCl2) is probably the most toxic; it causes irritation of the sensory nerves supplying the upper air-passages, as well as inflammatory changes; it is the "gas" most likely to be used by an enemy; it is insidious in its action, and persons gassed with it often have no warning symptoms until it is too late to avoid serious poisoning. It is said to have the odour of "musty hay," and is not easily detected.

The main pathological changes seen microscopically in a lung from a case of death due to phosgene poisoning are as follows :

(1) The pulmonary alveoli are filled with œdema fluid, and the walls of the air-sacs are burst in many places.

(2) The bronchi are filled with œdema fluid.

(3) The blood-vessels of the alveolar network are congested.

(4) Intravascular thrombosis is frequently found in the smaller blood-vessels.

The result of these changes is that the blood circulation through the lungs is impeded and the respiratory exchange of gases between the blood and air in the lung is seriously diminished. Death is brought about by asphyxia, the patient being, as it were, drowned by his own œdema fluid.

If death does not occur, the œdema fluid begins to be absorbed or expectorated from the third day onwards, and if all goes well, the lungs soon resume their normal functions. Broncho-pneumonia complications may develop from secondary infections, but they are not common.

The patient's symptoms are a copious frothy sputum, a frequent cough, and hurried shallow respirations. With the "blue-type" the respirations are from forty to forty-eight per minute, with a temperature of 100° to 102°, and a pulse of about 100. The "paled-type" may have a respiration rate of fifty per minute or more, with a rapid running pulse of 130 to 140.

In the "blue-type" the patient, as a rule, is fully conscious and complains of headache and pains in the chest; he turns restlessly to and fro in extreme discomfort, and his hurried breathing is interrupted from time to time by short bursts of coughing and expectoration. The best treatment is rest, warmth, the administration of oxygen by an efficient apparatus, with three litres a minute for twenty-five minutes and five minutes interval, with venesection to lessen the embarrassment of the circulation; from fifteen to twenty ounces of blood should suffice to produce relief from the discomfort. The diet should be fluid, and bland drinks should be given freely; expectorants should *not* be given.

The "paled-type" patient is restless, often he is semi-delirious, and his skin may be dry and hot, or damp with perspiration. There is a small, hurrying pulse, with panting, rapid, shallow breathing, and often sounds can be heard of fluid in the trachea. In common with the "blue-type" a little dullness can be elicited on percussion, and numerous fine râles and rhonchi, especially in the axillæ and over the back. In both types the intensity of the pulmonary œdema is hidden from the physical examination by the presence all over the chest of scattered patches of emphysema. *Venesection is contra-indicated in this type,* otherwise the treatment is the same as for the "blue-type."

Vesicants.

The two principal vesicants or blister gases are mustard and lewisite. Although lewisite is a compound containing arsenic (chloro-vinyl-di-chlor-arsine), it is not so deadly in its action as mustard. It has an immediate irritant action both on the respiratory tract and on the skin in low concentrations, and its penetrating odour of geraniums renders it easy of detection. Its action, however, is more rapid than

mustard, and if the vesicles which it produces are left unopened, the patient will die of arsenical poisoning. It should be noted that the vesicles due to lewisite poisoning are "pearly" in appearance, and there is no erythematous ring around them as seen in mustard-gas cases.

Lewisite can be easily destroyed, and may be neutralised by water, especially if it is hot and contains an alkali—a five per cent. aqueous solution of sodium hydroxide is, possibly, the best solution for this purpose. Apart from these facts, lewisite produces similar symptoms and pathological changes to mustard.

Mustard gas, known to chemists as di-chloro-di-ethyl-sulphide, in its pure state is a transparent oily liquid, but in the crude form in which it is used in warfare, it resembles dirty oil from a motor-engine. It is almost odourless in ordinary field concentrations, but in strong concentrations it has the pungent odour of horse radish or garlic. It is one of the most persistent gases known, and it is very difficult to destroy. Cases of blistering have been described where the persons concerned had unconsciously sat down on ground contaminated by mustard, and the vapour had passed through the clothing, causing inflammation and blistering of the buttocks and scrotum within twenty-four hours, followed by balanitis and pain on micturition.

The main pathological changes seen microscopically in a lung from a case of death due to mustard-gas poisoning are as follows :

(1) The bronchioles are filled with fibrin and pus cells, and the lining epithelium may be completely destroyed.

(2) Inflammatory changes cause rings of hæmorrhage in the tissues around the bronchial tubes.

(3) Patches of septic broncho-pneumonia and small abscesses may be present.

(4) There is no generalised pulmonary œdema, as in cases of phosgene poisoning, and there is no disruptive emphysema.

As a rule, no symptoms are complained of at the time of exposure, but after two to six hours the skin and mucous membranes begin to react with a progressive inflammation, beginning as an erythematous blush which gradually deepens in intensity until the skin looks scorched. These reactions are best seen in the axillæ, groins, scrotum, inner side of the thighs, and perineum. Blisters develop at a later period over the reddened area. At first there is a sense of burning in the eyes, followed by intense conjunctivitis and lachrymation; if the vapour has passed down the respiratory and digestive tracts, there is vomiting, with discomfort in the throat, a hoarse cough, and some retro-sternal pain. Although the effects of this toxic gas are very intense, death is uncommon, and when it occurs it is the result of septic conditions, especially septic broncho-pneumonia.

In cases of vapour contamination, the rapid removal of *all* clothing is essential, followed by a thorough washing of the body with soap and water. The eyes should be irrigated frequently with plain warm water or normal saline.

If blisters have developed, they should be opened and the condition treated as an ordinary thermal burn.

For liquid contamination three forms of treatment are available:

(1) BLEACH TREATMENT by ointment or paste, composed of equal parts of white vaseline and "supertropical" bleach, which will neutralise the mustard-oil. The ointment should be rubbed into the skin for *one minute* and then washed off with soap and water. If it is left on the skin longer than this short period it will burn the skin. This treatment should never be given where the skin already shows signs of irritation, when it would merely aggravate the condition.

(2) TREATMENT BY SOLVENTS. Petrol and kerosene will dissolve the mustard-oil, it will not destroy it, and care must therefore be taken not to spread the contamination by allowing the solvent to run over the skin. Thorough washing with soap and water will complete the treatment.

(3) WASHING WITH SOAP AND WATER with frequent changes of water. This should always be done, even after a time has elapsed since the patient was contaminated. *It does not destroy the mustard; it merely removes it in the lather;* the scrubbing should therefore be confined to the affected area, and the hands should be protected.

Speed is the essence of all preventive treatment, and a delay of even three minutes with liquid contamination, or twenty minutes following exposure to vapour before cleansing the skin, will result in definite burns.

In all cases of poisoning by mustard gas the eyes must receive immediate attention, as they usually show the first signs, due to exposure. The eyelids become œdematous, and there is severe pain behind the eyes and in the forehead; the conjunctiva becomes swollen and œdematous, and the blood-vessels become markedly injected. There is photophobia and blepharospasm. The eyes may be so severely burned that they may be destroyed. They should have frequent lavage with two per cent. solution of boric acid or normal saline. If spasm and pain are marked, the application of one per cent. atropine ointment every twelve hours will give relief. Note carefully that *cocaine should not be used,* as its effects are only transitory, and it tends to loosen the corneal epithelium and facilitates ulceration. If a muco-purulent discharge is present, instil a two per cent. solution of argyrol twice daily. Rhinitis is best treated with copious warm douches of five per cent. sodium bicarbonate solution several times daily, inhaling the steam of hot water to which have been added to each pint of water one ounce of tinc. benz.co. If broncho-pneumonia develops, the treatment is sympathomatic and follows the usual forms of procedure.

Blisters should be evacuated under asceptic conditions by means of hypodermic syringe, allowing the intact epithelium to collapse and seal down the raw, sensitive surface beneath. The application of dry dressings is recommended, but if crude cod-liver oil is used and the dressings changed daily, little or no irritation is caused and the oily dressings come off easily and without pain. If large areas are involved,

spraying with a solution made by adding twenty per cent. of "Dettol" to a freshly-prepared five per cent. solution of tannic acid, and dressing with lint moistened in the same solution. The entire dressing should be removed at the end of eight to twelve hours, when a firm coagulum has been formed; this is sprayed with five per cent. solution of tannic acid, and dried.

After the separation of the coagulum, the general principles of wound treatment are followed; stimulating lotions or scarlet-red ointment will be found useful in encouraging the growth and epithelium.

Hæmolytic Substances.

Arseniuretted hydrogen may possibly be used as a non-persistent war-gas by an enemy. But it is likely that if it is used it will be in the form of calcium arsenide. This substance is a dark-grey, heavy powder, which in contact with atmospheric or soil moisture slowly generates arseniuretted hydrogen over a period of hours or days, according to the amount of moisture present. In weak concentrations it has a peculiar garlic-like odour, reminiscent of acetylene, but in strong concentrations this odour is not perceptible.

The symptoms produced by arseniuretted hydrogen vary with the amount of gas inhaled. In mild cases there is lassitude, headache, and undue breathlessness on exertion. In cases of moderate severity there is shivering, weakness, giddiness, nausea, and vomiting, and often there is insomnia associated with renal and hepatic pain and diarrhœa. In severe cases the above symptoms are accentuated, and the patient gradually becomes comatose.

The symptoms are due to the action of the arseniuretted hydrogen on the red blood cells which take up the substance, and hæmolysis results. The hæmoglobin of the red cells is set free, and is in part excreted by the kidneys, giving rise to hæmoglobinuria, and is partly converted by the liver into bile pigments, which are formed in excessive amounts, and in severe cases this in turn gives rise to jaundice.

Post-mortem examination shows congestion and damage to the kidneys, liver, and spleen. There is tubular degeneration of the kidneys with blockage of the capillaries by the debris of red cells and cellular debris and casts; there is toxic degeneration and necrosis of the liver.

Death in severe cases may take place within forty-eight hours of exposure to the gas, and may be preceded by complete anuria; deaths may continue to occur over a number of days, and are sometimes accompanied by uræmic symptoms with partial or complete supression of the urine.

Treatment consists of blood transfusions, the promotion of diuresis, and the administration of glucose. The risk of hæmolysis of the transfused blood by the gas apparently is slight after an interval of two to three hours after exposure, but transfusion may have to be repeated, as hæmolysis of the patient's own blood may continue for several days. In promoting diuresis to rid the system of the arsenic, organic mercurial diuretics must *not* be employed; potassium or sodium citrate in doses of three to four drachms in twenty-four hours is the best treatment. Glucose

should be given freely from the onset of symptoms, with or without insulin; in the presence of severe hepatic symptoms, it may be given intravenously.

During convalescence a light diet is indicated so long as the urine shows evidence of the toxic action of the gas. Full doses of iron and liver extract are also indicated.

Paralysant Gases.

These gases are hydrocyanic and hydrogen sulphide. They both act on the nervous system, are extremely deadly, but lethal concentrations are not easy to arrange under war conditions. It is, however, possible that the enemy may have been able to overcome this difficulty by combining them with a heavy molecule, and making them available for use in warfare.

Hydrocyanic acid is a protoplasmic poison; in high concentrations it is capable of causing death through paralysis of the respiratory centre in the brain stem.

The symtoms are first an uneasiness, vertigo, palpitation, and hurried breathing. If the gas is present in lethal concentrations, these concentrations are followed by convulsions and death by paralysis of the respiratory centre and circulatory failure.

Treatment must be immediate, and is primarily directed to restoration of the circulation. The patient must be removed from the infected area, and artificial respiration used. Oxygen with a mixture of five per cent. carbon dioxide is useful in stimulating normal respiratory efforts.

Hydrogen sulphite acts as a local irritant and as a systemic poison. High concentrations cause death with dramatic suddenness; moderate concentrations give rise to bronchitis and pulmonary œdema. The symptoms are panting respiration, pallor, and the rapid onset of unconsciousness, followed by convulsive movements and the cessation of breathing.

Treatment must be prompt, and the patient must be removed immediately from the infected area. Artificial respiration must be given with the inhalation of oxygen mixed with five per cent. carbon.

R. H. H.

REVIEW

CEREBRO-SPINAL FEVER. By Denis Brinton, D.M.(Oxon.), F.R.C.P.(Lond.). Edinburgh: E. & S. Livingstone. 1941. Pp. 163. Plates 4. 8s. 6d. net.

The author includes in his preface to this book the statement that last year he became aware of the need for a small book to review this subject and its modern treatment. This statement may be true, but as it appears that the author's experience of cerebro-spinal fever consists of forty-six cases personally observed during 1940, he does not seem to have the necessary experience to justify his undertaking the task. Whilst the book is pleasant reading, it savours throughout of a lack of intimate personal experience in the handling of a variety of cases of cerebro-spinal fever which must limit its value. One statement cannot pass unchallenged: on page 130 it is implied that for an adult a total intake of two to three pints of fluid in twenty-four hours is adequate. That is not the general teaching in the treatment of acute infectious diseases. There is no illustration of any skin manifestation of the disease likely to be of assistance in making a diagnosis, whilst four plates are given to pictures of sulphanilamide rashes.

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Thomas Sinclair, C.B., M.D., F.R.C.S.(ENG.),

EMERITUS PROFESSOR OF SURGERY,
QUEEN'S UNIVERSITY, BELFAST

THE death of Colonel Thomas Sinclair, C.B., M.D., F.R.C.S.(Eng.), sometime Professor of Surgery in the Queen's University of Belfast, at the age of 82, terminates a career of outstanding distinction in the profession of medicine. He belonged to a well-known and highly respected family, closely connected with the industrial and charitable life of the city. He was unmarried and throughout his professional life enjoyed the care of a devoted sister. For the last year his health had been failing, but it was only in September that the onset of serious symptoms led to the resignation of his seat as representative of the Queen's University in the Imperial Parliament. For some months pain and suffering had been his constant companions, but they were borne with a fortitude and a resignation unaffected by his all-too-accurate knowledge of his own disease and of its inevitable termination. For many old Queensmen the world over the passing of Tom Sinclair will sever a link with the past, as it will recall a beloved teacher, for whom they will always have the deepest admiration and affection.

In his early life Sinclair's health had caused his family not a little uneasiness, more especially when he determined to exchange a business career for that of medicine. Considerations of health, too, in later years prevented him from taking part in many of those ordinary pleasures and pastimes which relieve the tedium of the overworked surgeon's life—a life which must necessarily be so ordered and so orderly that for long periods there is little in its occupations to differentiate one day from another.

Entering the Belfast Medical School as a student in 1877, he gained honours at every stage, so that when he graduated in 1881 in the Queen's University of Ireland with first place, first-class honours, and a gold medal, he had laid the foundation for a career of high professional achievement. On the advice of Professor Redfern, who at that time was the acknowledged leading personality in the Medical School, he continued his studies in London, where in 1885 he acquired the Fellowship of the Royal College of Surgeons of England, and in Berlin and in Vienna, at that time the Mecca of all serious and ambitious students of medicine. Afterwards he returned to his native town to become a member of the surgical staff at the old Royal Hospital in Frederick Street, and the Ulster Hospital for Children and Women. But these appointments proved to be but a stepping stone to the more important post of Professor of Surgery rendered vacant by the death of his old teacher, Professor Alexander Gordon, also a man of considerable attainment in the surgery of that time. Naturally the vacancy in this Chair, synchronising as it did with the discoveries of Lister and the opening of fresh vistas to the scientific operator, led to a keen contest, and when the youngest of the candidates, qualified but five years, and with the standing only of an

assistant surgeon, and with no beds in the wards, carried the election, it was as if a bombshell had suddenly fallen amongst the then members of the School. The young but accomplished surgeon proved himself equal to the occasion, though he did not escape the sidelong glances of his seniors, tinged as they were at first by not a little jealousy. Whether in the classroom or in the operating-theatre he soon established himself in a leading position, and became at once the ultimate court of appeal in all difficult cases both in hospital or in private. His lectures in those early days were models of lucidity, precision and completeness, and were well suited to the needs of the undergraduates. In later years, as his experience increased, he did not escape the common fault of trying to include too much detail in his systematic and clinical lectures, with an inevitable diffuseness which the student of medicine preparing for an examination so much abhors. In the operating-theatre and as a clinician, however, he remained *facile princeps* during all the years of his active professional life. It was frequently said of him by those who were best able to form a sound estimate of his abilities that if he had not been the first surgeon in the School he might have been the first physician. But it must be remembered that at this time it was essential for the surgeon to be a physician also, for the auxiliary services of physiology, chemistry, bacteriology, and radiology were either wholly non-existent or in their infancy, and that such pathology as was known was derived from a knowledge of the terminal stages of disease as they were found in the post-mortem room. The study of pathology in the living had to follow the adventures of the surgeon, rendered possible at a later date by the work of Lister and the general use of anæsthetics.

For the life and work of a surgeon Thomas Sinclair was ideally endowed. To a superb mental capacity there was added the perfect surgeon's hands, a manual dexterity delightful to watch, and a delicacy of touch agreeable to the patient—characteristics which were at once the admiration and despair of his students and his assistants. To this technical superiority as an operator he added a sound knowledge of anatomy, both normal and morbid, and a logical mind. He refused to be carried away by popular trends in operative treatment—ever careful to avoid any procedure which might leave the patient the worse rather than the better of his interference.

As indicative of the position held by Professor Sinclair in the University and in Belfast, there is hardly a society of which he had not held the presidential chair, nor a hospital on the staff of which he had not been a consulting member.

Between the year 1886, when Sinclair was appointed professor, and the outbreak of the Great War, he led a very busy life. There must have been few nights when he did not go to bed utterly exhausted. His delicate constitution, which threatened to give way when he witnessed his first operation, frequently suffered from the strain of a prolonged and difficult day in the operating-theatre. But yet he managed throughout a long professional life to deliver four lectures in systematic surgery every week throughout the winter session, and to give four demonstrations a week in operative surgery in the summer. In addition, he gave clinical lectures at

hospital, at which his position as examiner secured for him the great majority of the final-year students. His private consultations during this time filled up the hours of daylight, and he had frequently to operate at night. This was a time when surgery was growing by leaps and bounds and much reading and study were necessary to keep abreast of its ever-advancing front. Transport, too, was difficult and time-consuming, requiring nights to be spent in country towns and slow journeys by train. The result of the amount of time he had to give to teaching, to operating, and to private consultations, prevented him from contributing much to the literature of surgery. On the other hand, he left his mark on the School through that very large band of surgeons who acknowledged his leadership and who owed much to their teacher's early instruction and example.

During his busy years Sinclair had very little time to spare for recreation and exercise. He rode to hounds on most Saturday mornings in the hunting season, he fished and played some golf. The only attraction which was ever known to lure him away from his morning hospital lecture was skating, at which he was an expert. Here he would meet members of his class, who had similarly defaulted, to the amusement of both.

At the outbreak of the Great War Sinclair volunteered for active service with the Forces. The War Office accepted his offer and he was granted the rank of Colonel, Army Medical Service, and served as consulting surgeon with the 4th Army under Lord Rawlinson, another distinguished Ulsterman, in France, and in Egypt under Lord Allenby. His health had been a source of anxiety to those of his friends whom he consulted before volunteering, but he stood up to the strain of field service marvellously, readily adapted himself to the new life, and developed qualities of comradeship of which many thought him incapable. He figured in the now historic controversy which marked the death of Baron von Richthofen, the famous German air ace, who was responsible for the death of eighty-five Allied airmen.

Richthofen was brought down behind the British lines, his dead body being found in the cockpit of his machine. In the controversy which followed there were allegations that he had been shot on the ground after he had been forced to descend. Colonel Sinclair, however, who examined the Baron's body, established the fact that he had been killed in action.

At the end of the campaign he was rewarded for his distinguished service by the Companionship of the Bath.

The war over, he returned to take up again his university and hospital appointments and to continue the work of teaching to which he had unselfishly devoted so great a portion of his active professional life.

Retirement followed in 1923 on his attaining the age of 65, and at the same time he gave up the hospital appointment, which he had held for thirty-seven years. But he was not allowed to escape from participation in the work of the University. Already a member of the Senate, he was elected Registrar and later a Pro-chancellor. He became the Member for the University in the Imperial Parliament, where he succeeded his friend and former colleague, Sir William Whitla, a Senator in the upper

chamber of the Northern Ireland Parliament, and the representative for the University on the General Medical Council. At this time, too, his retirement from the Chair of Surgery was marked by the presentation by his friends and former pupils of his portrait in oils. This portrait has since occupied a conspicuous place in the Great Hall of the University, near that of his distinguished predecessor, Alexander Gordon.

It is hardly possible for anyone not belonging to the Belfast Medical School to appreciate the enormous influence Sinclair exerted upon the development of surgery in the School. Starting professional work at the very birth of modern surgery as we know it to-day, he taught laboriously year after year the elementary principles upon which the art and science of surgery depended. In spite of the rapid growth of the operative field, it was his delight to demonstrate the classical operations of the past. These he performed with consummate skill and perfection, and few students left his classes without some desire to imitate, if not emulate, his methods. To his hospital colleagues, with few exceptions, and to the practitioners throughout the country, his surgical knowledge carried with it a similar appeal, so that with the years his influence spread throughout the City and Province.

It is true that prior to the Great War the name of Thomas Sinclair as a surgeon was almost unknown outside the limits of his native province. For this there are several reasons. His main obstacle throughout his life, in work and recreation, was that of indifferent health. When the day's work was done he had no energy to sit down and compose an article for one of the medical journals, and so his contributions to the literature of his own speciality are but scanty. Again, though he was faithful in his attendance at meetings and congresses, he lacked the self-confidence and fluency of speech which are essential for effectiveness in discussion. To some extent the contacts of the war gained for him the reputation which his professional standing deserved, and which every member of his own School recognised. His outstanding distinction lay in the fact that he had succeeded in setting up in his native province a standard of operative surgery which for pure technical skill has never been quite equalled by any of his better-known pupils and followers. Moreover, it was a standard unexcelled by the most brilliant operators, of whom there were many in these islands in the early years of the present century.

The name of Sinclair is perpetuated to-day in Belfast and Ulster by his nephews. Major Maynard Sinclair is a Member in the Northern Ireland Parliament and Chairman of the Ulster Hospital for Children and Women; Mr. Alan Sinclair is Professor of Greek in the University; and Major Samuel Ronald Sinclair, presently serving with His Majesty's Forces, is on the staff of the Belfast Ophthalmic Hospital.

If a memorial to the late Thomas Sinclair be sought it may be found in the Belfast Surgical School as it exists to-day, and in the contributions to surgical literature of his pupils, some so distinguished as to gain for their authors international reputations.

S. T. I.

Robert Maitland Beath, B.A., M.B., F.F.R.

DR. Robert Maitland Beath's comparatively early death on 21st November, 1940, was a source of great sorrow to an exceptionally wide circle of friends. That circle embraced, not only hospital colleagues, but members of all branches of the profession and outside it, not only in Northern Ireland, but in Great Britain, the Scandinavian countries, the United States, and Canada. Dr. Beath was a keen student of his speciality, an enthusiastic traveller, and a most companionable man. Contacts formed at congresses and visiting other clinics were never willingly relinquished by those who once made his acquaintance. At his death he was probably one of the best-known British radiologists in the world.

A native of Belfast, he graduated with honours in medicine in the Queen's University in 1914, having previously taken his arts degree in classics in the old Royal University of Ireland. After serving as house surgeon in the Royal Victoria Hospital, Belfast, he joined the R.A.M.C. in 1915, retiring with the rank of major in 1919. He served in France, in a hospital ship in the Mediterranean, and, finally, at the close of the war, as assistant radiologist to the military surgical hospital at Shepherd's Bush. On returning to Belfast after further post-graduate study in radiology, he commenced practice, and in a few years had acquired, not only a large practice, but a reputation which extended far beyond his own school. His first appointment was to the Ulster Hospital for Children and Women; soon other hospitals, the Royal Victoria, the Belfast Union Infirmary, the Forster Green Hospital for Diseases of the Chest, and the Down Mental Hospital, appointed him to their staffs, and on the establishment of the department of dentistry in the Medical School he was appointed lecturer in dental radiology in the Queen's University.

In spite of the claims of practice and manifold hospital engagements, he found time for many other activities, notably the Ulster Medical Society, of which he had been a most efficient honorary secretary; the B.M.A., to which he rendered outstanding service during the annual meeting in 1937, acting as chairman of the Belfast Division and chairman of the Dinner Committee, imposing tasks discharged with credit to himself and the city. Other activities included the Masonic Order, in which he had held high office, and lately he had given invaluable service as chairman of the Medical War Services Committee. He was peculiarly fitted for this important office. He possessed, in remarkable measure, the confidence of his fellow-practitioners, and his impartiality and fair-mindedness were indisputable. Such are the bare facts of Maitland Beath's career, but they are absolutely inadequate as a picture of a very remarkable man, who was beloved in his own home circle, held in affection by those who had the privilege of intimacy with him; and his acquaintances, be they members of the profession, patients, or the public generally, gave him their ungrudging regard and respect. It is difficult, without seeming exaggeration, to do justice to his character, gifts, and accomplishments, and it is equally difficult to express what his passing means to his friends and colleagues.

He is a striking example of heredity apart from environment. His father died when he was only ten years old, so that the paternal influence, while present at a very important stage of his boyhood, was soon removed. In spite of that, glimpses we have of his father from an old acquaintance and from letters and records, are strongly reminiscent of the son, and it is not without interest to note his father and forbears.

John Beath of Duniface, in Beath Parish, Fifeshire, a substantial farmer, died there in 1690, having originally come from Inverness, and our colleague could trace his descent through six generations to him. The good Scottish names of the female side are striking: Robertson, Flèming, Bonthorne, Christie, Durie, Park, Maitland. The Beaths were a large connection. Many won their livelihood from that most honourable of all occupations, the land. Some were in commerce and some in the Scottish Church. His grandfather, David Beath, was a Greenock merchant with interests in India. He was born in 1778, and his journals, in beautiful handwriting, are an interesting commentary on the conditions of travel over one hundred and thirty years ago.

David Beath married Jane Maitland in 1817, and their first child was born in the Indian Ocean in 1819, but died in infancy in Madras. The next child, Robert Maitland Beath, born 1820, was Dr. Beath's father. Robert Maitland Beath, senior, was by profession a marine engineer, and started his career in the service of the old East India Company in 1844. He came to Belfast in the fifties of the last century as manager of Princes Dock Foundry, resigning from this position in 1861 and becoming consulting engineer and marine superintendent to the Ulster Steamship Company, the Head Line, the old Belfast Steamship Company, and the Antrim Iron Ore Company. He was connected with these firms until his death in 1896. From testimonials, an address from the employees of Princes Dock Foundry accompanying a presentation of mathematical instruments, letters of condolence to Mrs. Beath, sen., on his death, one reads of characteristics plainly discernible in his only son: "Courtesy," "kindness," "consideration for others." Thus the Princes Dock employees in 1861, "the kindness of your amiable disposition, courteousness of manner, the reverse of anything that savoured of haughtiness, and other excellent qualities with which you are endowed." Their gift they describe as "a slight token of our affection." In a letter to Mrs. Beath, the Church Session in 1896 recorded: "Mr. Beath had a large place in the affection of every member of the Session. His uprightness and uniform simplicity of character, his general and kindly bearing towards everyone, his self-forgetfulness, his readiness to sympathise with and aid any in trouble."

Here we see the outstanding characteristics of our late friend: "Courtesy," "reverse of anything that savoured of haughtiness," "uprightness," "uniform simplicity of character," "kindly bearing," "readiness to aid," "a large place in the affections of everyone." Like father, like son.

Mr. R. M. Beath, sen., married as his second wife Miss Annie Hardy of Belfast. Dr. Beath, their only child, was born in 1886. Although dying at 54, his grandfather, his father, and he bridge one hundred and sixty-two years.

It was the writer's privilege to enjoy friendship and intimacy with him for many years, to have travelled with him and his charming wife in Canada and the United States, and to have frequently enjoyed the hospitality of his home in Belfast and his delightful seaside cottage at Ringneill. Nowhere was he more completely happy than in his own family circle, and an evening with the Beaths was something to look forward to, enjoy to the full, and look back on with happy recollections.

From his many trips abroad he brought home cinema records and photographs of men and places. These would be shown and commented on. Like Dr. Johnson, he believed that the more you knew about a place before you visited it, the greater would be your enjoyment of it while there and the more information you would bring back. With an orderly mind, everything was planned well ahead, and this made him an ideal travelling companion. No Cook's courier could have excelled him in forethought or competed with him in the delicate task of keeping the laggards up to time for train or boat.

Well read and critical in his appreciation of books, he always had something interesting to tell, and his judgments on current affairs, the theatre, food and wine at home and abroad, were discerning and shrewd. His technical ability and judgment in his own sphere of work were beyond criticism.

It is as a friend we shall miss him most of all. Good radiologists can be trained—and each generation produces its own experts, but a friend like Robert Maitland Beath is a landmark in a lifetime. It is difficult to focus his many virtues or to say what facet of his character made the greatest appeal. Always quietly cheerful, optimistic, and friendly, he brought courage to the pessimist. Simple, modest, and unassuming, he inspired loyalty and affection. In times of stress or friction he could take an equitable view of men and situations which commanded respect, and ever he thought the best of others. No tinge of acerbity, envy, or malice coloured his actions or his criticisms.

Nothing showed his quality so finely as his last illness. During the early autumn he had experienced disquieting symptoms which, to a man of his knowledge and experience, must have raised doubts, but he betrayed no alarm even to his intimates. Within five weeks of his death he attended a dinner at which many of us met annually, and was his usual self. When within two or three weeks of this the outcome was plainly inevitable, no murmurings escaped him, and he died as he lived : calm, courageous, thoughtful of others, and quietly confident. Without effort he achieved Sir Wm. Osler's criteria for the well-balanced man, "that equanimity which enabled him to bear success with humility, the affection of his friends without pride, and when the day of grief and sorrow came, the courage to meet it like a man."

We who loved him cherish his example and mourn his loss. His funeral service in Elmwood Church was a remarkable and spontaneous tribute from all classes. The Church, law, politics, the medical profession, architecture, the University, the medical school, and his patients were all represented. To Mrs. Beath, his devoted partner, and her daughters the sympathy of an exceptionally large circle is extended.

C. G. L.

Studies from the Institute of Pathology

CASE A2871

A CASE OF AMYLOIDOSIS.

Clinical History.

The patient was a woman of 34, married for seven years, with no children. Her only previous history was of a "weak chest" and asthma since an attack of measles as a child. She was first admitted to hospital on 20th December, 1939, with one month's history of swelling of the feet, slight swelling of the face in the mornings, and frequency of micturition. Examination showed a well - nourished slightly anæmic woman, with œdema of the ankles and slight puffiness below the eyes. Her frequency of micturition was five to ten times per day and once or twice at night. Her urine, when tested on admission, showed a trace of albumen, sp.g. 1010. She was treated with pot. cit., and two days after admission a catheter specimen of urine was sterile. Her blood-pressure was 120/70. She had a rather emphysematous hyper-resonant type of chest, with prolonged expiration and scattered rhonchi. She stayed in hospital for three weeks, during which time she ran a slight evening temperature up to a maximum of 99.6° She had a rather fast pulse, and an electo-cardiogram showed right ventricular preponderance. She was discharged apparently much improved

On 17th September, 1940, she was readmitted, her history being that her previous symptoms had returned in July, together with vomiting, diarrhœa, weakness, and lassitude. Her urine contained albumen, but no blood, and her blood urea was 120 mgm. per cent. Her systolic blood-pressure was now 95. A fractional test-meal, barium meal, and X-ray of the chest were done, but were of no help in diagnosis.

On 20th October, 1940, the patient became much worse. She was semi-conscious, and her chest was full of moist interrupted sounds. She died on the same day.

Post-Mortem.

The body is that of a thin woman. There is œdema of the ankles, but none of the face, which appears slightly jaundiced.

Body cavities: The peritoneal sac contains some semi-purulent fluid, and in the pelvis there are a few whitish flakes like pus. The tip of the omentum extends to the right iliac fossa and is adherent to the posterior abdominal wall near the appendix. There are other adhesions in the region of the terminal ileum, cæcum, and appendix, and between the liver and spleen and the parietes. The pericardial cavity contains several ounces of brownish fluid. The pleural sacs are practically obliterated by adhesions.

Heart: The heart weighs 8 oz. The wall of the left ventricle feels slightly roughened and the epicardium covering the fat in the atrio-ventricular groove is injected. The posterior surface of the auricles is also reddened. The right auricle

has a smooth endocardium. The foramen ovale is patent, but the aperture is only about a millimetre in diameter. The tricuspid valve admits three fingers. The right ventricle is of normal thickness; the muscle is brown in colour, and feels flabby. The pulmonary valve is normal. The left auricle has a smooth endocardium, with no ante-mortem thrombus. The mitral valve admits two fingers and its cusps are thin. The wall of the left ventricle is of normal thickness, rather brown in colour, and feels flabby. The aortic valve is normal and the orifices of the coronary arteries are patent.

Lungs: The right lung, on section, shows a small fibrous scar near the apex. The entire lung is very œdematous, and, on squeezing, a large amount of blood-stained fluid can be expressed especially from the lower lobe. The larger bronchi exude pus. There is no consolidation. The hilar glands are slightly enlarged, and are anthracotic. The left lung is similar. It shows a subapical fibrous scar.

Spleen weighs 8 oz. Its surface is rough owing to torn adhesions. It feels firm and rubbery and cuts cleanly. The Malpighian bodies and trabeculæ show clearly on the cut surface. On treating the cut surface with iodine and sulphuric acid, the Malpighian bodies stain a deep blue-black, giving the typical "sago spleen" pattern.

Stomach and duodenum are normal externally. The mucosa of the stomach shows scattered petechiæ along the lesser curve. The duodenal contents are bile-stained.

Large and small intestines show no external abnormality. The appendix appears slightly congested.

Pancreas is normal in size and on section.

Liver weighs 3½ lb. There are numerous roughened areas on the surface corresponding to torn adhesions to diaphragm and abdominal wall. On section, the lobular pattern is very distinct, the paler areas being yellowish.

Adrenals are of normal size and appear normal on section.

Kidneys: The right kidney weighs 3 oz. The capsule peels with a little difficulty, leaving a slightly granular surface. When sectioned, the cut surface appears pale. The cortex is slightly narrower than normal and the usual cortical striations cannot be seen. The pelvic mucosa is slightly congested.

The left kidney looks similar.

Ureters are not distended or hypertrophied and their mucosa is normal.

Bladder wall is of normal thickness. The mucosa is greyish, except for some congestion over the trigone.

Genital organs: The ovaries appear normal. The peritoneal surface of the fallopian tubes is congested. The uterus and vagina are normal.

Neck organs: The tongue is normal. The trachea contains brownish fluid, probably aspirated stomach contents. The thyroid is slightly enlarged, and on section appears to be a normal colloid-containing gland.

Aorta shows fatty changes in the intima of the transverse arch and the lower part of the descending aorta.

MICROSCOPICAL EXAMINATION.

Heart.—The smaller branches of the coronary arteries show some amyloid infiltration of the media. The large coronary artery in the section shows patchy calcification in the media. The muscle appears normal.

Lung.—In some areas the alveolar walls are greatly thickened, partly by a layer of amyloid material lying just beneath the alveolar epithelium. Some of the arterioles also show amyloid in their walls. In other parts there is fibrosis of alveolar walls in which patchy calcification has taken place. There is also calcification in the media in some of the pulmonary veins. There is some emphysema, and the larger bronchi show evidence of chronic bronchitis, with an unusually large number of eosinophils. There is also slight terminal broncho-pneumonia. A hilar lymph-gland contains no amyloid and appears normal.

Liver.—Scattered diffusely through the liver are small areas where the columns of liver-cells are compressed by strands and small patches of amyloid material. The hepatic arteries show amyloid infiltrating the media.

Spleen.—The amyloid in the spleen is almost entirely situated in the Malpighian corpuscles, there being very little in the pulp. The central part of each Malpighian corpuscle is almost unaffected, while the walls of the central arterioles are markedly infiltrated with amyloid.

Kidney.—The architecture of the kidney is much distorted. The glomeruli show amyloid infiltration of the afferent arterioles extending into the glomeruli. Some have been converted into what are virtually balls of amyloid material, while in others the change has been patchy, some tufts being markedly affected whilst others are almost normal. Most glomeruli fill the capsular space completely, but in some granular material resembling precipitated albumen is present in it. A few glomeruli show adhesions between the glomerular tuft and the capsule. Most of the tubules contain hyaline casts which do not give the staining reaction of amyloid. In the cortex many are greatly dilated and the casts in them are very large. Some of the casts in the cortex are granular and contain nuclear remains associated with the presence of a few neutrophil and eosinophil polymorphs. There is a ring of amyloid round some of the small atrophic tubules in the cortex. The interstitial tissue is increased in amount by fibrosis, and contains numerous lymphocytes and a fair number of eosinophils. The loose fibrous tissue just below the pelvic mucosa is also infiltrated by lymphocytes and contains flecks of amyloid. There is practically no amyloid in the interstitial tissue of the medulla. A large artery at the hilum shows calcification of the inner half of the media. The small arteries and some of the small veins at the hilum show some amyloid in their walls.

Bladder.—This appears normal except for a small amount of amyloid in the arterioles.

Adrenals.—There is extensive infiltration of the cortex, the zonal fasciculata and reticulata being almost entirely replaced by amyloid. The zona glomerulosa has survived and looks relatively normal. There appears to be amyloid also in the

small arteries of the capsule. The central vein shows a small organised thrombus projecting into the lumen.

Pancreas.—This is normal except for amyloid infiltration of the walls of the small arteries and arterioles.

Thyroid.—The stroma is increased in amount owing to infiltration by amyloid. The acini are those of a normal colloid-storing gland, but in parts appear compressed by the amyloid infiltration of the stroma.

ANATOMICAL - SUMMARY.

General amyloidosis affecting kidneys, spleen, liver, adrenal, pancreas, lungs, thyroid, and vascular system.
Renal failure.
Oedema.
Terminal broncho-pneumonia.
Chronic bronchitis.
History of asthma.
Peculiar calcification of alveolar walls.
Patchy calcification of veins.

COMMENTARY.

The increasing rarity of amyloid infiltrations renders this case of interest, and it forms an interesting comparison with the two other cases of amyloidosis (A2200 and A2267), which have occurred in the last two thousand autopsies.

In the classic case, amyloidosis is found as a complication of some chronic suppurative lesion such as osteomyelitis, or tuberculosis or syphilis. Of our two previous cases of amyloid infiltration, one (A2267) had a history of osteomyelitis of the femur over a period of ten years, whilst the other showed bilateral apical bronchiectasis of tuberculous origin. In the present case, however, none of the recognised etiological conditions of generalised amyloid infiltration has, however, been demonstrated either clinically or at post-mortem. A few cases of generalised amyloidosis have been described in the absence of any of the usually associated etiological lesions, whilst localised deposits of amyloid in the tongue and heart may also occur, and have so far not been correlated with any other disease process. In the absence of any known pathogenesis, such deposits are sometimes referred to as examples of para-amyloidosis.

The clinical course in this patient does not seem altogether clear. The renal amyloidosis was apparently established at the time of her first visit to the hospital. As evidence of this there is the albuminuria and polyuria. It seems somewhat surprising that these symptoms should clear up so rapidly with rest in bed and a brief course of potassium citrate. It is worthy of note that during this period in hospital the patient showed a mild pyrexia and tachycardia, which persisted unchanged until her discharge, and for which no satisfactory explanation was discovered.

The terminal recrudescence of her symptoms is more easily explained on the morbid anatomical findings. In addition to œdema and frequency of micturition, she now suffered from diarrhœa due to amyloid infiltration of the intestinal walls.

Her other symptoms of weakness, lassitude, vomiting, and fall in blood-pressure may, in view of the very extensive infiltration and destruction of the zona fasciculata of the adrenals, be attributable to adrenal insufficiency.

The rather vague history of chest trouble can be correlated with the findings of chronic bronchitis and emphysema, whilst the eosinophil infiltrations support the history of asthmatic attacks. The calcification in the alveolar walls and pulmonary veins is a very unusual finding, and this, together with the calcification in the renal and coronary arteries, suggests some undiscovered disturbance in calcium metabolism. The most suggestive lesion would be a parathyroid tumour, but no such lesion was discovered.

When compared with the other two cases of amyloidosis, certain interesting facts arise. In A2267, the patient was a man aged 47 years with a long history of osteomyelitis. There was a two-months history of headache, giddiness, and œdema. Albuminuria was marked, and the specific gravity of the urine was fixed at 1010. The blood-pressure was 160/90. Post-mortem showed amyloidosis of kidneys, spleen, and adrenals, with hypertrophy of the heart. A2200 was a man aged 38 years. There was a history of œdema for eighteen months. His blood-pressure was low, 80/40, and post-mortem showed bi-lateral tuberculous bronchiectasis, with tuberculous ulceration of the intestine, and amyloidosis of the kidneys, liver, spleen, and adrenals.

Two of the patients, therefore, showed a hypotension, whilst the other showed a moderate degree of hypertension. The cause of hypotension is in some doubt, and it might be suggested that the extensive adrenal infiltration and atrophy played an important part. In any large series of Addison's Disease it is generally found that about one per cent. is found associated with such amyloid infiltrations. In the older literature examples of the association of amyloid infiltration of the kidneys and hypertension are rare, but more recently more numerous cases have been reported, and it is now obvious that in long-continued renal amyloidosis a state known as amyloid contracted kidney may develop.

The present case shows the usual clinical picture of amyloid nephrosis with massive albuminuria and œdema with no rise in blood-pressure. Case A2267, on the other hand, shows the development finally of an azotæmic type of renal lesion associated with some degree of hypertension. Comparison of the kidneys in these cases shows that in the patient with hypertension the amyloid infiltration has developed to such an extent as to produce marked obliteration of the glomerular capillaries, and a condition of renal ischæmia comparable to that seen in chronic glomerulo-nephritis. In this final stage of amyloid contracted kidney with hypertension the clinical picture is practically indistinguishable from that of chronic glomerulo-nephritis, and the suspicion of amyloidosis would only arise as the result of the presence of one of the commonly associated lesions.

The present case, however, shows no evidence of glomerular ischæmia, and it is more difficult to account for the terminally elevated blood-urea. The most striking histological finding in the kidney is the great dilatation of the tubules which are

distended by hyaline casts, and the question arises as to whether some blockage has not been present. It is also possible that the raised blood-urea was, at any rate partly, of extra-renal origin—the vomiting, the destruction of the adrenal cortex, and the interference of the amyloid infiltration with liver function—may each have contributed to the production of a pre-renal azotæmia.

Although amyloidosis has been a well-recognised condition for very many years and has been the subject of much descriptive and experimental work, the nature of the substance and the mechanism of its deposition are still indefinite. Its name, which emphasises its resemblance to starch in regard to its reaction with iodine, is misleading, since it is known to be a complex protein substance. One theory postulated its structure as a compound of a protein and chondroitin-sulphuric acid derived from broken-down tissue such as cartilage, bone, and lung, which are all said to contain this acid. This view has been challenged by others, who claim that pure amyloids contain no sulphur. Letterer considers amyloid to be the combination of an antigen derived from broken-down tissue with a precipitating anti-body.

Discussion as to the nature of the substance is complicated by the facts that amyloid from different cases and different organs does not give quite the same results on chemical analysis, and that its staining reactions also vary. In some cases the amyloid, for example, has not stained with iodine or with iodine and sulphuric acid.

Experimental work on the method of formation was helped by Kuczynski's discovery that amyloidosis could be produced in mice by injections of sodium cascinate or by feeding with a high protein diet consisting largely of cheese. Others have produced it in mice by injections of bacterial suspensions, and bacterial toxins have also produced amyloidosis, as is seen in the horses used in the preparation of diphtheria anti-toxin. Detailed study of experimental amyloid infiltrations still leaves the method of its deposition in doubt. Some investigators claim that the first appearance of amyloid is intracellular in the phagocytic cells of the reticulo-endothelial system. These later die and fuse into a structureless mass in which the deposition of amyloid continues. This is difficult to demonstrate, and most authors take the view that amyloid is always deposited extra-cellularly, and laid down as an infiltration between cells which may subsequently be strangled by pressure.

Studies on mice show that, when the cause is removed at an early stage, amyloid may be re-absorbed. In man, cases of apparent resorption have been recorded only rarely when the suppurative focus was completely removed. Treatment of amyloidosis, as distinct from that of the underlying cause, is nil, although it is interesting to note that Grayzel and his collaborators were able to retard considerably the appearance of amyloid in mice by adding powdered whole liver to their diet.

In summary, therefore, a case of generalised amyloidosis with no discoverable infective focus is recorded. Apart from the lack of a distinct pathogenesis, the case is of interest in view of the renal changes seen in this condition, and also because of a peculiar process of calcification seen in the lung alveoli and veins.

A. R. C.

ULSTER MEDICAL SOCIETY

In spite of the uncertainty of the war situation, and of the inconvenience of the black-out, the Society, in conjunction with the Northern Ireland Branch of the British Medical Association and the R.A.M.C., decided to hold a number of meetings. Contributions were forthcoming more easily than anticipated, and ten meetings in all have been held. The president's address on "The Incidence of Abortion in the Jubilee Hospital" was the subject of the opening meeting on the 9th October, 1940, and is published in more detail elsewhere. The second meeting took the form of a clinical meeting, held in the Royal Victoria Hospital on 6th November, 1940. Two papers were read on 20th November, 1940: one by Lieut.-Colonel L. B. Cole on "Diabetic Coma in a Series of Young Subjects," and the other by Major H. Agar on "Peripheral Arterial Embolectomy." At the fourth meeting on 4th December, 1940, Dr. Charlotte Warner read a paper entitled "The Child, the Community, and the General Practitioner." This was followed by an address on "Some Recent Advances in Ophthalmology," by Major B. W. Rycroft. At the fifth meeting of the Society on 18th December, 1940, Lieut.-Colonel R. W. D. Turner read a communication on "Sciatic Pain." This paper is published in another part of this Journal. Dr. B. R. Clarke also addressed the Society on "Case-Finding in Pulmonary Tuberculosis." Details of this paper are published elsewhere. The sixth meeting was held on 15th January, 1941, when three papers were given on "Non-Penetrating Injuries Caused By Blast." Lieut.-Colonel Coyte and Major Barber dealt with the surgical side, and the medical aspect was treated by Major Bownell in the absence of Major Osbourne. The seventh meeting was a description of the casualty service of Northern Ireland, by Professor T. Thomson Flynn, Dr. F. M. B. Allen, and Dr. F. P. Montgomery.

At the eighth meeting on 29th January, 1941, two papers were read: one on "The Depressive Phase of Manic-Depressive Insanity," and one on "The Inter-Relationship of the Endocrine Glands." The former, by Dr. R. Thompson, is published in this number. The latter was by Professor J. H. Biggart.

The ninth meeting took the form of a clinical meeting, given by the staff of the 24th General Hospital, and was held in Campbell College on 12th February, 1941.

The final meeting was held on 26th February, 1941, when a paper was read by Lieut.-Colonel Jackman on "Congenital Hypertrophic Stenosis of the Pylorus," and Dr. Douglas Boyd also read a communication on "Radiological Observations on the Colon."

All these meetings were well attended, and some were illustrated by lantern slides and cinema films. The thanks of the Society are due to Major J. J. M. Brown, R.A.M.C., for his helpful co-operation in the organising of these meetings.

H. Hilton Stewart, *Secretary.*

Malone Road, Belfast.

REVIEWS

THE USE OF SULPHONAMIDES IN THE TREATMENT OF WOUND SEPSIS.

THE use of the drugs known as "sulphonamides for the prevention and treatment of wound sepsis" is a subject of obvious importance at the present time, and much attention has recently been directed to the employment of sulphonamides by topical application for this purpose. This interest is reflected in the many enquiries received by the Medical Department of Messrs. May & Baker Ltd. of Dagenham, for information on the subject.

The sudden interest in the topical application of sulphonamides to wounds is in surprising contrast to the time-lag which occurred between research on the use of sulphonamides in certain other fields and their general adoption for the purpose. There appears to exist some confusion concerning the rational application of sulphonamide prophylaxis and therapy to wounds. Messrs. May & Baker have prepared a memorandum, in which an attempt has been made to collate and review literature on the subject and, in summarising such data as are now available, to present a critical review of the existing position.

This publication differs from ordinary publicity pamphlets in that it describes not a particular product but certain therapeutic procedures. The memorandum does not seek to have any advertising value, but it is hoped that it will prove of use and interest to those in clinical practice who desire in compact form a statement of the facts which are known and the theories which have been advanced concerning the implantation of sulphonamide drugs into wounds.

Copies are available to any member of the medical profession on request to Messrs. May & Baker Ltd., Dagenham.

TEXTBOOK OF MEDICINE. By various authors Edited by J. J. Conybeare, D.M., F.R.C.P. Fifth edition. 1940. Edinburgh: E. & S. Livingstone. Pp. 1,131. Price 24s.

THE appearance of the fifth edition of this textbook less than two years after the fourth edition and less than twelve years after the first edition is ample proof that it meets a widespread demand. New articles have been included on (1) Congenital Cystic Disease of the Lung, and (2) Herniation of the Nucleus Pulposus. A fuller account is given of Gastroscopy. The section dealing with Blood Transfusion and Blood Groups and the article on Anorexia Nervosa have been rewritten. The use of sulphonamide group of drugs in the treatment of cerebro-spinal fever, septicæmia, gonorrhœa, etc., is described. Six new radiograms have been introduced. In these and many other respects no effort has been spared to bring the book thoroughly up to date.

The following errors were noticed :—(1) In both examples which have been introduced to show how to calculate maximum and standard clearances in the "urea clearance test," there are arithmetical mistakes. (2) On p. 249 it is stated that "lead poisoning is notifiable to the Home Office"; it is, of course, only industrial lead poisoning that is notifiable. (3) On p. 328 it is stated that vitamin B is absent in meat; this is surely an over-statement. (4) In the diagnosis and treatment of myasthenia gravis, the dose of Prostigmin is given in c.c. instead of milligrams. (5) A few mistakes in spelling have been noticed, e.g., referrable (p. 256); utterences (p. 1,012); *Ferrosol* for Fersolate (Glaxo) (p. 344); *Simmond's* Disease for Simmonds' Disease.

REVIEWS

THE USE OF SULPHONAMIDES IN THE TREATMENT OF WOUND SEPSIS.

THE use of the drugs known as "sulphonamides for the prevention and treatment of wound sepsis" is a subject of obvious importance at the present time, and much attention has recently been directed to the employment of sulphonamides by topical application for this purpose. This interest is reflected in the many enquiries received by the Medical Department of Messrs. May & Baker Ltd. of Dagenham, for information on the subject.

The sudden interest in the topical application of sulphonamides to wounds is in surprising contrast to the time-lag which occurred between research on the use of sulphonamides in certain other fields and their general adoption for the purpose. There appears to exist some confusion concerning the rational application of sulphonamide prophylaxis and therapy to wounds. Messrs. May & Baker have prepared a memorandum, in which an attempt has been made to collate and review literature on the subject and, in summarising such data as are now available, to present a critical review of the existing position.

This publication differs from ordinary publicity pamphlets in that it describes not a particular product but certain therapeutic procedures. The memorandum does not seek to have any advertising value, but it is hoped that it will prove of use and interest to those in clinical practice who desire in compact form a statement of the facts which are known and the theories which have been advanced concerning the implantation of sulphonamide drugs into wounds.

Copies are available to any member of the medical profession on request to Messrs. May & Baker Ltd., Dagenham.

TEXTBOOK OF MEDICINE. By various authors Edited by J. J. Conybeare, D.M., F.R.C.P. Fifth edition. 1940. Edinburgh: E. & S. Livingstone. Pp. 1,131. Price 24s.

THE appearance of the fifth edition of this textbook less than two years after the fourth edition and less than twelve years after the first edition is ample proof that it meets a widespread demand. New articles have been included on (1) Congenital Cystic Disease of the Lung, and (2) Herniation of the Nucleus Pulposus. A fuller account is given of Gastroscopy. The section dealing with Blood Transfusion and Blood Groups and the article on Anorexia Nervosa have been rewritten. The use of sulphonamide group of drugs in the treatment of cerebro-spinal fever, septicæmia, gonorrhœa, etc., is described. Six new radiograms have been introduced. In these and many other respects no effort has been spared to bring the book thoroughly up to date.

The following errors were noticed :—(1) In both examples which have been introduced to show how to calculate maximum and standard clearances in the "urea clearance test," there are arithmetical mistakes. (2) On p. 249 it is stated that "lead poisoning is notifiable to the Home Office"; it is, of course, only industrial lead poisoning that is notifiable. (3) On p. 328 it is stated that vitamin B is absent in meat; this is surely an over-statement. (4) In the diagnosis and treatment of myasthenia gravis, the dose of Prostigmin is given in c.c. instead of milligrams. (5) A few mistakes in spelling have been noticed, e.g., referrable (p. 256); utterences (p. 1,012); *Ferrosol* for Fersolate (Glaxo) (p. 344); *Simmond's* Disease for Simmonds' Disease.

Passing from errors to subject matter, the following observations are offered :—(1) Many will question the value of administering parathyroid extract orally—with calcium lactate in chilblains. (2) In the treatment of lobar pneumonia no suggestion is made that sulphapyridine is preferable to sulphanilamide in most cases. (3) In the treatment of *large* pleural effusions, on p. 650 we read "Attempts should not be made to remove the whole of the fluid"; it would appear to be better teaching to make it clear that it is seldom advisable to remove more than from a few ounces to half a pint at most. (4) In the diagnosis of Weil's Disease, it is stated that a definite diagnosis can be made by inoculation of the patient's urine into a guinea-pig; it is not pointed out, however, that negative results may be of little value, as the Leptospira icterohæmorrhagiæ seldom survives in the urine for more than an hour after excretion, and only if the urine is alkaline. (5) On p. 350 it would appear to be desirable to mention that the figure obtained for the "colour index" is dependent on the hæmoglobinometer used. Thus, using Haldane's instrument, 13.8 Gm. hb. per 100 c.c. of blood is regarded as 100 per cent.; but, using Dare's instrument, it is only 86 per cent., as the 100 per cent. figure is taken as 16 Gm. hb. (6) Students would be liable to be penalised if in an examination test they prescribed the mixture given on p. 628 containing oxymel scillæ with ammon. carb. and pot. iod.

Despite these criticisms, the book has been attractively produced, and on the whole gives a well-balanced and sufficiently detailed account of the subject for students preparing for the final examination. It can be recommended, too, to the practitioner who wishes to make a rapid general revision of medicine. No doubt the present edition will prove to be as popular as its predecessors.