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Fractures of the Femur in Children

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Abstract of a thesis for which the Colonel Davis Memorial Scholarship of the Belfast Hospital for Sick Children was awarded

INTRODUCTION.

THIS paper is based upon an investigation into the treatment and results thereof in 111 cases of fracture of the femur which were treated in the Belfast Hospital for Sick Children between the years 1930 and 1935.

The cases show a wide variety in the type of fracture and in their treatment, though one cannot help being struck by the marked preponderance of the spiral or oblique fracture of the middle third of the shaft, which forms almost seventy per cent. of the total. The list contains many interesting fractures, such as those in two cases of *fragillitas ossuim tarda*, a fracture through a single cyst in the neck of the femur, and a case of true Perthe's disease following a fracture of the neck of the femur.

The treatment falls into two very distinct and separate groups: first, the conservative method of extension in a Thomas splint; and, second, the operative method of fixing the bone-ends together by various means.

Of the 111 cases, one died a few hours after admission from the complications following a fractured skull. A systematic re-examination was attempted, in the remaining 110 cases, and carried out in all but one, which could not be traced.

The following points were looked for in the re-examination of each case:—

1. Presence or absence of deformity.
2. Shortening or lengthening of the limb.
3. Wasting of muscles—thigh and calf.
4. Movements at joints, active and passive—hip, knee, and ankle.
5. Presence or absence of foot-drop.
6. Length of time disablement continued after discharge from the hospital.

An X-ray photograph was taken in all cases showing deformity, shortening, wasting of muscles, or limitation of movement. In all, about sixty X-rays were taken.

Age.—In the series the age varied from three days up to twelve years. From the table below one will see that forty-five of the cases were between the ages of three and six, and that the average age of the cases was five and seven-twelfths years.

Under 3 months	2	6 years— 7 years	9
3 months—12 months	0	7 years— 8 years	12
1 year—2 years	10	8 years— 9 years	7
2 years—3 years	12	9 years—10 years	3
3 years—4 years	16	10 years—11 years	5
4 years—5 years	13	11 years—12 years	6
5 years—6 years	16		

Side.—There was no preponderance of fractures on either side—fifty-five being of the left leg and fifty-six of the right leg.

Type of Accident.—The types of accident fall into four main groups :—

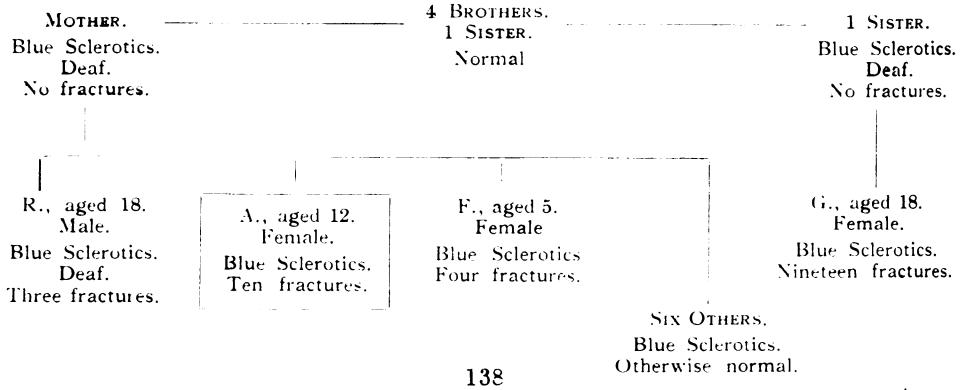
1. A fall at home—thirty cases.
2. A fall in the street—thirty-seven cases.
3. Knocked down by mechanically-propelled vehicle—thirty-three cases.
4. Knocked down by other types of vehicle—five cases.

Total, 105 cases.

From the above it will be seen that there are only six cases apart from these groups. In one of these six cases the cause was a difficult birth; the other five were all direct violence fractures caused by various heavy articles falling directly on the child's leg, such as a meat safe, a ladder, and a gate, etc.

In two of the motor accidents the wheel went directly over the leg, and in a third the leg was caught in the spokes of a wheel.

The violence in some cases was of very slight severity—notably that in the two cases of *fragillitas ossium tarda*. One of these cases, a girl aged 12, has had the right femur fractured four times and the left femur five times, in addition to a fractured radius and ulna. The family history is interesting.



The second case of *fragillitas ossium tarda* has had four fractured femurs, a fractured radius and ulna, and a fractured tibia and fibula twice.

The remarkable thing about these fractures is their ability to heal in good position. Case No. 1 was treated by extension in a Thomas splint. She now has a quarter of an inch shortening, but otherwise her legs are normal. Case No. 2 was operated on twice, in each instance on the same femur, the bone-ends being fixed in position with silkworm gut clove hitches. She now has an eighth of an inch shortening of the leg, but otherwise the result is excellent.

Type of Violence.—It was difficult to be certain from some of the case sheets whether a case had been a direct or indirect violence fracture, but on taking the X-ray into account and the fact that a direct violence fracture is always transverse in type, the task was made simple.

In only nine of the cases was the violence direct, whereas in the remaining 102 it was indirect in type.

Type of Fracture.—The middle third of the femur in almost nine cases out of ten is the seat of the fracture. To explain this one can say that—

1. The femur is the longest bone in the body.
2. The bone is not straight, but shows a gentle curve antero-laterally.
3. The slenderest portion of the bone is in the middle third.
4. The violence is almost always indirect in type.

Below is a table giving the percentages of the various types of fracture.

Site	*Nature of Fracture*	*Number of Cases*	*Percentage of Total*
Neck	- - -	2	1.8
Upper Third	Spiral - - -	6	5.4
	Transverse - - -	4	3.6
	Greenstick - - -	0	0.0
		—10	— 9.0
Middle Third	Spiral - - -	76	68.5
	Transverse - - -	10	9.0
	Greenstick - - -	6	5.4
		—92	—82.9
Lower Third	Spiral - - -	1	0.9
	Transverse - - -	2	1.8
	Greenstick - - -	3	2.7
		— 6	— 5.4
Epiphyseal Line	Separation of Lower Epiphysis - -	1	0.9

All the fractures were of the closed or simple type, leading one to believe that a compound fracture in a child is very rare. Here again one requires direct violence to produce a compound fracture, and, as we have seen, only one child in eleven is of this type.

In eight of the cases the fracture was comminuted, though not severe in any, most of them showing only one loose fragment of bone.

None of the fractures were complicated in the true sense of the word, though two of them had also sustained fractured skulls. One of these two constituted the only death in the series.

Another boy who had his legs caught in the spokes of a lorry-wheel had to have both legs amputated below the knee, one on account of severe lacerations and the other on account of a compound, comminuted, fractured tibia and fibula. The fractured femur in this case, treated only by the application of side and back splints, united well, though with some shortening and angulation. The shortening, which actually amounted to three and a half inches, is of no account, as it does not in any way increase his disability. It is, therefore, permissible to omit the technical findings on re-examination in his case from the general list of results.

The youngest patient, three days old, who sustained a fractured femur during a difficult birth, was also suffering from an Erb's paralysis, which responded to treatment as readily as the fractures, and a complete recovery from both was obtained.

Treatment.

The treatment in this series of 110 cases varies a great deal, taken as they are over a period of six years and including as they do all the various types of fractured femur.

I propose to give, therefore, the treatment and results in each type of fracture together, and where possible to give a comparison of the results obtained by different lines of treatment.

Fracture of the neck of the femur.—Two cases. The first case in this group is very interesting on account of (*a*) the age, which was a year and nine months; (*b*) the present condition of the hip-joint. The youngest case of this type of fracture that could be found in reviewing the literature was that described by Greig, occurring in a child two years of age.

The leg was treated by extension in a Thomas splint for five weeks, after the removal of which a light plaster of paris splint was applied, weight-bearing not being commenced until twelve weeks after the injury. On discharge from hospital there was three-quarters of an inch shortening.

The second interesting point about this boy is that now, five years after the accident, though he has a quarter of an inch shortening, but no deformity or limp, and full movement both at the hip and knee, there is present on X-ray examination a marked coxa vara, a mushroom-shaped deformity of the head of the femur and a change in the direction of the epiphyseal line from vertical to horizontal (fig. 1): in other words, a condition undistinguishable from Perthe's disease.

According to Böhler, this condition is caused by too early weight-bearing, though he has never seen any deformity occur when weight-bearing has been commenced after three months treatment by continuous traction. He does not

consider it necessary to relieve the leg from weight-bearing from one to two years, as has been advised by many authorities.

This case would seem to point out, assuming too early weight-bearing is the cause of Perthe's type of deformity, that twelve weeks treatment is insufficient. But this is a large assumption when we consider that the Perthe's type of deformity occurs almost always after some very minor type of injury. Might it not be possible that the deformity is caused by an injury to the epiphyseal cartilage, and that weight-bearing is only of very secondary importance?

The second case in this group was through a single cyst in the distal end of the neck of the femur (fig. 2). This fracture was treated in abduction in the hospital for a period of seven weeks, and was discharged in a Thomas hip splint, which the patient is still using two years after the accident.

RESULTS.—In both cases bony union was good. In the first case there was a quarter of an inch shortening, but no muscle-wasting or limitation of movement, and it was only on X-ray examination that the Perthe's disease was detected. Function in this case was perfect, and use of the leg, which included playing football, never caused any tiredness or limp. In the second case there was half an inch shortening and a quarter of an inch wasting of thigh and calf. Loss of function in this case is due to the presence of the cyst, which necessitates the wearing of a Thomas hip splint long after firm bony union had been obtained.

Separation of the lower epiphysis.—One case. The one case of this type of injury was in a boy of twelve years. The deformity was reduced under anæsthesia, and a light plaster of paris splint applied with the leg in about five degrees of flexion. On re-examination six months later all movements were normal. There was no shortening or deformity of the limb, and function was perfect.

Spiral fractures of the shaft.—I am grouping together spiral fractures of the upper, middle, and lower thirds under this heading, as the treatment in the three classes is essentially the same. The treatment falls into two entirely separate lines.

1. Operative: (*a*) By insertion of clove-hitches round the bone-ends after reduction has been effected—forty-three cases.
   (*b*) By the insertion of a carpenter's screw—three cases.
2. Conservative: (*a*) Extension in a Thomas splint—twenty-seven cases.
   (*b*) Suspension in a Gallow's splint—five cases.
   (*c*) Manipulation alone—four cases.

OPERATIVE METHODS OF TREATMENT.

1. OPEN OPERATION WITH INSERTION OF CLOVE-HITCH—forty-five cases. In this operation the fracture is exposed by an incision through the *vastus lateralis*. All blood-clot and callus are removed from the bone-ends, and they are then brought into perfect apposition by extension of the foot. One or two, according to the obliquity of the fracture, double clove-hitches of silkworm gut are applied round the overlapping portions of the bone and tightened. The legs are then immobilized in Hamilton's splints, a light plaster of paris splint being also applied along the

medial side of the fractured leg. The splints are removed at the end of six weeks, active movements being then commenced. Weight-bearing is started early, and the patient is, as a rule, discharged about the end of the seventh week.

All the cases were treated similarly, except that in some instances catgut and chromic gut were used in place of silkworm gut for the clove-hitches, but as they were not found to be so successful they were soon abandoned. The later cases also differ in that they received normal cow serum from their admission to hospital until after the wound had healed: this prevented any tendency towards sepsis in the wound. The only wound showing infection after the administration of serum was one in which B pyocyaneus was isolated from the pus.

RESULTS.

Deformity.—Six cases showed slight genu valgum (ten degrees); one keloid scar; one case showed osteomatous formation at site of fracture; two cases with "waddling" gait; two cases with lateral angulation of fragments.

Shortening.—Twenty-four cases showed no shortening. Nineteen cases showed average shortening of 0.25 inches. Average shortening for the forty-three cases was, therefore, 0.11 inches.

Lengthening.—Five cases showed lengthening of from an eighth to a quarter of an inch.

Wasting of muscles.—Wasting in thigh muscle was present in eighteen cases, ranging from a quarter to half an inch. Wasting of calf muscles in three cases.

Movements.—Two cases showed ten degrees of limitation of abduction, and two showed five degrees limitation of flexion at the hip-joint.

Length of time in hospital.—This varied in some cases from seven and a half to twelve weeks; the average for the forty-three cases was eight and a half weeks.

Disability after discharge.—The duration of this period depended a great deal on the care or otherwise which the parents took in carrying out instructions. Possibly then the figure of four and a half weeks, which represents the average for the forty-three cases, is of little value.

Function.—100 per cent. in forty-one cases, 90 per cent. in two cases, giving an average of 99.5 per cent. for the total.

2. OPEN OPERATION WITH INSERTION OF SCREW—three cases. The technique of this operation is similar to that of the former, except that a carpenter's screw is inserted through the overlapping oblique ends of the fracture in the reduced position. The legs are again immobilized in the Hamilton's splints for a period of six weeks.

RESULTS.—Of the three cases treated by this method, one obtained good bony union with the screw in position, though possibly with an excess of callus formation. The second case also obtained union without shortening, though the X-rays show that there is present a certain amount of lateral angulation. The third case only united after removal of the screw.

It is generally agreed now that the insertion of a screw is not good treatment for a recent spiral fracture. The damage and interference with the blood supply

to the already devitalized bone-ends which the insertion of a screw necessarily causes, quite apart from the presence of a "foreign body," must have a detrimental effect on bony union.

Deformity.—Lateral angulation in one case.

Shortening.—Two cases showed no shortening; one case showed a quarter of an inch. Average 0.8 of an inch.

Wasting of muscles.—One case showed half an inch wasting of thigh and a quarter of an inch wasting of calf.

Movements.—Limitation of abduction fifteen degrees in one case, with also slight limitation of flexion at hip-joint.

Function.—100 per cent. in two cases, 90 per cent. in one case; average 96.6 per cent.

Conservative Methods of Treatment.

1. Extension in a Thomas Splint—twenty-seven cases. The extension in all cases was obtained by means of surgical plaster, it being applied in the usual manner. A certain amount of pain is caused in the application, no matter how much care is taken, and in a nervous child this is often much increased by wriggling about, causing a certain amount of difficulty. This is easily overcome, however, by an administration of an anæsthetic dose of avertin. The writer is of the opinion that avertin should be given to all children treated in this manner, not only because of its anæsthetic properties, but also because of the great psychological effect it has on the child. The extension is applied entirely free from pain and with complete muscle relaxation; it has, moreover, several hours of muscle relaxation in which to act and bring about almost complete reduction of the fracture. When the child wakes with a painless leg there is no horror of having it examined and measured, as these cases require to have done frequently.

The extension was maintained for from six to seven weeks, the patient then being discharged with a plaster of paris spica bandage applied to the leg, if the bony union was satisfactory. After three weeks lying in bed at home, the patient returned to hospital, had the plaster of paris removed, and commenced weight-bearing gradually.

Results.

Deformity.—One case five degrees genu valgum. Eversion of the foot in three cases. One case slight angulation of fragments.

Shortening.—Fourteen cases showed no shortening; thirteen showed average of 0.27 of an inch; average for total, 0.11 of an inch.

Wasting of muscles.—Six cases a quarter to half an inch wasting of thigh; three cases a quarter of an inch wasting of calf.

Movement.—Five degrees limitation of flexion at hip in one case.

Function.—100 per cent. in twenty-six cases, 90 per cent. in one case. Average 99.6 per cent.

2. Suspension in a Gallow's Splint—five cases. Cases under three years of age were as a rule treated in this manner. Some authorities suggest that even up to

the age of six years the patient could be treated satisfactorily by this method. Again opinions differ as to whether one or both legs should be suspended, supporters of the latter maintaining that it prevents inversion or eversion deformity of the foot, which they say is liable to occur when only one leg is suspended. The method, moreover, permits easy application and change of diapers with the least possible interference to the fractured leg.

RESULTS.

Deformity.—One case five degrees genu valgum.

Shortening.—Three cases showed an average of 0.125 of an inch; two cases showed none. Average for total, 0.075 of an inch.

Movements.—Normal.

In hospital.—Five weeks.

After discharge.—Disablement for three and a half weeks.

Function.—100 per cent. in all cases.

3. MANIPULATION AND HAMILTON'S SPLINTS — four cases. In these cases the fracture was reduced under an anæsthetic, and the position maintained by means of Hamilton's splints for a period of five weeks.

RESULTS.

Deformity.—One case pes planus.

Shortening.—Three cases showed none; one case showed a quarter of an inch. Average for total, 0.06 of an inch.

Movements.—Normal.

In hospital.—Five weeks.

After discharge.—Disablement for two weeks.

Function.—100 per cent. in all cases.

TRANSVERSE FRACTURES OF THE SHAFT—(sixteen cases).

As with spiral fractures, the treatment here is essentially the same, whether the fracture be in the upper, middle, or lower third.

The treatment is again divided between—

1. The operative method—five cases.
2. The conservative method—eleven cases.
   (*a*) Extension in a Thomas splint—five cases.
   (*b*) Manipulation—six cases.

1. THE OPERATIVE METHOD.—In all five cases a plate and screws were used to keep the bone-ends in position after reduction. Two of the cases only obtained bony union after the plate and screws had been removed, one of these uniting with some medial angulation of the fragments, and with almost complete loss of movement at the knee-joint.

RESULTS.

Deformity.—One case genu valgum (five degrees), and one case showed slight medial angulation of fragments.

Shortening.—One case showed none, four cases showed an average of 0.25 of an inch. Average for five cases, 0.20 of an inch.

Movements.—One case showed sixty degrees limitation, and three others showed slight (five degrees) limitation of flexion at knee.

Wasting.—Three cases showed a quarter of an inch wasting of calf.

In hospital.—Average ten and a half weeks.

Disablement continued for a further four and a half weeks.

Function.—Three cases one hundred per cent., one case sixty per cent., and one case fifty per cent.

2. Extension in a Thomas Splint—five cases. The technique is similar to that used for spiral fractures.

Results.

Deformity.—Nil.

Shortening.—Four showed none; one showed a quarter of an inch, giving an average for the five of 0.05 of an inch.

Wasting of muscles.—Nil.

Movements.—Normal.

In hospital.—Average time seven and a half weeks.

Disablement continued for a further three and a half weeks.

Function.—One hundred per cent. in all cases.

3. Manipulation and Hamilton's Splints—six cases. These six cases were manipulated under avertin anæsthesia. The reduction being complete and the deformity showing no tendency to recur, the legs were put up in Hamilton's splints, with a light plaster of paris splint on the medial side of the fractured leg.

Results.

Deformity.—One case five degrees genu valgum.

Shortening.—Average for the six cases was 0.33 of an inch.

Movements.—Normal.

Wasting of muscles.—Nil.

In hospital.—Average time six and a half weeks.

Disablement continued for a further average period of four and a half weeks.

Function.—One hundred per cent. in all cases.

Greenstick Fractures—(nine cases).

The treatment in these cases varied according as to the presence or absence of deformity. Six of the cases required manipulation under anæsthesia to reduce the deformity. These were then treated in Hamilton's splints for a varying period of about three weeks. They were then discharged in a light plaster of paris splint. The other three did not show any deformity, and were treated in Hamilton's splints.

Results.

Deformity.—Nil.

Movements.—Normal.

Shortening.—Four cases showed none; one showed shortening of an eighth of an inch. Average for total was 0.014 of an inch.

Wasting of muscles.—Two showed slight (a quarter of an inch) at thigh and calf

In hospital.—Average time five weeks.

Disablement continued for a further four weeks.

Function.—One hundred per cent. in all cases.

ANÆSTHESIA.—It is interesting to note that of the 111 cases, seventy-seven were given an anæsthetic. Of these, sixty-three were avertin, the remaining fourteen being ether, the latter being mainly given for manipulation.

RESULTS FOR TOTAL 110 CASES.

Deformity.—Present in twenty-three cases; twenty-one per cent. of total. The deformities were as follows:—Ten cases five degrees genu valgum; four cases of lateral angulation of fragments; three cases of eversion of foot; two cases of "waddling" gait; one case of medial angulation of fragments; one case of pes planus; one case of osteoma at site of fracture; one case of keloid scar following operation.

Shortening. — Fifty-seven cases showed no shortening. Fifty-two showed an average shortening of 0.35 of an inch. Average shortening for 109 cases was 0.17 of an inch. Greatest amount of shortening in one case was an inch.

Wasting of muscles.—Forty-two cases showed wasting of muscles either in thigh or calf. The wasting was not greater than half an inch in any one case, and averaged just under a quarter of an inch.

Movements.—Movements were normal in all, with the exception of ten cases. At the knee, four showed limitation of flexion: one of sixty degrees and three of fifteen degrees. At the hip, three cases showed slight (ten to fifteen degrees) limitation of abduction, and three about five degrees limitation of flexion.

In hospital.—Average time eight weeks.

Disablement continued for a further average of three and a half weeks.

Function.—100 per cent. in 103 cases; 90 per cent. in five cases; 60 per cent. in one case; 50 per cent. in one case; giving an average for the total of 98.7 per cent.

CONCLUSIONS.

1. Invariably good results are obtained, correct anatomical position of the bony fragments not being essential.
2. Children under three years of age are best treated by overhead suspension.
3. Cases discharged with shortening will be partially or wholly corrected spontaneously in one to two years.
4. A certain number of cases will be followed by lengthening of the fractured limb.
5. Operations where "foreign bodies" are inserted into the bone-ends have a detrimental effect on bony union.
6. Fractures of the upper third of the shaft require to be treated in a greater amount of abduction than is the custom.

7. The results obtained in the Belfast Hospital for Sick Children compare very favourably with those published from other centres.

I am much indebted to Mr. T. S. Kirk, Professor P. T. Crymble, Mr. H. P. Hall, and Mr. Ian Fraser for the use of record cards and X-rays.

REFERENCES.

GREIG, D. M., 1919, *Edin. Med. Jour.*, 22, 75.
BÖHLER, L., 1936, "Treatment of Fractures," Fourth Edition, p. 323.
COLONNA, P. C., 1929, *Amer. Jour. Surg.*, 6.
WHITMAN, R., 1909, *Med. Rec.*, 75, 1.
GORDON, D., 1929, *Amer. Jour. Surg.*, 6, 768.
FALLER, A., 1934, *Archiv. Für. Klin. Chir.*, 179.
CONWELL, H. E., 1929, *Jour. Bone and Joint Surg.*, 1.
COLE, W. H., 1922, *Arch. Surg.*, 5, 702.
SPEED, K., 1921, *Surg. Gynæ. Obst.*, 32.
FIRROR, W. M., 1924, *Bull. Johns Hopkins Hosp.*, 35, 412.
BURDICK AND SIRIS, 1923, *Ann. Surgery*, 77, 786.

Radiological Diagnosis of Brain Tumours (including Ventriculography)*

By T. GARRATT HARDMAN, M.D., T.C.D.,

Radiologist to the Richmond Hospital, Dublin, and the Royal City of Dublin Hospital. Consulting Radiologist to Mercer's Hospital; Lecturer in Radiology, Dublin University.

RADIOLOGY plays a comparatively small though important part in the diagnosis of brain tumours. It is essentially a question of team-work divided between the neurological surgeon, the neurologist, the occulist, and radiologist. The neurological surgeon is the captain of the team, and it is he who collects together and correlates the evidence deduced from the various methods of examination, finally putting them together as one assembles a jigsaw puzzle, until the picture is complete and the diagnosis is established. In some cases the interpretation of the radiographs is easy, but in many cases it is extremely difficult, and calls for considerable experience and an accurate knowledge of the anatomy of the brain, the pathology of brain tumours, and every detail of the procedure of the examination which has been carried out. For this reason team-work is essential, for in many cases the radiologist does not possess the information upon the clinical side of the case to enable him to make a diagnosis from the X-ray appearances alone. In some instances the X-ray diganosis can be made without any reference to the clinical history or neurological findings, but in many others localization of a tumour is extremely difficult, even while utilizing every method of examination at our disposal.

I should like, first, to refer very briefly to the routine examination of the skull, for such an investigation always precedes ventriculography and may give valuable

*A paper read before the Ulster Medical Society, 13th February, 1936.

Dr. McMechan's Paper

FIG. 1.

Perthe's disease of the left hip-joint following a fracture of the neck of femur five years previously.

Dr. McMechan's Paper

FIG. 2.
A fracture through a single cyst in the neck of the femur.

FIG. 3.
The same case two years later. Note bony union in good position

FIG. 4.
A transverse fracture through the middle third of the shaft of femur, treated by extension in a Thomas splint.

FIG. 5.
The same case one and a half years later, showing end-result, which was functionally perfect, with no shortening, deformity, or wasting.

7. The results obtained in the Belfast Hospital for Sick Children compare very favourably with those published from other centres.

I am much indebted to Mr. T. S. Kirk, Professor P. T. Crymble, Mr. H. P. Hall, and Mr. Ian Fraser for the use of record cards and X-rays.

REFERENCES.

GREIG, D. M., 1919, *Edin. Med. Jour.*, 22, 75.
BÖHLER, L., 1936, "Treatment of Fractures," Fourth Edition, p. 323.
COLONNA, P. C., 1929, *Amer. Jour. Surg.*, 6.
WHITMAN, R., 1909, *Med. Rec.*, 75, 1.
GORDON, D., 1929, *Amer. Jour. Surg.*, 6, 768.
FALLER, A., 1934, *Archiv. Für. Klin. Chir.*, 179.
CONWELL, H. E., 1929, *Jour. Bone and Joint Surg.*, 1.
COLE, W. H., 1922, *Arch. Surg.*, 5, 702.
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I should like, first, to refer very briefly to the routine examination of the skull, for such an investigation always precedes ventriculography and may give valuable

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information as to the existence of a brain tumour, its site, and, in some instances, even its nature. This examination may be quite a simple one : a plain lateral view, an antero-posterior, or an occipital view will suffice in most cases.

Now, what to look for in such an examination is best answered by referring you to a table compiled by Karl Kornblum of Philadelphia, showing the incidence of various röntgen manifestations of intracranial tumour occurring in a series of 446 verified cases.

1. Deformation of the sella turcica - - -	64.6 per cent.
2. Convolutional atrophy - - - -	8.8 per cent.
3. Calcification of the tumour - - -	6.5 per cent.
4. Widening of the sutures - - - -	4.6 per cent.
5. Local bone erosion - - - -	2.9 per cent.
6. Local hyperostosis - - - -	1.8 per cent.
7. Lateral shift of the pineal body - - -	1.8 per cent.
8. Widened diploic channels - - -	0.2 per cent.

1. *Deformation of the Sella Turcica.*—One must be careful in diagnosing abnormalities in the sella turcica, for the size varies greatly within the normal. Decalcification and erosion of the clinoid processes and floor of the sella is a much more reliable guide of disease than size. Only when greatly enlarged or altered in shape should one diagnose pathological change. While deformation of the sella is an extremely important indication of the presence of an intracranial tumour, it cannot be taken as infallible evidence of an intrasellar lesion, or even as an indication of a tumour in close proximity to the pituitary fossa. Increased intracranial tension from a tumour in the posterior cranial fossa may produce destructive bone changes in the sella turcica and anterior cranial fossa. (Plate 1.)

2. *Convolutional Atrophy.*—This sign is of very limited value, in my opinion, for one has no standard of normality from which to draw deductions. The appearance is produced by pressure of the convolutions of the brain against the inner table of the skull, and is present in some degree in most children and young adults. With abnormal intracranial pressure these so-called digital markings become more pronounced, but the difficulty lies in distinguishing between what is physiological and what is pathological.

The appearance of convolutional atrophy gains in significance with the age of the patient.

Convolutional atrophy requires several months for its production, so must not be looked for as a result of sudden increase in pressure following head injuries or fracture of the skull.

3. *Gaping Sutures.*—Of much more value as a sign of increased intracranial pressure is widening or gaping of the sutures. For anyone who is experienced in the examination of skull-films, the detection of such a change is easy, and is positive evidence of abnormal tension.

4. *Calcification.*—One of the most reliable X-ray signs of an intracranial tumour is calcification of the growth. It is not of common occurrence, as shown by Kornblum's table, i.e., 6.5 per cent. of the series of cases analyzed.

Such changes take place most frequently in gliomas, and may be found anywhere within the cranium, though not often below the tentorium. Calcification above the pituitary fossa is usually associated with a hypophyseal duct-tumour or Rathke pouch. The pineal body is calcified in a large percentage of normal people, and must not be mistaken for tumour. Displacement of the pineal in a lateral direction should be looked for; but in connection with this one must sound a word of warning. A unilateral calcification of a choroid plexus should not be mistaken for a displaced pineal body. Calcification of the choroid is usually larger than a pineal body, and is generally bilateral. Ossified plaques in the falx cerebi are recognized by their central position and linear contour, as seen in the antero-posterior view.

Calcified Pachionian bodies lie on either side of the sagittal suture in the parietal region. Calcification may occur in the meninges following trauma.

5. *Localized Bone Erosion.*—I have already referred to erosion in the region of the sella turcica, but destructive changes may also be associated with acoustic tumours of the petrous bone and with meningeoma. In the case of the latter it is not uncommon to find also widening of the diploic channels.

6. *Localized Hyperostosis.* — Frequently found in association with an underlying meningeoma, and usually found in the anterior part of the cranium. The whole thickness of the skull is involved in these cases, and the condition should be distinguished from benign hyperostosis, which involves only the inner table of the skull and is of little significance.

Pineal displacement and widening of the vascular channels in the bones I have already referred to, and do not wish to add to what I have said. Changes in the optic foramina also deserve mention, but it would take too much time to elaborate upon this subject.

Ventriculography.

To Walter Dandy of Baltimore belongs the credit for discovering a method of localizing brain tumours by air injection of the ventricles. His first published report of this new procedure was in the "Annals of Surgery" for July, 1918. While it would be interesting to describe at some length Dandy's early investigations in this connection, and trace the progress of this work during the following years, I do not propose to do so, as time will not permit, and you can obtain the original communication from your medical libraries, should you wish to read them.

As there are some here to-night who are not doing radiological work, and are not familiar with the *modus operandi* of this particular branch in radiology, may I explain very briefly the method of examination, what one expects to find in the event of obstruction at certain points in the ventricular system, and what deductions we can make.

By substituting air for cerebro-spinal fluid, the ventricles can be made visible, just as gas in the stomach or intestines will demonstrate the contour of these organs by rendering them more translucent than the surrounding tissues. Fluid is withdrawn from a lateral ventricle and an equal quantity of air injected. The more complete the fluid replacement the better will be the radiological demonstration of

the ventricles and the easier the diagnosis. In practice, the smaller the interchange of fluid and air which will enable a diagnosis to be made, the less danger there is to the patient. Total air replacement in a case in which there is already increased intracranial tension is accompanied by severe and often dangerous alteration in the tension, and for this reason this method is contra-indicated.

From the changes produced in the size, shape, or position of the ventricles, we endeavour to deduce the situation of the tumour. Dandy has stated that "all tumours which give signs of intracranial pressure will produce some change in the shape, size, and position of one or more of the ventricles. By that I do not mean that all brain tumours distort or change the size, shape, and position of the ventricles, but that all brain tumours which give symptoms of pressure produce one or more of these changes which would make a diagnosis possible."

Brain tumours give rise to two types of symptoms :—(1) Localizing, (2) those due to general pressure. If the former are present, localization of the tumour is accomplished and there is no necessity for ventriculography. If there are no localizing symptoms, the only other symptoms are those of pressure, and in these the X-ray method should enable a localization to be made.

Dandy has stated, and stated truly, that "there are many pitfalls in the interpretation of X-ray findings; it is not a simple foolproof interpretation : it requires much experience." Before describing the technique of examination, may I refer very shortly to the physiology of the circulation of the cerebro-spinal fluid. All of this fluid is formed in the ventricles, but is absorbed outside the brain. There are four ventricles—two lateral ventricles and the third and the fourth ventricles.

Fluid formed in the lateral ventricles will flow through the foramina of Monro into the third ventricle. Should one of these foramina be blocked, the ventricle on that side will dilate. If fluid is withdrawn from this ventricle and replaced by air, the dilated air-filled cavity will be demonstrable by a radiograph, and the failure of air to pass via the third ventricle into the ventricle of the opposite side when this side is placed uppermost, is further proof of the site of the block. If the other side is now injected with air, one can see whether this ventricle is also dilated. If so, it proves that the tumour involves the third ventricle to such a degree that no fluid can pass through it or only in very small quantities. From the third ventricle there is only one exit, the aqueduct of Sylvius, through which all fluid formed in the lateral and third ventricles must pass. Should the aqueduct of Sylvius become blocked, there will be a general dilatation of the third and the two lateral ventricles.

Assuming the aqueduct of Sylvius is patent, the fluid passes into the fourth ventricle and from thence it flows into the cisterna magna through three openings, two foramina of Luschka and one of Magendi. From the cisterna magna the fluid passes downwards into the spinal canal and upwards into the sub-arachnoid spaces which cover the whole brain.

A sub-tentorial tumour pressing upon the fourth ventricle will produce a general dilatation of the whole ventricular system. One of the objects of ventriculography is, therefore, to determine whether dilatation of the ventricles exists, and if so, where the obstruction occurs. The site of obstruction will be the location of the

tumour. An extra ventricular tumour may be detected by the pressure defect it produces upon the ventricles and by displacement of the ventricles.

A tumour of the frontal lobe will deform the anterior horn on the affected side. A tumour of the occipital lobe will compress or displace the posterior horn. A tumour of the parietal lobe will produce a flattening of the body of the lateral ventricle and probably some displacement of both ventricles towards the opposite side. A tumour in the temporal lobe will displace the whole ventricular system towards the opposite side, sometimes deforming them.

Technique.

After injection of the air into the ventricles the patient is sent straight from the operating-theatre to the X-ray department. The radiologist should be told whether both ventricles have been filled or, if the replacement has been unilateral, which side was injected. This is important, as the information will guide one as to the subsequent manipulation of the head which will be necessary in order to make the air pass from one side to the other. Assuming that the right ventricle has been injected with air, the first film may be taken with the head in the lateral position, the right side uppermost. Two films are taken, one with the face downwards towards the table at an angle of thirty degrees to the horizontal plane. In this position the posterior horn of the right ventricle is the highest part of the ventricular system, and will therefore be well filled with air, provided no obstruction exists.

The second lateral film is taken with the face turned away from the table at an angle of thirty degrees from the horizontal plane. In this position the descending horn on the right side is the highest part of the ventricular system, and should be well demonstrated by its air-content. The head should then be turned over on to the right side for a few moments in order to allow the air to pass via the foramina of Munro and the third ventricle into the lateral ventricle of the opposite side.

The third film is then taken with the occiput down, the head perfectly straight, and the line from the outer canthus of the eye to the external auditory meatus at right angles to the table. The tube may be centred vertically over the middle of the frontal bone, or, as advised by Lysholm, may be tilted fifteen degrees towards the cranium. This helps to avoid superimposition of the frontal sinuses over the anterior horns of the ventricles. In this view it is hoped to demonstrate the two anterior horns filled with air; and here it is necessary to remind ourselves that the lateral ventricles as they extend forwards diverge outwards and become expanded to form the anterior horns. If the air is equally distributed between the two ventricles, the anterior horns will present symmetrical shadows. (Plate 2.) Owing to the divergence of the lateral ventricles, composite shadows are produced. The outer and fainter portions are due to air in the anterior horns, while the inner and more translucent areas represent the bodies of the ventricles. The third ventricle will often be shown in this antero-posterior view as a linear shadow just below the anterior horns and in the middle line.

The third and sometimes the fourth ventricles may be demonstrated from a lateral position at this stage of the examination, and before the head is turned to one side

or the other. An inverted position of the head is obtained by raising the patient's shoulders and body on pillows. The head is then extended to the maximum degree possible, till the vault of the skull rests upon the table. The film is supported in a vertical position beside the head, and the tube centred so that the central ray passes through a point about an inch above the external auditory meatus and at right angles to the film.

If it is desired to obtain films of the left ventricle, the head is now turned over on to the right side, and a few minutes are allowed to enable the air to rise and fill the left ventricle, which is now uppermost. Two films are now taken in precisely the same manner as for the right side. The patient is then turned completely over on to his face and the head placed in the forehead-nose position. The head is placed so that the line joining the external auditory meatus to the outer canthus of the eye is at right angles to the table. The tube is centred vertically over a point about two inches above the occipital protuberance. The film taken in this position will demonstrate the posterior horns and portion of the bodies of the lateral ventricles. (Plate 3.)

The positions I have indicated will in most cases be sufficient to give the information desired, but each case must be treated on its merits, and other positions may be necessary to elucidate some particular point.

and sometimes more, but, as I have already explained, particular attention must be paid to the special requirements of each case.

The series of radiographs usually includes at least one pair of stereoscopic films A Potter Bucky diaphragm or Lysholm grid is used as routine, the Lysholm grid being particularly useful for the lateral film with the head in the inverted position.

While in many instances the X-ray findings by this method of examination are precise and give accurate information as to the site of a tumour, in a certain proportion of cases the X-ray evidence is inconclusive and unsatisfactory. Uneven distribution of air and residual pools of cerebro-spinal fluid may produce apparent defects and fallacious conclusions.

I want to refer now briefly to a newer method of examination which has been described by Schonfield and Freeman of Washington in 1933, and by Twining and Rowbotham in the "Lancet" of July, 1935, and which has been tried in a number of cases by Mr. McConnell at the Richmond Hospital. This consists in the introduction of thorotrast into the ventricles. The great advantage of this material is that it is radiopaque and is also diffusible with the cerebro-spinal fluid. Further, it avoids the alteration of intracranial tension which accompanies air replacement. As it mixes with the cerebro-spinal fluid, it possesses the enormous advantage of uniformly demonstrating the whole ventricular system at the one moment. (Plate 4.) The contrast between thorotrast and the surrounding brain substance is usually more striking than between air and brain, and it is therefore particularly suitable for stereoscopic visualization of the ventricles.

The radiographic technique is also simplified. The fact that the whole ventricular system is visualized in whatever position the patient is placed, avoids the multi-

plicity of films which are sometimes necessary by the piecemeal method of air ventriculography.

The ease with which the third and fourth ventricles can be demonstrated is a very great advantage. A lateral film with the patient in a sitting posture will show these ventricles clearly, thus eliminating the difficult inverted position which is necessary when air is used. We have only used thorotrast in a few cases in the Richmond, but there is no doubt that radiographically the results surpass those obtained by air injection in density, definition, anatomical detail, and more uniform visualization. From the patient's point of view, Twining and Rowbotham state "that the intracranial tension is unaltered and that the not inconsiderable risk of air replacement is obviated."

Some authors have doubted the suitability of thorotrast on account of slow elimination, radio-active and irritative properties. From our small experience we have learned that when there is no obstruction of the fourth ventricle and the thorotrast finds its way through the foramina of Magendi into the sub-arachnoid space, the patient then experiences some degree of shock associated with headache and sweating.

In the cases investigated by Twining and Rowbotham, 25 c.c. of fluid was withdrawn from the ventricles, and 10 c.c. of air introduced followed by 10 c.c. of thorotrast. The thorotrast was poured into the funnel for the reception of the cerebro-spinal fluid and mixed with it by agitation. It was then run into the ventricle by raising the funnel. The resulting shadows were very satisfactory, and two hours later a film showed that almost all the thorotrast had left the ventricular system. The method adopted by Mr. McConnell was similar to that of Twining and Rowbotham, except that air was not always injected.

The question is often asked: What becomes of thorotrast eventually?

A case had been injected with thorotrast five months before. Ventriculography with air was done recently, and it showed that small quantities of thorotrast were still adherent to the walls of the ventricles, and a film of the lumbar region showed the cauda equina clearly demonstrated by the opaque material.

In conclusion, I should like to say that ventriculography is not free from danger to life, and should only be carried out after all other methods of examination have failed to enable one to make a diagnosis.

With regard to thorotrast, I do not think that very much is yet known as to its after-effects or whether its introduction does any permanent harm. From a purely radiographic standpoint it possesses one outstanding advantage over air, i.e., the ease with which the third and fourth ventricles can be demonstrated, even after the introduction of a very small quantity of thorotrast. (Plate 5.) The visualization of these ventricles is of paramount importance in cases of hydrocephalus, because one can determine with some degree of accuracy the position of the obstruction. The value of this lies in the fact that the surgical approach varies greatly according to the site of the lesion. An approach from a wrong direction leads to great difficulties in operation and possibly a fatal result.

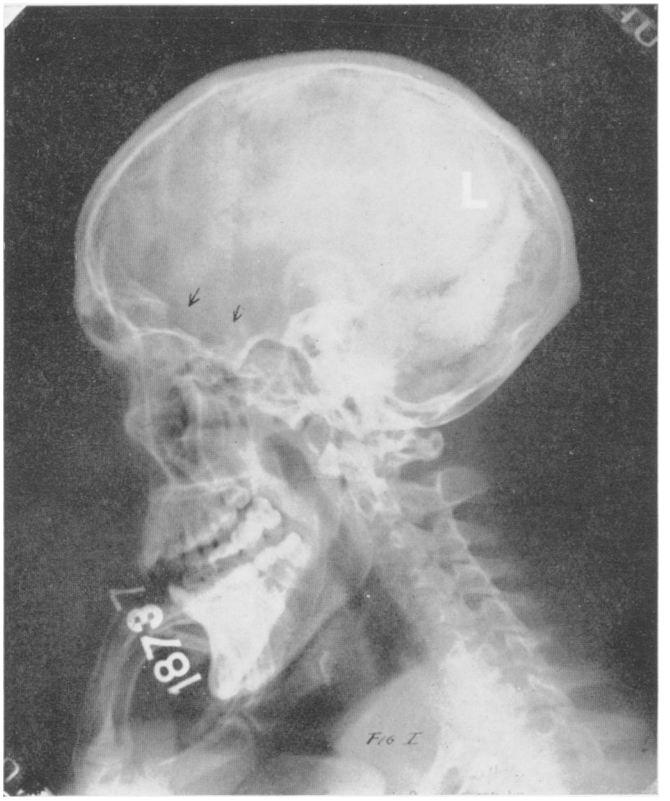

PLATE 1.

Deformity of sella turcica and extensive destruction of the anterior floor of cranial fossa due to increased tension associated with tumour of fourth ventricle.

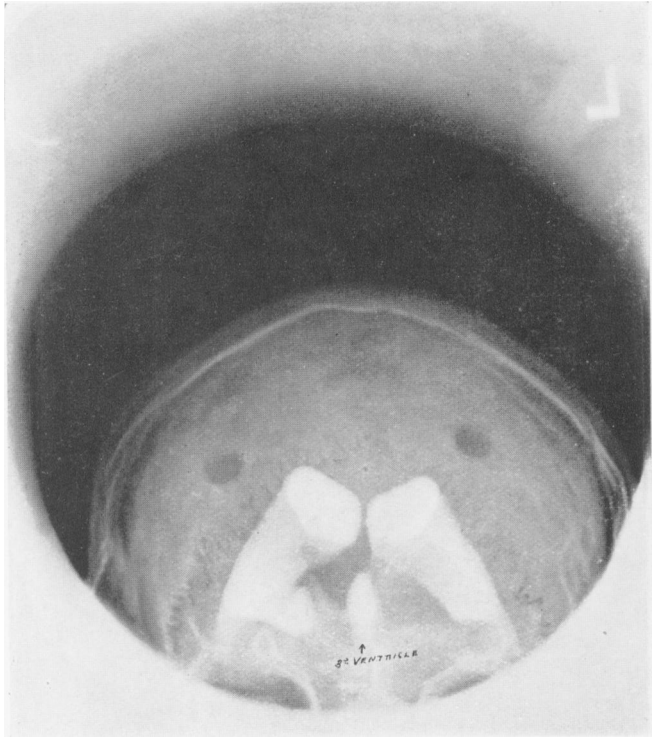

PLATE 4.

Whole ventricular system demonstrated by thorotrast.

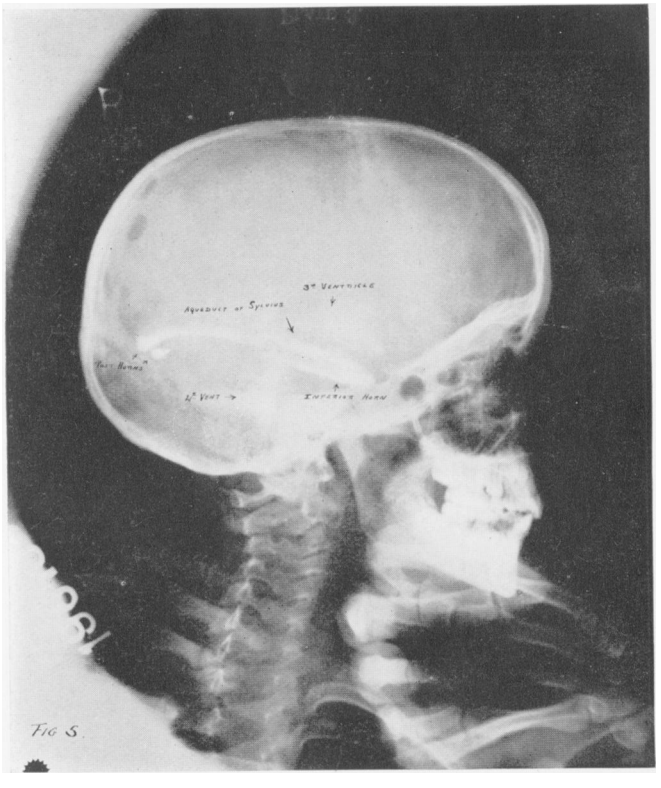

PLATE 5.

Third and fourth ventricles clearly demonstrated by a very small quantity of thorotrast. Upright position.

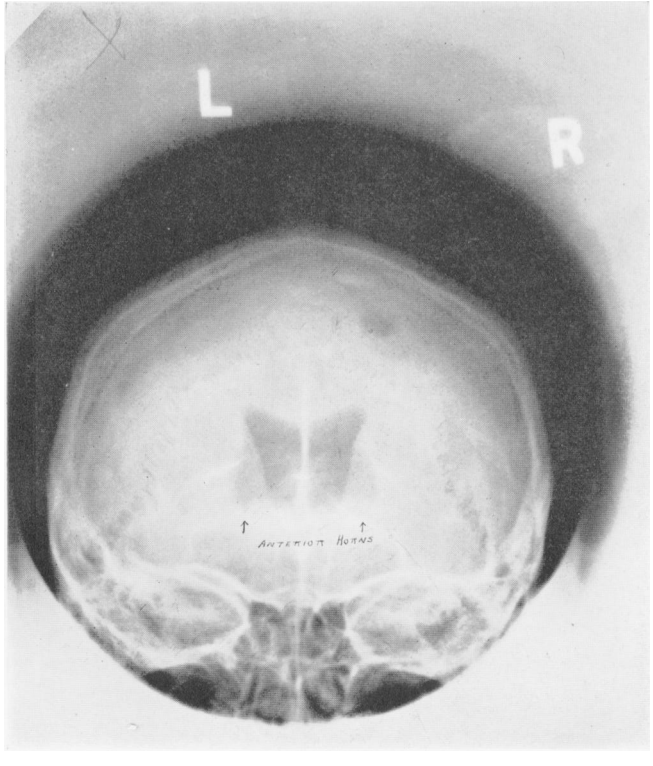

PLATE 2.
Anterior horns.

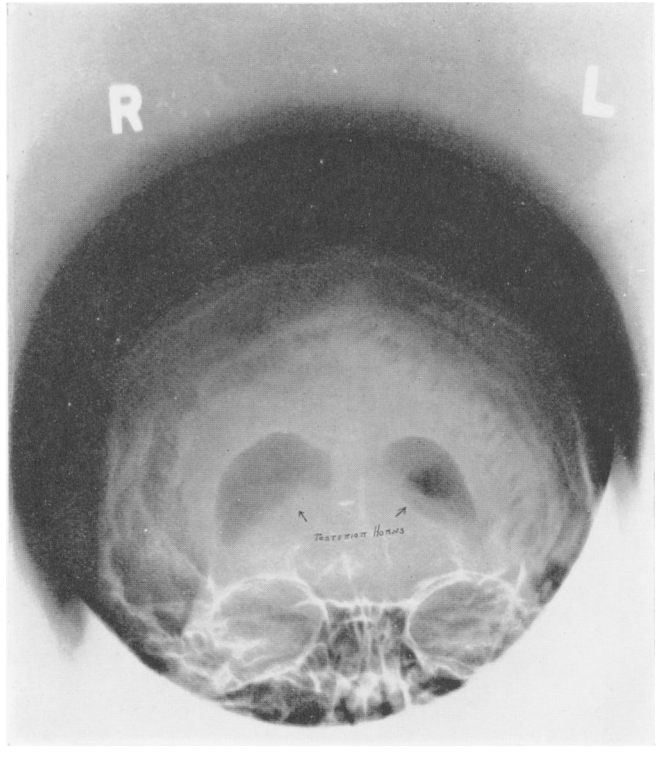

PLATE 3.
Posterior horns.

Surgical Aspects of Ventriculography*

By ADAMS A. MCCONNELL, F.R.C.S.I.,
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Surgeon to the Richmond Hospital, Dublin
Consulting Surgeon to Dr. Steeven's Hospital, Dublin
Consulting Neurological Surgeon to the Royal Victoria Eye and Ear Hospital, Dublin

I PROPOSE to deal with the surgical aspects of ventriculography, and at the beginning I want to emphasize two principles which are fundamental : first, the necessity for a clinical diagnosis before ventriculography is attempted; second, the necessity of being prepared to perform at a moment's notice any intracranial operation after ventriculography has been done.

The first principle may appear paradoxical, for if there be a clinical diagnosis, why do a ventriculography? In the great majority of cases a clinical diagnosis can be made, and the very absence of "localizing" signs localizes in some degree the lesion in certain regions of the brain. If clinical methods cannot tell us where a tumour is, they can nearly always point to some of the places in which it is not, and the side and site of the preliminary puncture of the ventricle must be determined by some sort of clinical localization. Moreover, one or both of the lateral ventricles may be displaced, and the finding of them may depend on clinical rather than anatomical data. When ventriculography is indicated, the ventricles are probably not normal. Again, it is wrong to pass a needle into a vascular tumour, and the clinical history apart from the clinical signs may give some indication of the nature of the growth. To perform ventriculography before, for instance, examining the visual fields in cases where perimetry is practicable, may be a very culpable short cut. Formerly ventriculography was done if the tumour could not be localized otherwise. Now it is done, not only for that reason, but also to confirm the clinical diagnosis and to give more precise information about the site and the size of the growth. On the interpretation of the ventriculograms depend the size and situation of the operative exposure, and these may determine the success of the operation.

The second fundamental principle is preparedness—not merely for an emergency decompression, ventricular puncture, or dehydration, but for formidable procedures like removal of a pineal tumour or of a tumour of the third or fourth ventricle. When intracranial pressure is high, there is a sort of balance between the various intracranial forces. The mere puncture of a ventricle will disturb this balance, and a tumour may slip or swell sufficiently to exert fatal pressure on some vital area. If a simple puncture will do this, how much more the introduction of any foreign gas or fluid. One must be prepared, for instance, to carry out some method of artificial respiration until breathing can be restored by operation. Once fluid appears the die is cast, and there is no looking back. Fortunately, such emergencies are not frequent, but only the blind do not see them. Ventriculography is only safe when it

*Abstract of a paper read before the Ulster Medical Society, 13th February, 1936.

is regarded as dangerous. Whether the anterior or the posterior horns are chosen for puncture depends, as has been pointed out, on the clinical probabilities. If the anterior be chosen, the face is kept down during the procedure; if the posterior, it is kept up. The posterior route is more commonly used.

The technique is simple, but must be exact. Two drill openings are made at corresponding points just above the lamboid suture and level with its apex. These openings overlie the back of the parietal lobes and so avoid the visual areas. They are made large enough to permit deliberate opning of the dura and inspection of the cortex. Frequently a large cortical vein is exposed, and it is wise to avoid puncturing it. A fine, blunt needle with obturator is passed into the ventricle of one or both sides, according to the type of case being investigated. When fluid comes from the needle a rubber connection is made between the needle and a three-way tap attached to a 10 c.c. syringe. A few c.c. of fluid are slowly withdrawn and replaced by an equal amount of filtered air or oxygen. If it be remembered that the maintenance of balance referred to above is essential, it is obvious — one, that minimum amounts of fluid and air be interchanged; and two, that the interchange must be carried out slowly. No fluid must be allowed to escape rapidly. If it does so, the ventricle may collapse and it may be impossible to introduce air at all, for if fluid is not obtained after *each* injection of air there is no certainty that the needle is still in the ventricle. The ventricle is not a cavity with rigid walls : it resembles more a thin, rubber bag. When no more fluid can be obtained, the needle is left open and in a dependent position, in order to allow any excess of air to escape. Manipulation of the head may bring more fluid to the needle at this stage.

How far one proceeds towards complete evacuation of the cerebro-spinal fluid depends again on the clinical estimate of the case. Twenty c.c. from one ventricle may be enough for a suspected temporal lobe tumour; every drop that can be obtained by repeated manipulations of the head and through needles in both ventricles may not be sufficient to give a complete visualization of the third ventricle. There is not enough time to go into details to-night. Those who are interested should consult Dandy's classical papers on the subject. My aim is to mention some of the points which my own experience has led me to emphasize.

Figure 1 illustrates the deformity and displacement of the lateral ventricles produced by a right parasagittal meningioma. The clinical symptoms in this patient suggested a temporal lobe tumour.

Figures 2 and 3 show thorotrast in the ventricles in a case of a left frontal glioma. The lateral view makes the deformity of the left ventricle very obvious. Air had been tried previously in this case, but as only 5 c.c. of fluid had been evacuated there was too little air to show. This is one clear indication for the use of thorotrast, and in such cases we have found thorotrast quite safe.

Figure 4 is a typical ventricular picture produced by a large glioma of the anterior part of the temporal lobe. The right ventricle is occluded, the left pushed laterally, and the third ventricle is oblique.

When ventriculograms reveal symmetrical dilatation of the lateral ventricles, the essential problem is to determine the site of ventricular obstruction. This calls for

complete lateral visualization of the third ventricle, of the aqueduct, and the fourth ventricle. In our experience the only certain way to do this is to inject thorotrast, but we are not at all sure that thorotrast is safe in such cases. When thorotrast gets into the sub-arachnoid space it produces shock. If the ventricular system is open, the shock occurs during the radiographic examination, and the patient is in good condition to withstand it. If the ventricular system is closed, the shock occurs when the block is relieved, and this relief is only obtained towards the end of a long operation, when the patient is in the worst possible condition to combat it. So far it is wiser to attempt visualization of the third ventricle with air than with thorotrast.

Ventriculography gives essential information which can be obtained at present in no other way, but it is safer to regard it as part of an extensive surgical operation than as a simple diagnostic procedure. My remarks, of course, have been confined to ventriculography in cases of brain tumour associated with increased intracranial pressure.

Specific Desensitization in Ocular Tuberculosis: An Account of Cases

By J. Allison Corkey, M.D., F.R.C.S.I., D.O.M.S.,
from the Benn Hospital, Belfast

The method of treatment which is carried out by Meller and Urbanek in Vienna in dealing with tubercular affections of the eye is of interest in that it illustrates a new principle in the therapeusis of this disease, namely, that of desensitization of the patient who is considered to have an allergic sensitivity to the protein of the tubercle bacillus.

In introduction, a brief account may be given of the eye conditions which these authorities consider to be due to tuberculosis and of the rationale which underlies this form of treatment.[1]

Allergy as a Factor in Ocular Tuberculosis.

According to Urbanek, the underlying cause of any inflammation in the eye may be tuberculosis. He recognizes a general condition of chronic miliary tuberculosis in which from time to time showers of emboli are distributed from an almost quiescent tuberculous focus by the blood-stream, causing numerous miliary nodules throughout the tissues. The condition is recovered from, and in most areas of the body the tracts of the lesion, being small, are rapidly covered up. In the eye, however, owing to the delicacy of its structure, even this minimal inflammation causes an important lesion, and its progress can be watched through all stages. According to the site of lodgment of the embolus in the sclera, iris, choroid, or retina, there is set up a corresponding inflammation.[2]

The difference in the pathological picture between the primary reaction in an organism infected with the tubercle bacillus and the reaction in secondary sites is

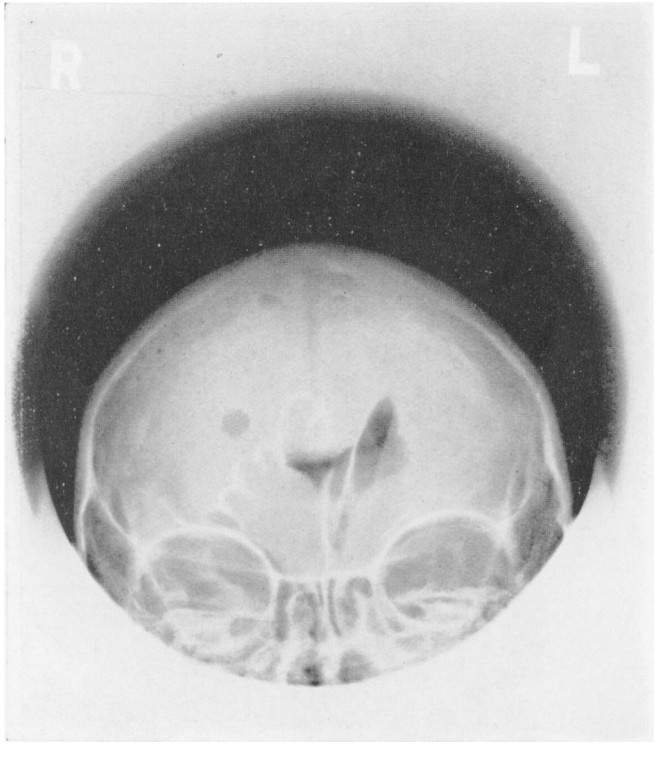

FIG. 1—Right parasagittal meningioma.

Note displacement of ventricles to the left; obliquity of third ventricle; and the flattening of the right ventricle by pressure from above.

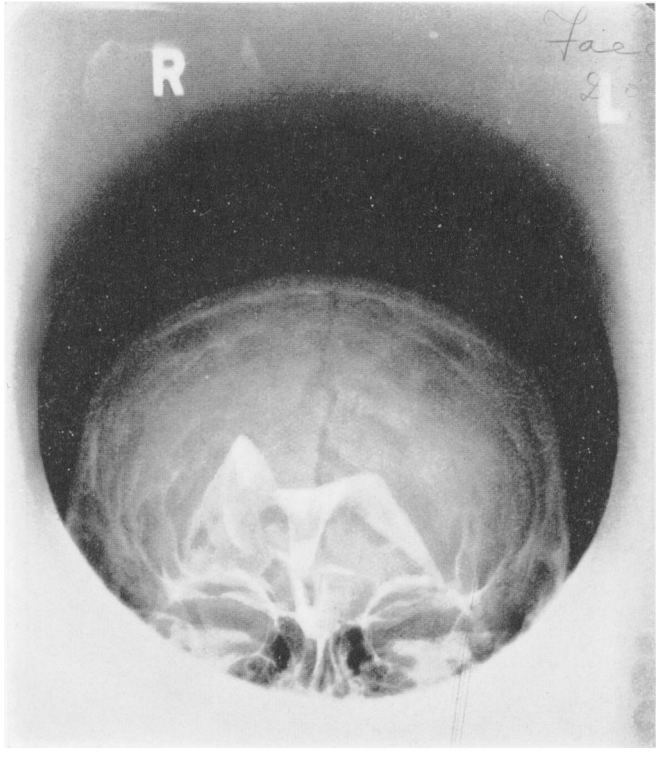

FIG. 2—Left frontal glioma.

Note displacement of both ventricles to the right and the marked deformity of the left.

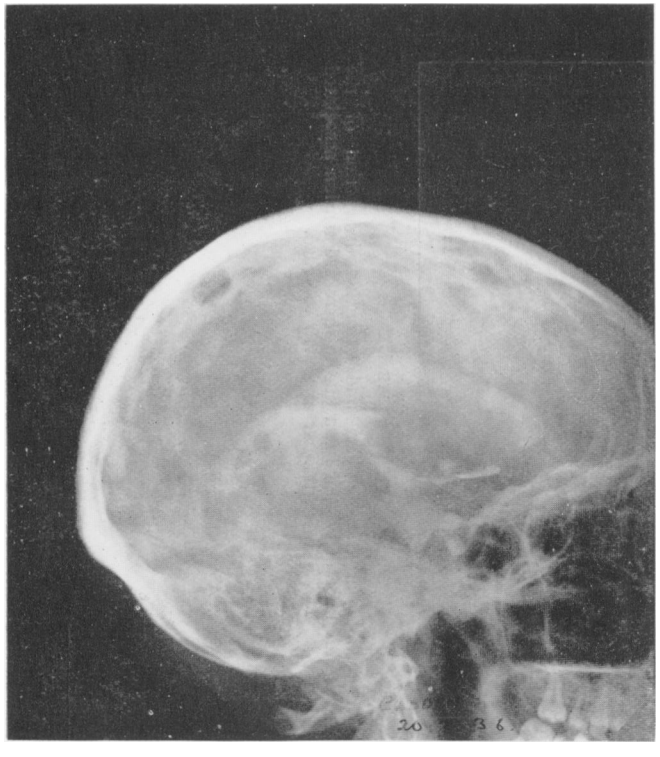

FIG. 3.

Lateral view of same patient as shown in Fig. 2. Note right ventricle is uniformly outlined. Left ventricle shows a filling defect so that only a little thorotrast is shown lining its floor. The third ventricle shows clearly.

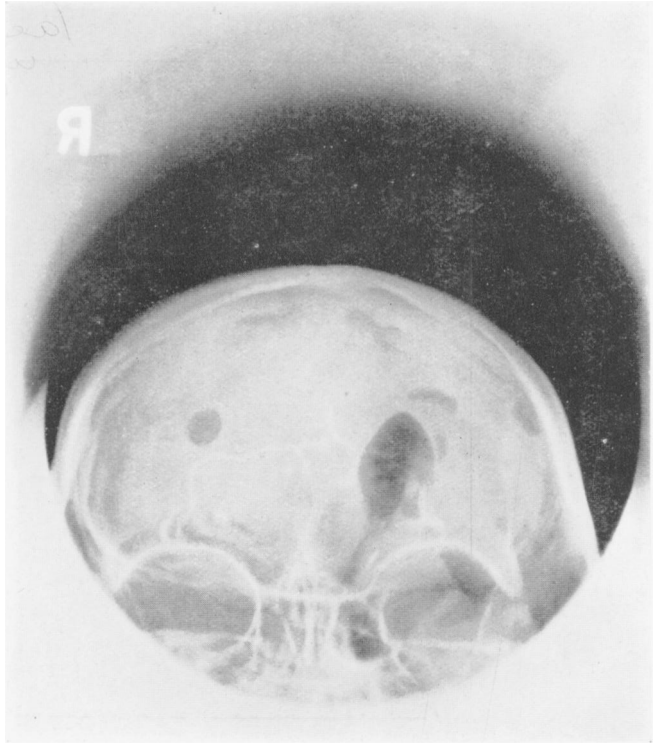

FIG. 4—Large right temporal lobe tumour.

Note that both the third and lateral ventricles are displaced to the left and that no air has passed into the right side.

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The difference in the pathological picture between the primary reaction in an organism infected with the tubercle bacillus and the reaction in secondary sites is

a well recognized phenomenon.[3] In order to account for this fact, one may recall that the tubercle bacillus, in addition to elaborating tuberculo-toxin, contains, or rather is composed of, proteins.

It is possible that the altered reaction to the secondary infection is due to an alteration in the sensitivity of the body-fluids to this protein factor rather than to the toxin. To put the matter in another way, the body has become allergic to the tuberculo-protein, and the type of lesion which is called by pathologists a secondary reaction has a double basis—the response due to the tuberculo-toxin is overlaid by the allergic response caused by sensitivity to tuberculo-protein.

Now, all lesions of the eye as described above are secondary, and on this theory are due in part to an allergic response. Furthermore, it is possible that in a person who has had such a lesion, and whose tissues remain in a sensitive state, the condition may be lit up again by the introduction of the sensitizing agent into the body, or even by the introduction of some other protein (thus giving rise to a non-specific reaction). In this case a lesion may be present without there being any tubercle bacilli at the site of the lesion, but only a localized allergic sensitivity due to a previous tubercular inflammation.

Recognition and Treatment of Hypersensitivity.

If one takes this view of the condition, the therapeutic problem resolves itself into the desensitizing of a patient whose tissues present an allergic response when confronted with a specific protein. Meller and Urbanek use for this purpose a substance known as Toeniessen's "tebeprotin," which the manufacturers claim contains the protein element of the tubercle bacillus without including the toxin.

Before embarking on the treatment of a case believed to be of this nature, every endeavour should be made to exclude other possible causes, e.g., syphilis, gonorrhœa, diabetes, and focal sepsis, and it should be ascertained that there is no gross pulmonary tuberculosis. (Urbanek finds minor gland infection to be the rule.)

If these conditions can be excluded, the patient is admitted to hospital for a skin test, to investigate for hypersensitivity to tebeprotin. This is done after it has been ascertained that the patient while at rest in bed has no pyrexia when the temperature is taken every four hours. Successive tests are made with gradually increasing doses administered, with a control, intradermally on the arm, until either a positive reaction has been obtained or the patient has been shown to have no hypersensitivity to the substance. A positive reaction is one in which the diameter of the reactionary swelling exceeds 3 c.m. after forty-eight hours.

The initial therapeutic dose is one-tenth of that which gives a positive reaction, and gradually increasing injections are given up to a maximum of five-hundredths mgm. The injections are given at regular intervals over a period of several months. A warning must here be given that it is possible to precipitate a catastrophe by an unwise injection of protein, either by giving too large an amount or by letting too long a period elapse between injections and so allowing an anaphylactic state to arise. The disaster may occur in the eye, or other tuberculous lesion, as an excessive focal reaction, or there may be a generalized anaphylactic shock. It is probably on

account of such misadventures that tuberculin therapy has at times fallen under a cloud, but trouble can be avoided if sufficient attention is given to the dosage and the timing of the injections. The difficulty of deciding what initial dose should be given is solved by the skin test, which ensures that the initial dose is not excessive and is on the other hand sufficiently potent to exert some effect.

The following cases seen and treated at the Benn Hospital during the past two years are an illustration of the indications for treatment. In general it may be stated that if benefit is going to ensue, it is noticed at an early date, in some cases even immediately after the diagnostic skin injections.

Cases.

Case I—S. D., male, aged 33. Right retinal detachment. No hole could be found, and the condition was considered to be due to choroiditis on account of a small, fairly recent choroiditic lesion in the portion of the retina that was not detached. The Wassermann reaction was negative, but there was a previous history of treated spirochætal infection. Tebeprotin skin tests were done, and he reacted positively to dilution II. He was given sixteen injections over a period of three months, increasing up to the maximum. The eye condition at the end of treatment was unchanged, but the patient found his general condition much improved.

Case II—L. G., male, aged 28. Keratitis and iritis, right eye. Wrinkling of Decemet's membrane. Numerous synechia of iris to lens capsule. The slit lamp revealed early signs of iritis in the left eye also. The synechiæ in the right eye were completely ruptured by the use of mydricaine, but ten days after the onset there was obvious K.P. in either eye. The Wassermann reaction was negative. The patient was admitted for testing with tebeprotin, and found to be sensitive to dilution II. He was given injections over a period of four months, during which his eye condition progressively cleared up. Seen recently, a year later, the eye was quiet and the only trace of the inflammation was a few small tags of pigment on the lens capsule. Vision in each eye 6/6.

Case III—D. L., female, aged 16. Choroiditis. The right eye was blind from an old injury received in early childhood. For some days the patient had noticed a 'spot' before the left eye situated on the temporal side of the fixation spot. On the morning of the day when she first came to hospital she wakened up to find that the left eye had become blind, and she had to be led into the out-patient department. The vision was reduced to seeing hand movements only, and through considerable vitreous opacity a focus of choroiditis was made out on the nasal side of the disc.

There was K.P. present, and the slit lamp showed very numerous floating cells in the aqueous. She was admitted to hospital for investigation and treatment. Treatment consisted in leeching and atropinizing the eye and administering mist. sod. salicyl. The Wassermann reaction was negative. The patient was found to be sensitive to dilution I of tebeprotin. Regular injections were given over a period of four months, during which time the condition gradually cleared up, leaving a minimal amount of destruction of the choroid. At the end of that time the visual acuity, with correction, was 6/9 partly. When last seen, ten months after

the onset of the trouble, the condition had been maintained, the visual acuity was 6/9, and the small degree of destruction caused by the disease was emphasized by the considerable proliferation of retinal pigment which had taken place at the site of the inflammation. (A more severe inflammation would have destroyed these pigment cells and left a white area with a pigmented margin.)

Case IV—M. L., female, aged 22. Eroding lesion of right upper lid, which had been present three months when patient was first seen. The condition was said to have started as a small pimple, and vaccine treatment had already been given without effect. The middle portion of the lid had been eaten into, and the margin and hair follicles here had been destroyed. The Wassermann reaction was negative, but in spite of treatment for two months more the lesion showed no tendency towards healing. She was admitted to hospital, and showed a positive reaction to dilution I of tebeprotin. The lesion healed rapidly after the diagnostic injections. A possible factor in this result was the use for one day during the test of a vaccine filtrate containing ointment. Tebeprotin injections were given over a period of two months, increasing to the maximum doses. The lesion has remained healed.

Case V—L. M., female, aged 22. Diffuse retino-choroiditis, right eye, giving rise to detachment of retina. Wassermann reaction negative. No hole could be found in the retina. Tebeprotin test : sensitive to dilution II. Injections given over a period of five months. No improvement.

Case VI—F. E., female, aged 35. Chronic choroiditis, left eye. The right eye had been removed some years previously on account of pain. The sight in it had been destroyed by a similar inflammation. The origin of the trouble had been ascribed to an operation for squint in childhood, and the left had been the squinting eye. On examination, central vision was found to be absent and the visual field was limited to the lower temporal region. The fundus presented the picture of disseminated choroiditis, most of the lesions being old. There was, however, a region where the disease appeared active, and the patient complained that her vision was getting worse. The blood sedimentation was found to be much raised. The response to the tebeprotin test was atypical. There was no skin reaction, but the patient was considerably upset generally, and showed a temperature of 100.6 degrees following the use of dilution II. She was started on a dose one-tenth the strength of that which produced the reaction and worked up to the maximum dose over a period of six months. The patient reported that she found her vision much improved.

Case VII—S. M., female, aged 59. Right eye had been removed following inflammatory disease thirty years previously. Left eye had been diseased since childhood. The patient complained of flashes of light coming frequently before the left eye. Examination revealed extensive old-standing choroiditis. The lens had been dislocated, and was seen lying in the vitreous. There was a family history of phthisis, and the patient had recently been much troubled with Bazin's disease. To the tebeprotin test she showed a strong reaction with dilution II. Injections were started, and have now been given for four months. The flashes of light now occur very seldom, and since commencing the injections no further nodules have appeared on the shins.

Case VIII—H. W., male, aged 21. Left choroiditis. The patient, whose vision in the left eye was 6/6, complained of failing vision in this eye. There was seen to be a ring of choroiditic spots around the macula. Wassermann reaction negative. The tebeprotin test was positive to dilution II. The patient lived in the country and did not return for injections.

Case IX—D. R., male, aged 34. Iritis, left eye. The patient was first seen after the eye had been inflamed for one week. There was marked ciliary congestion, and the iris vessels were much dilated. With the slit lamp, cells could be seen floating in the anterior chamber. In spite of treatment, no improvement had taken place two weeks later. The Wassermann reaction was negative. Tebeprotin positive to dilution I. The patient was given injections up to the maximum over a period of three months. The eye settled down rapidly following the initial diagnostic injections. Seen a year later, the eye was perfectly quiet, except for one old posterior synechiæ, and the vision was 6/6.

Tests were also carried out on a number of cases (scleritis, retinitis, choroiditis, iritis (two cases), and disciform keratitis), where the Wassermann reaction was negative. In these, all adults, there was no reaction to tebeprotin. One case of phlyctenular conjunctivitis in a child which had been very resistant also cleared up during the time she was getting the diagnostic injections, although there was no cutaneous response. A youth (heterochromic cyclitis) also gave a negative result.

Comment.

On account of the limited number of cases here presented, no attempt is made to draw any definite conclusions. There are, however, a few suggestive points that arise :—

1. A number of cases of uveal inflammation give a positive result to the cutaneous test and responded to the use of tuberculo-protein as a desensitizing agent. This applies both to acute and chronic cases, though better end-results have been obtained in acute cases before extensive destruction of tissue has taken place.

2. About one-third of the adult patients examined gave a negative response to the cutaneous test for hypersensitivity to the protein.

3. A proportion of the reacting cases failed to show any improvement after desensitization.

4. The method gauging the initial dose is important. It ensures that the dosage is effective, and yet within the patient's tolerance. Unless care is exercised in the dosage and in the interval between doses, it is possible to do the patient more harm than good.

5. It is difficult to prove that the effect is a specific one. No focal reactions have been noted in the present series, but none were expected on account of the control of the dosage. In Case VIII, in which there was a tuberculous family history and in which as well as the eye disease there were other tuberculous manifestations (Bazin's disease), the therapy seemed to produce an equally ameliorative effect on both lesions. The question can only be settled by the study of many more cases, but the results obtained in this small series seem to indicate that such study would be well worth while.

SUMMARY.

1. Some account is given of the view of Meller and Urbanek that many chronic eye diseases are due to an allergic sensitivity of the tissues to the protein of the tubercle bacillus. They advocate treatment by desensitization, as is done in diseases due to hypersensitivity to other proteins (e.g., hay fever, asthma).

2. A record is given of the results of treatment in a small number of cases. While not successful in every case, the results were sufficiently good to warrant further research in the method.

I wish to acknowledge the kindness shown by Prof. Meller and Dozent Urbanek in demonstrating this method of treatment to me at the First University Eye Clinic, Vienna, and I should like to thank the senior members of the staff of the Benn Hospital for their co-operation in carrying out this work, and in particular Dr. R. S. Allison for his assistance in the general physical examination of the patients.

REFERENCES.

1. URBANEK, *Trans. of the Ophth. Soc. of U.K.*, Vol. 52, 1932, p. 227.
2. TOOKE, *Brit. Jour. of Ophth.*, January, 1936, p. 23.
3. BOYD, "Pathology of Internal Diseases," 1931 Edition, pp. 201, 213.

The Effect of Arsenic Preparations (Neoarsphenamine and Silver Arsphenamine) on the Protein Fractions of Blood Plasma in Syphilis and Disseminated Sclerosis

By D. C. PORTER, M.B., B.CH.,

from the Department of Pharmacology, Queen's University, Belfast

IN the course of a study of the alterations in some physico-chemical properties of the blood following various therapeutic and diagnostic measures, the blood-plasma protein fractions were examined in a series of cases, before and after injections of arsenic. Ten patients were examined. Nine of these suffering from primary syphilis were treated with neoarsphenamine, and one suffering from disseminated sclerosis was treated with silver arsphenamine. The subjects used were chosen at random from the venereal out-patient department of the Royal Victoria Hospital, Belfast.

The method used for separation of the plasma protein fractions is that described by Peters and Van Slyke (1932), a modification of the method originally used by Howe (1921). In this method sodium sulphate solutions in strengths of twenty-two per cent. and fourteen per cent. are used for the precipitation of total globulin and euglobulin plus fibrinogen fractions respectively. These solutions are super-saturated and necessitate precipitation in an incubator at 37°C. The fibrinogen fraction was estimated by recalcifying the plasma and washing the clot with saline. The total plasma protein was estimated directly using a 1 in 25 solution in 0.8 per cent. sodium chloride. The nitrogen estimations were done by the micro-Kjeldahl

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method. From the four estimations described all the protein fractions of the plasma were calculated.

Block (1933), and Block, Darrow, and Cary (1934), by determination of the basic amino acids of serum protein, made observations which throw some doubt on the idea that living serum contains two proteins or two groups of proteins which are usually classified as albumins and globulins. They suggest that the proteins obtained from blood serum by the usual physico-chemical methods are not of a constant amino acid composition, but are artificial products produced by the reagents employed in their attempted separation. Whether or not, however, protein fractions exist as separate entities in living plasma, is not under consideration in this work; when the various fractions are mentioned as such, the names merely indicate those portions of the plasma protein precipitated under certain experimental conditions which are maintained from day to day as constant as possible.

The only parallel work found in the literature by the writer is that of Lloyd and Paul (1929) on the treatment of kala-azar with von Heyden's compound 693. In kala-azar the albumin-globulin ratio is very low, due to a greatly increased globulin fraction, chiefly euglobulin, which Lloyd and Paul found to be consistently about forty per cent. of the total globulin, instead of the normal value of about five per cent. In addition to this increase in globulin, there is a decrease in albumin. After treatment with eight injections of von Heyden's compound, the albumin-globulin ratio returns to normal. Lloyd and Paul mention similar work which they have done on the effects of salvarsan on the plasma protein fractions in the treatment of syphilis, but so far as is known this work has not yet been published.

Space does not permit publication of complete tables showing results of estimation of plasma protein fractions in various pathological conditions and in normal individuals. Some mention must be made, however, of the deviation from normal which occurs in the nine syphilities under consideration. On examination before treatment, all show a low albumin-globulin ratio, that is, a ratio in the region of 1.6 :1, instead of the value found for normal individuals, viz., about 2.4 :1. This is due to an increase in the globulin fraction, and to a less extent a decrease in the albumin fraction. All show a definitely increased fibrinogen fraction. Eight out of the nine show an increased euglobulin fraction, but there is, in fact, no change in any individual globulin sub-fraction comparable in magnitude to the change in euglobulin found in kala-azar. One case of disseminated sclerosis examined also showed a low albumin-globulin ratio, entirely due to an increase in globulin, all three globulin fractions being increased.

In these ten cases the extent of the deviation is perhaps small, but the regularity with which deviations in one direction occur is striking.

The effects of arsenic may now be considered. In some of the cases used the blood was examined several times after varying numbers of injections. The time allowed to elapse between the injection of neoarsphenamine and examination of blood varied from half an hour to several days. The immediate effects were found to be negligible. Only after a course of several injections was any change found, and even this was not a very marked change.

FIG. I

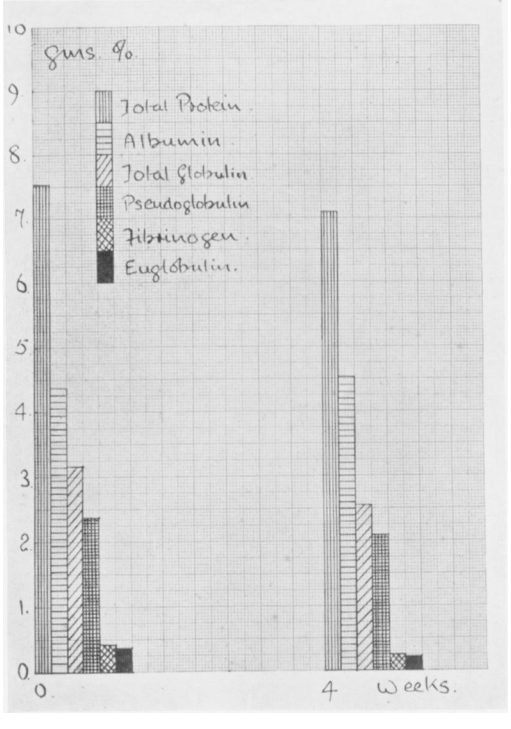
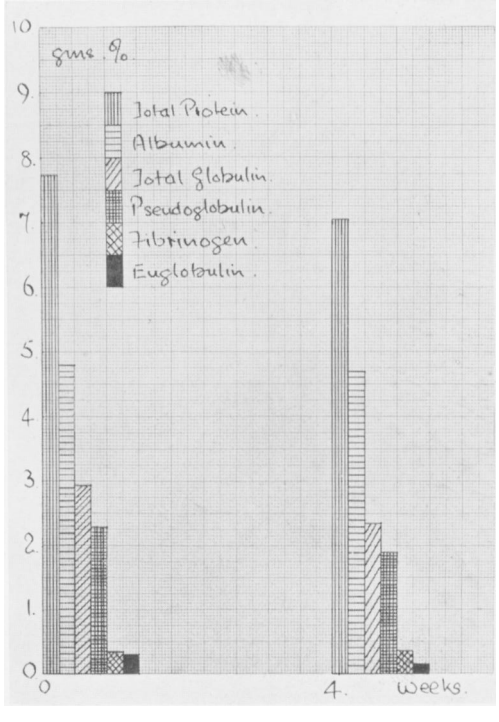


FIG. II



Figures to show the effect on the plasma protein fractions of (1) neoarsphenamine in primary syphilis and (2) silver arsphenamine in disseminated sclerosis. Note the decrease in globulin fractions, particularly the euglobulin fraction, and the resultant increase in albumin-globulin ratio.

Table 1 gives some idea of the values found for normal individuals, and of the tendency for the plasma protein fractions of patients treated with arsenic to return to normal.

TABLE 1.

VALUES FOR BLOOD-PLASMA PROTEIN FRACTIONS.

	Average Normal	*Before Arsenic*	*After Arsenic*
Total protein - -	6.997	7.529	7.074
Albumin - - -	4.908	4.358	4.519
Total globulin - -	2.089	3.172	2.555
Albumin-globulin ratio -	2.41 :1	1.37 :1	1.80 :1
Pseudo-globulin - -	1.632	2.381	2.098
Euglobulin - - -	0.144	0.383	0.222
Fibrinogen - - -	0.279	0.409	0.235

Table showing average normal values for plasma protein fractions, and the values in a syphilitic patient before and after injections of arsenic. The results were similar for the other syphilitics and the one case of disseminated sclerosis examined.

Fig. 1 shows the effects on the plasma proteins of a syphilitic patient of a course of eight injections of neoarsphenamine extending over a period of four weeks.

Fig. 2 shows the effect on the plasma proteins of a patient suffering from disseminated sclerosis of a course of four weekly injections of silver arsphenamine.

It may be seen that the albumin-globulin ratio increased after a course of injections. This was due, to some extent, to an increase in the albumin fraction, but chiefly to a decrease in the globulin fractions, and the relatively large decrease in the euglobulin fraction as seen from figs. 1 and 2 is striking.

As the albumin-globulin ratio in primary syphilis or disseminated sclerosis is not so markedly diminished as in kala-azar, it is not expected that such definite changes will be found with treatment. Nevertheless, the albumin-globulin ratio in the above conditions is definitely sub-normal, but after treatment with arsenic approaches the average value for normal individuals.

I should like to thank Dr. J. C. Rankin for permission to examine his patients, and the nursing staff of the venereal out-patient department of the Royal Victoria Hospital, Belfast, for assistance in obtaining blood specimens.

BIBLIOGRAPHY.

BLOCK, R. J., 1933, *Journal of Biological Chemistry*, Vol. 103, p. 261.

BLOCK, R. J., DARROW, D. C., AND CARY, M. K., 1934, *Journal of Biological Chemistry*, Vol. 104, p. 347.

HOWE, P. E., 1921, *Journal of Biological Chemistry*, Vol. 49, pp. 93 and 109.

LLOYD, R. B., AND PAUL, S. M., 1929, *Indian Journal of Medical Research*, Vol. 16, p. 203.

PETERS, J. P., AND VAN SLYKE, D. D., 1932, *Quantitative Clinical Chemistry*, Vol. 2, p. 710.

A Comparison of H-ion Changes in Roller Tube Cultures of Five Pure Strains of Rat Sarcoma Cells and One Strain of Normal Rat Fibroblasts*

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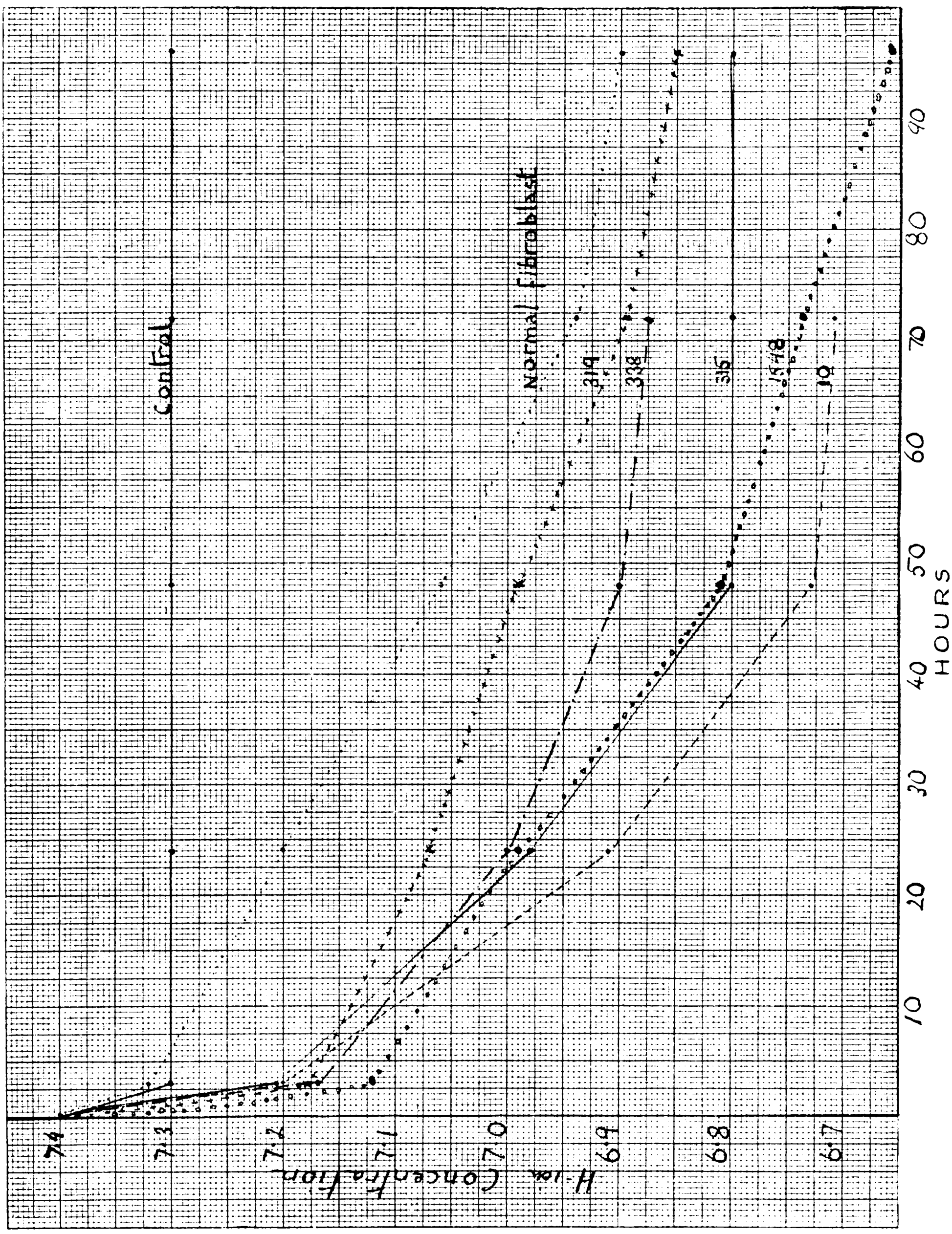
Since Warburg showed in 1927 that excessive glycolysis with the production of lactic acid is a quality of malignant cells, many confirmatory tests have been made according to his method, but almost no work has been done on the acid production of pure strains of malignant cells growing *in vitro*. Carrel and Ebeling found that flask cultures of pure strains of Crocker rat sarcoma No. 10 and Jensen rat sarcoma produced more acid than normal fibroblasts. They used phenol red as an indicator, and state that "although they were in practically identical metabolic conditions, the sarcomatous tissue became bright yellow, while the normal cells remained pinkish-orange."

Since there are, according to W. H. Lewis, definite cytological and cultural distinctions between the malignant cells of the different rat sarcomas that he has studied in pure strains cultivated *in vitro* for periods of from nearly two to more than four years, it seemed possible that these tumour cells, which showed such obvious morphological distinctions, might also show metabolic differences, and that this might be demonstrated by their capacity to produce acid as measured by the changes in the H-ion concentration of the supernatant culture fluid from hour to hour and day to day.

Method.—Roller-tube cultures were set up for pH estimation from Dr. Lewis's pure strains of malignant cells of the following rat sarcomas :—Crocker round-cell sarcoma No. 10, Crocker polymorphous cell sarcoma No. 1548, Walker round-cell sarcomas Nos. 315 and 319, and Walker polymorphous cell sarcoma 338. After cultivation for three to six weeks in roller tubes, tests were made at approximately the following ages *in vitro*:—No. 10 at 680, No. 1548 at 725, No. 315 at 575, No. 319 at 740, and No. 338 at 1,530 days. A strain of normal fibroblasts from a young adult rat was also set up. A thin layer of chick plasma was used as a lining for the tube in all cultures; eight pieces, $\frac{1}{2}$-$\frac{3}{4}$ mm. in diameter, from pure colonies of tumour cells, were placed in each tube and the plasma clotted with chick embryo extract. The supernatant fluid 1 c.c. consisted of a mixture of horse serum, chick embryo extract, and saline solution in the proportions of 2 : 1 : 2. In cultures of fibroblasts and tumour 338, it was found necessary to add to this one drop of rat serum to get a healthy growth. Cultures were maintained for three to six weeks by transfer or patching when necessary, and changes of supernatant fluid were made every four

*Aided from the grant to Dr. and Mrs. Warren H. Lewis by the International Cancer Research Foundation.



Control
Normal fibroblast
319
338
315
1548
10
H-ion Concentration
7.4
7.3
7.2
7.1
7.0
6.9
6.8
6.7
10
20
30
40
50
60
70
80
90
HOURS

L

days before they were utilized for tests. The tubes were 25 c.c. volume. At the end of this time a series of tubes was selected, which showed, as far as possible, the same amount and the same condition of growth. Those tubes were chosen which contained eight healthy colonies 5 mm. in diameter, or its equivalent, in which there was no liquefaction of the plasma and no obvious deposition of fat in the cells. It was necessary to have, as nearly as possible, the same amount of growing tissue in each tube, as the total acidity produced was found to be in proportion to the amount of tissue growing in a tube. This was demonstrated by estimating the pH in a series of tubes containing two, four, and eight colonies respectively of the same tumour (315). The increase in acidity as measured by the changes in colour of the phenol red in this series was proportional to the number and size of colonies in each tube.

The tubes selected for pH estimation were throughly washed with saline solution. Eleven drops of supernatant fluid were added to each tube along with one drop of indicator, phenol red, solution, and the tubes were rapidly sealed. Phenol red was made up in normal saline in a strength of 0.2 per cent. and Arnoldized for forty minutes. Controls were made at the same time, using the same media. A standard series of similar tubes containing buffer solutions of known pH from 6.4 to 7.6 was made up with phenol red solution, and this series was used for colorimetric comparison with the culture tubes. Tubes were incubated, and readings taken at one, three, and five hours, and subsequently every twenty-four hours for three days. Average readings for all the tubes are given in Table I.

TABLE I.

AVERAGE CHANGE IN pH.

Tissue	*Start*	*3-hr.*	*24-hr.*	*48-hr.*	*72-hr.*	*96-hr.*
S. 10 -	7.4	7.2	6.91	6.73	6.71	—
S. 1548 -	7.4	7.17	6.99	6.81	6.74	6.66
S. 315 -	7.4	7.18	6.98	6.8	6.8	6.8
S. 338 -	7.4	7.17	7.0	6.9	6.9	—
S. 319 -	7.4	7.2	7.07	6.99	6.92	6.85
Fibroblasts -	7.4	7.32	7.2	7.06	6.94	6.9
Control -	7.4	7.29	7.29	7.29	7.29	7.29

Table II shows a graph for the average fall in pH for the different tumours and normal cells during three days.

While it is realized that with such a method, exact quantitative results are impossible, it is felt that these readings show a definite general difference in acid produced by the growth of the different tumours and of normal fibroblasts.

SUMMARY.

1. The changes in the H-ion concentration of supernatant fluid in roller-tube cultures of pure strains of malignant cells from five rat sarcomas—Crocker Nos. 10 and 1548, and Walker Nos. 315, 319, and 338—and one strain of normal fibroblasts,

were determined with phenol red during the first three days after a change of supernatant fluid.

2. All the tubes showed a rapid fall in pH during the first two hours. This was attributed to the setting up of an equilibrium between the CO_2 in the air of the tube and the supernatant fluid. In comparison with the control tubes, which never fell below the initial drop to 7.3 or 7.25 during the first two hours, all the tubes showed an increase in the production of acid during ninety-six hours incubation, the pH falling most rapidly during the first forty-eight hours.

Crocker No. 10 showed the greatest proportion of acid, the normal fibroblasts the least, and the other tumours showed a gradual decrease in the production of acid in the following order :—Crocker 1548, Walker 315, 338, and 319, as indicated by the colour changes.

I am indebted to Dr. Warren H. Lewis for making this work possible, for his advice and criticism, and for his generous supply of tumour material.

BIBLIOGRAPHY.

1. WARBURG, O., "Metabolism of Tumours." 1927.
2. CARREL, A., AND EBELING, A., *Jour. Exp. Med.*, Vol. 48, No. 1, 1928.
3. CARREL, A., AND EBELING, A., *Jour. Exp. Med.*, Vol. 48, No. 2, 1928.
4. GEY, G. O., *Amer. Jour. Cancer*, 17, 1933.
5. LEWIS, W. H., *Anat. Rec.*, 58, Suppl., 1934.
6. LEWIS, W. H., *Bul. Mt. Desert Island Biol. Lab.*, 1935.
7. LEWIS, W. H., *Contrib. to Embryology*, 1935.

Prognosis and Treatment of Epilepsy

By H. HILTON STEWART, M.D., M.R.C.P. LOND.

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WHEN all the causes of epilepsy have been considered, and when clinical examination, radiology, pathology, and biochemistry have yielded a negative result, there still remains a large group of cases which we are forced to term "idiopathic epilepsy." No doubt in time this group of epilepsies will disappear with the advance of knowledge, but until then empirical treatment is the only hope of relief. Included in this empiricism are general hygiene, diet, and drugs.

General hygiene merely requires the exercise of ordinary intelligence in such matters as choice of occupation and amusement. For example, the epileptic must never be employed where he will be required to manage machinery, or to drive a motor-car. A fit under such circumstances often proves disastrous, not only to the patient, but also to others. In the realm of sport it is seldom that an epileptic takes a fit while actually playing a game: it more frequently occurs after the game is over. "How rarely does a fit occur in any epileptic when either mind or body is at a high physiological level of activity."[1] Nevertheless, such sports as swimming, flying, etc., should be discouraged. Kinnier Wilson's dictum in regard to the mental

were determined with phenol red during the first three days after a change of supernatant fluid.

2. All the tubes showed a rapid fall in pH during the first two hours. This was attributed to the setting up of an equilibrium between the CO_2 in the air of the tube and the supernatant fluid. In comparison with the control tubes, which never fell below the initial drop to 7.3 or 7.25 during the first two hours, all the tubes showed an increase in the production of acid during ninety-six hours incubation, the pH falling most rapidly during the first forty-eight hours.

Crocker No. 10 showed the greatest proportion of acid, the normal fibroblasts the least, and the other tumours showed a gradual decrease in the production of acid in the following order :—Crocker 1548, Walker 315, 338, and 319, as indicated by the colour changes.

I am indebted to Dr. Warren H. Lewis for making this work possible, for his advice and criticism, and for his generous supply of tumour material.

BIBLIOGRAPHY.

1. WARBURG, O., "Metabolism of Tumours." 1927.
2. CARREL, A., AND EBELING, A., *Jour. Exp. Med.*, Vol. 48, No. 1, 1928.
3. CARREL, A., AND EBELING, A., *Jour. Exp. Med.*, Vol. 48, No. 2, 1928.
4. GEY, G. O., *Amer. Jour. Cancer*, 17, 1933.
5. LEWIS, W. H., *Anat. Rec.*, 58, Suppl., 1934.
6. LEWIS, W. H., *Bul. Mt. Desert Island Biol. Lab.*, 1935.
7. LEWIS, W. H., *Contrib. to Embryology*, 1935.

Prognosis and Treatment of Epilepsy

By H. HILTON STEWART, M.D., M.R.C.P. LOND.

Hon. Physician, Hospital for Nervous Diseases, Claremont Street, Belfast

WHEN all the causes of epilepsy have been considered, and when clinical examination, radiology, pathology, and biochemistry have yielded a negative result, there still remains a large group of cases which we are forced to term "idiopathic epilepsy." No doubt in time this group of epilepsies will disappear with the advance of knowledge, but until then empirical treatment is the only hope of relief. Included in this empiricism are general hygiene, diet, and drugs.

General hygiene merely requires the exercise of ordinary intelligence in such matters as choice of occupation and amusement. For example, the epileptic must never be employed where he will be required to manage machinery, or to drive a motor-car. A fit under such circumstances often proves disastrous, not only to the patient, but also to others. In the realm of sport it is seldom that an epileptic takes a fit while actually playing a game: it more frequently occurs after the game is over. "How rarely does a fit occur in any epileptic when either mind or body is at a high physiological level of activity."[1] Nevertheless, such sports as swimming, flying, etc., should be discouraged. Kinnier Wilson's dictum in regard to the mental

hygiene of the epileptic adequately sums up the situation: "An atmosphere of normality should be sedulously cultivated."[2] The epileptic must not be treated as "the invalid" or the "weak-minded" member of the family, as otherwise an irretrievable inferiority will develop. The question of vetoing marriage is still unsettled. That the disease runs in families is undoubted, and therefore marriage is inadvisable in the opinion of some. Whether the percentage of familial cases is great enough to warrant the advice to abstain from marriage does not appear to be finally decided.[3]

Diets in epilepsy have been numerous but unconvincing. The latest, the ketogenic diet, is perhaps the most logical on account of the fall in blood cholestreral just prior to the epileptic fit. It was hoped by the diet to prevent such a fall, and in fact Brain[4] reports very favourable results with its use. The great objection to this diet is a practical one. The patient will not stick to it on account of its nauseating effect, and if one is to judge its efficiency by the production of a ketosis, it is practically impossible to accomplish this outside an institution. It is also stated that such a diet only acts for a short time, that the body readjusts itself to the new type of treatment, and that fits occur in the presence of ketonuria. What the effect of this ketogenic diet is is not yet clear, but there is a strong probability that the results are due to the diuresis which accompanies the ketosis, in the same way as in pyelitis. The results in epilepsy might be explained by dehydration, and in practice the only dietetic advice given to the patients in the reported series of cases was to reduce the fluid intake.

Drug treatment in "cryptogenic"[6] epilepsy is indispensable, in spite of other forms of medication. Many authorities still use bromides as the sheet anchor in therapeutics. There is much to be said in their favour, as having a time-honoured reputation, but the tolerance so soon acquired, the inconvenience of carrying medicine around wherever one goes, and the unmistakable branding of the rash, are very strong arguments against the use of the bromine salts. Therefore, if any other drug could be found as an adequate substitute without the inconvenience, it would certainly simplify treatment.

In order to avoid such inconvenience and at the same time exercise at least equal efficiency, the use of phenobarbital has become more and more prevalent as time goes on. As far back as 1924[7] Collier stated, "They (malonyl urea compounds) do not seem to affect the general health adversely, or to lose effect with prolonged administration." That the phenobarbital tablets are convenient to carry around is undisputed, and in order to assess the value of their qualities in controlling epilepsy I have chosen at random twenty-five cases treated solely with a reliable brand of phenobarbital and analyzed their results. The cases were so arranged that the patient did not know what drug was prescribed. The drug was only supplied by the hospital dispenser, so that the same brand was used by all.

The criterion of the epileptic fit was a "sudden and temporary loss of consciousness" (Aldren Turner). The results are tabulated in the accompanying table.

The most striking revelation on looking over the cases was the irregularity with which the patients attended for their tablets. Cost was no barrier, for tablets were

APPENDIX

Case	Sex	Age	Date of First Attendance	Duration of Disease at First Visit	Unconscious	Longest Free Interval	Frequency of Fits at First Visit	Phenobarbital Treatment	RESULT
1.	F	24 yrs.	25/9/34	7 yrs.	Yes	1 mth.	10 per week	gr. i b.i.d.	In 3 months, 7 attacks. Then 1 year, 17 fits, but attendance irregular. Then regular attendance for 3 months, 1 fit.
2.	M	17 yrs.	29/11/35	6-12 yrs.	Yes	3 mths.	?	gr. i b.i.d.	No fits.
3.	M	16 yrs.	5/11/35	5 yrs.	Yes	5 yrs.	1 fit in 5 years	gr. ½ t.i.d.	No fits.
4.	F	23 yrs.	3/11/31	1 yr.	Yes	6 wks.	3-4 per week	(1) gr. ½ t.i.d. (2) gr. ½ b.i.d. (3) gr. ½ t.i.d. (4) gr. i t.i.d.	1932—3 major, 2 minor. 1933—1 major, no minor. 1934—2 major, 3 minor. 1935—7 major, 9 minor. 1936—2 major, 1 minor.
5.	M	12 yrs.	24/5/35	3 yrs.	Yes	6 mths.	?	gr. ½ t.i.d.	Impossible to assess owing to irregular attendance.
6.	M	17 yrs.	26/11/35	6 mths.	Yes	?	?	gr. ½ t.i.d.	Irregular attendance.
7.	F	58 yrs.	31/10/33	9-10 yrs.	Yes	2-3 mths.	?	gr. i t.i.d.	No fits. Ceased to attend.
8.	M	35 yrs.	24/11/33	5 yrs.	Yes	?	1 fit daily	gr. ½ t.i.d.	Attended 4 months. Major 0, minor [illegible]
9.	M	11 yrs.	4/12/34	6 yrs.	Yes	?	?	(1) gr. ½ t.i.d. (2) gr. i b.i.d	Attended 5 months. Minor fits [illegible]
10.	M	13 yrs.	1/2/35	3 mths.	Yes	?	?	gr. ½ t.i.d.	Attended 3 months. Minor fits [illegible]
11.	F	38 yrs.	—	12 yrs.	Yes	?	1 per week	gr. i b.i.d.	Major fits 0, minor fits 11.
12.	F	29 yrs.	—	1½ yrs.	Yes	1 mth.	3-4 per week	gr. ½ b.i.d.	Major fits 5, minor fits 3. Attended 6 months.
13.	F	15 yrs.	—	2 mths.	Yes	1 mth.	1 per month	gr. i mane gr. ½ b.i.d.	1934—3 fits. 1935—major 7, minor 3. 1936—minor 1.
14.	M	9 yrs.	—	4 yrs.	Yes	?	?	gr. ½ b.i.d.	1935-6—major 0, minor 1 fit.
15.	M	44 yrs.	—	1 yr.	Yes	?	1 per month	gr. i b.i.d.	Regular attendance 1932-3—major fits 4. Then irregular attendance for 8 months—4 fits.
16.	F	14 yrs.	—	2 yrs.	Yes	?	1 per month	gr. ½ b.i.d.	1933—3 fits. 1934—7 fits. 1935—5 fits.
17.	M	9 yrs.	—	5 yrs.	Yes	?	?	gr. ½ t.i.d.	One year—4 fits. Ceased to attend.
18.	F	13 yrs.	—	5 mths.	Yes	?	?	gr. ½ b.i.d.	1931—minor 1, major 0. 1932—minor 0, major 0, 1933—minor 0, major 2. 1934—minor 0, major 0. 1935—minor 0, major 1.
19.	M	14 yrs.	—	8 mths.	Yes	?	About 3 fortnight	gr. ½ t.i.d.	1934—7 fits (attendance irregular). 1935—3 fits (attendance irregular).
20.	F	32 yrs.	—	7 yrs.	Yes	?	?	gr. ½ t.i.d.	1934—2 fits while attending. 1935—1 fit (attendance irregular).
21.	F	27 yrs.	—	6 yrs.	Yes	?	?	gr. ½ nocte	Attended 6 months—no fits.
22.	F	15 yrs.	—	5 yrs.	Yes	?	1 per week	gr. ½ t.i.d.	Attended 6 months irregularly—8 fits reported.
23.	M	4½ yrs.	—	—	Yes	?	?	gr. ½ t.i.d., later b.i.d.	June 1933-4—no fits. 1934-5—no fits.
24.	M	22 yrs.	—	6 yrs.	Yes	5 mths.	?	gr. ½ t.i.d.	Did not return.
25.	M	21 yrs.	—	20 yrs.	Yes	?	?	gr. ½ t.i.d.	Did not return.

supplied to the poor free, yet forty per cent. of the cases did not avail themselves of the treatment as recommended, or did so at irregular intervals. This I believe to be a fairly general experience, and although care was taken to explain the necessity of continuing treatment for at least two years, nearly half of the cases seen discarded this advice as soon as they began to feel better and the number of fits lessened. The number of males was fourteen and of females eleven. The dose of phenobarbital varied from half a grain to three grains daily. The commonest initial dose was gr. ½ t.i.d. The practice has been to start with this dose, and then either reduce or increase in proportion to the number of fits recorded.

Five out of the group were relieved completely of any sort of fits. It is, of course, too soon to be dogmatic about some, as they have not been under treatment for a sufficiently long period.

Of those who have not been completely relieved, the fits have become fewer in number in all cases. Where it has been possible to assess the result, *petiti mal* has been substituted for *grand mal* in a large proportion of cases. Cases 4, 11, 13, 14, and 18 illustrate the diminution and alteration in the fits particularly well.

It has been found in this series that those patients in whom it was difficult to control fits completely, were all (with one exception) epileptics of one year's standing or more before presenting themselves for treatment. This emphasizes the importance of prolonged treatment before the epilepsy has become established.

No deleterious effect has ever been noticed on the mental faculties of any of these patients by judicious use of phenobarbital, but in one case the mentality was considered to be below par on her first visit, and this was attributed to the disease. This fear of producing imbecility by the cerebral depressant drugs has led to the sparing use of them over prolonged periods, but the fear has not been borne out by facts, and there is now no excuse for the omission of the maintenance dose either on the score of ill-effects or inconvenience.

The phenobarbital rash so often mentioned in the past has been conspicuous by its absence. Not one of these patients had a rash, and indeed it would appear to be a rarity to see such a rash at all nowadays.

To sum up the present position with regard to the treatment of idiopathic epilepsy with phenobarbital, it is concluded from the present survey that all cases carrying out regular treatment are relieved in the number and type of fits. Some lose their fits completely, and in others minor attacks replace major ones. Cases 9 and 10 "resisted" treatment, and ceased attending after five and three months respectively. They were aged eleven and thirteen years, and were possibly cases of pykno-epilepsy, i.e., that peculiar form of epilepsy in children characterized by numerous fits mostly of a minor variety often occurring in cycles, and entirely uninfluenced by any form of medication. The ultimate prognosis is good, and this may account for their failure to attend.

The prognosis in idiopathic epilepsy must remain doubtful as regards complete cessation of fits. Hence the advice to continue the treatment for two years after the last fit. On the contrary, all fits except those of pyknolepsy can be relieved both

in number and nature of attacks, and this without danger to mind or body, by the judicious use of phenobarbital.

With two years freedom it is justifiable to gradually reduce the dose until, after a further period of three months, the drug is abandoned altogether.

REFERENCES.

1. COLLIER, JAS., "Discussion on Nature and Treatment of Epilepsy," *Brit. Med. Jour.*, 6th December, 1924.
2. WILSON, S. A. K., "Treatment of Epilepsy," *Brit. Med. Jour.*, 16th November, 1935.
3. BRAIN, W. R., "Recent Advances in Neurology."
4. *Ibid.*
5. *As for* 2.
6. *Ibid.* 2.
7. *Ibid.* 1.

CASE REPORTS

UNUSUAL CASE OF HÆMATURIA

By C. J. A. WOODSIDE, M.B., F.R.C.S.I.

Royal Victoria Hospital, Belfast

THE following is recorded as an illustration of the difficulties in diagnosis and treatment in dealing with a patient suffering from hæmaturia.

J. S., aged 54 years, began to have hæmaturia in January, 1936. This succeeded a severe attack of asthma from which he had suffered for eight years. Beyond an occasional sense of fullness in the left iliac fossa, and a loss of weight amounting to two stones in the preceding eighteen months, there were no other symptoms, and the family history was irrelevant. Beyond appendicectomy twenty-six years before, there were no other illnesses.

He was thin but, apart from his asthmatic condition, healthy. The urine contained a large quantity of blood, but was sterile; X-ray showed no calculus. Cystoscopy revealed a normal bladder and ureteral orifices, but regular spurts of blood from the left side. The pyelogram was perfectly normal. He was opposed to operation on account of his chest condition.

The hæmaturia ceased for a few days, and he was discharged; but it recommenced a day or two later. Cystoscopy was again performed, three weeks after the first occasion, with identical results. X-ray after intravenous uroselectan showed a normally functioning right kidney, but defective filling and secretion on the left side.

He now agreed to exploration, bleeding having persisted for three months. At operation a perfectly normal kidney presented, and most careful examination failed to detect the slightest evidence of any tumour of the pelvis. There was, however, a large aberrant artery to the lower pole. This was divided, and for

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almost a week no more bleeding occurred. It then began again as profusely as before, so the kidney was removed and the hæmaturia ceased. Macroscopically the kidney revealed no evidence to account for the bleeding, but of course showed an infarct corresponding to the divided aberrant artery.

Microscopically Dr. Davis found degeneration of parenchyma and glomeruli, and the tubules denuded of their epithelium, with catarrhal inflammation. Even this seems inadequate to account for such severe hæmorrhage.

Summary.

In the absence of a calculus or infective condition, a neoplasm seemed the most probable cause of severe hæmaturia in a patient of his age. The absence of a filling defect in the retrograde pylograms would seem to exclude a tumour encroaching on the pelvis, but would not dispose of the possibility of a small papilloma of the pelvis. The first operative finding appeared to provide a possible cause, and was provisionally accepted in view of the fact that in cases of so-called "essential hæmaturia" the remaining kidney may start to bleed when the primary bleeding one has been removed. This condition is, however, nearly always a hæmorrhagic nephritis, and it is probable that some evidence of abnormality would be revealed in both by the uroselectan test. The possibility of an association with his asthma remains.

This patient was seen in consultation with Dr. C. W. Kidd, to whom I am indebted for permission to publish the case.

REPORT ON CASE OF HÆMOCHROMATOSIS OR BRONZED DIABETES

By Foster Coates, M.D.

Royal Victoria Hospital, Belfast

With Post-Mortem Report by J. A. Fisher, M.D., and Special Report on the Iron Content of the Tissues by S. Andrews, M.B., B.Sc.

Introductory.

This disease is characterized by three outstanding features :—

1. Accumulation of iron in the body, with pigmentation of the skin and internal organs.
2. Cirrhosis of the liver.
3. Fibrosis of the pancreas with or without glycosuria.

It was formerly supposed that hæmochromatosis was due to a primary blood disease involving the breaking down of hæmoglobin and the deposition of iron, which caused irritation and a secondary sclerosis of the tissues in which it was deposited. It is now generally believed that the increased iron content of the tissues is the result of some abnormality in the metabolism of iron, whereby the iron is retained in the tissues and not excreted.

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The case which we are now recording is very similar to one which I published in the Transactions of the Ulster Medical Society in 1927. In that paper I described the pigmentation as a dull leaden tinting of the skin, most marked on the face and on the back of the hands.

Hanot and Chauffard have described the pigmentation as a uniform leaden tint, dull earthy, but with a grey rather than a brown hue; something, in a word, absolutely characteristic. Sheldon called it a bluish-bronze colour. Barth states: "It is not a frankly bronzed discoloration, but rather a shade of blackish-grey with metallic tints reminiscent of cast iron."

These descriptions show that bronze is not the usual colour of the pigmentation, though possibly in some cases there may have been jaundice super-added. Bronze is generally accepted as being a reddish-brown colour.

I have since seen five other cases, in all of which the pigmentation was of a leaden tint and very characteristic. The term 'bronze' would not be a correct description of the colour of any of these cases.

Notes of Present Case.

Male, aged 38, police constable. Married for three years; no children. Admitted to hospital on the 4th April, 1935.

Family history.—There was no record of the occurrence of diabetes or of abnormal pigmentation.

Personal history.—He enjoyed good health up till 1928, when he developed diabetes, and had been taking insulin daily since then. He was not sure when the pigmentation commenced, but had noticed it for about two years.

History of present affection.—About two weeks prior to admission his feet and legs became swollen, his abdomen distended, and he was troubled with shortness of breath on exertion.

Condition on admission.—Patient was tall and of spare build. Nutrition was poor. Skin was of a peculiar slate colour, most marked on the face and hands (this description of the pigmentation was noted by my house physician). Growth of hair on the scalp was normal. Face smooth: he only required to shave once weekly. Pubic hair was thin and very scanty. Testicles were small. Oedema of feet and ankles was present.

Heart and lungs were normal. Pulse was 84. Arteries were not sclerosed. Blood-pressure was 98/70 mm. Hg.

Abdomen.—The liver was enlarged to the level of the umbilicus; it was firm and not tender. Free fluid was present in the peritoneal cavity. The spleen was palpable.

Nervous system.—Knee jerks and ankle jerks were absent, and nothing else abnormal was noted.

The urine contained sugar and acetone, but no albumen. Blood-sugar on admission was 0.37 per cent. Wassermann reaction was negative.

His general condition improved under treatment, the ascites and œdema almost disappeared, and his weight fell from 11st. 2lb. to 9st. 8lb. The blood-sugar was difficult to control, as he had frequent hypo-glycæmic reactions. He was discharged on the 16th June, taking forty units of insulin daily.

He was readmitted on the 26th August with a recurrence of his symptoms, and improved for a time, but gradually became weaker, and died on the 1st November, 1935. There was no marked somnolence or mental dullness present until a few days before death.

Post-Mortem Examination.

The body was that of a poorly nourished male subject, and exhibited a generalized greyish-brown pigmentation. The sclerotics were bluish-white in colour; there was no enlargement of the superficial lymph-glands; there was slight œdema of the feet; there was normal growth of hair on the scalp, but pubic hair was exceedingly scanty. The testes were very small. Healed pigmented scar of old varicose ulcer was seen over the middle third of left tibia. On the anterior aspect of the thigh on the right side was a healed surgical scar two and a half inches long, which was white in colour, in contrast to the surrounding pigmented skin.

Thorax.—On reflecting the skin and superficial fascia, the intercostal muscles were seen to be brownish-red in colour—the brown colour of these muscles being very striking when compared with those of another body on which a post-mortem examination had just been performed.

There was approximately half a pint of clear yellow fluid in each pleural sac. The lungs were œdematous and were the seat of a broncho-pneumonic consolidation affecting the lower lobes.

The pericardial sac contained an excess of clear yellow fluid.

The heart weighed 1lb. 2oz. The muscle was flabby in consistence and rusty brown in colour. The left ventricle was enlarged as the result of dilatation of the cavity. Apart from a few small patches of fatty degeneration on the ventricular surface of the aortic valves and anterior cusp of mitral valve, the heart presented no abnormalities.

Abdomen.—The peritoneal sac contained a large quantity of clear yellow fluid. There were a few calcified mesenteric glands in the mesentery of the lower part of the ileum. There were a number of enlarged brown, fleshy lymph-glands in the retro-peritoneal tissue, most marked in the upper part of the abdomen.

The liver was enlarged and weighed 7lb. It was brownish-red in colour, and was the seat of a multilobular cirrhosis. Its surface was stippled with small white nodules, representing foci of hyperplasia.

The stomach was dilated. There was a brown pigmentation of its wall, seen best by holding the stomach up to the light. The duodenum was healthy.

The pancreas weighed 4oz. It was soft in consistence and deep brown in colour.

The kidneys weighed 10oz. each. On section, apart from this enlargement and some congestion, they showed no gross abnormality.

Adrenals were healthy in appearance.

The spleen weighed 8oz. No notable changes were seen in pulp. Fibrous trabeculæ were thickened.

The prostate was diminished in size, and the urinary bladder healthy.

Testes were small, soft in consistence, and rather brown on section.

Microscopical Examination.

The liver was the seat of a multilobular cirrhosis. There was a very large amount of iron pigment contained within the liver-cells and also dispersed widely through the interstitial tissue. Smaller granules of the same pigment were observed in the epithelium of the bile-ducts. It was noteworthy that the regenerating liver-cells in the nodules of hyperplasia were free from pigment.

The pancreas exhibited a well marked fibrosis. The glandular elements were degenerated to such an extent that the islets of Langerhans could not be identified. The degenerated parenchymatous cells contained much hæmosiderin.

The lymph-glands from the upper part of the abdomen contained a large amount of hæmosiderin, for the most part contained in phagocytes. The pigment occurred in localized collections, and in these areas an increase of fibrous tissue had occurred. A few foreign body giant cells were present.

The skin showed fine deposits of hæmosiderin in relation to the sweat glands.

The muscle fibres of the heart were loaded with granules of hæmosiderin, which were situated mainly around the poles of the nuclei.

Testis.—The seminiferous tubules and the interstitial cells of Leydig had undergone an extreme degree of atrophy associated with a remarkable increase of loose interstitial tissue. No iron could be demonstrated in the tissues of this gland.

Iron Content of the Tissues.

The amount of iron in some of the organs is given in the table below. The results are expressed as percentage of the dry weight. Analyses of a former case (November, 1927) are also given, since they have not previously been recorded. For comparison, the normal values for iron are given, and also the average values for all the recorded cases of the disease (Sheldon).

	Percentage of Dry Weight.			
Organ	*Present Case*	*Case November, 1927*	*Normal Values*	*Average of Recorded Cases*
Liver - -	3.330	3.740	0.075	3.650
Heart - -	0.530	0.329	0.039	0.517
Spleen - -	0.363	1.390	0.140	0.631
Kidney - -	0.145	0.140	0.039	0.195
Pancreas - -	—	1.200	0.018	1.890

The large accumulation of iron which takes place in the body in this disease is illustrated by the above figures. The total amount of iron in the whole human body is normally about 5 to 8 gms., and the average daily intake in the food is 10 to 20 mgms. Calculating from the analysis of the liver in the present case (weight 7lb.), we find that this organ alone contains actually 26.4 gms. of iron. Making a very rough approximate calculation, we might say that the whole body contained between 50 and 60 gms. of the metal, which would mean, with a daily intake and complete retention of the 10 mgms. in the food, that there was a gradual accumulation of the iron over about fifteen years.

A CASE OF CHYLIFORM SPUTUM

By R. W. M. STRAIN, M.D., B.SC.
Royal Victoria Hospital, Belfast

THE case about to be described is worthy of record for two reasons, first because the sputum rarely presents the appearances of chyle, and second because it is not generally realized how difficult it is to prove by chemical analysis that a milky fluid owes its turbidity to chyle.

This patient was in the Royal Victoria Hospital under the care of Professor Thomson, to whom the writer is indebted for permission to publish the case.

J. H. was a man of 25 at the time of his admission to hospital. One of his brothers is asthmatic, and another has been attending a tuberculosis institute.

The patient himself had had pleurisy when twelve years of age, and thereafter had always been subject to bronchitis. Ten years prior to admission he had had one attack of hæmoptysis.

His complaints on admission were of breathlessness, not paroxysmal in type, pain in the chest, loss of weight, and copious sputum.

On examination he was thin to the point of emaciation, slightly cyanosed, and with clubbing of the fingers. He had mitral incompetence, and his chest showed generalized bronchitis. He ran an irregular high temperature, and there was gradual consolidation, fibrosis, and cavitation in the right lung. He had several attacks of hæmoptysis. There was no sign of the tubercle bacillus, but a pneumococcus was cultured from the sputum. Blood culture, Widal, and Wassermann were negative. There was a leucocytosis up to 20,000.

Death from toxæmia occurred ten months after his admission.

The clinical diagnosis of bronchiectasis was confirmed at autopsy, and in addition there was fibrosis in both pleural cavities and in the posterior mediastinum. There was an abscess at the base of the right lung. It was not certain whether the wall of this abscess cavity was actually bronchial tissue.

The thoracic duct was dissected out in its upper abdominal and posterior thoracic courses, but no naked-eye lesion was discovered. Its course in the terminal thoracic portion was not determined.

Throughout the illness, the sputum, at all times copious, looked as though it contained milk in which were lying nummular woolly masses, the whole suggesting chyle.

Accordingly an attempt was made in the living patient to see whether any connection could be demonstrated between the thoracic duct and the lung. Fats, however foreign in their nature, are, after digestion, resynthesized and concentrated into the thoracic duct. Twenty c.c. of the iodine-saturated fat lipiodol were given by the mouth. It was hoped that this might reach a sufficient concentration in the thoracic duct to make this structure radio-opaque, but after four hours this hope was not realized. The sputum was collected for twenty-four hours and examined chemically, but here again no iodine could be demonstrated.

The attempt to visualize the thoracic duct was made again on a normal subject, using the same dose, but once more without success. It is doubtful if this technique has further possibilities, as this dose of lipiodol is not well tolerated by the gastric mucosa, and the dose could not be increased with safety.

Detailed analysis of the sputum was made by Dr. Andrews of Queen's University, and the result is put down in tabular form for comparison with the corresponding figures for other sputa obtained from Wells's "Chemical Pathology."

TABLE I.

(IN PARTS PER THOUSAND.)

	Total Split and Unsplit Fats	*Cholesterol*	*Lecethin*
Bronchitis in Typhoid -	0.22	Trace	Trace
Fibroid Phthisis - -	1.41	0.4	Trace
Early Apical Phthisis -	1.41	1.62	1.54
Phthisis Cavities - -	3.38	0.17	—
Advanced Phthisis - -	4.29	1.16	1.17
Do. - -	14.59	0.14	1.25
Chyliform Sputum			
Dr. Andrews' analysis -	3.4	1.04	1.04

It might be thought that these figures exclude a true chylous sputum, but Wells gives analyses for ascitic fluids which must be taken into account. Chylous fluid is that found where there is a demonstrable leak in the lacteal system, chyliform where there is a fatty admixture from other causes such as the fatty degeneration of cells in an effusion or in the lining of a cavity, and pseudochylous where the milky appearance is due to lecethin or pseudo-globulin rather than to fat.

TABLE II.

	Chylous	*Chyliform*	*Pseudochylous*
Ether Extract - -	0.065—9.2	0.1—4.3	0.007—1.86
Cholesterol - -	+ in 7	+ in 4	+ in 3
	— in 2		— in 2
Lecethin - -	+ in 4	+ in 3	+ in 20
	— in 1		— in 2

In these cases there is such an overlap that it is not always possible on chemical grounds to say to which type the fluid belongs. The analysis of the sputum in question is therefore not out of keeping with a true chylous admixture, and it is clear that in all cases of milky fluid the final proof of the presence of chyle must remain the demonstration of a lesion of the lacteal and thoracic duct system.

In the present case it is evident that the sputum should be classed as chyliform and that the milkiness is due to fatty degeneration of cellular elements in the abscess or its walls.

A History of the Ulster Medical Society

By RICHARD H. HUNTER, M.D., M.CH., PH.D., M.R.I.A.,
Queen's University, Belfast

PART II

WILLIAM MCKEOWN, M.D., was elected president for session 1882-3. He was born in 1845, and died on July 9, 1904. McKeown was a man of great originality, and his work as an ophthalmic surgeon earned for him an international reputation. He was the first surgeon to use the magnet for the removal of metal from the *interior* of the eye (1873), after making a surgical incision into the sclera, through which the metal passed.* This fact is recorded in the American Encyclopædia of Ophthalmology, vol. 10, p. 7679. He also devised a new method for removal of cataract. Until his time patients suffering from this condition were allowed to become totally blind before removal of the opaque lens. McKeown devised a technique to inject a few drops of water below the capsule of the lens, and by this means produce a rapid ripening of the cataract. The operation could then be performed in a few weeks time, without the patient having to pass through the unhappy period of waiting for months before the removal of the lens was possible. His book, describing the technique of the operation, gained for him a wide reputation both in Europe and America. He also devised a method of "irrigation" of the anterior chamber after removal of the lens.† These facts are recorded in both the American and the French Encyclopædias of Ophthalmology.

At an early period Dr. McKeown opened a small dispensary for the free treatment of diseases of the eye among the poor. Mr. Edward Benn, Belfast's great philanthropist, was deeply impressed with the value of this work McKeown was doing, and in 1871 built a small hospital in which McKeown could work. This building was situated in Great Patrick Street. So successful was the work done here that Mr. Benn built and equipped a new hospital in Clifton Street for Dr. McKeown. This building was opened in 1874 at a cost of £3,180. It is now known as the Benn Ulster Eye, Ear, and Throat Hospital.

Dr. McKeown had an active concern in all matters pertaining to the interests of the medical profession and the advancement of the Belfast Medical School. In 1880 he suggested the equipment of "paying wards" in public hospitals, a policy which is only now receiving serious attention; and in 1882 he delivered a report before the annual meeting of the Benn Hospital, in which he drew attention to certain gaps in the teaching facilities at the Belfast Medical School. Dr. McKeown was the first

*The magnet had been used for the removal of metal from the superficial parts of the eye from earliest times, but McKeown was the first to make a surgical incision in the eyeball and then use the magnet. The electro-magnet was not used for this purpose until Julius Hirschberg did so in 1875.

†A paper by McKeown describing his methods was published in "The Lancet," 1889, p. 783.

surgeon to practise ophthalmology exclusively in Belfast, and he was the first lecturer in ophthalmology in Queen's College.

PROFESSOR DILL was elected president for a second period in 1883-4. The medical event of this year was the British Medical Association Annual Meeting in Belfast, when six hundred members from various countries attended. Professor James Cuming was president of the British Medical Association that year, with Dr. Moore, Dr. Dempster, and Dr. Byers as local secretaries, and Dr. William Whitla honorary treasurer.

On this occasion Professor Dill took as the subject of his presidential address, medical education in general, and the question of women in medicine in particular. He said: "I believe it was one of the errors of the age to open our colleges, our schools of medicine, and our universities to women, whereby enabling them to compete with our young men while pursuing their medical studies, and in obtaining degrees and other medical distinctions.

"Indeed, I should have hoped that the culture and refinement of the age would have forbidden such a consummation, as that the two sexes should be found receiving united medical education. Which of you would like to see his sister, his daughter, or other young female friend, in the dissecting-room at work in common with the youths of the opposite sex? Which of us would willingly join in consultation in *certain cases* with Dr. Elizabeth ——, or be found investigating *certain diseases* with Dr. Mary ——; I believe the properly constituted mind of either sex would revolt at the very thought of such a practice."

Strange reading, when to-day women are admitted to consultations of all kinds, to the staffs of our hospitals, and to membership in our medical societies.

SIR JOHN FAGAN, L.R.C.S.I., F.R.C.S.I., D.L., was elected to the chair for 1884-5. In this year the Ulster Medical Society changed its meeting-place from the Royal Hospital to rooms in the Museum, College Square North. The pathological room was, however, retained in the Royal Hospital, the specimens being considered unsuitable for exhibition in such a public building as the Museum. The day of meeting was also changed from Saturday to Thursday, and the meetings began to take on a more social character.

Sir John was elected president for a second session, 1885-6. The meetings were largely clinical in nature, except one formal paper read by Dr. (afterwards Professor) Lindsay on "The Physiological Action of Tea, and the Effects of Its Excessive Use."

The president showed a patient on one occasion from whom he had removed "almost all the lower jaw." On another occasion he showed a patient from whom he had removed the tongue. These go to show that major operations were at this time attempted and successfully performed.

This period marks the beginning of interest in bacteriology, and the members of the Society had the opportunity of seeing a demonstration by Dr. Workman of "Disease Germs," with "a variety of specimens under the microscope."

Sir John Fagan was born in 1844, and died in 1930. He was educated at St. Vincent's College and the Catholic University, Dublin. He qualified L.R.C.S.I. in 1865, and after studying in London, Paris, and Vienna, obtained the F.R.C.S.I. in 1874. He was an honorary surgeon to the Royal Hospital, Belfast, for twenty-five years, and he was one of the leading spirits which succeeded in establishing the Belfast Hospital for Sick Children. In 1897 he was appointed Inspector of Reformatories and Industrial Schools in Ireland, and completely changed the methods of education and training in them. He was appointed a medical member of the General Prison Board in 1906, and was knighted for his public services in 1910.

Sir William Whitla, M.A., M.D., D.Sc., LL.D., was elected president of the Ulster Medical Society for the first time in 1886. His presidential address was typical of the man. It was "The Present Position and Prospects of Therapeutics with Its Relation to Other Departments of Medical Science."

Sir William was born in Monaghan in 1851, and his death in 1933 was mourned by the members of the Ulster Medical Society, not only as a great benefactor in the gift of the Whitla Medical Institute, but as one who, until growing infirmity compelled him to retire to the seclusion of his home, was an active member in its deliberations.

On leaving school young Whitla was apprenticed to Wheeler & Whitaker of Belfast, then the leading firm of dispensing chemists in town. But soon he decided to study for a medical degree, and succeeded in obtaining his M.D. with first-class honours and a gold medal of the old Queen's University of Ireland.

Soon after graduation he was appointed resident medical officer and superintendent of the Royal Hospital, Belfast. His exceptional ability both as a physician and an administrator soon became evident, and he quietly revolutionized the working of the whole institution.

He began private practice in Belfast, and quickly gained a large number of patients. He was soon afterwards appointed a visiting physician to the Royal Hospital, and few of his former students will readily forget his clinical lectures or the original methods he employed in imparting knowledge.

In the midst of his hospital work and his extensive and exacting practice, he found time to write his "Materia Medica and Therapeutics," which was at once a pronounced success. This work was the first textbook to reproduce woodcuts of pestle and mortar, measure-glasses, and other apparatus used by dispensers. The book had an enormous sale. The twelfth edition, revised and edited by Dr. Gunn of Oxford, was published just two months before Sir William's death.

Sir William was appointed to the Chair of Materia Medica and Therapeutics in Queen's College, Belfast, in 1890, in succession to Professor Seaton Read, a position which he occupied with dignity until his retirement in 1920.

An indefatigable worker, he produced that remarkable book, "The Dictionary of Treatment." His versatility and the extent of his reading may be gauged from the fact that every article in the first edition was written by himself. The success

of his work was universal. It was published simultaneously in England and America. The English edition of eight thousand copies was sold within nine months; two thousand of the American edition were imported into this country to meet the immediate demand. The book met a definite want, and was soon found on the bookshelf of almost every general practitioner. A specially-bound volume of the Chinese edition was amongst Sir William's most treasured possessions.

Appreciation of his merits by those best qualified to judge is indicated by the number of honorary degrees conferred upon him. They include M.A., R.U.I.; LL.D., Glasgow; M.D., Dublin; D.Sc., Belfast. King Edward VII included his name for a knighthood in his list of birthday honours in 1911. He was a Pro-Chancellor of Queen's University of Belfast, which further honoured him by electing him as its first representative in the Imperial Parliament. He was also elected president of the British Medical Association on the occasion of the annual meeting in Belfast in 1909.

ROBERT ESLER, M.D., was elected president for the session 1887-8. He was born in 1836, and died in London in 1919. He is known as the first historian of the Society. His first paper on this subject was published in 1885, entitled "The Early History of Medicine in Belfast." This paper was followed by "A Sketch of the Ulster Medical Society." He also was the author of the "Guide to Belfast," published for the use of the members of the British Medical Association when they held their annual meeting in Belfast in 1883. Dr. Esler practised in Belfast for nearly fifteen years after graduation, but at the end of that time went to London, where he built up a large general practice. In Belfast he was one of the founders of the Ulster Hospital for Children and Women, which was at first housed in Chichester Street. He was a man of wide interests and varied attainments, and his passing left behind him many happy memories amongst his former colleagues.

Dr. Esler's presidential address took the form of a discussion on the changes in medical and surgical science for the previous thirty years. He mentions that chloroform was unknown and antiseptics had no place in surgical technique in 1837. During this period hot water was substituted as "injections" for cold water in the treatment of hæmorrhages. In gynæcology he mentions that "the simple record of successfully performed abdominal sections speaks of progress with trumpet tongue." He also mentions that during the year 1886 five members of the Society had performed ovariotomy "with perfect success in every case."

He discusses the then controversial subject of women in medicine. He says: "A subject of present importance to a Society like this is the membership of women. They are entering the ranks of the profession; they will soon knock at the door of our medical societies. The time is past for discussing the capacity and adaptability of women for medical studies. It is said that women are fascinated by gold and men by beauty. The latter assertion is admitted, but regarding the former, I think there are other attractions than gain for women in the medical calling. Women make patient nurses; they will be quick observers and safe prescribers."

HENRY BURDEN, M.A., M.D., was president for 1888-9. He was born in 1835, and died on February 19, 1893. He was a man of purely scientific cast of mind,

and could hardly be said to belong to the ranks of the practising physician, as he devoted himself mainly to the study and teaching of chemistry and pathology. He was a first-class microscopist, within the limits of the knowledge of the time, and he became the first pathologist to the Royal Hospital, Belfast. He read a number of papers before the Society, but undoubtedly his best effort was his presidential address, entitled "The Progress of Bacteriology in Recent Years."

A meeting was held on May 29, 1889, at which the business was "to consider a report for the Council relative to a proposal to establish a medical journal for Ulster." This report favoured the establishment of such a journal, and suggested that the North of Ireland Branch of the British Medical Association should be asked to co-operate and make a grant of fifteen pounds towards the cost of publication, and that the proposed journal be placed under the control of a committee composed of four members each of the Ulster Medical Society and the North of Ireland Branch of the British Medical Association.

No conclusion was reached on the subject that evening; the discussion was adjourned, and nothing more was heard of it until 1894.

ANDREW MCCONNELL, L.R.C.P.&S.Edin., was president for 1889-90. Dr. McConnell differed from most of his predecessors in office, inasmuch as he was a general practitioner pure and simple. He was, however, on the visiting staff of the Belfast Union Infirmary. He took as the subject of his presidential address the work of his daily routine, with special reference to drunkenness and impurity. He had, in the previous year, out of eight thousand patients in the Infirmary, *treated* four hundred lock cases, and a hundred cases of delirium tremens, so that his remarks were based on his direct observations on a wide series of cases.

During Dr. McConnell's year of office a sum of fifty pounds was allocated for the purchasing of "new and standard works" for the Society's library.

The Notification of Infectious Diseases Bill was before Parliament at this time, and the Society, at a meeting held on November 6, 1889, passed the following resolutions unanimously: "That this Society approves of the application of the Notification of Infectious Diseases Bill to Belfast, but is of opinion that before this is done, suitable accommodation should be provided for the reception of patients. They are also of the opinion that the carrying out of the Act should rest solely with the Superintendent Medical Officer of Health for the city."*

At a further meeting a resolution was passed "that the Ulster Medical Society should memorialize the Lord Lieutenant to change the Bill so that the Notification of Infectious Diseases Act should be carried out by the Superintendent Medical Officer of Health for the city."

SIR ALEXANDER DEMPSEY, M.D., was president during the session 1890-1. Sir Alexander was born in 1852 at Coldagh, near Ballymoney. He was educated at St. Malachy's College, Belfast; Queen's College, Galway; and the Catholic Univer-

*The Act as first framed made notification to the dispensary doctors by the private practitioners, and it was held that this would be a fruitful source of friction.

sity Medical School, Dublin. He graduated M.D. in the old Queen's University of Ireland in 1874, and began practice in Belfast soon afterwards. He was knighted for his many public services, including his work on the Royal Commission which investigated the 1886 riots in Belfast; for his work as a member of visiting committee of the Belfast Prison; for his active part in the settlement of the university question in Ireland, and for his public services as a physician and gynæcologist in the Mater Infirmorum Hospital, Belfast. He died on July 18, 1920.

The inauguration of post-graduate courses of instruction was proposed by Dr. Burdon during Sir Alexander Dempsey's year of office. It was thought that the scheme as proposed was not sufficiently mature, and a decision was deferred. At a later date the subject was again raised, and Dr. Burdon proposed: "That the Society approves of a movement having in view the institution of post-graduate courses of lectures under its auspices, and pledges itself to promote their success in every reasonable way, more especially by granting the use of its room free of rent to lecturers and their classes." This resolution was considered too wide in its bearing, and a small committee was appointed to "inquire into the subject, and, if it is found feasible, to formulate a scheme and present it to the Society." It was also during Sir Alexander's session that a report came from the Council "that it would be to the advantage of this Society if, during the session, we invited some distinguished member of the profession to address us on some important subject." This recommendation was approved, and Dr. Lindsay moved "that Professor Gairdner of Glasgow be invited to deliver an address to this Society during the session." This was passed unanimously.

At the same meeting the report from the committee regarding post-graduate teaching was considered. It stated:—

(1) That the project is highly commendable.

(2) That if aided by the support and co-operation of the members of the Society it is not only feasible, but also likely to prove eminently useful.

(3) That the method of instruction should include provision for a considerable amount of clinical demonstration.

(4) That the most suitable time of year for the course of instruction would be from the middle of May until middle of July.

(5) That with a view of enlisting the interest of the profession in the scheme, a committee should be appointed by the Ulster Medical Society, with instructions to arrange for a few extra meetings of the Society during the above-named period, and to select lecturers competent to supply their audiences at those meetings with accurate information as to the latest advances in theory and practice of some important branch of medicine.

The report was passed. From this period onward the practice of reading formal papers, rather than merely discussing clinical cases, became common; pathological specimens continued to be shown.

Dr. Gairdner of Glasgow gave the first visiting lecture before the Society on April 22, 1891, taking as his subject "Some Fallacies and Errors in the Estimate of New Drugs." This lecture, the minutes read, was "treated in a masterly manner, and was listened to throughout with evident interest by all present." No other details of this lecture have been preserved.

Dr. Whitla gave a reception in honour of Dr. Gairdner, at which sixty-three members and guests attended.

HENRY O'NEILL, M.D., was president during session 1891-2. He was born in 1853, and died on May 16, 1914. Dr. O'Neill was one of the most striking personalities of his day. He was born at Crosnacreevy, Castlereagh, County Down, and was a lineal descendant of the O'Neill family of Dungannon. He became an apprentice to the well-known chemists, Wheeler & Whitaker, Belfast, but soon entered the old Queen's College, Belfast, and Queen's University of Ireland, where he obtained the degrees of M.D. and M.Ch. in 1877.

While still a student, O'Neill showed himself as a leader of his fellow-men by founding in 1886 the Belfast Medical Students' Association, and was elected its first president.

In 1879 Dr. O'Neill was appointed assistant surgeon to the Royal Hospital, and in 1884 he undertook the work of pathologist. He founded the now defunct Belfast Health Society in 1892, and at his own expense published the "Belfast Health Journal." His interest in public health problems brought him into contact with many grades of society, and as a direct result of these contacts he was elected a councillor of the city as representative of St. George's Ward, and he continued to represent this ward for twenty-five years without a break until the time of his death. Problems of public health continued to interest him, and he presented many reports to the Corporation on the city meat supply, the city milk supply, and the housing of the working classes. So interested was he in these questions that in 1900 he resigned his post of visiting surgeon to the Royal Victoria Hospital. He then attended law terms, and was called to the Irish Bar in 1902, and to the English Bar in 1909. He devoted himself to the service of the working people, and soon had an extensive practice in workmen's compensation cases, and won the famous heat-wave case, the decision of which was confirmed on appeal to the House of Lords. Dr. O'Neill was instrumental in obtaining the erection of a modern and well-equipped public mortuary in Belfast, the old mortuary being a scandal and disgrace. He was also instrumental in having passed new by-laws regarding the laying of sewers and several other matters of public hygiene.

Such a record of work shows the man. No sooner had he reached one goal and gained a prize, when most men would have considered they were entering on their life-work, than he tossed it aside, to see new fields to conquer. He had many openings, first as a successful surgeon, then as a gynæcologist, and later as a pathologist, when he abandoned his advantages and turned to public health, which he made his life-work. But even here he blunted the edge of his force by turning aside to law and then to the Workmen's Compensation Act. However, for twenty-five years he insisted, in season and out of season, on the necessity, on the right of

every individual, to a pure food supply, to a pure milk supply, and to good housing accommodation.

Dr. O'Neill was a voluminous writer, chiefly on sanitary and professional matters; he was a ready and, at times, an eloquent speaker, and while surgeon at the Royal Hospital a clear, emphatic, and definite teacher. He was at his best when sore pressed by opponents and apparently hemmed on all sides without chance of escape; his smiling face would show that he was not disconcerted, and at the psychological moment he would, by a string of statistics, by apt and humorous ridicule, and by a worthy appeal to all the higher feelings of the audience, turn the tables and escape from the net that had been drawn around him. Although he had many opponents in his varied career, he had few, if any, enemies, but hosts of friends. It is a difficult, if not a hopeless and useless task, to estimate the "what might have been"; but it is surely not an exaggeration to say that if Dr. O'Neill had had more of the judicial and quiet, painstaking faculty, had chosen wisely and well one of the departments of human activity, and had concentrated all his indefatigable energy into his undertaking, he would, with his great physical strength, his rapid and subtle mind, his shrewdness and faculty of reading character, his general capacity, have made himself a power not merely in the town of his adoption, but in the nation itself.

Henry Whitaker, M.D., M.R.C.S.Eng., was president in 1892-3. Dr. Whitaker was a general practitioner in Belfast for some years, and a member of the firm of Wheeler & Whitaker, the apothecaries and chemists with which Sir William Whitla and Dr. Henry O'Neill served their apprenticeships as pharmacists. He was for some time a member of the Belfast City Council, and was Medical Officer of Health for Belfast from January 3, 1891, till July 1, 1906. He died on June 4, 1912.

During Dr. Whitaker's year of office it was proposed that a deputation be sent to the City Council, to urge them to adopt the Notification of Infectious Diseases Act, as it had been ascertained that it would be legal to notify the Superintendent Medical Officer of Health instead of the dispensary doctors. The motion was lost. This motion was down in Dr. Henry O'Neill's name.

Sir John William Byers, M.A., M.D., M.A.O., M.Ch., was president for session 1893-4. He was born in Shanghai, China, in 1853, where his father was a missionary, and brought to Belfast by his widowed mother, where she founded Victoria College. His medical education was received at Queen's College, Belfast, where he had a distinguished career, and in the London Hospital. He graduated M.D. in 1878 in the old Queen's University of Ireland. He was appointed to the Chair of Midwifery in his Alma Mater in 1893, and filled many important positions throughout Ulster as a skilful physician and an authority on diseases of women. He was surgeon in charge of the department of gynæcology in the Royal Victoria Hospital, Belfast, and for many years senior surgeon to the Belfast Maternity Hospital. He was knighted by Lord Aberdeen in 1906. Sir John's interests were wide and catholic. His leisure hours were devoted to literary pursuits, and he was a recognized authority on the dialects and folk-lore of Ulster. He died after a short illness on September 20, 1920.

Sir John's presidential address was concerned with problems of medical education. He taught that medical men should obtain a sound knowledge of general practice before adopting any speciality. By following this course he thought that the doctor would be less likely to take too narrow a view of a case, a fault often laid at the door of specialists. "We must never forget how closely the different organs of the body are correlated," he said, "and he who from his special training allows himself to think that the only organ to be looked after is the eye, a joint, a uterus, or a liver, will often neither be correct in his diagnosis nor effective in his treatment."

During Sir John Byers's term of office the Society considered, for the second time, the possibility of publishing a local medical journal, and a committee was set up to consider the matter. The committee reported to the Council on February 15, 1894, that "they are favourable to this project of establishing a medical journal for the North of Ireland, and that in order to secure its financial position they recommend that a joint stock company be formed with a small capital."

Apparently this was not considered a financial possibility, for no further reference is made to it in the minutes of the Society.

Another important matter which arose this session was the question of the Society changing its rooms from the Belfast Museum, owing to some difficulties experienced in keeping the Society's medical library private and free from the interference of non-medical persons visiting the museum. New rooms were obtained, where the annual general meeting of the Society was held on July 20, 1894. They were situated on the top flat of 13 Lombard Street.

At this meeting new rules of procedure at the meetings were passed. These were :—

1. Chair to be taken by the president, or in his absence by one of the vice-presidents; and in their absence, a chairman shall be chosen by the meeting.

2. Reading and confirmation of the minutes of previous meeting; reports from Council; balloting for members; proposing new members; notices of motion.

3. The business of the meeting shall, as far as possible, be conducted in the order in which the subjects appear upon the circular (the clinical cases being taken first).

4. Members reading papers or introducing any subject to the Society shall not occupy more than twenty minutes. Speakers other than those whose names appear upon the circular shall be limited to ten minutes.

5. Members addressing the meeting shall do so standing.

6. Members who have taken part in any discussion shall, if they desire to have their remarks included in the transactions, furnish a written statement to the Society.

7. Pathological, microscopical, and other objects to be exhibited shall be required to be in readiness previous to the time of meeting, in a place set apart for that purpose; and attached to each exhibit shall be a card on which the exhibitor shall

note the points of interest in the case to which he wishes to direct the attention of the members.

BRIGADE-SURGEON F. E. MCFARLAND, L.R.C.P.&S.I., was president during the session 1894-5. Little is known of him except that he had been twenty years in the Army Medical Department, and on settling in Belfast was appointed consulting physician to the Ulster Hospital for Children and Women. Dr. McFarland's year of office was a noteworthy one, for in it the first volume of the Transactions of the Society was published as a separate volume.* Rules for the library were passed during this session. These were :—

1. The library shall be for the exclusive use of members of the Ulster Medical Society.

2. Every member using the Society's rooms shall enter his name at each visit in a book kept by the caretaker.

3. Each member shall have the privilege of taking two volumes out at the same time.

4. All books taken from the library shall be entered by the borrower in the book kept on the library table for that purpose, and a fine of 2s. 6d. will be imposed for each infraction of this rule.

5. No member shall retain a volume longer than one month, and on its return he may not borrow the same volume till a month be elapsed.

6. Any member retaining a book more than a month shall be fined sixpence per week for such detention, after he has received a notice to the effect that it shall be returned.

7. Periodicals and journals shall be placed on the table when they are published, and none shall be borrowed till the succeeding number is on the table.

8. A suggestion book shall be kept, in which any member may enter the name of any book which he desires to have added to the library.

9. Any member losing or injuring a book shall be required to replace the same.

10. The library shall be under the direction of a committee of five, of which the hon. librarian shall be convener.

PROFESSOR THOMAS SINCLAIR, C.B., M.D., M.Ch., F.R.C.S.Eng., was president in session 1895-6. Although no longer in practice, Professor Sinclair is still with us. He was appointed to the Chair of Surgery in Queen's College, Belfast, in 1886, a position which he held until his retirement in 1923. During the Great War he obtained the rank of colonel in the R.A.M.C., and for his service was awarded the C.B. No man has ever stood in higher regard with his professional brethren than Professor Sinclair, and it is a matter of great joy that he has been able to continue to serve the profession, even in advanced years, as University Representative to the General Medical Council, and as University Representative in the Imperial Parliament since 1923. During the session presided over by Professor Sinclair the hour of meeting was changed to 8.30 p.m., on the motion of Dr. H. L. McKisack.

*The Transactions of the Society had been published in the "Quarterly Journal of Medical Science" (Dublin) since 1873 until this date.

During this session an attempt was made to form a closer relationship with the Northern Ireland Branch of the British Medical Association, by the issue of a yearly volume of the combined transactions of the two societies. This arrangement was ratified at a meeting of the Ulster Medical Society held February 6, 1896. The minute reads:—

"The following report from the Council of the Society was adopted:

" 'The Council report that a joint meeting of the Committees representing the North of Ireland Branch of the British Medical Association with the Ulster Medical Society was held on January 17, 1896, and it was agreed to submit the following recommendation to the members of the two societies: "That the Northern Ireland Branch of the British Medical Association and the Ulster Medical Society pay equal proportions of the expense of printing the Transactions, estimated at twenty-five pounds; that a small Journals Committee be appointed by the two societies; that the title be 'Transactions of the Ulster Medical Society and North of Ireland Branch of the British Medical Association,' and that the Transactions be issued yearly as soon as possible after the annual meetings of the societies."

The first volume of this series was published for the session 1895-6, but the arrangement does not appear to have been a success, for only three further volumes were issued, one for 1896-7, one for 1897-8, and one for 1898-9. The Transactions of the Ulster Medical Society were published alone for the session 1900-1 until session 1931-2, when they were replaced by a quarterly periodical known as the ULSTER MEDICAL JOURNAL.

JOHNSON SYMINGTON, M.D., F.R.C.S.Eng., F.R.S., was president in session 1896-7. Born in 1851, he died February 23, 1924. He graduated in the University of Edinburgh, M.B. with first-class honours, in 1877. He was demonstrator of anatomy at Edinburgh University for two years, and in 1879 became lecturer in anatomy at Minto House, Edinburgh. He was called to the Chair of Anatomy in Queen's College, Belfast, in 1893, a post which he filled until his retirement in 1918.

In Belfast he was in his time the greatest power in the Medical School. He was elected a member of the Senate of the College soon after his appointment, and in 1901 became registrar, while under the Irish University Act of 1908 he was appointed one of the commissioners to frame its statutes. He was one of the honorary secretaries of the Better Equipment Fund, and the new buildings of the University erected at that time were very much under his care. The University has indeed cause to revere the memory of the man who never spared himself in its interests.

Symington was a man of action; he was full of enthusiasm for his work, and what was most characteristic of him was his capacity for working far into the night, and appearing first in his department the following morning as fresh and full of enthusiasm as he had been the previous day. He was the greatest topographical anatomist probably of all time. During his life he published nearly sixty articles, the most important of which were concerned with cranio-cerebral topography and the abdominal viscera. His larger works were "The Anatomy of the Child," which will remain for all time one of the classics of anatomy; "An Atlas

of Skiagrams of the Teeth," volumes in Quain's Anatomy on "Splanchnology" and the "Nervous System." During the Great War he published a "Cross-Section Atlas of Human Anatomy," which was used extensively in all the great military hospitals of that time as an aid to the localization of foreign bodies in the wounded.

Symington was the first teacher of anatomy in the British Isles to have installed in his department an X-ray apparatus exclusively for the study and teaching of anatomy, a lead which is now, after some twenty years, being followed by all anatomists to-day.

He was one of the most forceful personalities ever on the staff at Queen's, and no student who passed through his classes will ever forget him, with his direct straightforwardness to praise or to condemn, and all look back with pride at that happy period spent under his stimulating direction.

The Symington Prize of Queen's University, Belfast, awarded on the recommendation of the Council of the Anatomical Society of Great Britain and Ireland, perpetuates his memory among those who carry on the work which he loved so much.

At the beginning of the session 1896-7 the Society vacated the Lombard Street premises. These had been situated on the top flat of a high building, and as there was no elevator installed, the climb up some six flights of stairs involved too great exertion on the part of the more elderly members of the Society. It was decided, therefore, to make a change in the Society's house, and a new agreement having been reached with the Belfast Natural History and Philosophical Society, rooms were opened once more in the Museum, College Square North.

The terms of the agreement are given in a minute dated July 9, 1896. They are as follows: "The Council accept the offer of the Belfast Natural History and Philosophical Society for the use of their premises from 10 a.m. to 10 p.m. from October 1 to June 30, and from 10 a.m. to 6 p.m. in the remaining months of the year for the library, and the use of a room for six meetings in the year (with 7s. 6d. for any additional meetings), at a yearly rent of £25. The Natural History and Philosophical Society to supply light and heat. The library to be kept locked, and the names of members using it to be registered."

At the first meeting of the session held on November 5, 1896, a resolution was passed urging the City Council to adopt the Notification of Infectious Diseases Act in Belfast, as the notification to Poor Law officers had been changed to the Public Health Department of the City Council, and as a fever hospital was about to be built at Purdysburn.

The following statement was forwarded to the City Council: "The Ulster Medical Society consider the present time opportune for renewing the efforts they have made from time to time to support the sanitary authorities in their endeavours to effect various improvements in the public health of the city.

"The members of this Society have always heartily approved of the principle of notification of infectious diseases (for example, on December 4, 1889, they passed

a resolution approving of notification under suitable conditions). They had, however, always foreseen insuperable difficulties in the practical working of the Act under the conditions hitherto existing, which were, firstly, infectious diseases to be notified to officials of the Poor Law Board, whilst the executive sanitary authority was the Public Health Department of the City Council. In view of this fact, our Society memorialized the Lord Lieutenant of Ireland in January, 1890, to have the notification placed in the hands of the Medical Superintendent of Health for the city. The second unfavourable circumstance was the absence of suitable accommodation for the treatment and isolation of cases of fever after notification. On these two grounds the members of this Society had objected to the immediate adoption in Belfast of the Notification of Infectious Diseases Act. The removal of these difficulties by, firstly, the change in the authority to whom notification should be made, and secondly, the proposed erection of a fever hospital, enabled the Society to heartily recommend to the City Council the adoption of the Notification of Infectious Diseases Act in Belfast as soon as possible."

Professor James Alexander Lindsay, M.A., M.D., F.R.C.P.Lond., was elected president for session 1897-8. He was born in 1856 in Fintona, County Tyrone, a descendant of the physician, Alexander Lindsay, who was killed during the defence of Derry in 1688. He died on December 15, 1931. Distinguished as a physician, teacher, author, and scholar, he probably had a greater influence on the Belfast Medical School than any other figure of his time. He was a man of wide culture far beyond the confines of his profession, and he contributed in a material degree to the fame of his university, adding lustre to its history as one who always strove for the highest ideals of his profession. In his earlier days he was an enthusiastic golfer, and he presented the first golf trophy to the Society, the Lindsay Cup. He was a former secretary to the Society, and shortly before his death he was elected an Honorary Fellow. Many of the philanthropic and educational institutions of Belfast had the benefit of his energy and advice. In the Royal Victoria Hospital he served as a physician as well as chairman of its Board of Management, and he was also chairman of the Maternity Hospital. His influence had much to do with the amalgamation which resulted in the new Royal Maternity Hospital, while his services in the foundation of the Dental School at the Royal Victoria Hospital were outstanding. He was also a member of the Board of Governors of the Methodist College, Belfast, and of the Belfast Society for Promoting Knowledge. He lived a full life, sacrificing himself in the interests of the community, and his name will ever remain green so long as the Belfast School of Medicine and the Ulster Medical Society remain in being.

Joseph Nelson, M.D., L.R.C.S.I., was elected to serve as president for the session 1898-9. He was born in Downpatrick in 1840, and died in Belfast on August 31, 1910. Nelson was a great personality, bordering almost on the eccentric; even as a boy he showed his originality and strength of character, and on one occasion shocked his master at school by submitting an essay entitled "A Defence of Cock-fighting." He entered Queen's College, Belfast, as a medical student, but as soon as he had successfully passed his second profesional examination he sailed

for Italy, where he obtained a commission in Garibaldi's "Regimento Inglese" to fight for Italy's freedom. Garibaldi afterwards presented Nelson with a sword, and the King of Italy decorated him with two medals. On his return to Belfast, Nelson recommenced his studies and graduated M.D. of the old Royal University of Ireland in 1863. But the spirit of adventure surged within him, and he sailed for India, where he obtained an appointment as surgeon on a tea plantation, and later, it is said, he became a tea-planter on his own account. The life in India began to pall, and in 1878 he made up his mind to return to Belfast; and as he had obtained a large experience in diseases of the eye while surgeon on the tea plantation, he decided to specialize as an ophthalmic surgeon. But before settling in Belfast he visited Vienna, where he worked as assistant to Professor Fuchs, and later with Professor F. R. von Arlt. In 1889 he came to Belfast, and two years later was appointed the first ophthalmic surgeon to the Royal Hospital, where he held classes for students at 8 a.m. daily. Dr. Nelson was a man of great personal charm and generous to a degree. As president of the Ulster Medical Society he entertained the members to dinner in his own house in Wellington Place, in sections, week by week, during his term of office.

JAMES GRAHAM, M.D., M.Ch., was president for session 1899-1900. He was born in Boardmills, County Down, in 1852, and died June 15, 1932. Dr. Graham was for many years in general practice in Belfast, where he was an outstanding figure both in professional and civic life. His first entry into public affairs was in 1885, when he was appointed to the Lagan Pollution Committee, and in 1888 he became an alderman of the Belfast City Council. He was soon after elected chairman of the Public Health Committee of the Council, when he took an active part in the establishment of a municipal hospital for infectious diseases, which was built at Purdysburn. In 1905 he was appointed coroner for the city, and during the years in which he filled that office he conducted innumerable inquiries with dignity and tact. He brought to bear an intimate knowledge of medical science on many a knotty problem, and his urbanity, *savoir faire,* and good sense successfully surmounted many difficulties. He could make allowances for the frailties of human nature and, where some would have administered reproof and punishment, often met the case with a few words of kindly and helpful advice. At the time of his death he was a link between the pre-antiseptic and aseptic periods of surgery, and often recounted his experiences as the first medical man in Belfast to use carbolic acid as an antiseptic. This substance was unobtainable in Belfast when he first began practice, and he had to write to Edinburgh to obtain supplies.

SIR WILLIAM HENRY THOMPSON, M.D., F.R.C.S.Eng., M.R.C.P.I., was president for the session 1900-1. Sir William was the first Professor of Physiology at Queen's University, Belfast. He was the author of many original papers on physiological subjects, but he will be best remembered for his translation of Pawlow's work on the Digestive Glands. He left Belfast to become King's Professor of Medicine in Trinity College, Dublin. He was drowned in the Irish Sea when the R.M.S. "Leinster" was torpedoed in 1917 during the Great War.

Sir William Whitla, M.A., M.D., D.Sc., LL.D., was elected to serve a second period as president of the Society for 1901-2.

This is possibly the most important year in the history of the Society, for it was during it that the first steps were taken to build a medical institute for its special use.

Trouble had again arisen with the Philosophical Society members, the latter interfering with the medical books and periodicals, and the Council decided once more to seek a new abode. A sub-committee for this purpose was appointed on October 14, 1901, and whatever happened at its meetings is unknown, as no reference is made to it in the minutes either of the Society or of its Council. But at a meeting held on November 5, 1901, the first reference to the new building is made. The minute reads: "The changes in the rules of membership of the Society which will be necessary in order that the generous offer of Professor Whitla to erect and equip a building for the sole use of the members, were under consideration, and also the question of the site of the proposed building."

A site for this building is mentioned in the Council minute book of December 13, 1901. It reads as follows: "Professor Whitla reported that a site with fifty feet of frontage towards College Square North could be obtained from the Governors of the Royal Academical Institution for the erection of the proposed Medical Institute at an annual rental of sixty pounds. The Council were unanimously of the opinion that the offer should be accepted, and the secretary was instructed to draw up a report of Council to that effect to be presented to the next ordinary meeting of the Society."

The next ordinary meeting was held on January 10, 1902, and Professor Redfern proposed the following resolution: "That we, the members of the Ulster Medical Society, accept the very generous offer of the president (Professor Whitla) to build and equip a Medical Institute for the Society." This resolution was seconded by Colonel MacFarland, and passed with acclamation.

Dr. Dempsey then proposed: "That we, the members of the Ulster Medical Society, accept the offer of the Governors of the Royal Academical Institution of a site for the proposed Medical Institution in College Square North at an annual rental of fifty pounds." This was seconded by Professor Lindsay and passed.

The birth of a new era in the history of the Society thus took place. Work was at once begun, and Professor Redfern laid the foundation stone in April, 1902. Rapid progress was made in the building of the Institute, and His Excellency the Lord Lieutenant, the Earl of Dudley, formally declared it open on November 26 following, in the presence of a large assembly, with Sir John Campbell, the president for session 1902-3, presiding over the proceedings.

In the afternoon, after the formal opening, the Countess of Dudley unveiled, within the Institute, a stained glass window erected to the memory of Dr. William Smyth, of Burtonport, County Donegal.

The cause of Dr. Smyth's death was as follows: "In October, 1901, an outbreak of typhus fever occurred on the island of Arranmore, County Donegal. Dr. Smyth,

though suffering from a poisoned wound, rowed daily alone from the mainland to the cabins on the island, carrying with him suitable food and medicine for the fever-stricken victims. So great was the terror of infection that he could procure no assistance, till Dr. Brendan McCarthy nobly came to his aid, and these two heroic men carried the poor patients into the only procurable boat and rowed them to Burtonport. The boat had not been in the water for a couple of years, and it sank a short time after landing. Dr. Smyth was smitten with typhus a few days afterwards, and died on November 19, 1901. His death, under the circumstances, aroused a great deal of sympathy, and a fund was opened and liberally subscribed to for the support of his widow and orphans. Though he never had a personal acquaintance with Dr. Smyth, Sir William Whitla, ever an admirer of noble deeds, as he was ever the sympathizer with every good cause, recognized that the action of his colleague, although performed from a sense of duty, was nevertheless heroic, and so regarding it, he erected the memorial window, placing it above the fireplace in the reading-room that it must always be in view, ever preaching the solemn and eloquent, though silent, sermon of the Institute, of love to our fellow-men, of devotion to duty, and of self-sacrifice."

Sir William said at the opening : "When I saw it possible that I could erect this building, and so carry out a day-dream of years, I set about planning how I might in it symbolize in art, some noble precept or example to our profession, and leave it here as a help and encouragement to those coming after—something that a weary brother seeing may take heart again. My first thought was to erect a tablet bearing a record of the life-work of the four immortals of our Society—Andrews, Gordon, Henry MacCormac, and Redfern—whose portraits are now cut in the stone bosses on the outside of the building. After much thought I decided on a subject which you are about to see, and which has been so successfully treated and carried out by the great artist, Swainê Bowne. It is placed in its odd position on the chimney-piece, with the building so planned that it must be always on view, ever preaching the solemn and eloquent, though silent, sermon of the Institute, of love to our fellow-men, of devotion to duty, and of self-sacrifice."

A beautiful bronze tablet in the entrance hall bears the following inscription :

"This building was erected, equipped, and presented to the Ulster Medical Society by Sir William Whitla, M.D. The foundation stone was laid by Professor Peter Redfern, M.D., on April 12, 1902, and the building was declared open by His Excellency the Earl of Dudley, Lord Lieutenant of Ireland, on November 26 following."

The first meeting of the Society in the New Medical Institute was held on December 11, 1903, at 8.30 p.m., and since that date the meetings have been held regularly from October to April on alternate Thursdays.

Sir John Campbell, M.A., M.D., M.Ch., LL.D., F.R.C.S.Eng., who was president during this important session of 1902-3, was born in Templepatrick in 1862, and died on August 31, 1929. Sir John was educated at the Royal Belfast Academical Institution, and afterwards the Belfast Queen's College. He graduated

B.A. and later M.A. in the Royal University of Ireland with first-class honours and exhibition in both degrees. His undergraduate studies were marked with the same high distinctions, gaining scholarships in pathology, therapeutics, medicine, etc. He graduated M.D., M.Ch., M.A.O. in 1887; became M.R.C.S.Eng. in 1888, and F.R.C.S.Eng. in 1891. Then, after a period of study in Paris, Vienna, Munich, Heidelberg, and Bonn, he settled in Belfast, where his interests were early shown to be associated with the speciality which he afterwards made his own : midwifery and gynæcology. He was appointed a general surgeon to the Belfast Hospital for Sick Children in 1891, but at the close of 1892 he retired from this position on his appointment as surgeon to the Samaritan Hospital for Women, Belfast.

During the Great War he acted for a time as chief surgeon to No. 5 British Red Cross Hospital, Wimereux, France, and he was knighted in 1925.

Sir John was one of the outstanding personalities of his day. He was a man of great ability, even shown as a student, when he acted as locum tenens for the Professor of Natural History in Queen's College, Belfast. He commanded the admiration and respect of a wide circle of friends, and was elected president of the Royal University Graduates' Association, and a member of Senate of the old Royal University. He was also elected chairman of Convocation of Queen's University of Belfast. He was the author of many articles on surgery and gynæcology, as well as two textbooks : "Obstetrics and Gynæcology" and "Clinical Gynæcology."

To the general public Sir John was a man of few words, downright in his manner and reserved. But to his friends he was a man of great charm and kindliness.

Many distinguished physicians and surgeons have occupied the presidential chair since Sir William Whitla presented the Society with its present home. Most of them, happily, are still with us, but a few have passed over that brook from which no traveller returns : J. Lorrain-Smith, M.D., who afterwards became Professor of Pathology in the University of Edinburgh, was president in 1904-5; he died on April 18, 1931, aged 63 years. John McCaw, M.D., the first physician in Belfast to specialize in diseases of children, and the author of two books on this subject, one of which passed into five editions, was president in 1907-8; he died February 22, 1924, aged 76 years. Sir Peter Reilly O'Connell, M.D., D.L., who was the moving spirit in the inauguration and the building of the Mater Infirmorum Hospital, Belfast, was president in 1910-1; he died in 1927, aged 44 years. H. L. McKisack, M.D., F.R.C.P.Lond., one of the leading consultant physicians of his day, was president in 1911-2; he died on March 12, 1928, aged 69 years. R. W. Leslie, M.D., for many years physician to the Ulster Hospital for Children and Women, was president in 1912-3; he died September 22, 1931, aged 69 years. Robert Campbell, M.B., F.R.C.S.Eng., whose memory the Campbell Oration keeps green, was president 1916-7; he died 1925, aged 66 years. James Colville, M.D., for many years one of the leading general practitioners in Belfast, president in 1918-9; he died in 1933. Andrew Fullerton, M.D., M.Ch., F.R.C.S.I., F.A.C.S.(Hon.), Professor of Surgery at Queen's University, Belfast, and an urological surgeon with an international reputation, was president in 1919-20; he died May 22, 1934,

aged 66 years. J. S. Darling, M.D., for many years the leading provincial general practitioner, was president in 1924-5; he died November 8, 1927, aged 71 years. These have passed from us, but their names are still fresh in our memory, as ornaments to our profession, leaders in our discussions, and originators of new and better methods in our campaign against disease, infirmity, and pain.

The Society has become a great force in the community, its membership is slowly but steadily increasing, the meetings are better attended, and for the last five years, instead of yearly transactions, the Society boasts of a quarterly journal of its own, the ULSTER MEDICAL JOURNAL, controlled by an editorial board of its own members, and with a circulation which extends far beyond the confines of Belfast and Northern Ireland.

This History of the Ulster Medical Society is based on a study of the following :—

The Minute Book of the Belfast Medical Society.
The Minute Book of the Belfast Clinical and Pathological Society.
The Minute Books of the Ulster Medical Society.
The published Transactions of the Ulster Medical Society.
Reports and Obituary Notices published in the "Quarterly Journal of Medical Science" (Dublin), "The Lancet," and "The British Medical Journal."
Reports and Obituary Notices published in "The Belfast News-Letter."
Private letters and documents kindly lent by relatives of deceased presidents of the Society.

ULSTER MEDICAL SOCIETY
ANNUAL MEETING, SESSION 1935-6

THE seventy-fourth annual general meeting of the Society was held in the Whitla Medical Institute, College Square North, on Friday, 22nd May, 1936, at 4.15 p.m.

The president was in the chair, and there was a fair attendance of Fellows and Members. The minutes of the last meeting were read, confirmed, and signed.

The hon. secretary then submitted the report of Council for the session 1935-6, and proposed its adoption. This was seconded by Dr. R. H. Hunter, and passed. The hon. treasurer's statement, in the unavoidable absence of Mr. Calvert, was read by Dr. Allen and passed. It was agreed that the financial statement should be printed and circulated to all Fellows and Members early in the autumn. Dr. Allen moved the adoption of the financial statement. This was seconded by Dr. Hunter, and passed. The JOURNAL account was also presented by Dr. Allen, which showed a profit for the year of £13. 9s. 8d., a condition of affairs on which the president heartily congratulated the editor, Dr. R. H. Hunter. The hon. librarian's report was then presented by Dr. Allison, who referred to the valuable gift of books

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from Dr. M. J. Nolan during the year. The adoption of this report was seconded by Dr. Morrow, and passed.

The following office-bearers were elected for 1936-7 :—President, Prof. P. T. Crymble; vice-presidents, Dr. T. Kennedy and Mr. T. S. Holmes; hon. treasurer, Mr. C. A. Calvert; hon. secretary, Dr. F. P. Montgomery; hon. librarian, Dr. S. R. Allison; hon. editorial secretary, Dr. H. Hilton Stewart; hon. editor, Dr. R. H. Hunter. Council: Prof. W. W. D. Thomson, Mr. J. R. Wheeler, Prof. J. S. Young, Dr. James Boyd, Dr. Frackelton, Mr. H. L. H. Greer. Editorial Board: Prof. P. T. Crymble, Prof. R. J. Johnstone, Prof. W. W. D. Thomson, Prof. J. S. Young.

The hon. secretary proposed the following resolution: "That Council shall be empowered by this general meeting to make any arrangements for the editorship of the Ulster Medical Journal."

Dr. R. H. Hunter seconded, and the resolution was passed.

The Council begs to present the seventy-fourth annual report of the Society.

The roll of the Society now stands as follows :—Hon. Fellows, 7; Life Fellows, 13; Fellows, 275; Members, 60—total 355.

During the year the Society has suffered the following losses by death :—Dr. J. W. Peatt, Fellow since 1920; Dr. S. E. Picken, Fellow since 1920; Dr. Katherine Robertson, Fellow since 1922; Dr. T. M. Tate, Fellow since 1905.

Eight meetings of the Society have been held during the year and attendances have been very satisfactory.

A joint meeting of the Society with the Radiological Society of Ireland was held during the year, which proved a great success.

The laboratory meeting was again an outstanding event of the year, and reflected great credit on Prof. Young and his staff.

The annual dinner was held as usual in the Medical Institute, and again proved a most enjoyable function.

The Ulster Medical Journal continues to progress under the able editorship of Dr. R. H. Hunter, and its continued high standard has greatly enhanced the prestige of the Society.

Your Council has met on seven occasions, and the following attendances are recorded :—

The president, 7; Sir T. Houston, 1; Dr. G. F. Campbell, 0; Dr. Harold Gray, 1; Prof. Lowry, 1; Prof. Thomson, 2; Prof. Young, 4; Dr. James Boyd, 7; Dr. Frackelton, 5; Dr. S. R. Hunter, 6; Dr. J. A. Smyth, 3; Mr. Greer, 3; Mr. Calvert, 1; Dr. Allison, 4; Dr. H. H. Stewart, 4; Dr. R. H. Hunter, 5; Dr. Allen, 3; hon. secretary, 7.

H. Hilton Stewart, *Hon. Editorial Secretary.*

BRITISH MEDICAL ASSOCIATION
NORTH-EAST ULSTER DIVISION

THE annual dinner of the Division was held in the Giants' Causeway Hotel on Thursday, 16th March. The chairman, Dr. J. C. M. Martin, presided, and there were over seventy members and guests present.

After the toast of "The King," Alderman D. H. Christie, M.P., Mayor of Coleraine, proposed the toast of "The British Medical Association," and Dr. F. M. B. Allen, honorary secretary of the Northern Ireland Branch, replied in a racy speech, and reminded those present that the Association would be meeting in Belfast in 1937.

The toast of "The Guests" was given by Dr. Bateman, and Dr. J. McLaughlin (Derry), Mr. W. G. Keys, and Mr. G. Boyle replied. Dr. Huey, the "father" of the Division, then proposed the health of the chairman, to which Dr. Martin responded.

Dr. Ross Thomson having proposed "The Secretary," Dr. Hunter replied, and Mr. Hugh Carson responded on behalf of "The Musical Guests," proposed by Dr. McClelland.

During the evening the company was entertained to a duet by Messrs. Carson and Donnan, and to some delightful songs by the same gentlemen. Mr. Dan McLaughlin gave some of his famous recitations, and Mr. A. J. W. Christie also recited and rendered solos from his repertoire on the ocarina.

One of the most enjoyable dinners the Division has had ended with the singing of "Auld Lang Syne."

The Division met in the Cottage Hospital, Coleraine, on Monday, 25th May, when the main business was a paper by Mr. Ian Fraser on "Injection Treatment of Varicose Veins." The paper was most practical, and was illustrated by lantern slides. At the conclusion several members asked questions, and the thanks of the meeting were given to Mr. Fraser for a most useful and stimulating address.

The following office-bearers were elected for 1936-7 :—Chairman, Dr. Sloan McI. Bolton; vice-chairman, Dr. G. Bateman; representative to annual meeting, B.M.A., D. Huey, Esq., F.R.C.S.; representative to Branch, D. Huey, Esq., F.R.C.S.; hon. secretary and treasurer, Dr. J. M. Hunter.

Dr. Huey drew attention to the poor support that the doctors in this district gave to the Royal Medical Benevolent Fund of Ireland, and appealed for better support for this Fund. He pointed out that County Antrim actually subscribed less than the county obtained from the Fund for local beneficiaries, and maintained that local subscriptions must be substantially increased in the immediate future. He asked everyone present to undertake to give a regular annual subscription.

The same speaker explained briefly the functions of the National Health Insurance Defence Fund.

Matron and her staff were cordially thanked for very kindly entertaining the meeting to tea.

J. M. HUNTER, *Hon. Secretary.*

36 Eglinton Terrace, Portrush.

BRITISH MEDICAL ASSOCIATION NORTHERN IRELAND BRANCH

THE annual meeting of the Branch was held on 7th May in the King Edward Building of the Royal Victoria Hospital, when the various reports were submitted and adopted. Mr. H. L. Hardy Greer was elected president of the Branch for the year 1936-7, and Dr. T. B. Pedlow the president-elect, Dr. Pedlow and Dr. Allen continuing as honorary treasurer and secretary respectively.

There were a number of clinical cases available for examination and discussion as usual, but the main attraction was the exhibition of pathological specimens which had been collected for the recent Congress of Obstetrics and Gynæcology, and which were displayed to advantage.

After the meeting the president (Dr. Wm. Lyle) entertained the members to lunch in the Grand Central Hotel, Professor R. J. Johnstone expressing the thanks of those present for the president's very generous hospitality.

F. M. B. ALLEN, *Hon. Secretary.*

73 University Road, Belfast.

BRITISH MEDICAL ASSOCIATION ANNUAL MEETING, 1937

SINCE the last number of the ULSTER MEDICAL JOURNAL appeared, considerable progress has been made with the more difficult problems with which the Executive Committee are faced.

We have been fortunate in persuading the Royal Mail Steam Packet Company to send over a liner capable of accommodating over four hundred visitors. The Belfast Harbour Board will allow this boat to lie up in the port for the duration of the meeting. At the end of the week it is suggested that the liner will make her way back to England round the north of Scotland and will visit one of the Norwegian fjords. These arrangements are so advanced that it will be possible to take bookings for berths at the Oxford meeting. This still leaves a big task before the Housing Committee, but it has relieved it of part of its burden.

Mr. Ferris Scott, business manager of the Association, has inspected the Ulster Hall and is satisfied that it is big enough for the Trades Exhibition. The registration and reception rooms will also be in the Ulster Hall.

The following members have been appointed as the local representatives to meet six other members appointed by the Council in London to make the arrangements for the scientific sections:—Professor Johnstone, Dr. F. M. B. Allen, Professor Thomson, Professor Crymble, Mr. S. T. Irwin, and Dr. Dempsey.

In response to the recent appeal sent to all doctors in the North of Ireland on behalf of the local funds, Mr. Fullerton, the honorary treasurer, reports that so far only eighty-four subscriptions have come in. We are sure there are many who fully intend to subscribe, but who feel that it is time enough. An early reply would be a great encouragement to the Executive, because many of the arrangements must depend on the finances available, and we are anxious to make the meeting in every respect a success.

R. W. M. STRAIN, *Hon. Assistant Secretary.*

9 University Square, Belfast.

ROYAL MEDICAL BENEVOLENT FUND SOCIETY OF IRELAND. BELFAST AND COUNTY ANTRIM BRANCH.

A GENERAL meeting of the Belfast and County Antrim Branch of the Royal Medical Benevolent Fund Society of Ireland was held in the Whitla Medical Institute, Belfast, on 22nd May, 1936. Dr. J. S. Morrow, O.B.E., chairman of the Committee, presided. He referred in suitable terms to the debt of gratitude which the Society owed to Dr. V. G. L. Fielden, who had recently retired from the office of honorary secretary and treasurer of the Belfast and County Antrim Branch after twenty-seven years of faithful and devoted service. The honorary secretary presented a short financial statement, showing that up to date the annual subscriptions of the branch amounted, with bank interest, to £138. 12s. 3d.; the expenses amounted to £11. 13s. 9d., of which £10. 1s. 11d. represented the cost of the special appeal which had been sent out in January to every medical practitioner in Northern Ireland. The grants recommended for the year, nine in number, for sums varying from £12 to £30, amounted to £177. He pointed out that the sum of £138 odd included donations of £20 and £5 which could not be considered as annual subscriptions. These figures represented a discreditable drop from the sums subscribed in the 1870-80 period, when the annual income of the branch was over £200 per annum, derived from a larger number of subscribers in a smaller medical population, with fewer requests for charity and with money of a higher purchasing power. He was particularly disappointed in the response from doctors outside the Belfast district of the county of Antrim, possibly the most prosperous county in the whole of Ireland. He drew attention to the small sums which it was possible for the Society to grant even in cases of dire necessity, and alluded to the desire on the part of the English Society to raise their grants to £52 per annum for impoverished doctors and £36 per annum for dependants, together with larger grants in special cases. Such sums as these, he said, were impossible in the present state of the

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Irish Society's finances, but he noted with gratitude that the Central Committee in Dublin had never once, in his experience, turned down an application or suggested a lesser sum than that recommended by the Belfast and County Antrim Branch. He felt that the objective of the branch should be a subscription of £1. 1s. (one guinea) from every medical practitioner in the Six Counties, a sum which would enable the Society to bring relief to many now suffering severely.

The following were elected members of the Branch Committee:—Dr. J. S. Morrow (chairman), Drs. Eileen Hickey, Olive Anderson, S. R. Hunter, V. G. L. Fielden, P. J. H. Mulholland, R. H. Hunter, C. G. Lowry, James Boyd, R. W. M. Strain, and Robert Marshall (hon. secretary and treasurer).

On the motion of Dr. S. R. Hunter, seconded by Dr. Strain, the Committee was authorized to co-opt suitable members to add to their number.

ROBERT MARSHALL, *Hon. Secretary.*

9 College Gardens, Belfast.

REVIEWS

PATHOLOGY OF THE NERVOUS SYSTEM. By J. Henry Biggart, M.D. (Belfast). Edinburgh: E. & S. Livingstone, 1936. Demy 8vo. 350 pp. 204 illustrations. 15s.

The author of this book needs no introduction to Ulster readers. He is a distinguished graduate of Queen's University, and is recognized as a sound authority on diseases of the nervous system. His experience as pathologist to the Scottish Asylums Board, neuropathologist to the Royal Infirmary, Edinburgh, and lecturer in neuropathology, Edinburgh University, has provided him with excellent opportunities not only to collect the requisite material, but also to determine the needs of the student in this subject.

The book is described as a student's introduction, and it embodies the courses of lectures given to the medical undergraduates and to those preparing for the examination for the Diploma of Psychiatry at Edinburgh University. It opens with an account of the reactions of the nerve-cell and of the interstitial cells to disease. The consideration of these fundamental matters is more elaborate than is possible in a textbook of general pathology, and it is one of the greatest merits of the book. The student who has grasped those essential facts can approach the study of the special lesions of the nervous system intelligently. The principles of the classification of these lesions can be readily understood, and the interpretation of their effects becomes comparatively easy. Also, in these opening chapters, the author emphasizes the analogies which prevail between neurological and other somatic lesions with which the student is or should be familiar. This emphasis is repeated frequently throughout the book, with appropriate examples, so that the student cannot fail to integrate the special problems of neuropathology with his more general experience, and that is probably more than half the battle. The third chapter is devoted to an account of the cerebro-spinal fluid in health and disease, and a clear account is given of the causes and effects of increased intracranial pressure, including papillœdema. Subsequent chapters are concerned with vascular disease, acute and chronic bacterial infections, diseases due to viruses, diseases of unknown etiology, intoxications and deficiency diseases, degenerative diseases, injuries to the nervous system, tumours of the glioma group, and finally errors in development. This is a wide field to cover within

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Typographical errors are few and far between.

The book can be warmly recommended to all students of the pathology of the nervous system. It should go far to realize the author's hope that "through familiarity with the pathology of the various lesions the student will be tempted to envisage what is actually happening in the nervous tissues, and to take a more active interest in the elucidation of possible etiological factors."

VASCULAR DISORDERS OF THE LIMBS. By Sir Thomas Lewis, C.B.E., F.R.S., M.D., D.Sc., LL.D., F.R.C.P. London: Macmillan & Co., 1936. Price 6s. 6d.

In every branch of medicine there come stages at which it is necessary to review the field of research, separate the "wheat from the chaff," and store the established facts for use when possible in the practice of medicine. Such an object is that of this excellent little book by this well-known author.

Before treating any cases of circulatory disturbance in the limbs, it is necessary to have a thorough knowledge of the normal circulation and its variations under different conditions. Consequently, the first section is devoted to this object.

Methods of testing which are of utmost importance are carefully explained, and it is interesting to note that tests practical to every practitioner are described.

The author then proceeds to various pathological conditions found in the extremities, and most instructive chapters follow on such things as embolism and thrombosis, ischæmic contracture, arterio-sclerosis and thrombo-angeitis obliterans, Raynaud's phenomenon, gangrene, vascular disorders in diseases of the nervous system, etc.

The various operations for vaso-dilatation are considered, and the indications for these procedures are clearly stated. The complications to these "sympathectomy" operations are also dealt with, and show that these may prove a real difficulty.

Useful hints are found throughout the book on treatment. For instance, the advantage of frequent changing of the position of the patient over the use of a water-bed, as a preventive of bed-sores

The book may be recommended with confidence to every student and practitioner.

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The appendix contains many interesting suggestions for experiments with common organic substances:—The carbohydrates, alcohol, soap, urea, milk, albumen, etc. The book should prove very useful to those sitting for university entrance scholarships and first-year degree examinations in chemistry.

AN INTRODUCTION TO HYGIENE. By W. Robertson, M.D., D.P.H., F.R.C.P.E. Edinburgh : E. & S. Livingstone, 1936. Second Edition. Pp. 314. Price 8s. 6d. net.

This little book provides what the title indicates, an introduction to the study of hygiene. The author points out the great importance of some knowledge of this subject to all those with medical qualifications, and shows the many fields open to those with special training in public health work. He emphasizes also the importance of supplementing such a book as this with practical experience and with larger textbooks.

The opening chapters describe briefly the administrative side of public health work, and the more important regulations governing vaccination, food supplies, notification of births, deaths, infectious diseases, are explained. A large section is devoted to infectious diseases, and details of incubation, incidence, prevention, epidemics, diagnosis, and treatment are given for all the common infectious diseases as well as many tropical ones.

Heating and lighting systems, housing, drainage, water supply, ventilation, and sewage disposal are described and illustrated with a large number of diagrams. The principles of dietetics are shown and the value of different foods compared. Vitamins, however, receive very little attention, and one is surprised to read such a statement that in no case has the chemical composition of any vitamin been discovered. Great emphasis is laid on milk supplies and pasteurization, and the regulations governing the sale of milk are given in a special appendix.

Maternal and infantile mortality, eugenics, birth control, school medical examination, occupational diseases, industrial conditions, and vital statistics are all considered. On the whole, one can say that a large amount of useful information has been arranged in an accessible and attractive form, and this book will be of use to the busy practitioner as well as to the student preparing for examination.

AN INVESTIGATION CONCERNING AN ANCIENT MEDICINAL REMEDY AND ITS MODERN UTILITIES. By C. J. Macalister, M.D., F.R.C.P. London : John Bale, Sons & Danielsson, Ltd., 1936. Pp. 60. Price 2s. 6d. net.

This little book of sixty pages contains a comprehensive account of comfrey (symphytum officinale) and the results obtained from its therapeutic use, both in the sixteenth and seventeenth centuries and within the last few years, during which the author has been trying to repopularize it. The active principle is allantoin, a substance closely related chemically to uric and nucleic acids. It is a normal constituent of allantoic fluid, urine in pregnancy, maternal milk, and the roots and buds of certain plants, i.e., it occurs in association with rapidly growing cells.

On injection into flower-buds it causes rapid development of the flower, so that it seems to have a stimulating action on cell growth. This conclusion is borne out by its stimulating

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AN INVESTIGATION CONCERNING AN ANCIENT MEDICINAL REMEDY AND ITS MODERN UTILITIES. By C. J. Macalister, M.D., F.R.C.P. London : John Bale, Sons & Danielsson, Ltd., 1936. Pp. 60. Price 2s. 6d. net.

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On injection into flower-buds it causes rapid development of the flower, so that it seems to have a stimulating action on cell growth. This conclusion is borne out by its stimulating

effect on indolent ulcers. Its parenteral use in pneumonia causes an increased leucocytosis (probably from its close relationship to nucleic acid), and on this account may increase the incidence of empyema. To Professor Titherly is due the identification, as allantoin, of the active principle of comfrey root, also its complete investigation.

If the continued and extended use of comfrey confirms the author's results, he will have performed a notable service in bringing it once more into general use.

THE VEGETATIVE NERVOUS SYSTEM. By Wulf Sachs, M.D., with an introduction by Sir Walter Langdon Brown. London : Cassell & Company, Ltd., 1936. Pp. 168; 85 text-figures and 8 plates. 15s. net.

In the preface to this extraordinarily interesting book, its author reminds his readers of Professor Edwin Bramwell's recent saying: "We are on the threshold of a period in which the activities and disturbances of the autonomic nervous system will occupy a progressively prominent place in the considerations of the clinician." This view is an accepted one by every progressive medical man to-day, but unfortunately the literature is not only enormous, but is widely diffused through the specialized medical and scientific journals not always accessible to the general practitioner. Dr. Sachs has attempted, and has succeeded in a most admirable way, in bringing our present-day knowledge of this subject into a single volume, in which the reader can gain a quick orientation in, and a practical approach to, the whole question of the ordinary tests, clinical observations, diagnostic criteris, and the essential anatomical, physiological, and pharmacological data of the autonomic nervous system.

An important point in this book is the way in which Dr. Sachs discusses the views of earlier workers in the light of recent investigation. He quotes Stohr's disagreement with Langley's two-neurone conception of the "vegetative" nervous system, as Dale's work on cholinergic and adrenergic fibres appears to re-establish Langley's views.

A helpful part of the book, as Sir Walter Langdon Brown says in his introduction to it, is the way in which Dr. Sachs explains the important influence of the pre-existing state of tonus in the vegetative nervous system on the results obtained by subsequently stimulating it. Neglect of this principle explains much of the confusion and contradiction to be found in the literature.

The book is well and clearly illustrated both by text-figures and coloured plates, taken largely from foreign workers such as L. R. Müller, E. A. Spiegel, Th. Hoepfner, G. von Leupoldt, and others. It should be not only read, but carefully studied, by every thoughtful medical practitioner and senior student, as it contains so much that is new, and discusses so many points of importance to clinical medicine.

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POST-GRADUATE COURSE FOR GENERAL PRACTITIONERS

A FEW years ago annual post-graduate classes in general medicine and surgery were inaugurated by Queen's University, Belfast. These classes were confined to panel practitioners nominated by the Ministry of Labour (N.I.), and were attended each year with coniderable success. A wider sphere of usefulness is now given these classes by opening a limited number of places to any general practitioners who wish to attend.

The classes this year will begin on Monday, September 14, and will end on Saturday, September 26. They will be conducted by the visiting staffs of the Royal Victoria and the Mater Infirmorum Hospitals, and the teaching staff of Queen's University, Belfast. The morning sessions, from 9.30 till 12 noon, will be confined to clinical study in the wards and out-patient departments of the hospitals. The afternoon sessions, from 2 till 5, will be devoted to demonstrations and lectures on the more theoretical aspects of medicine and surgery, to problems of preventive medicine, to pathology, bacteriology, and clinical biochemistry. They will be held in the Institute of Pathology, Grosvenor Road. One whole morning will be devoted to a visit to the Forster Green Hospital, Fortbreda, where Dr. R. B. Clarke has kindly consented to give a demonstration of the methods of diagnosis and treatment employed there.

Nowadays, when the importance of post-graduate study is being more clearly recognized, these classes should make a wide appeal, particularly to the many past students of the Belfast Medical School who are scattered throughout Northern Ireland, England, and the colonies. Participation in this course would give them an opportunity of renewing their student days, and reliving once more the carefree life which passes away on graduation, with its attendant responsibilities of general practice.

Anyone interested in these classes may obtain further information from Dr. R. H. Hunter, organizing secretary, or Professor W. J. Wilson, Dean of the Medical Faculty, Queen's University, Belfast. The fee for the fortnight's course is £5. 5s., payable in advance.