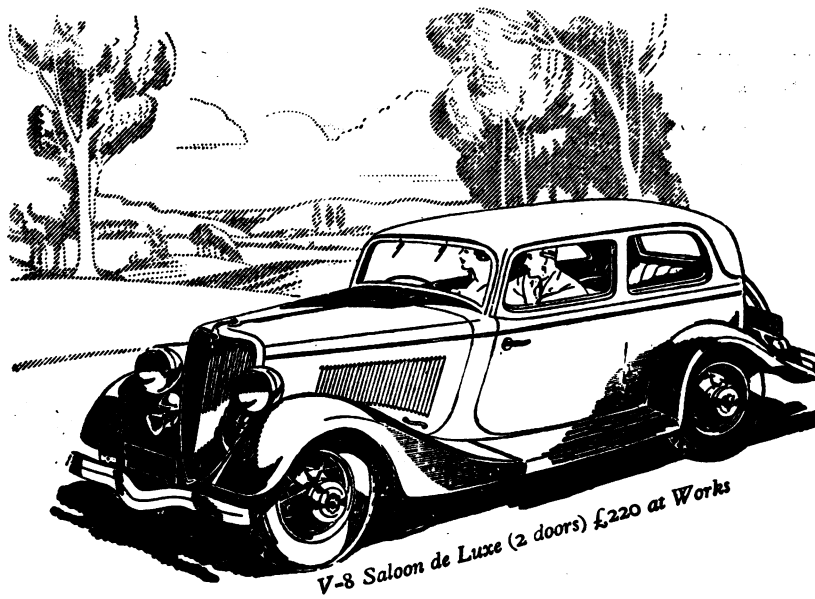
APRIL, 1935

THE ULSTER MEDICAL JOURNAL

PUBLISHED BY
THE ULSTER MEDICAL SOCIETY

FAST . . .



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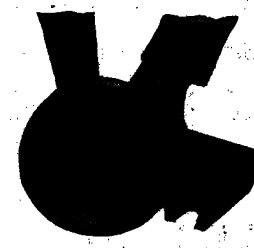

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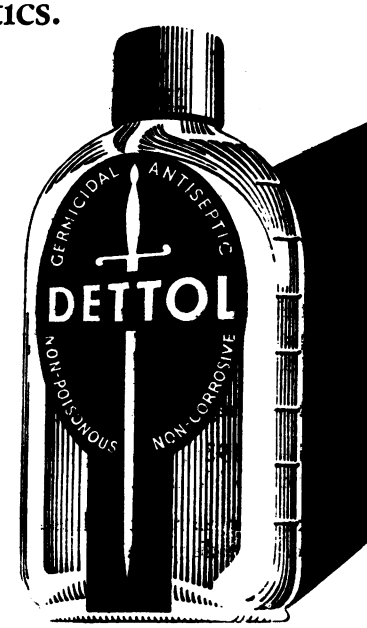

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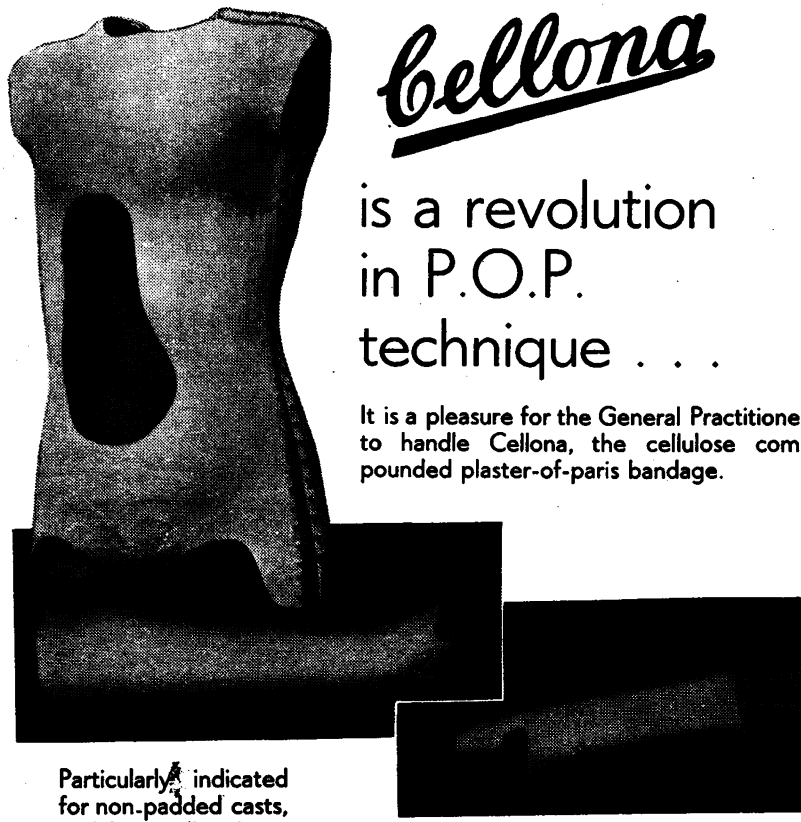

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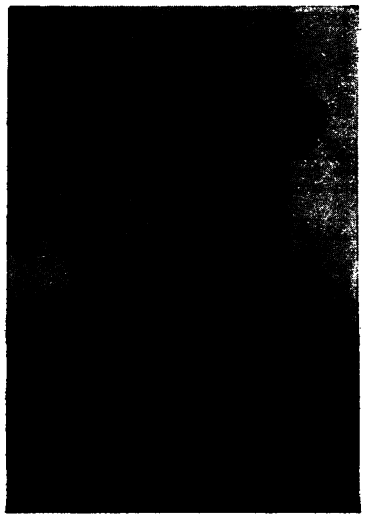

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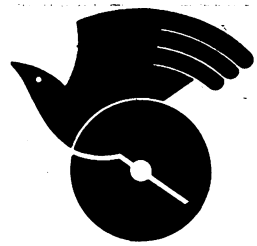

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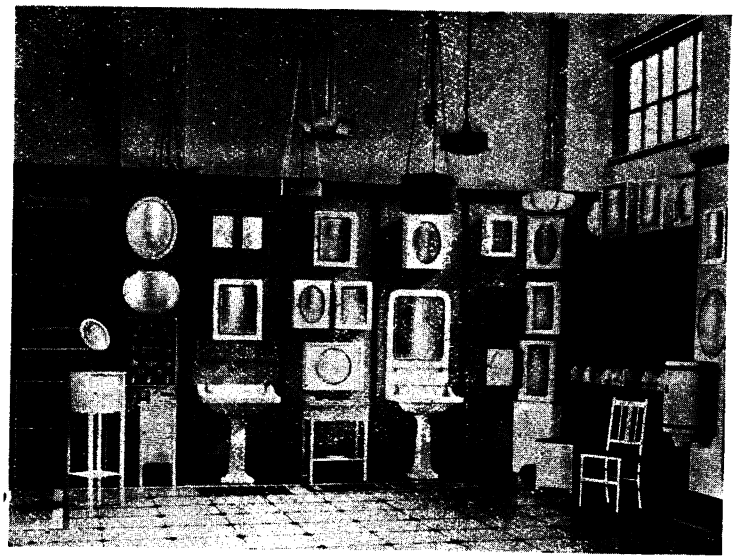

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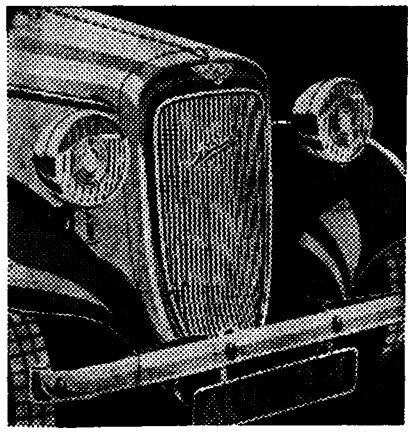

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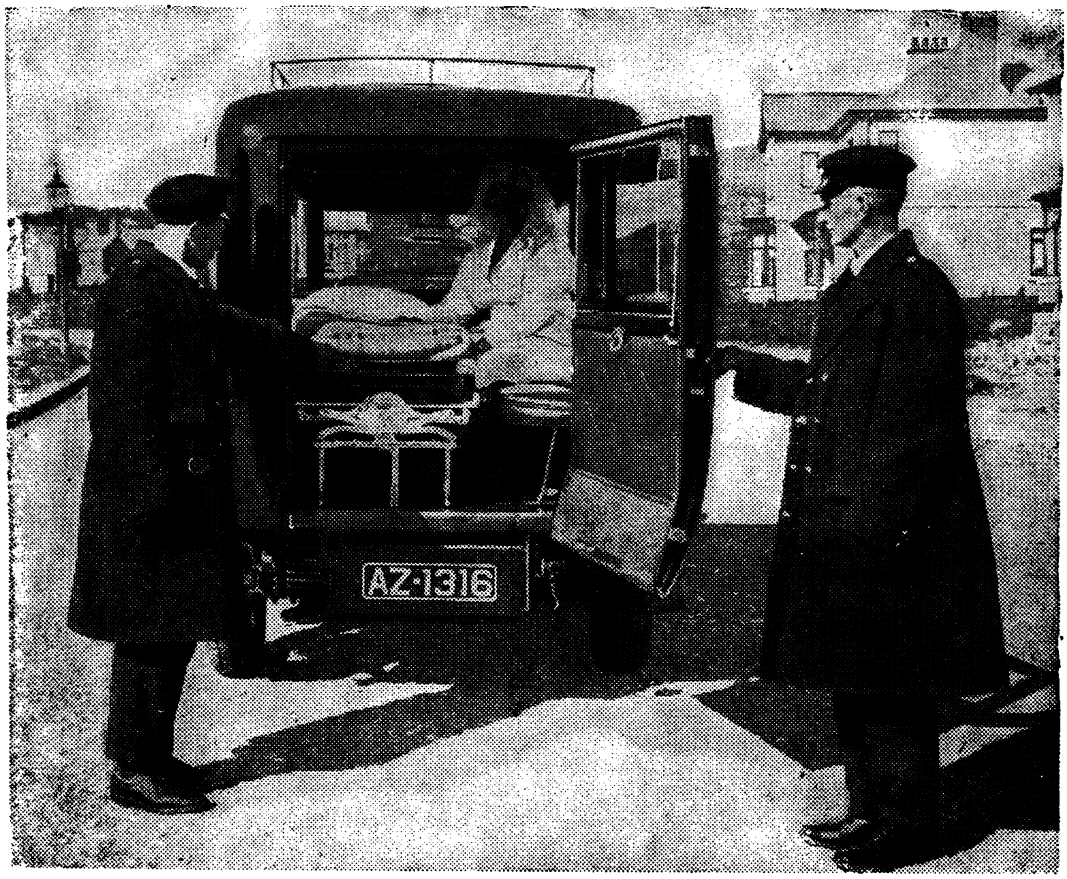

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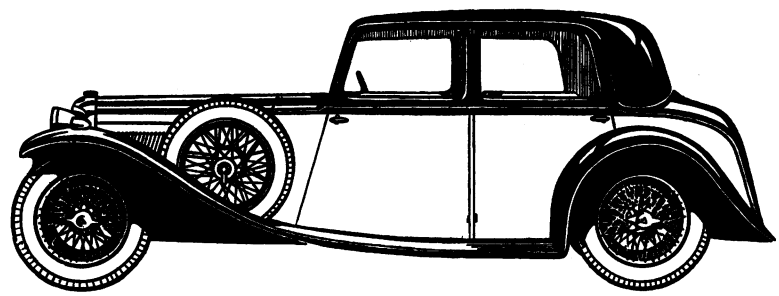

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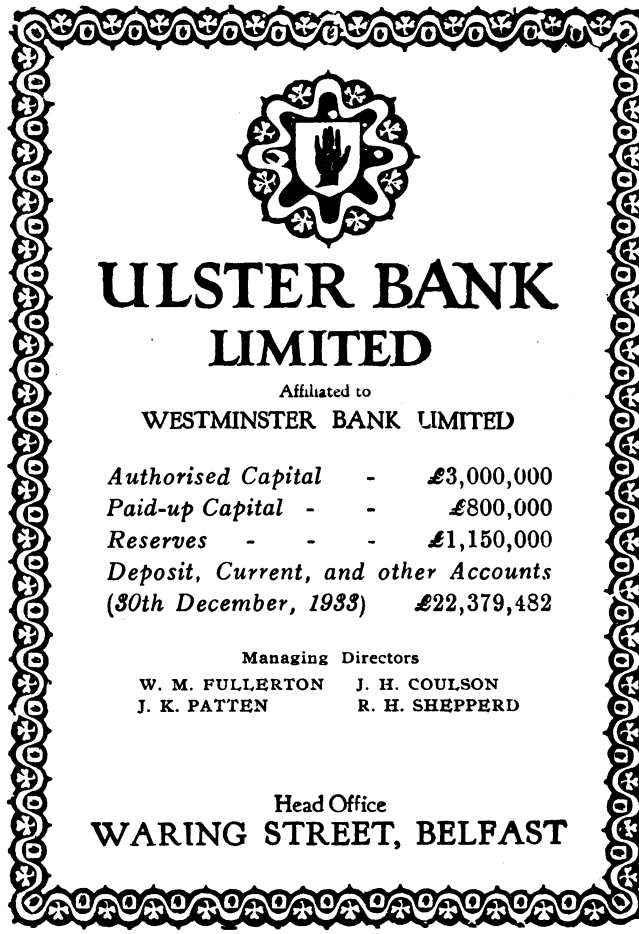

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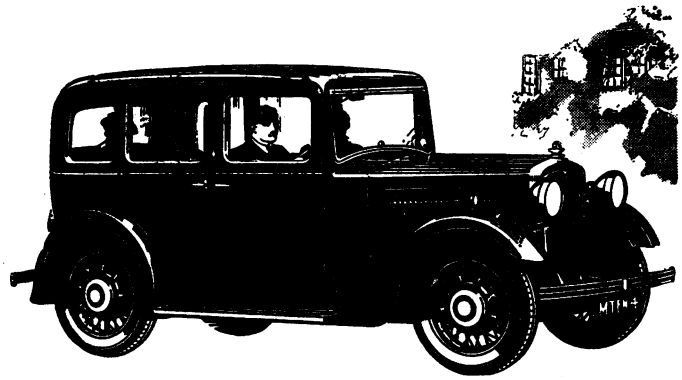

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CONTENTS

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THE ULSTER MEDICAL JOURNAL

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2. Illustrations must be in finished form ready for reproduction. They must be properly labelled in type or by hand, with reference pointers if necessary.
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DATES OF PUBLICATION

1st January, 1st April, 1st July, 1st October.

THE ULSTER MEDICAL SOCIETY

THE MEDICAL INSTITUTE,
COLLEGE SQUARE NORTH,
BELFAST.

Dear Sir (or Madam),

If you are not a member of the Ulster Medical Society, we would appeal to you to give the question of joining your consideration. The Society has been in existence since 1862, and has always been active in keeping its members interested in the advances in medical science as well as in current professional affairs. The Medical Institute, situated in College Square North, belongs to the Society (through the generosity of Sir William Whitla), and is ideally adapted for meetings, committee meetings, and recreation. There is a library with current medical periodicals, and facilities for reference to medical literature are available in conjunction with the library at the Queen's University. There is also a billiards-room available to members, and lighter periodicals are also provided. An annual dinner is held each year in December, and a golf competition in June. Meetings are held at intervals of a fortnight during the winter months, and papers are contributed by members. Distinguished visitors are occasionally asked to contribute papers on subjects upon which they are specially qualified to speak. THE ULSTER MEDICAL JOURNAL, the official organ of the Society, is issued to all Fellows and Members free of charge.

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

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

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

We remain,

Yours faithfully,

S. R. HUNTER, *President.*
F. P. MONTGOMERY, *Hon. Secretary.*
C. A. CALVERT, *Hon. Treasurer.*

THE
ULSTER MEDICAL JOURNAL

PUBLISHED QUARTERLY ON BEHALF OF THE ULSTER MEDICAL SOCIETY

VOL. IV 1st APRIL, 1935 No. 2

Clinical Aspects of Hodgkin's Disease

By PROFESSOR W. W. D. THOMSON, B.SC., M.D., F.R.C.P.
from the Royal Victoria Hospital, Belfast

THOMAS HODGKIN, when demonstrator of pathology in Guy's Hospital, presented in 1832 to the London Medical and Chirurgical Society a paper entitled "Morbid Appearances of the Absorbent Glands and Spleen," in which he described a series of cases characterized by an enlargement of the lymphatic glands and of the spleen. The glands were of "a firm cartilaginous structure." The spleen was "thickly sprinkled with tubercles presenting the same structure as the glands." Hodgkin regarded these changes as a primary affection of glands and spleen, not secondary to inflammatory or tuberculous changes, and due to hypertrophy of pre-existing structures. This paper attracted little attention, and seems to have been forgotten till 1856. At this date Samuel Wilks published in Guy's Hospital reports a paper dealing with lardaceous disease. He included an account of a peculiar enlargement of the lymphatic glands, which he considered was an original observation, but discovered while the article was in the press that he had been forestalled by Dr. Hodgkin, and loyally acknowledged the senior man's priority.

Nine years later Wilks contributed an article on "Cases of Enlargement of the Lymphatic Glands and Spleen" to the same journal, in which he analyzed the six cases which had constituted Hodgkin's series, two of which he discarded as being discordant with the others. He then proceeded to describe twelve additional cases which he had himself collected. Wilks in this paper put Hodgkin among the immortals by attaching his name to the disease. When Wilks's series of cases is studied, it is evident that he included two cases of leukæmia, a condition which was the following year definitely distinguished from Hodgkin's disease by Wunderlich. Wilks recognized that this disease formed a link between the granulomata, such as tuberculosis, and malignant disease.

In the course of its history, no other disease has been burdened with so many synonyms. It has been known as lymphosarcoma (Virchow), pseudo-leukæmia (Cohnheim), adénie (Trousseau), lymphadenoma (Wunderlich), lymphogranulo-

matosis, etc. These names are but an index of the obscurity which has so long enveloped its etiology. Probably "Hodgkin's disease" is the most non-committal name to employ when referring to this syndrome, some of whose atypical forms may yet prove to be distinct and separate diseases.

The disease is one of young adult life, the onset of the disease being rare after forty years of age. The commonest period of onset is between twenty and thirty, but many cases occur in the first, second, and fourth decades. I have seen the condition in a woman of seventy-five. Males are affected more than twice as frequently as females. Many writers stress the possibility of preceding sepsis as a predisposing factor. The cervical glands are the group most commonly affected. The area drained by these glands — mouth, teeth, tonsils, naso-pharynx, nasal cavity, and its sinuses, is the favourite seat of focal infection. In the exceptional cases where other groups are primarily involved, a previous history of sepsis nearby is not uncommon. I had under my care a young woman who after her confinement developed a sepsis of the breast while nursing her infant. The axillary glands of the corresponding side became enlarged. These were the precursors of a generalized lymphadenoma. Lord Horder relates the case of the only patient he had seen in which the first glands to be enlarged were the inguinal. In this case the disease followed a urethritis and bubo of the groin. He also narrates the rapidly fatal case of a surgeon in which the disease arose in the glands of the armpit. This followed three months after the healing of a septic finger of the hand on the same side.

The usual course of the disease is that described by Trousseau :—

1. Stage of local lymph-node enlargement.
2. Stage of generalized lymph-node enlargement.
3. Stage of cachexia.

Stage of Local Enlargement of Lymph-nodes.—The patient seeks medical advice on account of a swelling on one or other side of the neck. Except for the anxiety, inconvenience, or disfigurement produced by the mass of enlarged glands, there is no complaint of pain nor of any change in the general health. On palpation one finds a bunch of glands, not unlike a bunch of grapes, with the larger glands in the centre, and the smaller ones towards the periphery. There is no evidence of caseation or inflammatory changes; the overlying skin is not adherent nor reddened. The absence of inflammatory and infiltrative changes explains the characteristics of the individual glands, which are painless and insensitive, smooth, discrete, and easily movable. The disease appears to have as a site of election the glands of the posterior triangle, especially those in the supra-clavicular and post-auricular regions, although any of the other groups may be involved. The glands may reach a quite enormous size, scarcely paralleled by any other type of glandular enlargement.

Stage of Generalized Enlargement of Lymph-nodes.—After a variable period, other groups of glands make their appearance, signalling the onset of the stage of generalized enlargement of the lymphatic nodes. The advance as a rule takes place in an orderly manner, the disease spreading from one neighbouring group to the next. The glands on the other side of the neck become involved; the axillary glands

become palpable, especially the subclavicular and subpectoral group, and even the epitrochlear gland may be palpable. Although it is true that the inguinal glands may be the next to become evident, it is illogical to believe that the disease can jump from axilla to groin. Rather we must postulate, although direct evidence is often lacking, that the course is rather through mediastinal and bronchial groups to the retroperitoneal and hence by the mesenteric and iliac to the inguinal. And in this lies the hidden menace of this disease.

The early diagnosis of enlargement of the internal glands is fraught with almost insuperable difficulties, but the further course of the disease and post-mortem experience warn us that their involvement must be suspected. Later I shall stress the importance of recognizing that the deep glands may be the initial site of the disease. It is expedient to realize that when the axillary or inguinal glands are palpable, by this time also the mediastinal and tracheo-bronchial and abdominal groups are also involved. Sooner or later evidence of their presence is shown by physical signs or pressure symptoms. Abnormal areas of dullness in the chest should be carefully sought for. As the anterior mediastinal glands are favourite intrathoracic sites, dullness to right, left, and under the sternum in its upper part may be found. Careful attention should be paid to pressure symptoms—as intra-thoracic pain, cough (often paroxysmal), dyspnœa, hoarseness due to interference with the recurrent laryngeals, evidence of bronchial obstruction and pleural effusions, cyanosis of the face, turgidity of the jugular veins, alterations in the size of the pupils, difficulty in swallowing, and clubbing of the fingers. Careful X-ray of the chest should be carried out.

In over half the cases the spleen is sufficiently enlarged to be palpable, but its enlargement rarely reaches the dimension found in the leukæmias or in splenic anæmia. The edge of the liver in a smaller proportion of cases can be felt below the right costal margin. It is rare to be able to palpate the glands in the abdomen, but in one case observed, the retroperitoneal glands were huge enough to produce a mass which filled the larger part of the abdomen.

The swelling of the abdominal glands produces various symptoms; of these in my experience, severe and persistent pain simulating sciatica, due to pressure on the lumbar and sacral plexus, is common. Pressure on the coeliac plexus may give rise to a pigmentation not unlike that seen in Addison's disease. Pressure exerted by the glands in the hilum of the liver may lead to jaundice and ascites; while pressure on the large venous trunks may lead to œdema of the lower extremities.

Remembering the large amount of lymphoid tissue in the alimentary tract, it is surprising that this area should so often escape. It is but rarely that the tonsils are attacked, and symptoms pointing to involvement of Peyer's patches and of the appendix are rather of pathological interest than of clinical importance.

Although the absence of infiltration is a striking feature in lymphadenoma, yet it may and does occur, often with disastrous results. Fisher has already reported from my wards two cases of this nature. A large intrathoracic mass eroded and invaded the body of the fourth dorsal vertebra, producing collapse of the body. This woman suffered agonies of pain from pressure on the posterior nerve-roots, and

ultimately developed paraplegia. A second case developed paraplegia without X-ray evidence of infiltration of the vertebral column. It is possible that the tumour mass made its way through an intervertebral foramen and so caused a pressure paraplegia. It is interesting to notice that in this case the cerebro-spinal fluid was peculiar. Only about 5 c.c. of colourless fluid were obtained. Pressure on the jugular veins did not increase the rate of flow. The fluid was highly albuminous, approximately .2 per cent., and contained fifty cells per c.m., thus differing from the ordinary Froin's syndrome in the fact that the cells were increased.

Various constitutional symptoms manifest themselves during this period. The temperature, which is normal during the stage of local enlargement, becomes irregularly intermittent. A peculiar type of relapsing fever is of special importance. This was first observed by Murchison in Hodgkin's disease, but was later more fully studied by Pel and Ebstein, and known as the Pel-Ebstein syndrome. A period of pyrexia of ten to fifteen days' duration occurs, the temperature gradually rising in staircase fashion to a maximum, and then steadily falling by lysis. This is followed by an apyrexial period of another ten or fourteen days, when the temperature again rises. This cycle may occur over many months.

Sweating and pruritus are often very troublesome features of the disease. They may be early symptoms. An engineer aged 35 developed marked itchiness, chiefly in his groins and armpits. This itch persisted for two years, and was followed by sweating at night. At this time he did not notice any of his glands swollen. Probably, however, some of the internal glands were already involved. He came to hospital on account of night sweats and of general weakness. Glands were discovered in his groin; one of these was removed and found to show the typical histological appearances of Hodgkin's disease. There is some evidence to show that sweating and pruritus are associated with exacerbations of gland activity, and we have noted that during these periods an eosinophilia may appear in the blood.

Stage of Cachexia.—As the disease advances, cachexia sets in and the patient becomes rapidly more anæmic. There is no typical blood-picture in Hodgkin's disease, and a diagnosis cannot be made from the blood alone. The anæmia shows a greater fall in the hæmoglobin than in the red corpuscles—there is usually a low colour index. The number of leucocytes vary from a leucocytosis of moderate degree to a leucopenia. The variation in the number of the eosinophils is of importance. In two cases lately we have found the percentage nineteen and ten during a period of pruritus; at other times in the same patient these cells were within normal limits. The platelets are said to be increased.

Wasting may be marked in the cachetic stage, one of my patients losing over two stones in weight—from 8 st. 6 lb. to 6 st. 5 lb.—in a few months before her death.

Prognosis.—The prognosis in this disease is uniformly fatal. Probably two to three years is a fair expectation of life from development of symptoms, though many cases run a much more rapid course. In those cases in which the mediastinal or retroperitoneal glands are markedly involved, the outlook is especially grave.

Cases in which the superficial glands are chiefly affected may live five or more years. At any time a patient whose downward progress has been slow may show a sudden exacerbation of gland enlargement and the disease takes on a quickly downward course. Death in Hodgkin's disease is usually due to anæmia and exhaustion, or from direct pressure effects on vital structures.

DIAGNOSIS.—In a straightforward case seen in the stage of generalized enlargement of the glands with a palpable spleen, the diagnosis is not difficult. The diseases with which it is likely to be confused are lymphatic leukæmia and infectious mononucleosis or glandular fever, but the examination of the blood gives the required clue. Lympho-sarcomatosis may exactly simulate Hodgkin's disease, but the more constant presence of a mediastinal tumour, with greater infiltrative powers, its lesser tendency to pyrexia, and the fact that the spleen is much less frequently enlarged, may be suggested as points in the differential diagnosis; but, on the other hand, mediastinal tumour is not uncommon in Hodgkin's, and it may infiltrate neighbouring structures, as has already been described; Hodgkin's too may be afebrile, and quite frequently the spleen is not palpable. Hence the exact diagnosis must always be from the histological or biological examination of an excised gland.

In the early stage of Hodgkin's, when we are confronted with a localized swelling of the glands in the neck, the differential diagnosis is again difficult. Careful search should eliminate the question of local sepsis. Malignancy as a cause of localized enlargement may cause difficulty. I can recall a case of enlarged supraclavicular glands, where the primary focus was a bronchial carcinoma which until late in the disease gave rise to no clinical symptoms, although a persistent cough was suggestive. Here the diagnosis was established by excision of a gland before any definite clinical evidence of the primary growth was forthcoming. The tendency of the affected glands to form early adhesions, their peculiar hardness and the presence of radiating pain, suggest malignancy. From tuberculosis of the cervical lymph-glands the diagnosis is simple, if the tuberculous glands are tender and adherent, if they have softened, or if the overlying skin is inflamed, or if an actual sinus or old scar is present, or if tuberculosis be found elsewhere in the body. Tuberculous glands have not the same pronounced hardness nor are they so prominent as those of Hodgkin's disease. Quervain aptly remarks that the whole aspect of Hodgkin's disease resembles a caricature of tuberculous adenitis. But occasionally the diagnosis is far from evident, and the various classical clinical symptoms fail. The rare condition of generalized tuberculous adenitis is especially difficult. I have recently had in my ward a young woman who had enlarged glands in both sides of her neck, in axillæ, and inguinal regions. For many years she had been diagnosed as Hodgkin's disease. However, finally some of the glands caseated and broke down. X-ray examination showed a remarkable degree of calcification in cervical, intrathoracic, and abdominal glands—those in the neck forming almost a collar of chalk around the neck. Calcification is practically unknown in Hodgkin's disease. Excision of a gland in this case showed typical tuberculous changes. Later she developed caries of the second cervical vertebra. The exact diagnosis of a

tuberculous gland infection is of vital importance for the patient, the prognosis and treatment being so different in the two cases. The tuberculin reaction may assist, but the most satisfactory method is biopsy. It is important to remember that occasionally the enlarged glands of Hodgkin's may become secondarily infected by tuberculosis, but Gordon has shown that the incidence of tuberculosis is scarcely greater in the glands taken from cases of lymphadenoma than in a series of control glands.

A still greater difficulty arises in those cases where the disease plays its "signature tune" in an unexpected manner. For instance, I have already cited a case where pruritus and sweating were initial symptoms and their true etiology remained long unguessed. I have seen a case in which pain in the chest, due to pressure of a huge mass of enlarged mediastinal glands, caused the patient to seek advice, and at that time only a few unobstrusive glands in the left supraclavicular region could be found and which had entirely escaped the patient's observation. The disease starting with enlargement of the axillary glands, of the inguinal glands, or of the spleen, may all be very puzzling, unless this possibility is borne in mind. But probably the most difficult type for diagnosis, fortunately rare, is that in which no evidence of superficial glandular enlargement can be found and the spleen is not enlarged, the so-called "latent" or "larval" type. The following case illustrates the difficulty in diagnosis in this type of case. For fourteen months a man had at intervals pyrexial attacks which were accompanied by ordinary febrile symptoms. These attacks were separated by an interval of fourteen days' freedom from fever. In the early stages of his illness he carried on his work in an insurance office during the febrile period. As the condition continued he was forced to go to bed during the attack, but returned to work during the afebrile period. Finally, as weakness, anæmia, and wasting became gradually more marked, he discontinued work completely. He was frequently examined by many physicians; his blood again and again gave negative agglutination results to the enteric group and to bacillus abortus, his leucocytes were not increased; blood cultures, urinary examinations, X-ray examinations of chest and abdomen, and cholecystography threw no positive light on the case. He was admitted apparently *in extremis* to the Royal Victoria Hosiptal, emaciated and slightly jaundiced, with a greatly distended and protuberant abdomen, temperature 103, pulse 130. To our great surprise he began to improve, jaundice disappeared, and as the temperature fell he recovered to a surprising degree. However, after eleven days' freedom from temperature, his temperature again rose, jaundice reappeared, the liver became palpable, and he died just as his temperature was subsiding after fourteen days of a typical Pel-Ebstein pyrexia. While in hospital various examinations were repeated, with negative results. Unfortunately an autopsy was absolutely refused, but I have little doubt that the diagnosis suggested by the peculiar type of temperature and by a process of exclusion of other conditions, namely a larval type of lymphadenoma, was the correct one.

TREATMENT.—Two methods of treatment are in the present state of our therapeutic knowledge of value—deep X-ray or radium therapy, and the use of arsenic.

There is a general consensus of opinion that irradiation has prolonged the period of remission, especially in the early stages of Hodgkin's disease, and has reduced pressure symptoms, and so rendered the remaining span of life not only longer but more endurable.

I have repeatedly seen a localized focus of lymphadenoma tissue completely disappear under X-ray treatment and pressure symptoms relieved. But in spite of local success, recurrences sooner or later occur in the same area or in other regions, and with each recurrence the interval of remission becomes shorter and the fresh glands more resistent to irradiation. The failure to maintain the early success in the later stages is most disappointing. However, the difficulties of the radiologist seem to me almost insuperable. The wide dissemination of the disease throughout the thoracic and abdominal cavities militates against a dosage adequate to cause regression of all the affected nodes. The greatest success has been in cases where the disease is caught in its early localized condition in the neck. Unfortunately, this stage is too rarely diagnosed; most of our cases have advanced well into the generalized stage before treatment has been instituted. Enlarged glands in any part of the body demand urgent and exact diagnosis, and their successful early recognition is of special importance in Hodgkin's disease, if the unfortunate patient's only hope is not to be sacrificed. Between the intervals of X-ray treatment, arsenic should be pushed, either in the form of Fowler's solution, sodium cacodylate, or nov-arseno-billon.

To the knowledge of this disease first described by Hodgkin while working as a morbid anatomist, clinicians have added but little. It has gradually been isolated from a scrapheap of allied conditions, chiefly by the advance of pathological technique. To the pathologists we turn hopefully for further light on its causation, with a lively faith that the elucidation of this strange intermediate disease may be the stepping-stone to the solution of the infinitely more pressing problem of malignancy.

Hodgkin's Disease: Pathological Aspects

By J. S. YOUNG, M.A., M.D., B.SC.

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PATHOGENESIS.

THE natural jumping-off place for any consideration of the pathology of lymphadenoma should be a concise account of its pathogenesis. Unfortunately this is still unknown. At one time or another many different organisms have been incriminated —the tubercle bacillus, human, bovine, and avian; diphtheroid bacilli, spirochætes, and various fungi—but now there is an increasing probability that none of them has anything to do with the etiology of the disease. A thorough re-investigation of

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their individual claims has been carried out by Twort and Gordon and their colleagues under the auspices of the Rose Research on Lymphadenoma, and the results of their work in this direction have been uniformly negative. Gordon has put forward an alternative suggestion, namely, that lymphadenoma is a virus disease. His suggestion has been challenged by Friedemann and Elkeles, and it still lacks confirmation. Meanwhile, however, Gordon has elaborated a biological test for lymphadenoma which is, or certainly promises to become, an invaluable means of verifying a diagnosis when the histological characteristics of the lesion are atypical. The principles of this test are discussed elsewhere in this Journal by Dr. Davis.

Morbid Anatomy.

It is a matter of common knowledge that the disease is primarily an affection of lymph-glands. The lymph-glands become enlarged—cervical, retroperitoneal, and, sooner or later, mediastinal, axillary, and inguinal — and their enlargement is attended by various pressure affects. At the same time, the spleen becomes enlarged, often to a considerable degree. In some few cases, indeed, the spleen may be much enlarged, while the deep and the superficial lymph-glands are comparatively little swollen. In the earlier stages of the disease the enlarged glands are soft and discrete, whereas they tend to become indurated and more or less matted together in the later stages, often forming very large nodular masses. On section, such a mass presents a pale cellular appearance, intersected as a rule by strands or broader bands of connective tissue and studded, perhaps, by opaque foci of necrosis. The pulp of the spleen is generally congested, and usually shows scattered greyish-white areas described as "suet-bodies." In some cases, other organs such as the liver, the lungs, the kidneys, the bone-marrow, and the bodies of the vertebræ, may be the seat of lymphadenomatous lesions.

Histology.

At an early stage in the disease, the normal architecture of an affected lymph-gland is lost. The follicles, lymph-cords, and sinuses cannot be recognized, and the structure of the gland becomes more or less uniformly cellular. These preliminary changes are due to hyperplasia of reticular cells, derived from the framework of the gland, with or without an increased production of lymphocytes. At this stage it can usually be determined that the lesion is no ordinary inflammatory process, but the changes are not specific and they do not spell Hodgkin's disease. Next, the reticular cells enlarge; many of them acquire twin vesicular nuclei, while others proceed to the formation of peculiar giant-cells, variously described as Greenfield, Sternberg, or Dorothy Reed cells, possessing three or more overlapping nuclei. At the same time or later, eosinophile and neutrophile leucocytes make their appearance in varying number; reticular fibres are multiplied, and subsequently fibrous tissue is laid down in increasing amount. These several elements are integral to the typical picture of lymphadenoma, and they are found in every seat of the disease. Foci of necrosis may be present.

But the histological picture is not always complete in every detail. One or more of the characteristic cellular elements may be absent or exceedingly sparse, so that there are many variants of the typical lesion. Such variants are often described as belonging to the "Hodgkin group." In some cases a remarkably large number of the cells are seen undergoing mitotic division; the nuclei of the reticular and giant-cells are hyperchromatic, and the stroma is scanty, so that the picture may be strongly suggestive of a mixed-cell sarcoma. In short, the histological diagnosis of a typical example of lymphadenoma is a simple matter, but it can be difficult or even impossible to classify some glandular lesions which may represent atypical forms of the disease.

The Nature of the Disease.

There is just as little known about the nature of lymphadenoma as there is about its pathogenesis. According to one view, it is an infective granuloma; according to another, it is a neoplastic formation. Some sort of compromise between these opposing views is contained in the suggestion that there are granulomatous and sarcomatous varieties of the disease. Probably the most accurate conception of lymphadenoma is that it represents essentially a hyperplasia of reticular cells; it is, in short, a reticulosis. This view is strongly supported by the recent work of Pullinger (1932) and Ross (1933).

Reticular tissue is most abundant in lymph-glands, spleen, and bone-marrow, forming the framework of these organs, but it is distributed in smaller quantity throughout the body, generally in close relationship to the walls of capillaries. It consists of a syncytium of nucleated protoplasm interwoven with fibrils. According to Maximow, discrete cellular elements described as reticular cells can be formed from the nucleated syncytium. The reticular cells so formed are neither stable nor mature like the differentiated cells of the body. On the contrary, they are of a primitive or embryonic habit, capable of undergoing subsequent differentiation to other more or less mature types of cell.

In the first instance, therefore, it is suggested that a proliferation of reticular cells occurs under the peculiar and probably specific stimulus of the etiological factor of lymphadenoma, whereby the structure of an affected lymph-gland becomes more or less uniformly cellular. Subsequently the new-formed reticular cells follow several lines of differentiation, giving rise to eosinophile and neutrophile leucocytes, giant-cells, lymphocytes, and plasma cells and fibroblasts. If such cellular differentiations were complete, the lesion must assume the general characteristics of a granulomatous formation. On the other hand, if the cellular differentiation were incomplete, so that the lesion would be dominated either locally or more diffusely by one cell type possessing a hyperchromatic nucleus and presenting numerous mitotic figures, the structure of the lesion is liable to acquire sarcomatous characteristics. Thus the conception that lymphadenoma is essentially a reticulosis helps to reconcile the opposing views relating to the granulomatous and sarcomatous structure of different lesions. Moreover, it explains the development of lymphadenomatous nodules in such organs as the liver, kidneys, lungs, and so forth, which contain little or no lymphoid tissue, but do contain reticular tissue as a

normal constituent. Finally, a reticulosis may or may not be associated with leukæmia, usually of a monocytic type. In leukæmic reticulosis, the hyperplasia commonly affects the reticular cells lining the sinuses of a lymph-gland, and not the reticular tissue of the lymph follicle, whereas the converse state of affairs prevails in Hodgkin's disease. Exceptionally, however, a glandular lesion of the Hodgkin type has been attended by leukæmia. An unusual case, which may eventually be included in this group, has been studied recently in this laboratory. The patient was a girl of 16. A series of blood-counts and the blood picture had indicated a diagnosis of lymphatic leukæmia. An enlarged gland from the axilla showed a marked degree of reticular cell hyperplasia affecting particularly the follicular reticular tissue, although the sinus reticular cells seemed to be affected also to a slight extent. There was a very considerable number of eosinophile leucocytes scattered throughout the gland; lymphocytes were reduced in number; there was no fibrosis; giant-cells were absent, and the architecture of the gland was still discernible. The lesion was evidently not characteristic either of Hodgkin's disease or of lymphatic leukæmia, but, in view of the association of reticular cell hyperplasia with eosinophilia, it was suggested that it might belong to the Hodgkin group. Another gland was excised from the groin. It showed the same histological changes, but in addition biological tests were carried out and both the Gordon and the Friedemann tests were positive. This is the anomalous case (M. M.) which is referred to separately by Dr. Davis in his account of the biological aspects of the disease.

In conclusion, lymphadenoma is a disease not only of scientific but also of practical importance. It is a fatal disease, and it cannot be regarded as rare. For example, we have investigated and identified fifteen cases in Northern Ireland within as many months. We want more material, and we shall esteem it a very great favour if the members of the medical profession in Northern Ireland will send us cases or specimens of enlarged glands which have been excised—whether the enlargement of the glands should prove to be tuberculous, carcinomatous, leukæmic, or anything else. Such biopsy specimens should be dispatched in a clean, dry bottle or other glass container to me or to Dr. Davis at the Institute of Pathology, Grosvenor Road, Belfast. Also, if permission for a post-mortem examination can be obtained on any case of lymphadenoma, one of us will be glad to travel anywhere in the Six Counties to carry out the examination at short notice if desired. Alternatively, any glandular mass removed at autopsy, packed and dispatched in the same way as biopsy material, will be gratefully received.

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The Biological Aspects of Hodgkin's Disease

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PROBABLY the most serious obstacle to the successful experimental study of Hodgkin's disease has been the lack of a susceptible laboratory animal.

The disease has been described as occurring naturally in various domestic animals, such as the pig, the horse, and the dog, but it is very doubtful whether the diagnosis of lymphadenoma has been justified in any of these cases.[1]

Of all the animals used experimentally, from the monkey down to the mouse, none has reacted by producing a lesion with the histological features characteristic of the human disease, and, in the present state of our knowledge, histology must represent the final court of appeal in experimental work, as in diagnosis.

The results of the careful and prolonged investigations of the Rose Research on Lymphadenoma mark the beginning of a new era in the experimental study of the disease.[2]

This team of workers attacked the etiological problem on a broad front, but I propose to confine myself to a consideration of one particular aspect of their work, namely, the results obtained in the search for a virus. This quest was entrusted to Dr. Mervyn H. Gordon, who joined the investigation in 1928, and set out immediately in an attempt to demonstrate the presence of a virus in the diseased glands.

THE GORDON BIOLOGICAL TEST AND EXPERIMENTAL RESULTS.

The discovery of the phenomenon now generally known as Gordon's biological test is without doubt the most valuable single contribution made hitherto to the experimental study of Hodgkin's disease.

In the first instance, Gordon's procedure was to grind the lymphadenomatous glands in distilled water, and immediately to inject the resulting suspensions into rabbits and guinea-pigs. Several routes of injection were employed: intracerebral, corneal, and testicular in the rabbit; intracutaneous, subcutaneous, and intraperitoneal in the guinea-pig.

In these preliminary experiments the only result of note was obtained in the guinea-pig, in which a local subcutaneous nodule was produced, as had been found previously by C. C. Twort.[3]

Early in 1931, however, Gordon made two important changes in his technique. Instead of distilled water, ordinary laboratory broth was used in making the suspension, and this was allowed to macerate in the refrigerator for some six to ten days before injection.

The method at present used by Gordon is as follows :—

> A portion of the excised gland is fixed for section, and the remainder is minced as finely as possible with sterile scissors, weighed, and ground to a pulp in a sterile mortar.
>
> Ordinary laboratory broth is added gradually to make a ten per cent. suspension. This is decanted into a sterile tube, and allowed to macerate in the refrigerator for six

to ten days. Strict asepsis must be observed throughout the process if contamination is to be avoided. 0.4 to 0.5 c.c. of the resulting suspension is injected into the right post-parietal region of the rabbit's brain, and the same dose is given intravenously.

Within a few days of intracerebral inoculation of such a suspension in the rabbit, the animal exhibits an encephalitic syndrome which is peculiarly characteristic. For several days after injection it remains apparently normal, and then a condition of spastic ataxia develops quite rapidly. Inco-ordination and ataxia are accompanied by rigidity of the muscles. In an extreme case the animal is unable to stand; its back arches, it staggers and falls with the limbs stiffly extended.

The latent or 'incubation' period varies, and is usually from two to seven days. Gordon had one rabbit which he describes as very exceptional, in which the onset of paralysis was delayed for sixteen days.

In my series, the shortest time has been something less than twenty-four hours, and the longest thirty-seven days; this latter animal ran a typical course, progressing to death nine days after the onset.

The syndrome is accompanied by a marked and progressive loss of weight, recovery being followed by a corresponding increase, with usually a return to normal.

Apparently the failure of the earlier experiments with aqueous extracts was due, not to the absence of the encephalitogenic agent from the gland suspensions used, but to the fact that the tissue cells must be more or less thoroughly broken down in order to release the agent. This seems to be accomplished by the autolysis which occurs during the storage of the gland suspension, and it has since been found that although immediate injection of the suspension is effective in many instances, the process of maceration appears to render the result more certain.[4]

TABLE 1.

	Number of Cases	Positive	Negative	Per cent Positive
M. H. Gordon	35	30	5	85.7
Van Rooyen	20	15	5	75.0
Davis	16	12	4	75.0
Totals ..	71	57	14	80.3

Up to March last, Gordon had applied the test in thirty-five cases of lymphadenoma, and obtained a positive result in all but five.[5] Van Rooyen has published his results in twenty cases, fifteen of which were positive.[6] Here, we have examined

material from sixteen cases, twelve of which were positive. The results derived from these three sources are summarized in table 1.

Although these figures are accurate so far as they go, they are misleading in one important particular. The number of animals which it was necessary to inoculate before the characteristic syndrome was elicited is not stated. Thus Van Rooyen makes it clear that in several of his cases a positive result was obtained only by persistent repetition of the test. For example, he cites one particular case in which he injected twelve animals before he was satisfied that the test was negative.

Of the specificity of the test there seems to be no doubt. It has proved uniformly negative in the several forms of leukæmia, in sarcoma, carcinoma, and tubercle, and in various less well defined glandular enlargements.

Details of all the available control experiments are recorded in table 2.

TABLE 2.

Histological Diagnosis	Number of Cases Examined			Total	Total Negative
	Gordon	Van Rooyen	Davis		
Leukæmia	5	4	5	14	14
Sarcoma	12	5	1	18	18
Carcinoma	6	1	2	9	9
Tubercle	14	3 (1 doubtful)	2	19	19
Adenitis	11	0	0	11	11
Hyperplasia	14	0	2	16	16
Various	5	0	0	5	5
Totals	67	13	12	92	92

THE ENCEPHALITOGENIC FACTOR.

The agent responsible for the encephalitis which occurs in the rabbit is more thermostable than most of the known viruses, in that it withstands exposure to a temperature of 65° C. for thirty minutes. It is capable of passing bacterial filters such as the Seitz and the British Berkefeld, and is very resistant to desiccation.

It is only slightly affected by the action of 0.5 per cent. phenol, but is gradually attenuated by the addition of ten per cent. of ether. Van Rooyen has found that it remains active after having been maintained at a temperature of 190° C. below zero for twelve hours.

Serial transmission in animals, and attempts to cultivate the pathogenic factor, have not yet been successful. This failure, although it may be construed as evidence against Gordon's contention that the agent concerned is of the nature of a virus, does not by any means negative this possibility.

The work of Friedemann and Elkeles, however, has thrown more serious doubt upon the living nature of the factor concerned.[7] They have found that when a saline suspension of normal human bone-marrow is injected intrathecally or intracerebrally in rabbits, there results an encephalitic syndrome very similar to that obtained by injection of lymphadenoma gland suspensions.

Friedemann noticed that the species and organ distribution of his agent is very similar to that of the proteolytic ferment studied by Jochmann. It is present in human bone-marrow, human white blood-cells and spleen, and absent from the bone-marrow of rabbits, guinea-pigs, cats, and horses. Gordon has found that it is absent from the marrow of the human fœtus and the child at term.

Jochmann and Lockemann had devised a method for the isolation of their proteolytic ferment, and Friedemann has modified this method and applied it successfully to the isolation of his pathogenic agent from bone-marrow. The resulting extract is both encephalitogenic and proteolytic.[8]

Application of the Friedemann Technique in Lymphadenoma.

Lack of material prevented Friedemann from testing whether Gordon's agent could be extracted from lymphadenomatous glands by the modified Jochmann-Lockemann technique. As this question seemed to be one of great interest, I have applied the method in all available cases.

The procedure differs in no important particular from that detailed by Friedemann (10 c. cit.).

> A weighed portion of finely minced gland is ground to a pulp in a quantity of acetone* in a sterilized mortar. The addition of a little sterile silver sand assists in the disintegration of the tissue. The pulp is allowed to remain in contact with the acetone for approximately fifteen minutes, at the end of which time the acetone-insoluble fraction is collected on a filter paper (Whatman No. 5) in an ordinary glass funnel. It is washed thoroughly with absolute alcohol and then with ether. The residue on the filter paper is dried in the incubator at 37° C., and the resulting dry powdery mass is suspended in a measured volume of twenty-five to thirty per cent. glycerine in distilled water. It is advisable to avoid a very heavy suspension, and in general the volume of glycerine used should be from five to ten times that of the gland mince extracted.
>
> The glycerine suspension is allowed to remain on the bench for twenty-four to forty-eight hours; the undissolved material is then spun out (at 3,500 r.p.m. for fifteen minutes), and the supernatant glycerine is added to three times its volume of alcohol-ether. (Two volumes of absolute alcohol to one of ether.) The mixture at once becomes cloudy, and a flocculent precipitate gradually forms; it is usually complete within fifteen minutes. This precipitate is collected by centrifuging, and taken up in buffered distilled water, the volume used being 2 c.c. for each gm. of minced gland extracted. The wet weight of the final precipitate is usually about one-tenth of that of the minced gland used, but is commonly less with a fibrous gland.

* 25 to 50 c.c., according to the amount of gland mince used.

Up to the present, lymphatic glands from thirteen cases of Hodgkin's disease have been extracted by this method, and in twelve a positive result has been obtained.

The negative extract was prepared from a gland which when fresh had given negative results by Gordon's technique. A portion of 0.3 gm. fresh weight was kept in the refrigerator for some five months, and when extracted by Friedemann's method had shrunk to a mere flake of semi-translucent tissue. The single animal injected remained normal.

Glandular extracts prepared by Friedemann's technique from eleven cases of leukæmia, sarcoma, carcinoma, tubercle, and inflammatory hyperplasia, were uniformly negative. The details are given in table 3.

TABLE 3.

Patient	Nature of Case	Result of Test
McAlister ...	Bronchial carcinoma	Negative
Graham	Bronchial carcinoma	,,
McGreevey ...	Osteogenetic sarcoma	,,
Coulter	Carcinoma of breast	,,
Crowe	Carcinoma of breast	,,
Redpath	Myeloblastic leukæmia	,,
Stewart, F. ...	Lymphatic leukæmia	,,
Snoddy	Lymphatic leukæmia	,,
Stewart, S. ...	Proliferative tubercle	,,
Ligett	Inflammatory hyperplasia	,,
Shaw	Inflammatory hyperplasia	,,

PARALLEL EXPERIMENTS BY THE GORDON AND BY THE FRIEDEMANN METHOD.

I have referred previously to the number of animals which it may be necessary to use before a positive result is obtained in any given case. In ten cases of this series, the glandular material was minced, and the common mass was divided into two weighed portions. One of these was treated by Gordon's method and the other by Friedemann's.

The Friedemann extract was suspended in buffered distilled water (pH 7.4), and was generally injected within twenty-four hours of preparation. The corresponding Gordon suspension was made in Douglas digest broth (pH 7.4).[9] Methods of maintaining sterility such as heating or the addition of phenol, were deliberately avoided, and the suspensions were allowed to macerate in the refrigerator for at least seven days before injection. In each case the dose used was 0.5 c.c. intracerebrally and the same intravenously.

TABLE 4.

	Number of Cases of Lymphadenoma	Total Number of Animals	Number of Animals		Percentage of Animals Positive
			Positive	Negative	
Gordon's technique ...	10	18	6	12	33.3
Friedemann's technique ...	10	20	18	2	90.0

TABLE 5.

Patient	GORDON'S METHOD			FRIEDEMANN'S METHOD		
	Number of Animals Used	Positive	Negative	Number of Animals Used	Positive	Negative
Rooney	2	1	1	3	3	0
Martin	1	1	0	1	1	0
Breakey	2	1	1	2	2	0
Donnelly	2	0	2	3	2	1
Geddes	2	0	2	2	2	0
McQuillan ...	1	1	0	1	1	0
McGrogan ..	2	1	1	2	2	0
"Glasgow 1" ...	2	0	2	2	1	1
"Glasgow 3" .	2	1	1	2	2	0
McIlveen	2	0	2	2	2	0
Total cases - 10	18	6	12	20	18	2

The results so far obtained are analysed in tables 4 and 5. They are confined to cases in which the clinical and histological evidence places the diagnosis beyond all reasonable doubt, and in which all the extracts prepared proved sterile by ordinary ærobic and anærobic cultural methods.

It will be seen that in this series the percentage of positive results obtained in a given number of animals is appreciably higher with the Friedemann technique.

The case of recitulosis associated with leukæmia (M. M.), which Professor Young has already discussed, is not included in this series. Extracts of the gland excised from the groin were prepared by Gordon's and by Friedemann's methods.

Of three rabbits injected intracerebrally with the Gordon suspension, one developed the characteristic spastic ataxia seven days after injection, and made a gradual recovery, with a return to normal at the end of fourteen weeks. The other two animals remained healthy. The Friedemann extract was tested on two rabbits, one of which was unaffected, while the other became positive on the fourth day after inoculation, and ran a typical course terminating in death on the fourteenth day.

THE NATURE OF THE PARALYSIS.

Gordon has expressed the belief that the injection of bone-marrow extracts in rabbits results in a syndrome which is not identical with that induced by lymphadenoma gland suspensions, and suggests that true paralysis is a much more striking feature in the former.

So far as my observations go, I have been unable to detect any definite difference, except in one instance.

Three bone-marrow extracts, prepared as Gordon prepares his gland suspensions, gave a clinical picture in the rabbit quite indistinguishable from that given by the lymphadenomatous material, and this observation applies also to a number of extracts of pus prepared by Friedemann's method. Injection of a simple suspension of white cells in broth, isolated from blood taken during life from a case of myeloblastic leukæmia, did, however, produce a purely flaccid paralysis very different from the characteristic spastic ataxic syndrome.

COMMENTARY.

The experimental results here presented are based on a series of cases much too small to allow of any dogmatic statement. They serve to show, however, that the encephalitogenic agent of lymphadenoma can withstand a quite drastic chemical treatment, and suggest that in the routine application of the biological test as a diagnostic measure, the extraction of the diseased gland by Friedemann's technique may offer certain advantages.

This method of extraction is more complicated than that of Gordon, but I believe that the elimination of the strict asepsis so essential in the preparation of the broth suspension is adequate compensation for the additional manipulation involved.

It has had the great advantage that with reasonable care in the final stage of preparation, a sterile extract has been obtained even with heavily contaminated autopsy material.

If subsequent experience confirms the view that a positive test in lymphadenoma can be obtained in a high proportion of the animals injected, a further difficulty in the routine application of Gordon's test will be removed. Further, if immediate injection of the Friedemann extract is as effective as these preliminary results seem to promise, there will be no necessity for the repeated inoculation of the autolysing suspension, which is now considered advisable before the test is returned as negative in any given case.

In assessing the comparative merits of these two methods, however, it should be made clear that the broth used in making the Gordon gland suspensions was not prepared according to the formula given by Gordon. It does not seem probable that this deviation from the original technique can have introduced any fallacy, but it is proposed that in the next series of cases the broth employed by Gordon will be substituted for the Douglas digest broth previously used.

The real nature of Gordon's agent is still in dispute. Friedemann evidently believes that the encephalitogenic factors of bone-marrow and of lymphadenoma are one and the same.

Also, he has advanced experimental evidence in favour of the view that the pathogenic agent in bone-marrow is a proteolytic enzyme, thus suggesting that Gordon's agent, too, is a protease.

This view has been criticized by Gordon, on the grounds that while bone-marrow may be actively proteolytic in a dilution of 1 in 20,000, lymphadenoma glands are usually negative at 1 in 20.

If Gordon's suggestion that the pathogenic factor is a virus still awaits further proof, it is equally true that the available experimental evidence does not justify the conclusion that it is of the nature of a protease. It is probable that proteolytic enzymes are present in every cell of the body, with the exception of the red-blood corpuscles,[10] and if we are to assume that Gordon's agent is a protease, it is very difficult to understand why it is absent so consistently from diseased glands in all conditions other than lymphadenoma.

NOTE.—This paper had gone to press before the publication of that of MacKenzie and Van Rooyen (*Brit. Med. Journ.*, 1935, i, p. 406), so that it has not been possible to discuss their observations and conclusions.

It would appear that the modification of the Jochmann-Lockemann technique which has been practised here gives more consistent results than the modification employed by MacKenzie and Van Rooyen.

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Treatment of Influenza

By C. W. KIDD, M.D.

IT is my task to discuss briefly the treatment of influenza. Influenza has probably existed in epidemic form from time immemorial under many expressive names, one of the earliest recorded visitations being an epidemic in the Athenian army in 415 B.C.

It is a regrettable fact that our present-day therapeutics are not more effective in dealing with this disease than those used in mediaeval times.

The mortality in pandemics is enormous, the total estimated mortality in the 1918-19 prevalence being over twenty-one and a half millions. The annual mortality in Great Britain is still considerable, the Ministry of Health annual report showing that since 1919 there have been epidemics in 1922, 1927, 1929, and 1933 of some severity. Of these, the 1929 prevalence shows the greatest mortality, causing almost thirty thousand deaths in England and Wales. There is always a notable increase in deaths from pneumonia and respiratory diseases generally in years when influenza is widespread. Influenza is therefore one of our most important diseases.

There are clinically definite types of the disease, which is typically of sudden onset with high temperature, headache—often severe, generalized pain in bones and muscles, and prostration. There is usually coryza and cough of variable degree. This constitutes the common, simple catarrhal type. Secondly, we have the pneumonic type, most prevalent in pandemics and chief cause of death; thirdly, the abdominal type; and, finally, the toxic or malignant influenza.

Immediate and absolute rest in bed in a well ventilated room is the first essential. Free ventilation, with a uniform room-temperature of about 60° F. night and day, is indicated. Sleeping apparel should be light, and blankets should be substituted for sheets to avoid chill following the initial sweating.

Diet should be restricted to fluids, given frequently, such as water, soda-water, orange juice with added glucose. Diluted milk, barley-water, Benger's or Horlick's food, beef tea, and chicken soup may be given in small quantities, although, in general, anorexia is a marked initial feature.

Medicinally, purgation and diaphoresis are the primary indications. Calomel gr. 2, followed by a morning saline and a powder containing aspirin gr. x, Dover gr. v, and Phenacetin gr. v, should be given. This will insure an abatement of generalized pains and headache and some sleep.

There is a certain percentage of cases in which these measures, with rest in bed, are all that seem necessary to deal with the infection.

When general symptoms are marked and respiratory symptoms are slight, quinine and salicylate, separately or combined, are of service. In tabloid form quinsan combines these two drugs, one tabloid being given four-hourly.

Where respiratory symptoms are marked, the combination of a diaphoretic and mild expectorant mixture is of service.

The routine use of a mouth-wash and gargle of a non-irritating type, such as

glycerine thymolis co., is beneficial. Strong gargles which irritate the mucous membranes are detrimental in prophylaxis and treatment.

Persistent irritable cough is a common symptom, and may be relieved by codeine phosphate or a codoforme (Botol) tablet.

Inhalations are recommended, the old-fashioned tr. benz. co. menthol and eucalyptus being most effective.

Intractable pains in back and limbs are a common feature, and are benefited, when aspirin fails, by novalgin in four-hourly doses, or phenazone gr. v with caffeine citrate gr. 2.

Severe headache is common, and a cold compress, a veramon tablet gr. vi, a darkened room and quietness, are usually effective. High pyrexia and restlessness is best dealt with by tepid sponging, which, in capable hands, is of considerable value.

PNEUMONIC TYPE.—At the earliest suspicion of any pneumonic development, the services of a trained nurse should, where possible, be obtained. It is essential that everyone concerned, except the patient, should realize the potentialities for evil in the condition.

Immediate rigorous measures must be added to the routine treatment in anticipation of rapid clinical developments. Brandy should be given four-hourly and digitalis conveniently given in granules of 1/600 grains twice daily. In patients with any pre-existing cardiac involvement, four-hourly injections of caffeine sodium benzoate should be given, with coramine, cardatone, and strychnine to fall back on in emergency.

It has been recently suggested by Professor Wynn that the use of digitalis or any cardiac stimulant is contra-indicated in these cases, and he strongly advocates glucose in large quantities.

Antiphlogestine applied to the thoracic bases with a minimum of disturbance to the patient is, in my experience, of some benefit. It is emphasized here that the patient should never be disturbed or allowed any exertion in these cases.

Insomnia seems to be inseparable from the condition, and may be due to cough, pain, pyrexia, sweat, or lack of proper ventilation. A review of these factors should be made and treatment directed towards the cause.

Where drugs must be resorted to, dial or adalin are safe. Paraldehyde in two-drachm doses in suitable vehicle is recommended, and appears to have been used largely in the 1918 epidemic. Morphia may be given, provided the bronchial tubes are not choked with secretions or the patient cyanosed.

OXYGEN INHALATION.—There is some divergence of opinion in the literature as to the benefits of oxygen. I believe it to be of undoubted value given by the continuous nasal method at slightest sign of cyanosis. The oxygen tent devised by Poulton is now in vogue in London. These pneumonic patients are often cyanosed, and if cyanosis is due to anoxæmia it should help.

VENESECTION.—The patient's cyanotic condition, notwithstanding the common absence of right-sided cardiac enlargement, bears a close resemblance to a typical lobar pneumonia, and this apparently stimulated the practice of venesection in

many quarters during the 1918 pandemic. Abrahams reports a large series, and states that in no case did the slightest improvement ensue, either in the patient's general condition or in the degree of cyanosis.

ABDOMINAL INFLUENZA.—The abdominal type may be gastric, gastro-enteretic, appendicular, or typhoidal.

The general treatment of the systemic infection is given in the routine way, with special symptomatic treatment according to type. A diet of water, fruit juice, diluted milk, and the inevitable glucose are essentials. Where severe vomiting is frequent, rectal feeding or gastric lavage may be resorted to, but in the majority of cases avoidance of attempted food intake and the careful administration of dilute hydrocyanic acid in three-minim doses is sufficient. An injection of morphia is often effective, giving us a paradoxical pharmacological action.

The gastro-enteretic and typhoidal types are typically associated with abdominal colic and diarrhœa, and should be treated on general lines with, medicinally, bismuth with opium or chlorodyne. It is best to withhold the time-honoured dose of castor oil, as the infection is presumably blood-borne, and irritation of the gut with ricinolic acid can do nothing but harm.

That the so-called appendicular type exists I have no doubt, for, during the epidemic of 1933, I had four of my patients subjected to quite unnecessary appendicectomies, fortunately without ill results. A leucocyte count assists in differential diagnosis, a leucopenia as opposed to a leucocytosis in appendicitis being usual.

MALIGNANT OR TOXIC INFLUENZA.—It has been said of this rapidly fatal form, which occurs chiefly in pandemics, that no measures of treatment, however prompt or expeditious, seem to avert or delay the inevitable termination. It is an acute toxæmia, and for that reason large doses of anti-streptococcal serum are suggested by Horder (100 c.c. intravenously).

The complications and sequelæ of influenza are beyond the scope of this paper, in that they require such treatment as would be given for these conditions wherever met with. It is sufficient to say that few diseases give rise to so many and varied complications.

Convalescence should be carefully watched, and the patient should not be allowed up until at least four days after pyrexia has ceased.

Post-influenzal debility is commonly of a degree disproportionate to the severity of the attack, and tonic treatment is necessary. A complete overhaul should be made before any attempted resumption of normal activities, and often an electrocardiogram or chest-radiography is indicated where cardiac damage is suspected, or the light-up of some quiescent chest-focus.

VACCINES AND SERA IN PROPHYLAXIS AND TREATMENT.—It has been realized for many years past that the probable causation of influenza is a filterable virus, and a considerable amount of research has been done along these lines.

Shope has reported several investigations during the past three years on a virus in swine influenza. More recently, Douchez and his colleagues have experimented on a virus associated with the common cold, using anthropoid apes.

In 1933, Smith, Andrewes, and Laidlaw reported from the National Institute the existence of a virus in the throats of patients in the early stages of influenza, which is capable of producing the disease in ferrets. This they found after unsuccessful attempts to infect many different species of laboratory animal.

Ferrets which had recovered from the experimental disease proved resistant to infection, and their serum and serum from humans convalescent from influenza was found, in the majority of cases, to possess neutralizing power for the virus.

Their conclusions are that influenza, in man, is caused primarily by virus infection, and that in certain cases the infection facilitates the invasion of the body by bacteria producing various complications.

This is probably the most important contribution to influenza ever made, and opens up a fresh field of therapeutic endeavour.

Vaccines of every conceivable type, strength, and composition have been used in prophylaxis and treatment, on the principle of raising resistance and establishing immunity to the serious secondary invaders which so often determine the gravity of each individual case.

The Pichet-Thomson Research Laboratory has recently produced an enormous report on their investigations into the literature on this subject, and it seems fairly conclusive that when prophylactic innoculations are carried out on a large scale the fully protected groups are less liable to respiratory complications, and that, further, the duration and severity of the attacks are reduced.

The use of vaccines in treatment is of value chiefly, in my experience, where initial symptoms are severe and one fears quick pneumonic development. There are a variety of vaccines, possibly the best being the P.S.I. or Wynn's vaccine, containing—

B influenza	-	200 millions per c.c.
Pneumococci	-	200 millions per c.c.
Streptococci	-	200 millions per c.c.

1 c.c. dose should be given at earliest possible moment, and repeated every twenty-four hours for three doses if temperature does not fall.

In my opinion it is futile to give a vaccine in cases where pneumonic signs have already developed.

SERUM.—Convalescent influenza serum does not appear to have been tried out on any wide scale in the prophylaxis of influenza. In measles prophylaxis, immune serum is of undoubted value; and in the light of recent work on the influenza virus, it is suggested that a large-scale investigation should be made during the next epidemic. It is probably along this line of research that some real advance will be made in our therapeutics.

In treatment, convalescent serum has had but a limited trial, the results being on the whole good, but the dosage required is large (100 c.c.). Many other sera have been tried with inconclusive results, the most modern suggestion being to give twenty thousand units, i.e., 10 c.c. of polyvalent anti-pneumococcus serum to each toxic case, and hope for the best.

There are a vast number of proprietary non-specific preparations in use, such as diasulphamin, omnadin, edwinil, and S.U.P. 36. Of these I have only experience of S.U.P. 36, which is a symmetrical urea product of B.D.H. It is given in half or 1 c.c. doses intramuscularly, repeated if necessary. It is of undoubted value, especially in aborting the attack in cases seen in their initial stages, that is, in first twelve hours. During the last epidemic I obtained excellent results with this preparation.

I must apologize, in conclusion, for the inadequacy and incompleteness of this paper. There are, in fact, too many suggested treatments for influenza.

It is a condition of greatest interest to general and panel practitioners, and the effect of even a minor epidemic on our daily toil has to be seen to be believed.

One would hope that with our increased knowledge as to the causation of influenza, we shall be in a position to deal more effectively with the next inevitable visitation.

The Treatment of Constipation

By S. R. ALLISON, M.D., M.R.C.P. LOND.

from the Royal Victoria Hospital, Belfast.

BEFORE treating a case of constipation, the doctor should be careful to consider three things:—

FIRST: he must think of and exclude organic disease by careful examination, supplemented in all cases by a rectal examination. When there is any doubt, it is wise to order an X-ray examination of the bowel, but the decision as to this and the other tests which may be necessary will depend on the individual character of the case. Generally speaking, one should be sceptical of the benign nature of a constipation which is of recent origin, of constipation which is associated with bouts of diarrhœa, and of the constipation which is accompanied by abdominal pain. There is a general impression among the public that constipation causes a furred tongue, headache, lassitude, nervousness, and debility. There is little evidence, however, that constipation by itself can produce any of these effects. Often indeed the patient has a fresh, healthy complexion, a clean tongue, and is exceedingly active. The responsibility is therefore on the doctor to decide what importance such symptoms may have, and as a rule it is safer to assume that an additional cause is at work.

The SECOND point is to satisfy oneself that constipation is really present. This may sound unnecessary, but actually the patient's statement is by no means a reliable guide. The most obvious way of settling the point is to test the rate of passage through the bowel under natural conditions. The patient gives up his aperient for the time being. A tablespoonful of powdered charcoal in a glass of water is then taken shortly after the last evacuation of the bowels. Another way is

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to give a capsule containing 10 gr. of carmine. In either case the patient waits for the colouring material to appear in the stools. He should try to evacuate the bowel once a day and take heed of any desire which is felt. If the rate of passage is found to be seventy-two hours or longer, there can be no doubt as to the existence of true constipation. During the test period it is a good plan to make a daily rectal examination. Should coloured fæces be found there within twenty-four to forty-eight hours, and no desire is felt to go to stool, it is evident that the case is one of "habit constipation," or dyschezia.

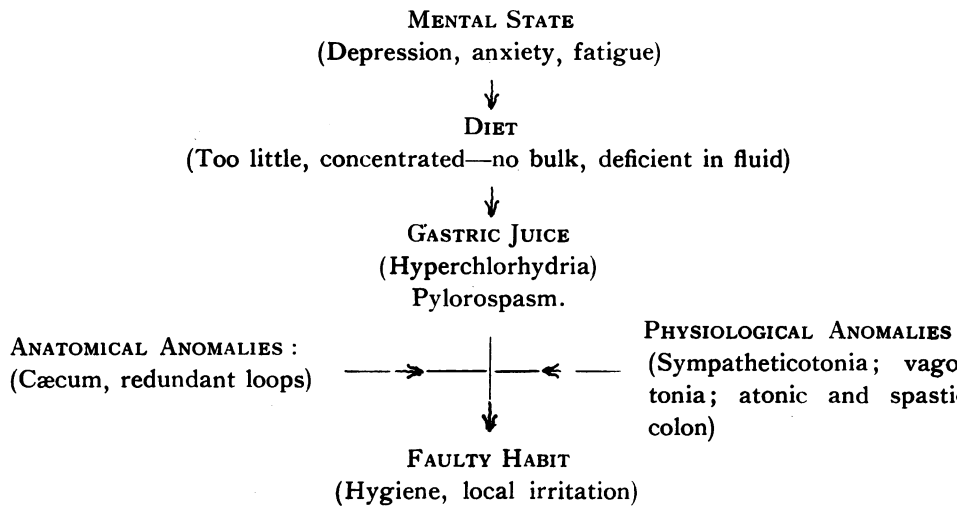

FIG. 1.
Diagram to illustrate the possible causes of constipation.

The THIRD point to consider before giving treatment is the probable cause of the disorder. Space does not permit of full discussion of this subject, but in fig. 1 the chief causes of constipation are represented. There is, of course, considerable variation in the frequency of evacuation in health. Some persons open the bowels once a day, others twice a day or more often, and a few in good health have an action only two or three times a week. The three most important factors in regulating the bowel are probably the *mental state,* the *diet,* and *faulty habits.*

The mental state is all important. About fifty per cent. of all types of neurosis complain of constipation associated with such symptoms as undue fatiguability, depression, and anxiety. The disorder arises probably from the patient's suggestibility and the abuse of aperients. A day passes and the bowels do not move. A pill is taken that night to make sure of a result in the morning. The result is often severe purging, after which the bowels do not move for two or three days. Another pill is then taken, and the patient views with apprehension the increasing doses which are necessary. Before long he is addicted to the habitual use of aperients, and either fails to secure an action or purges himself unmercifully. Needless to say, treatment in this type of case is required not so much for the bowel as for the

morbid mental attitude. The so-called constipation usually disappears when confidence is restored and aperients are omitted.

Diet is an important factor in causing constipation which will be referred to later. Many cases are associated with a gastric secretory and neuro-muscular disorder, viz., *hyperchlorhydria and pylorospasm*. The majority of cases of chronic duodenal ulcer suffer from constipation, and are relieved by the addition of magnesia to the alkaline powder taken after meals.

Two important sets of causes which tend to produce constipation act on the bowel itself. Disorders of the neuro-muscular mechanism lead to decreased movements of the colon or *spastic contraction. Megalocolon and mucus colitis* belong to this group, though it is customary to describe them as separate entities. On the anatomical side, mechanical difficulty may be offered to the passage of the fæces. Mr. T. S. Kirk has devoted considerable attention to this aspect of the problem, and has stressed the importance of a low-lying cæcum. This often lies below the level of the pelvic brim, and is held down by bands of peritoneum which are congenital in origin. The effect of this is to interfere with the contraction of the longitudinal muscle fibres of the ascending colon, which are continually stretched and placed at a disadvantage. As a result, fæces tend to collect in the cæcum and ascending colon. The presence of these bands has been demonstrated in children as well as in adults, which is evidence in favour of their congenital origin. Another not unusual anatomical finding is the *redundant colon,* which loops over on itself and joins the straighter portions of the bowel at an acute angle. These points are illustrated in plates 1 and 2, which have been kindly lent me by Mr. T. S. Kirk.

The last factor, and probably most important of all, is *faulty habit,* which may now be discussed under the actual management of the case. The treatment of a case of constipation then has four objectives :—

(1) Re-education of the normal habit.
(2) The selection of a suitable diet.
(3) The provision of temporary auxiliary measures to facilitate evacuation.
(4) The correction of accessory factors.

Re-education of Normal Habit.

The most satisfactory arrangement is when defecation occurs daily after breakfast. The fæces which are ready for evacuation are held in the distal part of the transverse colon and descending colon, the rectum being empty. When the fæces are propelled into the rectum by the involuntary movements of the colon, the gradual distension of the rectum stimulates the peripheral nerve-endings in its walls, and the desire is felt to go to stool. The majority of cases of simple constipation are due to neglect of this impulse. The reflex is consequently blunted or inhibited, so that the rectum may be loaded all day without any sensation being felt.

When discussing the re-education of a normal habit, most authorities comment unfavourably on the attitude adopted during the act of defecation. They stress the necessity for the squatting posture, and condemn the faulty construction of too

high lavatory seats which make this posture difficult to attain. Important as these considerations must be, there is another even more important one which has not been sufficiently stressed. The regular act of defecation in the majority of cases is a *conditioned reflex*. The man in whom this is well developed has a routine procedure. He takes breakfast, lights a cigarette, glances at the morning paper, and almost automatically goes to perform his daily action. Another will find bedtime more convenient. The object of re-education is to restore such a regular habit. The more associated ideas and actions can be introduced, the better. These help to strengthen the conditioned reflex, which it is the object to form.

The important point, therefore, is that the patient should go at the same time every day, the most convenient time, no matter what that time is and no matter whether he feels the desire or not. In time the habit can be acquired if a regular routine is maintained.

> The posture should be flexion of the trunk with the arms resting on the knees, the feet supported on the ground. Forcible efforts at expulsion should not be made. It is better to breathe deeply, using the abdominal muscles at regular intervals, and, if any sensation is felt, to encourage it by holding the breath and making gentle pressure.
>
> After ten minutes, if nothing has come, the exercise may be terminated. During that day any desire to go to stool is promptly attended to, but no further routine effort is made. The next day, at the same time, the procedure is repeated. If again there is no result, a glycerine suppository may be inserted, and after five minutes evacuated. This usually cause the expulsion of some fæces.
>
> The next day, and regularly from then onwards, the effort is made, the suppository only being used when nothing has come away after two consecutive daily efforts. This limits the use of the suppository considerably, and is desirable, as otherwise the patient may fall into the habit of using suppositories regularly, a harmful habit.

DIET.

The common dietetic causes are the eating of food which contains concentrated nourishment but insufficient residue. Too little food is also a common factor, and is often seen as a cause of constipation in poverty and in those who are attempting to reduce their weight by unskilled means. When sufficient food is eaten, the constipation disappears. Insufficient fluid intake is also sometimes a cause.

The principles of anti-constipation diets are to give plenty of vegetables and fruit which contain indigestible cellulose residues, abundant fluids, and little meat, which favours intestinal putrefaction. E. I. Spriggs advises that meat be taken two or three times a week only, or at most once a day. Fish, eggs, and cream cheese may be substituted as sources of protein. Milk is given with puddings if an increase of weight is desired, but not otherwise. Coffee, which has a slightly laxative effect, is taken in preference to tea, and the bread is made from wholemeal to increase the residue.

Formerly much importance was attached to *intestinal auto-intoxication*, which was held to be responsible for many of the alleged symptoms of constipation. Preparations such as koumiss, buttermilk, or live cultures of B. acidophilus were given with lactose as a means of inhibiting the growth of proteolytic organisms and putrefaction. Although the importance of intestinal toxæmia has been reduced in recent years, *buttermilk* and *lactose* are useful adjuncts to the diet in cases of

constipation. Both have a definite laxative effect, and the former may be taken instead of sugar in coffee or over fruit, and the latter as a drink with meals. Additional advantages are that it is popular and inexpensive. The following diet is one which is based on that used by E. I. Spriggs :—

Breakfast.—An apple or orange. Wholemeal bread, butter, marmalade or honey. A large cup of coffee with milk and plenty of lactose.

11 a.m.—A glass of buttermilk and wholemeal bread and butter.

Dinner.—Soup, fish, chicken, or egg dish. Vegetables (cabbage, lettuce, cauliflower, turnips, parsnips, etc.). Wholemeal bread and butter. Stewed fruit (apples, prunes, or figs), cream, and plenty of lactose. A glass of buttermilk.

Evening Meal.—Fish, chicken, or egg dish. Lettuce, tomato, or celery. Wholemeal bread and butter, jam, gingerbread. Tea with milk and plenty of lactose.

At Bedtime.—Raw fruit (apple, orange, or banana).

Auxiliary Measures.

We now come to the auxiliary measures which may be employed in assisting the action of the bowels during the early stages of treatment, before the habit has been established.

The first of these is, of course, *liquid paraffin.* This is given to lubricate the bowel, in initial doses of a tablespoonful morning and evening. The dose is not required for long, and should be reduced rapidly to a dessertspoonful and then a teaspoonful.

Two difficulties may arise in its use. First, the dose may be insufficient. The maximum dose one uses is a tablespoonful three times a day after food. The second difficulty is that it generally causes seepage, and the patient is apt to abandon it for this reason. The manufacturing chemists have taken advantage of this fact, and have prepared emulsions which do away with this difficulty. Actually, however, it is rarely necessary to resort to them if one takes the precaution of mixing the liquid paraffin with about twice its volume of milk. The mixture should be thoroughly whipped up before use, and, *when taken after meals,* usually causes no seepage.

The *practical point,* therefore, is that when the paraffin seeps through even after it has been given in milk, it is a sign that too much is being used, and the dose should be reduced.

The second auxiliary measure in treatment is the *intestinal douche.* This, it must be emphasized, is only required in exceptional cases when the combined efforts of habit formation, diet, and liquid paraffin fail to give an action of the bowels after three or four days. Even then they are not required more often than twice a week, and should be reduced to once a week and discontinued as soon as the bowels are acting naturally. Here again, as with the suppositories, there is the same danger of forming an undesirable habit, if the method is allowed too freely.

The object of the intestinal douche is not to irritate or distend the bowel unduly, but to wash it gently and permit of the evacuation of hard material. The following technique may be adopted :—

> A pint and a half of sterile normal saline is warmed to body-heat, and placed in a can or glass receptacle connected to a length of rubber tubing which ends in a small size catheter. The patient lies on the left side, buttocks slightly raised, and the catheter is lubricated and inserted just inside the rectum. The saline is then allowed to flow in slowly by gravity, the reservoir not being raised more than one to two feet. The tube is then withdrawn, and the patient rests for three minutes. The position may then be altered to the knee-elbow and the right side for similar periods, after which the contents of the bowel are evacuated. The procedure is then repeated as before, and after a second evacuation the patient should rest quietly for half an hour or so. The douches may be given once, twice, or three times weekly for two or three weeks, the interval being gradually increased and the treatment then concluded.

Correction of Accessory Factors.

The last point in treatment is to put right any obvious accessory cause. The abdominal wall may be weak and lax from repeated pregnancies or operations. Massage and remedial exercises are indicated to correct this. When the abdominal wall is permanently weakened, however, an abdominal belt may be necessary before any satisfactory efforts at defecation can be made. *Inflamed piles* and *fissure of the anus* are important accessory causes interfering with the reflex act, and require correction. *Obesity* is also often a contributory cause and should be treated.

Once the bowels are acting daily the regime should be continued uninterrupted for at least a month. Difficulties of various sorts are encountered, and a frequent complaint from patients who have been accustomed to aperients is that the motions are not large enough. This is of course natural, the dejecta being less fluid, as must be expected. If any doubt is entertained that material is being held back, though the bowels move daily, the charcoal or carmine test should be repeated to check the rate of passage. Anything up to forty-eight hours is satisfactory.

After a month the diet may gradually be brought back to normal, first allowing tea, then omitting the lactose and buttermilk. The liquid paraffin should, however, be continued for a full three months in teaspoonful doses. The one thing which must be continued indefinitely is, of course, the regular daily habit.

In conclusion, one should perhaps apologize for not discussing the use of aperients, but I have avoided this for two reasons. First, because, as a recent writer remarks, the general practitioner knows far more about the really useful laxatives and aperients than his brother consulting physicians and surgeons. Secondly, because it is taught, and I believe with good reason, that aperients have no place in the treatment of the common form of constipation, namely, that due to faulty habit.

No mention has been made of the vexed question of operative interference for the relief of constipation. Views differ considerably, but I think there will be a general consensus of opinion that no case should be submitted to surgery until the above measures have been taken and a careful trial given to treatment by diet and re-education.

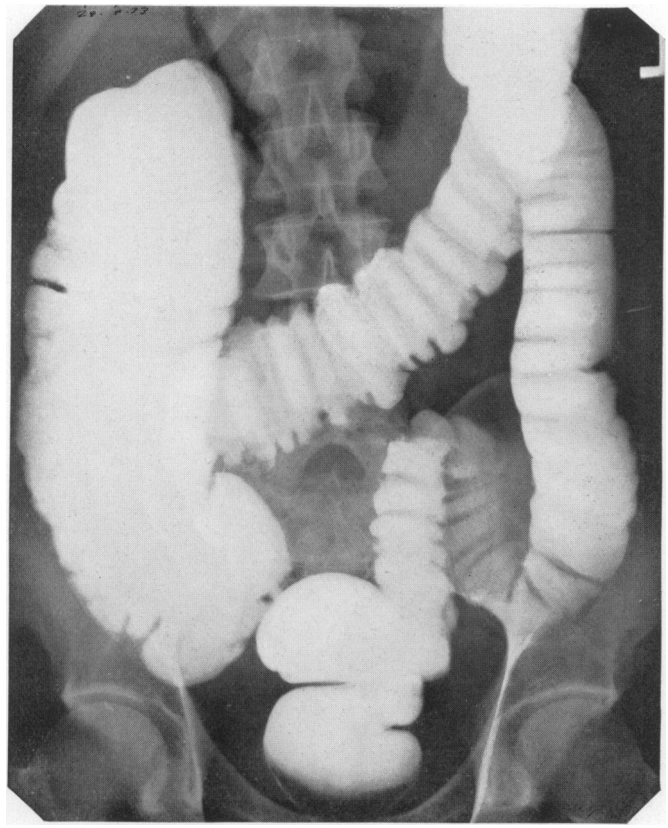

PLATE 1.

To illustrate low-lying cæcum.

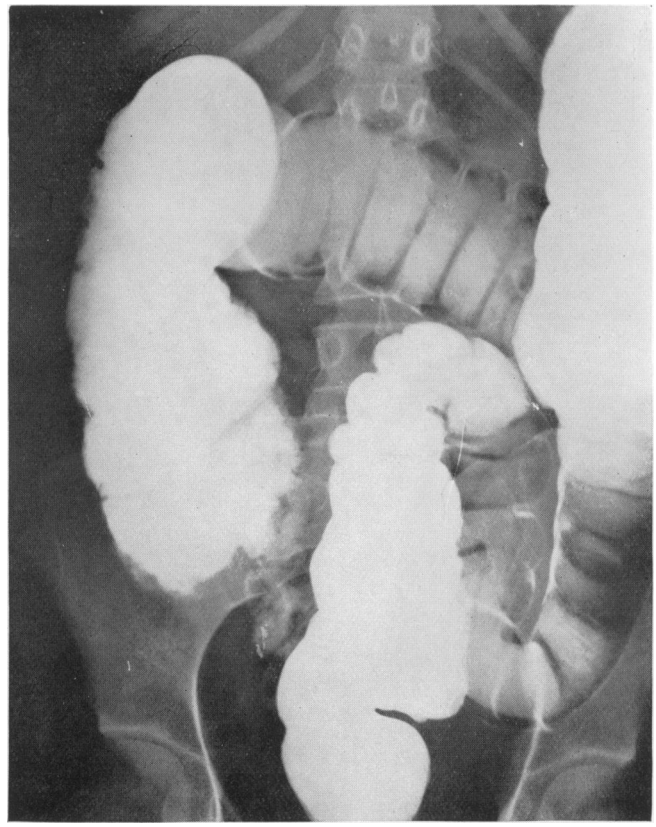

PLATE 2.

Redundant loop of colon.

The Mediaeval Physician

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IT is customary to think of the present century as the one epoch in the history of medicine when rational treatment is given to diseased persons. But a glance into the past often acts in a salutary manner to our egotism. During the twelfth, thirteenth, and fourteenth centuries, when pathology and physiology as understood by us now were unknown, it is surprising to find many of our most recent discoveries either in use by physicians in treating patients, or in a form which certainly anticipates them. For example, John of Gaddesden treated the son of King Edward II for smallpox by having him wrapped in a red cloth, and having the many bed-hangings, as well as the door- and window-hangings, made of red cloth also, so that he was completely surrounded by red-coloured light. Gaddesden declares that the prince, as a result of this treatment, "made a good cure and was without any vestiges of the pocks afterwards." This treatment, which was commonly used throughout the early mediaeval period, is strangely in anticipation of the Finsen red-light treatment for smallpox of our time.

This man, John of Gaddesden, a doctor of physic who flourished at Merton College, Oxford, about 1320, wrote a book in which all the medical lore of the mediaeval times is collected. He called it the *Rosa Anglica,* and he states that in it "there is nothing set down but what has been proved by personal experience either by myself or others." In it there are many points in treatment that have quite as modern an outlook as that of the red-light treatment for smallpox.

In the treatment of "dropsy" he recommends that the patient should "drink his own urine in the morning of every day," to provoke a flow of urine. This is astonishing as occurring in the fourteenth century, and urea was not introduced by chemists as a diuretic until many centuries after.

The idea of a salt-free diet in cases of renal disease was suggested by a mediaeval surgeon named John of Arden; and although he was ignorant of the pathology of the disease, he further anticipated modern physicians by emphasizing the possible danger to patients suffering from it of eating dark or red meats rather than white meats.

The principle of auto-intoxication, i.e., that the body is capable of producing poisons within itself which can act deleteriously on it, was recognized by mediaeval physicians centuries before its modern "discovery." And to reduce the possibility of these toxins injuring the body, they attempted to rid it of them by direct elimination, by the use of purgatives.

Avenzoar, a physician of the twelfth century, used nutrient enemeta, of eggs, milk, and gruel, per rectum, in cases of stricture of the œsophagus. He also used bladders taken from animals for a great many of the purposes for which modern obstetricians use rubber bags.

The mediaeval outlook on the phthisical patient was also quite modern. Geddesden, in his *Rosa Anglica,* writes: "A real cure can only take place before the

lung has broken down." He gives thirteen indications for treatment, many of which might almost have been written to-day :—

(1) Keep in check the catarrh and the rheumata.
(2) Cleanse the body.
(3) Divert and draw away the matter (of the disease) to a different part.
(4) Strengthen the chest and the head, so that they do not take up the matter, and there multiply.
(5) Cleanse and dry up the ulcers, and expel the matter from them.
(6) Consolidate them.
(7) Restrain the cough by using demulcent drinks, and with ointments and stupes.
(8) Assist the patient to sleep.
(9) Strengthen and bring back the appetite.
(10) Keep in check the spitting of blood.
(11) Do what can be done to make the breathing more easy and to remove the asthma and the hoarseness.
(12) Regulate the way of life so far as the six naturals (i.e., air, food, exercise, sleep, the excretions, the passions) are concerned.
(13) Cure the putrid and hectic fever which goes with the disease.

He recommends also that the phthisical patient should be sent to live in a dry, clear, and still atmosphere, and at a high elevation. Gaddesden then reminds his readers that Galen used to send his phthisical patients to a high mountain near Sicily where there was perpetual fire—a line of treatment closely similar to the modern practice of sending tuberculous patients to high altitudes in Switzerland.

Milk was strongly recommended to tuberculous patients. Indeed, there was a tradition throughout the whole period of mediaeval medicine that fresh air, milk, and eggs was the best possible treatment for these patients—a line of treatment strongly impressed on all patients when returning to their homes from modern sanatoria.

It was advised to give some exotic form of milk, probably because phthisical patients, as recognized to-day, react to the psychological effect of being given something out of the ordinary routine.

Gaddesden advises "the milk of a young brunette with her first baby, which should be a boy." Failing this source, he advises the milk of any other animal such as the ass, goat, or cow. He says: "If the patient likes, he can take the milk straight from the udder; if not, it can be boiled with a little salt and honey."

A particularly interesting section of the *Rosa Anglica* is devoted to the general care of health. It reads: "Let him whose life is ill-regulated beware, for if it does not affect him in the present, yet, as says Avicenna,* it surely will in the future. And those who say that they can eat often and to excess without any harm, let them have a care, for they will be struck down. Therefore should God punish at once

* Avicenna was a celebrated Arabian physician who lived A.D. 978 to 1036. His great medical work was "The Canon," which, together with the works of Galen and Hippocrates, practically dominated the whole period of mediaeval medical thought.

whatever sin be committed, no man should live. And as with universal nature in man, for punishment comes not at once, but in the course of time."

A tract of an earlier date than the *Rosa* expresses these views even more clearly : "Pure water and a humble mode of life brings greater strength and longer life than the palace of Cæsar or Falernian wine, or hunted game, or salmon and the pink-fleshed trout; eaten at the feasts of kings, such things become a weariness of the flesh."

In the great mediaeval medical schools of Salerno and of Montepellier, the education of medical students was of the most rigorous kind, and high standards were expected from them. Three years of literary studies were demanded as a preparation for the entrance to the medical faculty. This was followed by four years of purely medical studies, and a further year was then occupied as a kind of articled pupil to a practising physician. And if the student wished to proceed to the practice of surgery, yet another year had to be spent in the study of anatomy.

This rigorous course was demanded before the licence to practise medicine was given. Hence it is interesting to note that in many medical schools, notably in America and Germany, these mediaeval standards of medical education have been revived, and university graduates in medicine are not allowed to practise their profession until they have spent one further year as resident surgeons and physicians in recognized teaching hospitals.

On graduation at Salerno, each young physician had to take an oath which contained among other tenets the following :—

"Not to contradict the teaching of his college, not to teach what was false or lying, and not to receive fees from the poor, even though they were offered; to commend the sacrament of penance to his patients, to make no dishonest agreement with druggists, to administer no abortifacient drug to the pregnant, and to prescribe no medicament that was poisonous to human bodies."

In a tract published from the same school, instructions are given the young physician as to his general behaviour in society. It ends with a solemn warning not to make love to the patient's wife or daughter or maidservant, an injunction strangely similar to the Hippocratic oath and to the advice given by Sydenham to young English physicians at a much later epoch.

It would appear that ethical advice was given generally to young physicians right through the mediaeval period. Arnold de Villanova, a famous professor of the University of Montepellier, and who lived in the latter half of the thirteenth century, writes :

"Mark that the physician shall be earnest in inquiry; careful and methodical in discourse; cautious and far-seeing in reply; guarded in prognosis; neither let him promise more than he can perform, and especially recovery. For then shall he thrust out God's work and do Him injury. But that he himself will be faithful and diligent, he may promise. . . . And he shall be discreet in his visits, painstaking in his talk, quiet in his ways, and kindly to the sufferer."

Villanova, however, was not averse to giving more worldly advice, and in a book published by him, entitled "The Cantels," he writes : "When you come to

the patient's presence, always do something new, lest they (the patient's friends) should say that you can do nothing without your books."

This author gives advice as to the professional behaviour of the young physician, that he may escape the pitfalls which await him in practice, and into which he may fall. For example, in the inspection of urine, which occupied a prominent place in mediaeval medicine, the physician was expected to be able to distinguish human urine from that of lower animals by inspection alone, and to be able to tell the sex and age of the patient, as well as the disease from which the patient was suffering. Villanova apparently was quite well aware that this inspection of urine was sheer humbug, used only to impress the patient's friends. This is clearly suggested in the following lines :—

"Very possibly you gather nothing at all from an inspection of the urine; very well, then, say that the patient is suffering from obstruction of the liver. Your visitor (i.e., the person who has brought the urine) will say, 'No, sir, it's his head, or legs, or somewhere else'; then you must say, 'Well, that comes from the liver and stomach.' Be sure to use the word 'obstruction,' for they won't understand it, and it is often exceedingly useful that people should not understand what you say."

Fees in the mediaeval period appear to have been no more readily paid than nowadays, and the advice given by a fourteenth century author might have been written to-day. This author advises the physician to press for the payment of his fees as soon as the patient is getting better. And he further advises the necessity of getting fees paid while the sufferings of the patient are still a vivid memory, for patients soon forget their sickness, and sometimes even "forget" to pay their medical adviser, who has brought them back to health.

The relations which existed between physicians and laity are interesting. Apparently the physicians were feared by the people, rather than respected. This attitude of the people is shown in a book which was written in the middle of the twelfth century by John of Salisbury. It reads :

"What shall I say of the practising physicians? God forbid that I should say anything bad about them, since for my sins I fall only too often into their hands. They should rather be soothed by politeness than angered by words, and I do not wish that they should treat me hardly, nor could I endure all the ills about which they constantly talk.

"Nor is anyone more useful or more necessary than the physician so that he be faithful and full of foresight. For who can say enough in his praise who is the craftsman of the health and the begetter of life, in that he takes after the Lord, and stands in His place, for that health which the Lord gives as a Prince, the physician as steward and minister administers and dispenses.

"Perhaps you look upon me to say what the common people say, that physicians are the class of men who kill other men in the most polite and courteous manner. Well, you will be disappointed. God forbid that I should do them this injury."

It may be that this peculiar frame of mind was brought about by stories circulated by the uneducated, about experiments said to have been performed by physicians on unsuspecting patients. Caulton, in his book, "From Saint Francis to Dante," quotes the following story of this kind from Salimbene's Chronicles :—

"He (the Emperor Frederick II) fed two men most excellently at dinner; one at them he sent forthwith to sleep, and the other to hunt; and that same evening he caused them to be disembowelled in his presence, wishing to know which had digested better, and it was judged by the physicians in favour of him who had slept."

It would be hard to believe some of these somewhat wild stories. And if there was any substratum of fact for them, the physiological conclusions drawn from them do not redound to the credit of their intelligence. The erroneous ideas held at the period regarding the physiology of digestion are clearly shown in the much debated question of eating fruit. John of Gaddesden writes on this subject as follows :—

"Again with fruits; some eat more of them than of other food, wherein they do not well, for all fruits make watery, useless blood, and prone to putrefaction. But yet styptic fruits should be eaten after dinner by those who are inclined to looseness of the belly, and such are pears, figs, and apples. But these, when roasted and taken by sufferers from the colic before dinner, are laxative. When eaten raw, however, they are constipating, though not all equally, for the sweet are less so and the sour more so. Prunes, cherries, raisins, and figs should be taken before dinner, as Isaac lays down in his book on diet. But the common way of taking them is the opposite of this, and that is bad, for the fig, owing to its flatulent qualities, stops the bowels, and therefore ought to be eaten with ginger, for Avicenna notes that this drug is very opposed to all corruption of fruit. On the whole, however, it is best to do without fruit altogether, whence Galen in the sixth book of his regimen says that his father lived for one hundred years because he never ate fruit."

These views on the eating of fruit do not appear to have been universally accepted. We know from the writings of Maimonides, a Jewish physician who lived in the twelfth century, that the modern rule of eating fruits before meals, as we do now at breakfast, was anticipated by him. He taught that grapes, figs, and melons should be eaten freely, and set down the rule that as fruit was easily digested, it should be eaten at the beginning of a meal.

To-day we pride ourselves in the treatment of the insane; we speak of our "mental hospitals" and "psychiatric clinics," as if they were creations of this twentieth century. The truth, however, is that, quite contrary to the usual impression, well managed institutions for the insane were brought into existence in mediaeval times, the first of which was erected at Valencia in Spain in 1409. The neglect, and indeed the maltreatment, of mental patients belongs to an epoch much nearer our own. In the fourteenth and fifteenth centuries, mental patients in the early phases of their sickness were not isolated from other sick people. They were treated in general hospitals, until their affections had become so chronic as to appear incurable. By treating mental patients in this way they were taken away from unfavourable environments, and placed under skilled care, and to-day we see a general attempt to restore this line of treatment in our own general hospitals by the formation of what has been designated "the psychopathic ward."

But amongst the most startling surprises in the facts of mediaeval medical history is that women were admitted to the practice of medicine. It is known that women not only studied, but taught medical subjects in Salerno from the twelfth to the fourteenth centuries, and women professors were on its medical faculty. Indeed, the department of obstetrics and gynæcology was handed over to them, at one time, in its entirety.

The best known of these women physicians was Tortula, to whom is attributed a long series of books on medical subjects. But doubtless certain of these, like the so-called Hippocratic works, were written by her pupils. The most important of Tortula's books bears the title, "Tortula's Unique Book for the Curing of Diseases of Women, Before, During, and After Labour."

One of the most interesting passages in this book relates to the prevention of rupture of the perineum. It says :

"In order to avoid the aforesaid danger, careful provision should be made, and precautions should be taken during labour after the following fashion : A cloth folded in somewhat oblong shape should be placed on the anus, and during every effort for the expulsion of the child, that should be pressed firmly, in order that there may not be any solution of the continuity of the tissue."

This passage could hardly be improved upon even by the most advanced obstetricians to-day.

But an even more surprising account is given of the operation for the repair of a torn perineum, and for the complication of prolapse of the uterus. Tortula's description, according to de Renzi's *Storia della Scuola di Salerno,* is as follows :—

"Apply to the prolapsed uterus warm wine in which butter has been boiled, and these fomentations are continued until the uterus becomes soft, and then it is gently replaced. After this we sew the tear between the anus and the vulva in three and four places with silk thread. The woman should then be placed in bed, with the feet elevated, and must retain that position, even for eating and drinking, and all the necessities of life, for eight and nine days."

Other women known to have practised medicine in mediaeval times were—Mercuriade, who wrote a book on "Crises in Pestilent Fever," and Rebecca Guarna, who wrote "On the Urine" and "On the Embryo." But probably the most important book on mediaeval medicine written by a woman is that of a Benedictine abbess now known as St. Hildegarde. This book discusses every disease known to have occurred at the time in which she lived, and it even includes a series of chapters on normal and abnormal psychology. She discusses frenzy, despair, dread, obsession, anger, and idiocy, often in a way that would cause one to think that it was written since Freud's influence swept over European psychologists.

Many more examples of modern thought might be cited from the writings of physicians of mediaeval times. These short notes, however, should suffice to cause us to pause and consider what real advances we have made in medical study since then. They should help us to think less unkindly of the memory of these great ones who lived in the misunderstood "Dark Ages," and yet who did so much for their fellow-men in one of the most difficult phases in the history of human progress.

A Case of Lobectomy for Bronchiectasis

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THE patient was a man of twenty-three years of age, a poultry assistant by occupation, and he was first admitted to the Forster Green Hospital in 1931. At that time he had a history of cough, a small amount of sputum and repeated hæmoptysis, the largest hæmorrhage being about a pint. Tubercle bacilli were not present in the sputum, and there was no evidence suggestive of tuberculosis on any of the X-ray pictures taken. The physical signs were basal, fine crepitations at both bases, broncho-vesicular breathing, and increased vocal resonance at the left base. A provisional diagnosis of bronchiectasis was made, but no lipiodol test was done. As the patient had no further hæmoptysis, he was discharged from hospital in five weeks.

He returned in October, 1933, considerably worse. The cough and sputum had increased, and there had been several large hæmoptyses. The last hæmorrhage was said to have exceeded forty ounces, and after it he was admitted to Newry District Hospital in a very grave condition. Tubercle bacilli were still absent from the sputum, and the blood sedimentation rate was normal. The physical signs were more indefinite than three years previously, owing to the recent hæmorrhage, but fine crepitations were present at the left base. Lipiodol tests showed a marked bronchiectasis of the left lower lobe and no evidence of bronchiectasis in the left upper lobe or in the right lung field. The patient consented to have a lobectomy, and the risks of the operation were explained to him. He said he would rather die under the operation than have another hæmorrhage like the last one.

As a preliminary to the lobectomy, an artificial pneumothorax was done on the left side on the 2nd March, 1934, and following this a most unusual complication arose. It was feared that the artificial pneumothorax might start the hæmoptysis again, as is liable to happen in the hæmorrhagic type of case. Insted of this he developed a hæmorrhagic effusion in the left pleural cavity, which required aspiration at once before it became absorbed. On 17th April he was transferred to Dr. Boyd Campbell's medical unit in the Royal Victoria Hospital, where a further series of photographs were taken after lipiodol injections.

Bronchoscopy on 25th April, 1934, showed that there was no stenosis nor tuberculosis present. Purulent fluid was observed in the left main bronchus.

Operation, 28th April, 1934—one-stage lobectomy. Anæsthesia : gas and oxygen at a slight positive pressure, given by Dr. Stafford Geddes with a McKesson machine.

The chest was opened by a long incision in the seventh intercostal space. On incising the parietal pleura, it was found that the visceral and parietal pleuræ were adherent, but not too densely, and it was necessary to free the lung before the intercostal incision could be completed in its full length. A small piece of the seventh rib was resected near the transverse process of the vertebra to allow of

wider separation of ribs. The ribs were then widely separated and held apart by Tuffier's rib-spreader. Fairly extensive adhesions were found between the lower lobe and diaphragm, and were separated with some difficulty. In separating the anterior surface of the lobe from upper lobe, a very vascular connection was encountered which required several ligatures.

The pulmonary ligament was clamped and divided, three ligatures being required, and when this was completed it was found that the lobe was reasonably well pedunculated. A Roberts-Nelson tourniquet was threaded over the lobe and tightened on the pedicle as high as possible. A second tourniquet was applied distally about one and a half inches away, and tightened. The lower lobe was isolated by gauze packs moistened in week dettol solution, the packs covering also the wound edges. The pedicle was then cut through between the tourniquets, leaving a stump from which one or two projecting bronchi were trimmed off with curved scissors. The pedicle was sutured with two rows of No. 1 chromic catgut (twenty-day) continuous suture, using for the most part a short, straight, round-bodied needle and a needle holder. No bleeding occurred on releasing the tourniquet, and another continuous suture, picking up the lung tissue at the periphery, completed the pedicle suture, which was then buried in the under-surface of the upper lobe by two sutures.

The phrenic nerve, although looked for, could not be seen in the chest cavity, so was not interrupted by crushing.

It was now seen that on slightly increasing the pressure of the anæsthetic gases that the upper lobe expanded so as almost to fill up the space formerly occupied by the lower lobe. (There were no adhesions fixing the upper lobe to chest wall.)

A drainage tube was inserted through a small incision, with short rib resection of tenth rib, in mid-axillary line. It was held in position by a stitch through the diaphragm tied over it.

The wound in the chest wall was closed by—

1. Approximation of the ribs by interrupted pericostal chromic gut sutures maintaining the approximation, and these reinforced by further stitches through the intercostals.
2. Suture of divided muscles by continuous suture.
3. Skin sutures.

On his return to the ward the condition was fair. He was put into a moderate Fowler position, the drainage tube was connected to a further length of rubber tubing having at its distal end a long piece of glass tubing dipping below the surface of one-in-forty carbolic solution in a bottle placed on the floor.

1,000 c.c. of glucose-saline solution were given intravenously.

The temperature was normal for the first two days, and then was somewhat irregularly elevated, but never above 100° F., until the twelfth day, when it reached 101° F. It became normal again on the eighteenth day.

The pleura was explored by needle on the fourteenth day, as it was thought he might have a small empyema or fistula. Only a very little purulent fluid was found. He never showed evidence of having a bronchial fistula.

Professor Young examined the removed lobe, and reported that histologically the epithelial lining of the bronchiectatic cavities was largely desquamated and that the submucosa or wall was the seat of subacute inflammatory changes. The lung showed irregular areas of dense fibrosis. The arteries exhibited well-marked arteritis, evidently the effects of a chronic inflammatory lesion.

There was no evidence of tuberculosis.

This man wrote recently that he was feeling very well and anxious to obtain work.

So far as I know, this is the first successful case of lobectomy for bronchiectasis recorded in Ireland.

Apart from lobectomy, the treatment of bronchiectasis is only palliative and the results are far from satisfactory. Artificial pneumothorax is useless, except in children, and even then it requires to be kept up for an indefinite period. Bronchoscopic lavage and medication gives great relief in the type of bronchiectasis associated with much purulent sputum, but would be inapplicable to the treatment of the hæmorrhagic type.

The Treatment of Varicose Veins

By IAN FRASER, M.D., M.CH., F.R.C.S.ENG., F.R.C.S.I.

To deal fully in a short space with the treatment of varicose veins is difficult. I intend to consider only the injection method. Ten years ago the pendulum swung so far in favour of injection for all cases, that there is now the natural swing back to the old method for certain patients. In time a stable position will be reached, when it will be realized that certain veins, e.g., those in the calf, etc., are suitable; whereas, of those on the thigh, injection will be successful for some, and for those unsuitable ligature of a vein will be the only safe method.

Before dealing with the technique of injection, one or two facts must be considered. The first of these is the circulation in the limbs. The blood reaches the part through the arteries, having been pumped there by the heart's action. The return flow is carried to the heart by the veins, and of these there are two main types—(*a*) the superficial, lying subcutaneously; and (*b*) the deep, centrally placed, surrounded by muscles.

The force causing the return flow is complicated, and probably is a combination of several factors :—

(1) The heart's action extending through arteries and capillaries to the veins—the so-called *vis a tergo*. This, although doubted by some, must exist, as can be seen by the steady flow from the distal end of a completely severed vein.

(2) The aspiration or suction exerted by the heart and lungs—*vis a fronte*. The negative pressure produced in the thorax with the descent of the diaphragm—rather like that produced in a syringe by withdrawing the piston—is easily understood.

(3) Gravity is of great importance, but can only affect the dependent parts when recumbent or with the legs raised.

Professor Young examined the removed lobe, and reported that histologically the epithelial lining of the bronchiectatic cavities was largely desquamated and that the submucosa or wall was the seat of subacute inflammatory changes. The lung showed irregular areas of dense fibrosis. The arteries exhibited well-marked arteritis, evidently the effects of a chronic inflammatory lesion.

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(3) Gravity is of great importance, but can only affect the dependent parts when recumbent or with the legs raised.

(4) The action of the muscles which compress the veins with each contraction, and so, in conjunction with the valves, drive the blood towards the heart—rather like the expulsive effect produced on a Higginson syringe by the compression of the hand.

From the anatomical position of the veins, it is clear that the first three factors will affect chiefly the superficial veins, and the fourth factor chiefly the deep.

The deep veins probably carry nine-tenths or so of the total venous return, and the superficial the remainder, i.e., the latter are an overflow and their distension and capacity will vary with the demand put upon them by the deep veins, to which they act in a complementary manner. It is clear that a third type of vein must exist—the communicating, to join up the superficial and deep streams. The flow in these small veins must be chiefly in one direction—from within out. This point is of great clinical importance, as otherwise there would be a tendency for the sclerosing solution to pass in deeply rather than along the superficial vessels, and so cause serious trouble in the deep circulation.

With the following conditions, enlargement of the superficial veins may be expected :—

(1) With entire blockage of the deep veins by thrombosis or obstruction by pressure from tumour, etc. In such cases a permanent compensatory enlargement takes place, and so a balanced arterial and venous flow is maintained.

(2) With stasis in the deep veins, where, due to lack of muscular exercise and faulty valves, a stagnant column of blood remains, which overflows into the unsupported subcutaneous veins, which give under the strain. The walls are blown out, and thinned, so permeation and back-pressure occur, with resulting œdema.

(3) With athletes, where the muscles are firmly contracted and more than average pressure is exerted upon the deep veins, it is natural that blood is forced out. This is a gradual process, and the superficial veins slowly enlarge to their task; their walls are thick, and so, although they appear as a disfiguring mass of tortuous cords on the calf, there is little œdema and often few symptoms. The thick wall contrasts markedly with the thinness of the gravity veins, and so the difficulty in securing satisfactory sclerosis is much greater.

(4) There is a group, chiefly of young healthy adults who appear to lead a normal existence without excess in any direction, and yet in whom the superficial veins give way under the normal strain. This can only be explained on the assumption that the wall is congenitally weak; and when one gets a mother and daughter to treat at the same time, as frequently happens, with exactly the same vein enlarged, it lends support to the theory. By others this is explained by the lack of some internal secretion, i.e., pituitary, etc. They claim support for their theory in the varicose veins of pregnancy, which often appear in the early months before the enlarged uterus could possibly be considered an abdominal tumour congesting the pelvis, and which they explain by hypo-function of the ovaries, or the reflex-hypo-secretion of some allied internal secretion, viz., pituitary.

From this one can see that the patients attending with varicose veins readily fall into four groups :—

(1) The young patient with congenital or familial veins.
(2) The static or gravity veins.
(3) The athlete's or ex-athlete's veins.
(4) The compensatory veins.

It is not germane to this short paper to deal with the pathological changes found. The changes in the vein are that it is lengthened, tortuous, dilated or hypertrophied, arborizing, with valves incompetent. This picture is completed by the wasted muscles, the weakened joints, the flat feet all clothed in a skin bulging with œdema or else itching, eczematous, or ulcerating. Of the above, attention is drawn to two words—'dilated' or 'hypertrophied,' and in the subsequent treatment by injection, which condition is present must be carefully studied.

In considering each case, it is most important to find what general diseases and what local conditions rule out injection treatment.

General Conditions Making Injection Unsuitable.—

1. Pregnancy.
2. Abdominal tumour, especially in pelvis.
3. Veins of sudden onset.
4. Menstruation.
5. History of previous typhoid fever.
6. Veins on the abdominal wall.
7. History of white leg.
8. Heart patients.
9. Nephritic and diabetic.
10. Active phlebitis present.

Pregnancy.—If the general view is correct—viz., that the veins are the result of pelvic back-pressure, which will be relieved at term—then naturally treatment is contra-indicated. If, on the other hand, the hormone theory is correct, then the case should be considered by the biochemist. Whichever view is correct, the fact remains that with the completion of the pregnancy many mothers are left with permanently dilated veins. One wonders would support by Elastoplast or other dressing not have prevented the elasticity of the veins from being stretched beyond recovery! In America, pregnancy is not considered a contra-indication, provided a solution other than quinine is used.

Abdominal Tumour.—It is a fact worth noticing, how seldom with the largest abdominal tumour one gets varicose veins which one can attribute definitely to its presence. The free mobility of the average simple tumour prevents this; and as for the malignant ones, the general prognosis is so bad that it precludes any thought of minor ailments.

Veins of sudden onset always suggest something serious—thrombosis, embolism, new growth, so that in such a case a general examination is necessary, and, even if negative, a period of waiting is wise. Even then an experimental period of obliteration by tight bandage, before taking the irrevocable step of permanent sclerosis, will give one greater confidence.

A history of white leg following operation or pregnancy or of typhoid fever makes one consider the case with care. If one is satisfied that there is deep venous blockage, the case requires no further thought; however, with a case of *phlegmasia alba dolens,* where it appears to be chiefly lymphatic obstruction, and where it is thought that the leg may be made lighter by diverting the stream to the deep veins, injection may be tried, if and after temporary occlusion has been tried and found beneficial.

During the menstrual period and for the four days before and after, injection should be avoided, especially if using quinine or salicylates. The reasons are so self-evident barely to require mention: (1) The patient is less able to stand any mental or physical strain; (2) The blood is more fluid; (3) The menstrual loss can be so increased as to cause considerable anxiety to the patient.

If the superficial veins, instead of passing to drain into the deep veins through the saphenous opening, are seen to course up the abdominal wall, it always suggests that they are forming a new collateral circulation, and if so it is most important to leave the circuit intact.

With patients suffering from heart disease the question probably rarely arises. With the right-sided heart lesion with considerable venous engorgement, injection is out of the question, but with the lesion in the aortic valve and with general arterial emptiness, if the patient appears to have a fair expectation of life, injection is not contra-indicated.

With the nephritic or diabetic, the general state of the patient usually causes so great anxiety that a minor ailment such as varicose veins is usually postponed indefinitely.

In the presence of acute active phlebitis of bacterial origin, it is usual to wait. If the inflammation is in the deep circuit and a firm thrombosis is going to be the final state, superficial injection will never take place. If, on the other hand, the phlebitis is in the superficial veins, it may happen that nature will effect a permanent thrombosis. Injections have been used to supplement such a clot, or, more important still, to fix the clot and prevent its escape into the general circulation.

VEINS TO AVOID.—

1. Small blue blebs on the surface.
2. Swollen œdematous legs with no visible veins.
3. Veins, although enlarged, causing no symptoms.
4. Mass of veins at the saphenous opening or a *saphena varix.*

Concerning the actual veins themselves that one should avoid, the first type are the small thin-walled blue blebs that appear on the surface, also described as "hair veins." They usually disappear with successful injection of the main trunk. If treatment is insisted upon, it may be carried out by means of peri-venous injections of very small quantities of sodium morrhuate, or else by injecting into the vein a small quantity of the soapy foam that is obtained by forcibly emptying some sodium morrhuate from a syringe into a small dish.

The swollen œdematous legs with no visible signs are difficult; these should not

be touched unless, after a course of severe compression by bandages, the veins are seen to appear when the œdema has been displaced.

The enlarged vein without symptoms is also a problem. In the young person, if the vein is obviously a dilated gravity vein, injection should be carried out; but in the hypertrophied vein of the athlete it is probably best to wait till the first signs of failing compensation appear.

Those cases with masses of veins at the saphenous opening or a large single cavity—the *saphena varix*—are probably most safely dealt with by a proximal ligature, and if this is supplemented by injection of the vein distally, the treatment can be carried out with an easy mind. The "young veins in young people" are probably the easiest to deal with, whilst the athletes' veins are possibly the most difficult.

INDICATIONS FOR INJECTION.—

1. Swelling and œdema with gravity and standing.
2. Increasing heaviness of the legs, with tiredness.
3. Skin troubles imminent: itchiness, eczema, ulceration.
4. Occupational reasons.
5. To enter the Services or go abroad.

The cases which get the greatest relief from injection are those legs which with gravity and standing get swollen and œdematous, or those which with exercise get easily tired and increasingly heavy. The first remark by the patient after the injection is often how much lighter the leg appears to feel. With skin troubles imminent or present, such as itchiness, eczema, ulceration, injection is a matter of urgency, and with such cases the results are dramatic.

In many cases, for occupational reasons, veins may need to be injected which, if the patient's trade or profession was another one, would not require treatment. With the stringent laws prevailing regarding entrance into the army or going abroad, one gets many cases of a mild character referred, in whom as yet no symptoms are being complained of.

It should be impressed upon the patient in all cases that injection may not be sufficient, and that operation may be required to supplement it; that even if injection can sclerose the veins, some form of bandage support may be required, and that recurrence or the formation of new veins must always be remembered as a possibility.

COMPLICATIONS AND FAILURES.—

1. Embolism with death; 2. Sepsis; 3. Cinchonism; 4. Leakage ulcer; 5. Discoloration of the skin; 6. Pain; 7. Canalization; 8. "No result"; 9. Gangrene of whole limb; 10. Persistent red tender cord.

Embolism with fatal results was mentioned as the great danger in the early cases. McPheeters and Rice quote seven deaths in 53,000 patients, Kilbourne 1 in 5,000, and Dixon 5 in 5,400. Even admitting these, they fall far short of the operative mortality of .4 per cent. of the fatal cases arising spontaneously in untreated varicose veins. These figures mostly emanate from America, and were given in the

early days when one was using a very "safe" injection. The popular solution was sixty-six per cent. glucose, which was considered non-toxic and safe. It failed in that it formed a soft friable clot, and since it did not damage the wall, the clot was left free to float in the blood-stream.

The usual chemical clot is so firmly fixed to the vessel wall that it cannot be removed by the fingers alone, but needs to be freed with the scalpel (Meisen). The bacterial clot is different. It is less adherent and, being placed in the deep veins, is more likely to be swept into the general circulation.

Sepsis is a complication to be considered. It is of two types : the immediate, due to infection at the time of injection; and the latent, which may appear any time. The writer had an example of the latter in a boy of nineteen years who developed a fatal septicæmia one year after injection, and where the only point in the body suggesting infection was a red, tender mass in the vein which had been injected.

Cinchonism is always mentioned as a complication, but beyond the temporary discomforts of buzzing in the ears, a salty taste in the mouth, and nausea and vomiting, it rarely gives rise to anxiety.The alternate solutions can be used if the first injection is very unpleasant.

Leakage ulcer is due to several causes. Statistics vary with the honesty of the writer. Higgins found it in 12 out of 200 cases, and Payne in 13 out of 1,500 cases. It naturally varies with the type of vein—dilated or hypertrophied, the skill of the operator, and the type of solution used.

The first cause is faulty technique where the solution fails to enter the vein. With a long bevelled needle, it is possible for half of the lumen of the needle to be in the vein and the other half not; or, instead, the needle may have partially pierced the vein on the deep surface. Some veins go into spasm as the solution enters, and so may retract from the needle point. To test the return flow from time to time will verify the position. Subcutaneous leakage through the puncture may take place. The blood and solution are more likely to be driven out if the leg is held dependent with the veins full after injection, than if the vein is emptied by raising the leg and so the fluid is sucked along. In some cases a leakage ulcer may appear where one is satisfied that the technique has been perfect. In these cases it is seen that the vein wall is so thin with gross dilatation that the fluid was able to permeate through.

This certainly occurs in a mild way in those cases where the injection area is marked ever after by a brownish stain, probably hæmatoidin or other blood derivative.

Pain should not be excessive. It should with a perfect injection be almost nil at the time, partly due to the fact that the lining of a vein is insensitive, and partly due to the anæsthetic present in most of the sclerosing solutions, e.g., there is 6½ per cent. urethrane (anæsthetic) with the quinine. Pain in the calf of a crampy nature may occur a few hours later. Persistent pain or tenderness is usually the result of an incompletely thrombosed clot, and is generally recognised by a red tender cord usually in the thigh. It is commoner after 'full-vein' sclerosis than the 'empty-vein' technique, and commoner after the weaker solutions, such as sodium morrhuate, than quinine and urethrane. It is due to mild chemical phlebitis. The

condition settles down in time, but it is frequent to see these cases two or three years later with the vein again varicose.

Against canalization of the clot or recurrence, it is impossible to give a complete guarantee. Some writers say it happens in six per cent. of cases (Levi), others fifteen per cent.; Sicard the inventor of the injection method, admits five per cent. It certainly is *not more* frequent than the recurrences after the old dissection methods. Naturally, it is less likely to happen with the strongest agents, with the thin-walled veins and with the absence of blood. Some cases are classed under canalization which probably are really the production of new veins which nothing but an anatomical dissection could prove.

"No result" is one of the disappointments of this form of treatment. It is sometimes difficult to explain. The writer thinks it is less frequent with quinine and urethrane—others think the reverse. It is certainly less likely to happen if the solution does not waste its energy upon a large diluting mass of blood. To heat the solution often gives it a "bite" which it otherwise has not got. After ringing the changes on various solutions, and even mixing these, the blame is usually laid upon the patient, who is said to be "resistant," and the case treated by the universal Elastoplast or else the veins surgically dealt with.

Reports of gangrene of the limbs and other terrifying sequelæ of injection have been reported, chiefly in America. Such cases are rare, and there must have been some fault in the choice of case or else in the method of technique.

As regards actual technique, it is difficult to describe a universal method. This is made more obvious when one sees the similar results achieved with different methods by different operators.

Asepsis is most important. Probably boiling is best for the needle and syringe, although many prefer lysol and methylated ether or spirit. For the skin, methylated spirit and iodine are sufficient, provided there is no local skin infection.

The needle most suitable is one with a moderate bevel; if too long, there is a danger of leakage; if too short, the pain of piercing the skin is considerable, as also the difficulty of getting into those freely movable veins one finds when the fatty tissue is deficient. A 5 c.c. syringe with an eccentric nozzle completes the outfit; special adapters and viewing or mixing chambers are supplied, but probably are not necessary.

The most convenient position of the patient depends upon whether the surgeon wishes to inject the veins full or empty. If the former, the patient stands up on a couch; if the latter, he sits with his leg partly hanging over the edge. The writer prefers the latter; the patient is more comfortable, less likely to faint and fall, and the leg can be raised at once without disturbing the patient when the injection has been made.

Of the solutions available, there are so many that it is clear that the perfect solution has not yet been obtained which will give a firm clot, a fixed clot, an aseptic clot, damage to lining only of the vein, and no local gangrene or general toxic symptoms. A solution which gives a good clot often damages too severely the vein wall, whilst the weaker solutions either fail to clot, or give a clot which is not

adherent. One observer after one or two years examined several cases of injected veins and cultured the clot. He found that only with quinine was the clot aseptic; with the others, organisms, although quiescent, were present. The quantity to give at one injection is a matter for each case : 2, 3, 4, or 5 c.c. is a frequent dose, and if the solution can be given hot, it is a great advantage.

The number of actual *piqûres* depends again upon the operator. Some people prefer four injections of 1 c.c. The writer finds better results with one injection of 4 c.c. The dilution is less and the effect greater, also the leg can be at once raised; in the other method the leg has to hang while the first three are given, and so there is considerable delay.

In many cases a sufficient interval is not left for the injection to take full effect. Unless there is reason for early completion of the case, an interval of three weeks will give one a better idea of the state of affairs. Intervals of four days, one week, etc., can of course be used, if speed is an essential.

With some it is the custom to seal the skin prick with collodion or a small dressing on adhesive plaster, to prevent infection from the stocking. Again, if one wishes the superficial veins empty and their lumen to be non-existent, tight pressure from a bandage—Elastoplast—is essential.

The patient usually asks if she is expected to rest or to be energetic after each injection. Again, if the superficial veins are left full, probably it is best to rest and allow the clot to form, but if the veins are empty and kept in this condition by a tight bandage, it is probably best to encourage a free circulation in the deep veins by average exercise.

In conclusion, it must be pointed out that injection alone may not be suitable in all cases, but may be combined with ligature of the vein in suitable cases, e.g., tributary of a large trunk. This ligation can easily be performed under local anæsthesia. If any doubt exists as to whether permanent sclerosis will be of value, temporary compression with a tight bandage may be tried, and if this gives satisfactory results the permanent step may be taken.

"No result" as a rule is due to the sclerosing solution acting on a mass of blood rather than upon the vein wall. "Empty vein" injection gives the best results.

With the dilated saphenous vein which fills by regurgitation from the groin, ligature is essential.

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Modern Methods in the Treatment of Fractures

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PAPER READ BEFORE THE NORTH-EAST BRANCH OF THE BRITISH MEDICAL ASSOCIATION

THE treatment of fractures is of perennial interest. The complaint is common to any age. It may occour at any time of life. A fracture may usher in the new-born babe. It may ring down the curtain at the other end of life. The frequency of the complaint is not diminishing. With the increase in speed it is actually increasing.

It is only by using a high standard of comparison that a high standard of treatment can be obtained. In fractures that standard is the reproduction of the normal. To obtain it, Lister violated the canons of surgery. He converted a simple fracture into a compound one when he wired a fractured patella. But the genius of Lister did not popularize the method. It took the technical skill and personality of Lane to show that the opening up of a simple fracture, and fixing of the fragments in accurate anatomical apposition, was a justifiable and even desirable method.

The advent of X-rays was the cause of the next advance in the treatment of fractures. It was no longer necessary to cut down on the seat of fracture to see the position of the bony fragments. It was found that manipulation in itself, if assisted by X-ray examinations, could produce good anatomical apposition in certain fractures. X-ray examinations were especially helpful to those who followed the teaching of Hugh Owen Thomas: they could now watch the progress of their fractures, and their treatment became more of an exact science. In this way treatment in the Thomas splint became more popular.

The exigencies of war finally set the treatment of fractures on its present basis. It showed the weak points in the methods of open operation. The septic nature of the wounds drove surgeons to dispense with Lane's fixation methods by foreign bodies and to use traction as a means of holding the fragments in apposition.

It was found that the results obtained by traction were better than those obtained by operative fixation, and the mortality was greatly lowered. This, coupled with an efficient method of keeping the fragments from moving during transport, lowered the total mortality for fractured femora from eighty to sixteen per cent. The method adopted in our lines was the universal use of the Thomas ring-splint. Our enemies learnt the same lesson, and they had a like drop in their mortality; the splint adopted and modified by them was the Braun splint. The Thomas splint has the advantage over the Braun splint in that it is more easily adopted for transport and it allows of more movement of the limb without allowing movement of the fragments. The war signed the death warrant of plates and screws. It exalted the ring-splint of Hugh Owen Thomas. It established the principle of skeletal traction.

When a force is applied to a bone, it is fractured in the direction of the line of force. A twisting force will produce a spiral fracture, and a direct blow a transverse fracture.

The position the fragments will take depends to the greatest extent upon the disrupting force. But it is influenced by the attachments of muscles and ligaments. Where muscles are attached closely to a bone, the muscular fibres may hold the fragments in apposition, as, for example, in a fracture at the angle of the jaw. No displacement may likewise be shown by a fracture between ligaments, as in a fracture of the clavicle between the conoid and trapezoid ligaments. In a fractured patella due to a direct blow, the muscular fibres still hold and there is little displacement : but in that due to a sudden contraction of the quadriceps with the knee bent, the patella is broken by leverage over the prominence of the femoral condyles (fig. 10), and the muscular violence, still acting, tears through the facial and muscular fibres on each side, and the fragments are widely separated.

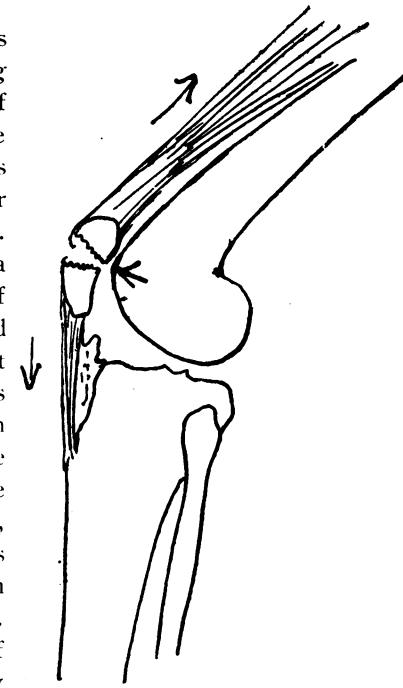

FIG. 10

To illustrate how the patella is fractured by being levered over the lower end of the femur in fracture by muscular violence.

A Colles fracture through the lower end of the radius illustrates well the parts played by the several factors—force, muscles, and ligaments. The fracture takes place with the hand outstretched (fig. 1). The line of force is upwards and backwards. This determines the line of fracture. The force pushes the lower fragment upwards and backwards, and in so doing the lower articular surface is rotated slightly backwards. By the attachment of the lower fragment to the ulna through the triangular ligament, its upward movement is restrained and it is made to swing in an arc towards the ulna (fig. 2). Sometimes the strain on this ligament is too great, and the ligament breaks off the ulna styloid. In these cases there is more upwards displacement, unless impeded by the impaction of the fragments. In more violent disruption the impaction comminutes the lower frag-

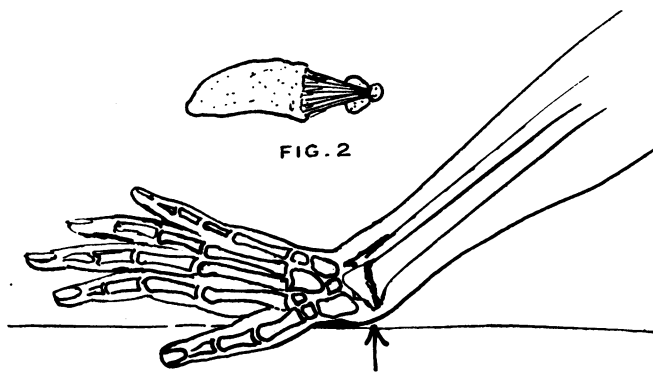

FIG. 1

The line of force in the case of a Colles fracture of the radius. The lower fragment will be driven upwards and backwards.

FIG. 2

Fig. 2.

The lower end of the radius and ulna, showing the triangular ligament binding the lower end of the radius to the ulna.

ment. The hand follows the lower radial fragment, and so the typical deformity is produced.

There is a delicate reflex mechanism between the muscles playing and the bones and joints over which they play. This reflex prevents dislocations and fractures in strong muscular efforts. Unused muscles are quickly followed by atrophied bones. One can then understand the sudden violent, powerful muscular contraction when a bone is broken. It is this spasm which exaggerates the deformity and maintains shortening. It is on this physiological fact that the treatment by skeletal traction depends.

The principles of skeletal traction are exemplified by the treatment of a fracture of the shaft of the femur. Here the over-riding of the fragments and the deformity are maintained by the contracted muscles. If a pull is applied to the fractured limb, the muscles are stretched, tired out, and relax, thus allowing the pull to correct the over-riding of the bone-ends. The normal bones lie with a balanced thrust of muscles around them, even shaping the bone itself: it follows that in a case of fracture the muscles will lie only in their normal line and relationship when the bone-ends are again lying in their normal relationship. In stretched condition of the muscles they will tend to press the bone-ends into normal position. If all the muscles acting on the femur arose from the pelvis at equidistant points from the line of the femur, and were inserted into the head of the tibia, the correction of deformity in the case of a fractured femur would be easily and perfectly accomplished by a pull on the tibia in the line of the femur. Unfortunately for the surgeon, some muscles arising from the pelvis are inserted at different angles and at different points along the shaft of the bone, and some into the head of the tibia. Also, some muscles pass only from the femur to the tibia. The ilio-psoas, pectineus, and small rotators are inserted high up, the gluteal muscles a little lower, and the adductors lower still. The psoas passes to the front, the gluteal obliquely downwards to the outer side, and the adductors obliquely down to the inner side. The popliteus, short head of biceps and gastrocnemii, pass from the back of the femur to the tibia. Besides these factors, the femur is an angled bone. It follows then that a fracture in the shaft will change the axis of movement. For example, the psoas is normally an internal rotator. If the femur is fractured through the neck, the psoas will, due to this change of axis, become an external rotator; hence one cause of the marked eversion of the foot in a case of fracture through the neck of the femur. If traction is to be employed intelligently, these factors must be recognized and the site of

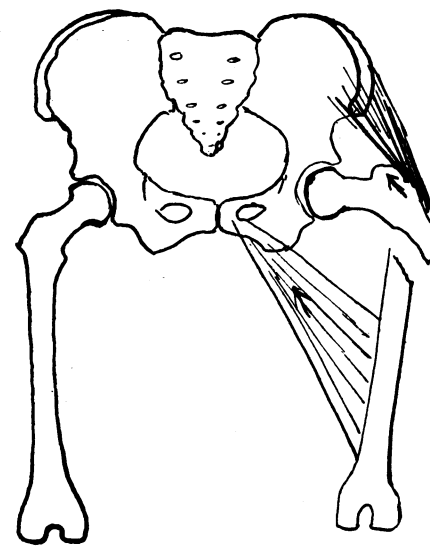

FIG. 3

A fracture through the upper third of the femur, showing how the upper end of the femur is abducted by the gluteal muscles.

the fracture taken into consideration.

In a fracture of the upper third of the shaft of the femur, the gluteal muscles have the greatest power on the upper fragment. Its abduction action is practically unopposed (fig. 3). The upper fragment is abducted markedly by the gluteal muscles and pulled forward by the psoas and pectineus muscles. This abduction can only be neutralized by putting the lower fragment in a like flexed and abducted position. Thus traction is applied to the lower fragment, with the limb in flexion and abduction. In fracture of the middle third, more of the adductor action is applied to the upper fragment, hence this fragment is not so abducted, and the limb should be treated with only slight adduction depending on the actual level of the fracture. In a fracture of the lower end, the whole adductor group is brought to play on the upper fragments, and it becomes adducted (fig. 4), the lower fragment is tilted back by the short head of the biceps and the gastrocnemii (fig. 5). This fracture can be treated in adduction, or a lateral pull is applied to the lower end of the upper fragment to neutralize this adducting

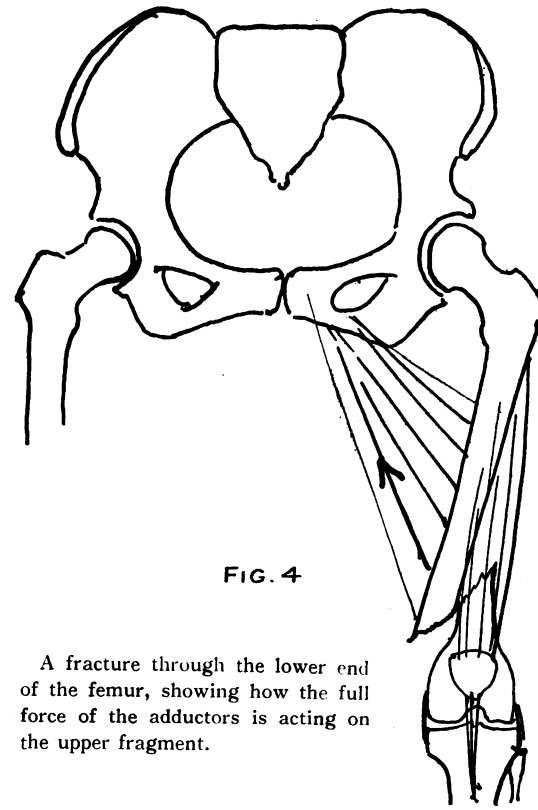

FIG. 4

A fracture through the lower end of the femur, showing how the full force of the adductors is acting on the upper fragment.

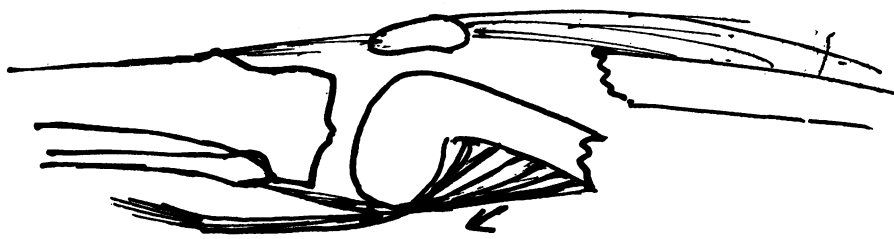

FIG. 5

This diagram illustrates how, in a fracture of the lower end of the femur, the lower fragment is drawn backwards by the short head of the biceps and the gastrocnemii.

force. The tilting back of the lower fragment is neutralized by a pull forwards, or more simply by a thrust from the back, obtained by bending the splint forwards

at this point. The law of pulling in the direction in which the proximal fragment points is a good guide, though it may on occasion need amendment.

As most of the muscles causing shortening are attached to the tibia, it follows that the traction force is best applied at this point. It may be applied through the extending force being stuck to the skin or fastened to pins passed through the crest of the tibia.

Traction may be applied by weights over pulleys, or by using the ischial tuberosity as a counter-pressure point and tying the strings pulling on the limb over the end of a Thomas ring-splint. The latter method needs constant attention, and the skin is likely to develop a pressure sore. Weight and pulley is the better method. The weight may be applied to the limb through being glued to the skin or being tied to a pin passed through bone. As the majority of the muscles causing the shortening are attached to the tibia, the pin is best passed through the crest of the tibia. Pins have many advantages over glue, in that the patient is more comfortable. There is no drag to cause pain, no skin sores, and no necessity of changing the sticking plaster or glue, and, finally, there is no limit to the weight that can be applied. The pins may be as thick as a quill, or may be as fine as a darning needle, as in Kirschner's wire.

In pulling out a fractured femur in a strong muscular adult, a weight of thirty pounds may be necessary, and it should be applied right from the first day of treatment. Later on it is more difficult to undo the shortening. When a quarter-inch lengthening is obtained, some of the weight may be reduced. If the knee is kept slightly bent the ligaments are not strained. Any fractured femur can be pulled out to its normal length.

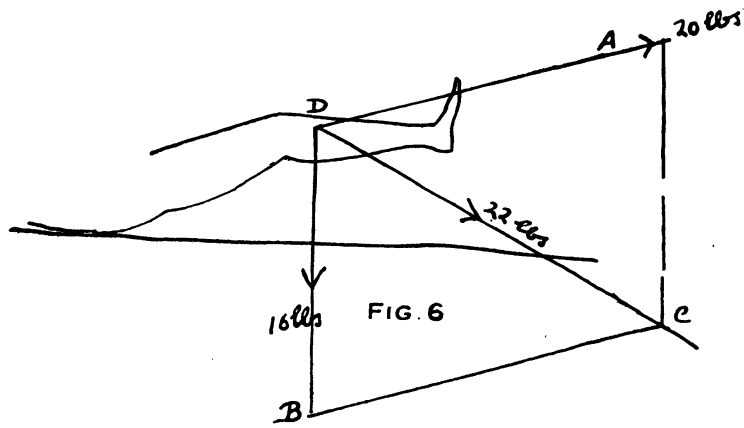

FIG. 6

In a man of eleven stone weight, the weight of the limb acting down at the point D is about sixteen pounds. If even a weight of twenty pounds is applied in the line of the limb A, to pull out the fracture, without the weight of the limb being supported, the resultant of the force applied is in the direction D—C, and its amount is twenty-two pounds. There will be no hope of the shortening being overcome.

In applying this traction, one must not lose sight of the parallelogram of forces (fig. 6). When a limb is suspended on a Thomas splint, there is the weight of the

limb acting down, and it must be neutralized if the pull in the axis of the limb is to be the resultant force (fig. 6). The patient's body is used as a counter-weight to the pull, so the greater the pull the more must the bottom of the bed be raised.

In the after-treatment of all fractures it is to be remembered that callus is strongest at the end of three weeks, and then begins to be absorbd as new bone is laid down. In this process the union becomes weaker, so that six weeks have elapsed before there has been sufficient bone laid down to equal the strength of the callus that has been absorbed. Union is weaker at four weeks than at three weeks, and at six weeks union is only equal in strength to union at three weeks.

In the case of the fractured femur, the limb must be maintained at its proper length for at least six weeks. When union appears firm, the splints can be adjusted and the pin removed. A smaller extension-weight to keep the fragments at rest is now applied with sticking plaster or Elastoplast above the knee-joint, and a flexing-iron applied to the Thomas splint (fig. 7). With this the patient exercises his limb

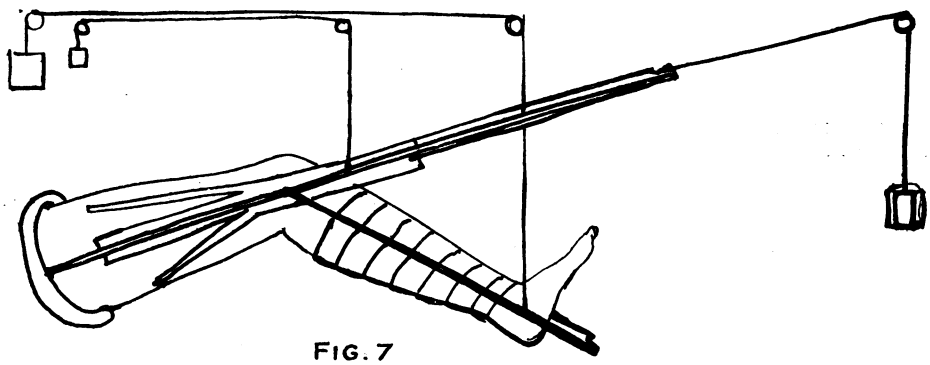

FIG. 7

Diagram to illustrate how the extension is applied to the femur when a flexing-iron is applied.

muscles, and this helps function and hastens union. With a flexing-iron the splint must be kept well applied, so that the joint of the flexing-iron is kept opposite the most prominent part of the femoral condyles. The patient's leg is bandaged to the flexing-iron, and the weight of the leg and flexing-iron is counterbalanced by weights over a pulley. In this way the patient can, more easily, actively extend the knee against gravity. About the end of three months a walking calliper is fitted and the patient allowed up.

This walking calliper must be so made that the ring impinges on the ischial tuberosity when the weight is borne upon it. It should be of such a length that when pressed firmly against the tuberosity its lower end projects at least three-quarters of an inch below the bare heel. In thick-soled shoes it should project one inch below the bare heel. Scarcely five per cent. of walking callipers are correct when delivered by the instrument makers.

The length of time a walking calliper is worn depends to a great extent upon the position of the ends of the fragments. A transverse fracture in good position will need less support than an oblique fracture or a fracture in which there is not

accurate end apposition. If the length is maintained and the alignment is good, in time a perfect bone will be formed by the projecting corners being absorbed and the scaffolding bone being laid down at the recesses. If the calliper does not take the weight, or is discarded too soon, the soft bone will bend and the deformity become marked. A child or a lightweight adult does not need to be supported proportionately as long as a heavyweight; for the strain on the lower limbs is not in direct proportion to the weight of the body, but rather in geometric proportion.

The principle of traction is also applied to fractures of the humerus, forearm, or leg bones.

In T-shaped fractures of the lower end of the femur, the knee-joint is involved. Extension is applied, and after thirty-six hours the blood should be aspirated from the joint to ease the pain. If with extension the fragments cannot be held in apposition, it will be necessary to screw them together at open operation. The same procedure applies to fracture of the tuberosities of the tibia. The joint surfaces must be kept accurately apposed.

In fracture of the spine of the tibia, aspiration of the knee-joint may be necessary. The joint is then forced into full extension. This presses down the avulsed spine. After two months, flexing movements begin. Any tendency to limitation of extension is the sign for further rest in the extended position. With care full function can be obtained.

Fractures of the shaft of the tibia are usually associated with a fracture of the fibula higher up, and should be treated with the knee-joint bent to relax the gastrocnemii. The calf should be only loosely supported to prevent the bulky calf muscles pressing the ends of the fragments forwards. Extension is applied through a pin transfixing the os calcis. When the deformity is reduced, the foot, pin, leg, and lower end of the thigh are enclosed in plaster of paris. This plaster of paris is split when wet, so as to allow for any subsequent swelling of the leg. In cases much contused, it is best to keep them in a Thomas ring-splint, with extension for three or four weeks before applying the plaster. At the end of six weeks the fracture should be supported and the ankle- and foot-joints pushed gently to their full movement. After eight weeks the patient should be fitted with a walking calliper or a walking plaster-splint. If, when first seen, there is difficulty in getting good anatomical position, and no grating of bone-ends can be elicited, it is better to do an open operation and place the fragments in position. In many cases fixation plates and wires are unnecessary, and the limb is encased in plaster of paris.

In a compound fracture of the tibia, good results have been obtained from the following procedure. Under low spinal, local, or general anæsthesia, the wound is sterilized by excising the edges of the wound and all injured tissues. A steel pin is passed through the tibia well above the injured part, and another pin through the tibia well below the seat of injury. An assistant pulls on the lower pin and turns it till the fragments lie in accurate apposition. If the wound is large, it is loosely sutured together and a small area left open. This is packed with vaseline, and sterile dressings applied. The whole limb from the knee down is then encased in plaster of paris. The pins embedded in the plaster effectively prevent any chance of movement

between the fragments. The plaster may be left on from six to eight weeks, the pins can then be dispensed with, and the fracture treated as the usual healing fracture.

This principle of transfixion pins and plaster of paris, slightly modified, has been of use in treating a patient with a compound comminuted fracture of the femur and a compound fracture of the tibia and fibula in the same limb. A pin is first passed through the crest of the tibia, the wounds sterilized by excision, the leg bones put in accurate apposition by holding the pin and pulling and rotating the foot. The wounds are then dressed with vaseline and sterile dressings. The leg from the knee down and the foot are then encased in plaster of paris. A Thomas ring-splint is applied, and the projecting ends of the pins used for applying extension through weight and pulley to the femur. In this way a limb with no shortening and good anatomical union has been obtained (see plates A, B, and C).

In fractures around the ankle-joint, full reduction must be obtained. If the fibula is broken, the lower fragment must be firmly pressed towards the tibia, so as to force the astragalus across (fig. 11). With marked displacement, the foot is displaced back and the posterior edge of the tibia is frequently broken off. The patient should be placed with the knee bent and the leg hanging over the end of the table, and a bandage passed loosely from above the ankle round the leg of the table. The operator grasps the heel with his two hands and pulls it forwards and upwards to produce full dorsi-flexion of the ankle-joint. The foot should be maintained in plaster of paris. In the after-treatment of these cases the tarsal joints should be gently moved through their full range from the fourth week, but splintage should be maintained for at least three months. In cases where the fibula has been broken, the patient should wear the inner side of the heel and sole of the boot raised for the ensuing twelve months.

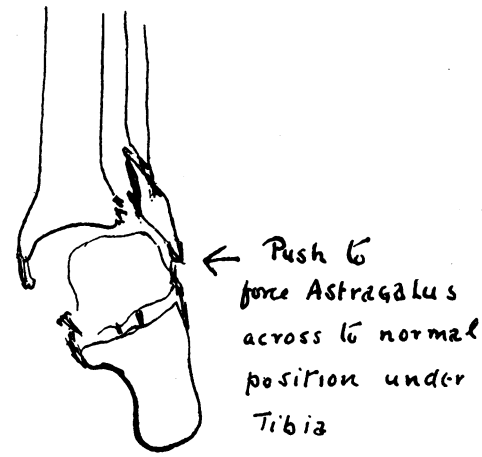

FIG. 11

An abduction fracture of the lower end of the fibula, with tearing of the intra-lateral ligament. The astragalus is displaced laterally with the fibular fragment. In reducing the fracture, the lower end of the fibula with the astragalus must be pushed hard up against the internal malleolus.

Fractures of the os calcis as a rule produce some permanent disability. The fracture often extends up into the subastralagoid joint, and osteo-arthritis of this joint follows. Early treatment consists in reproducing the arch and reducing the broadening caused by a longitudinal splint. A pin is passed through the os calcis and traction applied to reproduce the arch, and it may be necessary to tenotomize the tendo achilles. When the foot is remoulded it is encased in plaster of paris. In cases where there is pain following a fracture into the subastragaloid joint, an arthrodesis of this joint is indicated to relieve the pain.

An infant may have its humerus fractured during delivery. Here the fracture is usually low down in the surgical neck, or in the middle of the shaft. It is best treated with the arm in an abducted position. An abduction splint may be easily constructed by bending a piece of metal in an Z shape. One limb of the Z is sewn into the binder, and the flexed arm is bandaged to the other limbs of the Z. Separation of the upper epiphysis of the humerus occurs between ten and fifteen years. It is best reduced by Bohler's method. The child lies down on the floor anæsthetized. The surgeon, sitting on a chair beyond the patient's head, places his stockinged foot on the anterior-external surface of the shoulder; he catches the wrist of the affected arm and pulls upwards and outwards, using the heel to lever the upper end of the diaphysis into position. The arm is best placed in an aeroplane splint. Once properly reduced there is little tendency to displacement.

Fractures through the tuberosities of the humerus are nearly all in old people, and got by direct violence to the shoulder. An aeroplane splint is, as a rule, all that is required.

If the head is dislocated as well as fractured through the surgical neck, the arm is forcibly pulled by an assistant in an abducted direction, the stockinged foot being placed in the axilla as a counter-pressure if necessary. The surgeon then presses the dislocated head back into the glenoid fossa. Treatment is then that of a fracture of the surgical neck.

In a fracture of the surgical neck, extension is applied either in the abduction or in the line of the body. In the abducted position a Bohler's splint may be used and the patient can walk about, or a Thomas ring-splint may be used, keeping the patient in bed until union is firm (about six to eight weeks). Movement is then encouraged.

Traction in the line of the body has been lately advocated in fractures of the surgical neck of the humerus. It is first ascertained if the long head of the biceps is still intact. If the head is intact, the patient will complain of pain at the site of fracture on extending the elbow. If the

FIG. 12

Howard and Eloesser's method of reducing a fracture through the surgical neck of the humerus.

tendon is ruptured, open operation is indicated; if the tendon is intact, the site of fracture is infiltrated with two per cent. novocaine, with a few drops of adrenalin added; a sling is placed around the forearm of the affected arm, the surgeon places his foot through the other loop, the patient being seated in a chair. An assistant stands behind the patient, and with his contra arm reaches over the shoulder on the sound side and grasps the wrist of the affected side. With his other hand he steadies the upper fragment. The surgeon then standing at the side of the patient, presses down forcibly with his foot in the sling, and with his hands manipulates the fragments into position (fig. 12). The after-treatment is simple. A pad is placed in the axilla, and some wool around the arm. A short sling keeps the elbow flexed, and the arm is bound loosely to the body.

The supracondylar fracture is one of the most difficult fractures in the body to treat if not accurately reduced within twelve hours from the accident. Once marked swelling has taken place, the difficulties of reduction are enormously increased. The lower epiphysis is displaced backwards, taking with it a small piece of the diaphysis. For reduction, traction is made on the forearm; the method of using a sling, as related above in the case of a fracture of the surgical neck, is useful. The surgeon stands to the side of the patient and grasps the lower end of the humerus with both hands. His fingers being locked in front over the end of the proximal fragment, he uses both his thumbs to lever the lower fragment downwards and forwards (fig. 9). The restoration of a convex curve at the back of the elbow-joint, and ease in placing the elbow in full flexion, are indications that the fracture has been fully reduced. An immediate X-ray picture is necessary to make sure that not only the backward displacement has been fully reduced, but that any lateral displacement has been corrected. The pulse is examined to see that the circulation is not interfered with, and the parents are warned to report if any swelling or discoloration of the hands or fingers occurs. If, after reducing the fracture, the

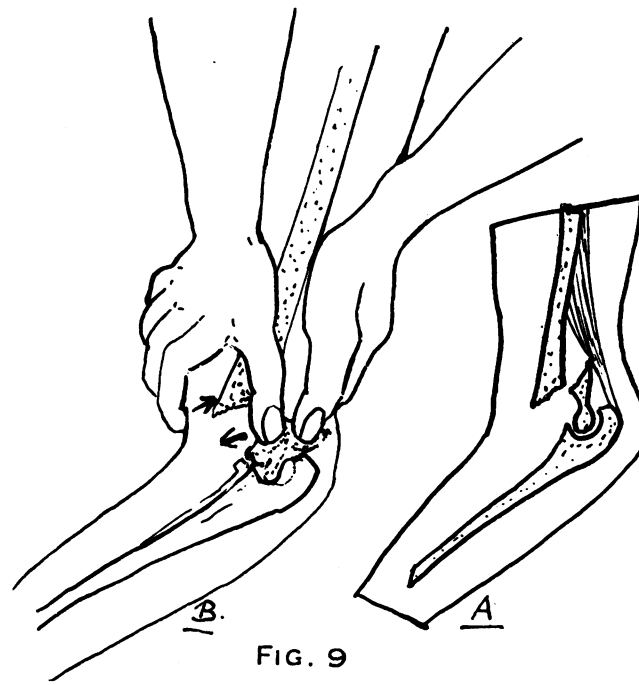

FIG. 9

A—The displacement in a supracondylar fracture of the humerus.

B—A method of reducing the displacement.

circulation seems unsatisfactory, the hand should be tried in a fully pronated position; if this is not satisfactory, the surgeon should again make certain that reduction is complete. If, when first seen, there is much swelling around the elbow, and the pulse at the wrist-joint cannot be felt, an attempt should be made at reduction. On reduction of the fracture, the pulse will probably improve. If, in spite of reduction, the circulation is still poor, the case should be treated as an emergency, and the skin and deep fascia should be incised to lower tension, when the pulse at the wrist-joint will improve. In this way a Volkman's ischæmic contracture, a most crippling condition, will be avoided.

Fractures of either epicondyle of the humerus should, if there is any displacement, be reduced by open operation, and the fragments sutured in position or fixed by a nail.

In fractures around the elbow-joint, the ulnar, median or musculo-spiral nerve may be interfered with. The ulnar-nerve lesion may be due to severance, contusion, caught in callus, or may only occur thirty to forty years after the accident. These late paralyses occur when the outer condyle has been fractured and not united, or has united, causing an increased carrying angle at the elbow-joint. In time the overstretched nerve suffers a physiological paralysis. If a paralysis occurring at the time of accident shows no improvement four weeks after the reduction of the fracture, it should be exposed by operation. Cases of late ulnar-nerve paralysis should be treated by transposing the nerve to the front of the joint.

In fractures of both bones of the forearm, it must be noted that a fracture of the shaft of the ulna is frequently associated with a dislocation of the upper end of the radius, and fracture at the shaft of the radius is frequently accompanied by a fracture at the lower end of the ulna.

These fractures of both bones of the forearm are reduced by traction in the line of the forearm in a Thomas arm-splint or in a Bohler splint. The traction should be continued for six weeks, when union should allow of placing the limb, with the elbow flexed to beyond the right angle, from the middle of the arm to the knuckles of the hand in plaster of paris. Where traction does not quickly show signs of reduction, it is best to cut down on the most displaced bone, and place the fragments in end-to-end apposition. No screw or plate is, as a rule, required. This gives a fixed fulcrum on which to manipulate the other bone and secure good apposition. The whole limb is then enclosed as before in plaster of paris.

A Colles fracture is best reduced by Jones's method. The operator should stand well over the patient, so that he can get his shoulder muscles into the twist and downward push. In this method for a fractured right radius, the surgeon places his right scaphoid over the lower end of the proximal fragment, and his left scaphoid over the upper end of the distal fragment, and as he forces the lower fragment downwards and forwards, he pushes the upper fragment upwards and backwards. He can gain extra power if he places his foot on a chair and uses the inside of his knee to increase the power of his wrists. As a final thrust, he should push the lower fragment towards the ulna. Plaster of paris is then applied, with the hand

midway between pronation and supination, and midway between extension and flexion. This plaster runs from below the elbow to the knuckles. The thumb and fingers are allowed full play. The plaster is split in two places while still wet. The patient is encouraged to use the fingers from the first. After fourteen days one-half of the plaster is removed for light massage and replaced. The wrist should not be used without a plaster of paris support for eight weeks. When supported it may be gently moved once daily through each movement. Special attention should be paid to active movement of the long extensor of the thumb. It is likely to become adherent to the seat of fracture and to rupture later.

Fractures of the scaphoid should be put up in plaster of paris in extension and slight ulnar adduction. This casing should fit accurately, and should be worn for two months, or until the union is sound. Full use of the hand is encouraged when wearing this splint.

Operation is necessary in a fracture of the olecranon and fracture of the patella with separation. Operation should also be done early in cases of intra-capsular fractures of the neck of the femur. In the latter cases a low spinal anæsthesia is given, and the fracture reduced by pulling on the limb, first slightly flexed and adducted, then internally rotated, and then slowly abducted in the internally rotated position and the knee extended. Reduction is probably accomplished if, on resting the heel of the affected limb on the surgeon's palm, the foot does not rotate back into the marked external rotation, but lies in a normal way. Other proofs are the restoration of normal length and the restoration of the hollow behind the great trochanter. Final evidence is the X-ray appearance, plates being taken in two planes. If the fracture is accurately reduced, an incision is made down to the trochanter, three or four Kirschner wires are drilled into the neck to meet the centre of the head, X-rays are again taken, and the wire that lies in the most central position and which is correctly placed, is chosen, and the other pins withdrawn. A Johansen's modification of Smith-Petersen's pin is threaded along this wire as a guide, and driven up through the neck into the head. The patient is returned to bed without any fixation apparatus. The following day the patient can raise the limb from the bed, and can be allowed up in about four weeks (see plates A, F, G, H, and I). In this treatment the operative interference is very slight, and the patient avoids the pain of any movement of the body, chest complications, and the difficulty of nursing; as well as being guaranteed a useful limb.

Most fractures of the spine are due to excessive bending, and it is sound treatment to carry them face downwards, unless one has reason to suspect that the ribs are also crushed. Operation is only to be recommended if there is increasing paralysis, or if, after some improvement, the paralysis remains stationary. In most cases manipulation and plaster are all that is necessary. In some resistant cases an infiltration of the injured area and more forcible manipulation are necessary. The patient is laid face downwards, his head and arms resting on one table and his legs on another table. The spine is thus sagging in hyper-extension; if necessary, some pressure may be applied to increase the hyper-extension. This reduces the deformity.

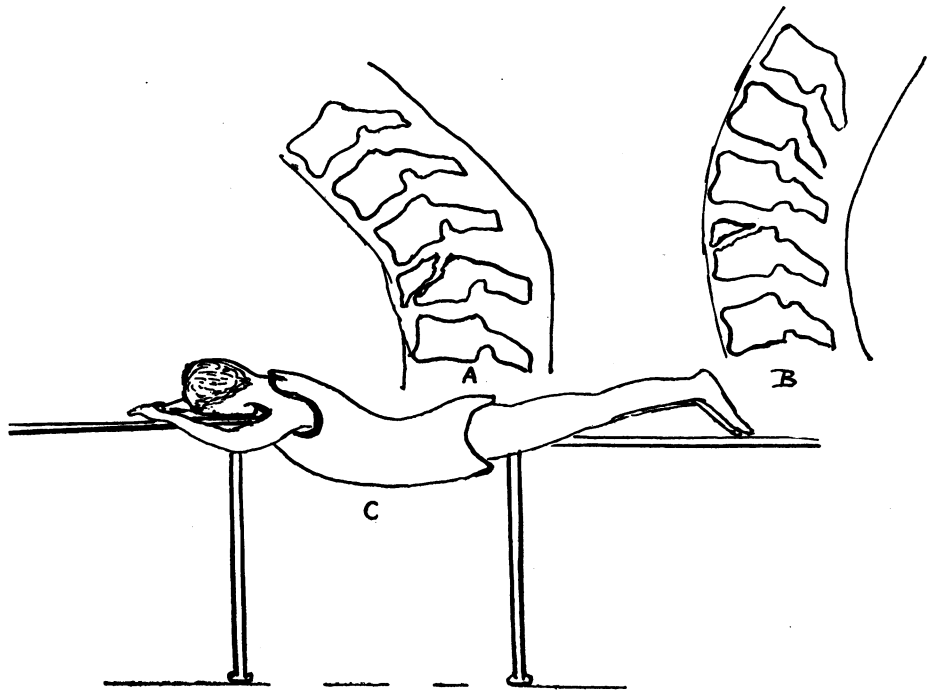

FIG. 8

A—The displacement that is common in a fracture of the spine.
B—When the spine is hyper-extended the displacement is corrected.
C—The plaster jacket applied in the hyper-extended position.

Pads of felt are stuck on the prominent bones, and the patient is then encased in plaster of paris in this hyper-extended position, from the nape of the neck to the buttocks. A large window is cut out in the front to allow of abdominal movement. This casing is worn till the X-ray shows sound bony union (fig. 8). The patient can be allowed up in his jacket after three weeks if he is otherwise fit.

PLATE A.

Comminuted compound fracture of the femur, with involvement of the knee-joint. A piece of the lateral side of the bone five inches long had extruded itself through the wound and was loose in the patient's trousers. There was two inches shortening. This patient had a compound comminuted fracture of the tibia and fibula on the same side.

PLATE B.

The shortening of the femur has been overcome by traction and the length maintained in traction.

PLATE C.

The final result. There is no shortening in the limb and the patient can flex the knee to eighty degrees.

PLATE F.

A typical intracapsular fracture of the femur.

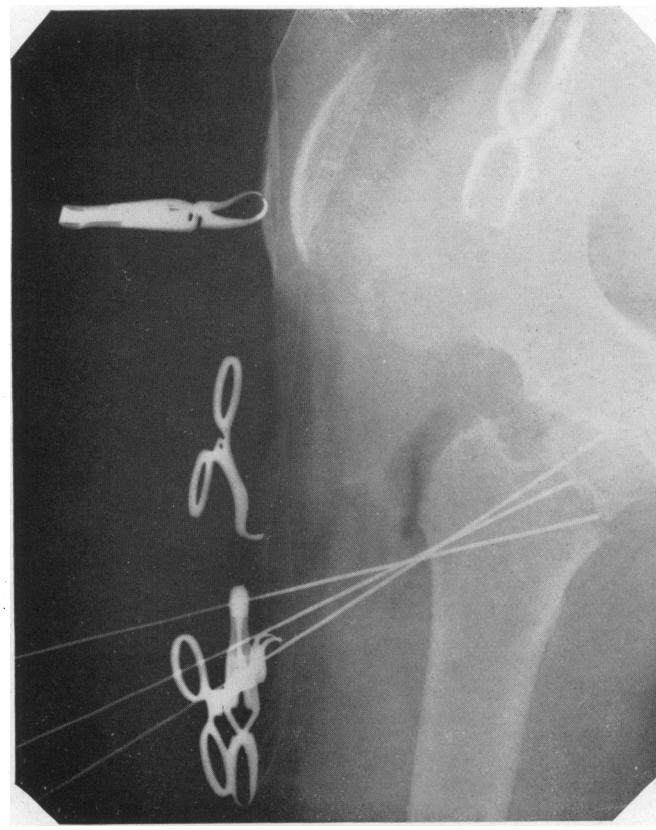

PLATE G.

The displacement has been corrected by manipulation and three Kirschner wires inserted as guides.

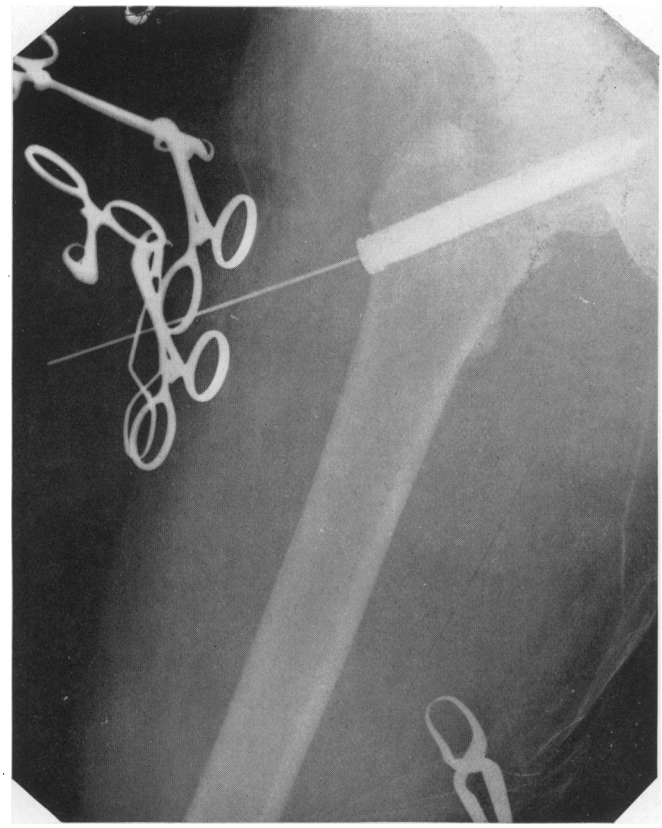

PLATE H.

The most suitably placed wire is chosen and the others withdrawn, and a Johansson's modified Smith-Petersen's nail is threaded on this wire as a guide and driven into the bone, uniting the fragments.

PLATE I.

The final result. The patient is walking about without pain, and the fragments appear firmly united.

ULSTER MEDICAL SOCIETY

THE fifth meeting of the session was held on 3rd January, 1935, in the Whitla Medical Institute. The president, Dr. S. R. Hunter, was in the chair. A series of short papers on treatment of common ailments occupied the attention of members.

The papers contributed were :—

"The Treatment of Constipation," Dr. R. S. Allison.

"The Treatment of Varicose Ulcers," Mr. C. A. Calvert.

"The Treatment of Varicose Veins," Mr. Ian Fraser.

"The Treatment of Influenza," Dr. C. W. Kidd.

"The Treatment of Achalasia of the Cardia," Dr. D. V. McCaughan and Mr. P. P. Wright.

These are published elsewhere in this number of the Journal.

The sixth meeting of the session was held in the Whitla Institute on 17th January, 1935. President Dr. S. R. Hunter was in the chair. A discussion on Hodgkin's Disease was opened by Professor W. W. D. Thomson, who spoke on the clinical aspects of the disease. He was followed by Professor J. S. Young, who spoke on the pathological aspects, and by Dr. W. B. Davis, who spoke on its biochemical aspects. These papers are published elsewhere in this number of the Journal. A general discussion then followed, with the following speakers :—Dr. Boyd Campbell, Dr. Robert Marshall, Dr. Clerkin, Dr. Blyth Brooke, and Dr. Montgomery.

The seventh meeting of the session was held on 3rd February in the Whitla Medical Institute. Dr. S. R. Hunter, the president, occupied the chair. The speaker of the evening was Dr. Barclay of Cambridge, who took as his subject "The Mechanism of the Digestion System." Dr. Barclay first drew attention to many fallacies which are passed from one textbook to another, in spite of the fact that radiographers have from time to time shown them to be inconsistent with both still X-ray photographs and with the more recently evolved cinema X-ray pictures. He first showed a series of X-ray photographs of the act of swallowing, and then a number of short cinema-pictures of the same act. The pictures indicate that the food bolus "drops" down the œsophagus, and is not propelled by the muscular force, as is usually taught. These pictures showed clearly the rising and falling of the hyoid bone, the closure of the pharynx, and the "drop" of the opaque bolus. It did not seem to make any difference to the patient whether he was standing upright or lying down when the pictures were taken. In proof of this contention, Dr. Barclay showed cinema X-ray films of the act of swallowing in cases of diphtheritic paralysis, cleft palate, and œsophageal pouches. Dr. Barclay then went on to discuss the movements of the stomach and intestines. But here, he said, the radiographer required to exercise great care, as there were such wide variations within the normal size. Then again, the posture of the patient at the time the picture was taken also influences the form and position of the parts, but most particularly the stomach, the pylorus of which shows in the same individual changes covering a space of seven inches. In the vertical position the pylorus was found at the level of the fifth lumbar vertebra; in the horizontal position face down, at the first lumbar

vertebra; lying on his back, at the disc between the first and second lumbar vertebræ; while the whole form of the stomach "slops over" if the patient lies on the left side. Respiration also influences the position of the stomach in any of the above postures over a space of three vertebræ. The movements of the small and large intestines were then considered, and Dr. Barclay pointed out the gradual slowing rate of the intestinal movements from the stomach to anus, and specially stressed the importance of the so-called "mass-movements" of the colon with its distinctive forward action, as contrasted to the Haustral segmentation movement, which was merely a churning action.

The eighth meeting of the session was held on the 14th February, 1935, in the Whitla Medical Institute. The president, Dr. S. R. Hunter, occupied the chair. A discussion on "Early Diagnosis of Pulmonary Tuberculosis" was raised, which resulted in a series of animated speeches. The opening speakers were Dr. B. R. Clarke and Dr. C. O. S. Blyth Brooke. It is hoped to publish these opening addresses in the July number of this Journal.

The ninth meeting of the session was held in the Institute of Pathology of Queen's University, by kind permission of Professor J. S. Young. A large number of interesting specimens were on exhibition, around which many valuable discussions took place.

The president of the Society gave a very enjoyable reception and dance for the members and their wives on Thursday, 7th March. He and Mrs. Hunter received the guests, who numbered over two hundred, at the entrance to the lecture hall in the Whitla Medical Institute, and after music and conversation, there was dancing to a first-class band conducted by Dr. G. P. McCullagh.

Refreshments of a lavish nature were served in the library of the Institute. The best thanks of the Society are due to Dr. Hunter for this very happy evening, which lasted well into the early hours of the morning.

H. HILTON STEWART,
Hon. Editorial Secretary.

Malone Road, Belfast.

LONDONDERRY MEDICAL SOCIETY

THE second meeting of the Londonderry Medical Society for the session 1934-5 was held in the City and County Infirmary on Friday, 21st December, at 8.15 p.m. Dr. J Matson, the president, was in the chair, and there was a good attendance of members to hear Dr. J. A. Smyth's address on the "Diagnosis and Treatment of the Various Forms of Goitre." The greatest interest was centred in a very careful analysis of the results of upwards of 250 cases, which were treated surgically, and especially in the very low mortality-rate.

The third meeting of the session was held on Friday, 25th January, at 8.15 p.m., and the president and members welcomed Mr. R. J. McConnell, who had been invited to give an address on the "Differential Diagnosis of Acute Abdominal Lesions." This was listened to with the greatest appreciation by all present, and numerous members took part in a very interesting discussion after the lecture.

The fourth meeting of the session was held on Friday, 22nd February, at 8.15 p.m. The lecturer on this occasion was Dr. Ivan McCaw, who gave an address on the "Differential Diagnosis of the Commoner Skin Diseases." This is notoriously a very difficult subject, and it was handled by Dr. McCaw in a very masterly manner, which helped very considerably to clarify everybody's ideas concerning these diseases.

19 Clarendon Street, Londonderry.

J. A. L. JOHNSTON,
Hon. Secretary.

BRITISH MEDICAL ASSOCIATION
BELFAST DIVISION

THE opening meeting of the session was held in the Whitla Medical Institute on 25th October, 1934. The outgoing chairman, Dr. G. G. Lyttle, introduced his successor, Dr. S. J. Killen of Carrickfergus. Dr. Killen took for his subject "The Dispensary Medical Service in Northern Ireland." In a fresh and thoughtful paper he pointed out some of the defects of the present system, and made suggestions for their reform. The dispensary officer was the first line of defence against the spread of disease, but too often his efforts to improve sanitary conditions and to prevent contamination of food and of milk met with active opposition. Vested interests too often succeeded in their policy of obstruction. The possession of a sense of humour, however, did much to brighten the lot of the harassed dispensary officer, as Dr. Killen showed in recounting a number of excellent stories of incidents from his experience.

A second meeting, on 13th December, was devoted to the exhibition of an obstetrical film, shown through the courtesy of Petrolagar Laboratories. There was an attendance of about one hundred and fifty, among which were a large number of medical students. The film, which had been made by Dr. Lee of Chicago, showed in a very lucid manner the management of the three stages of labour, suture of the perineum, and the immediate care of the child.

The third meeting of the session, on 7th February, was addressed by Dr. F. M. B. Allen, who dealt with the problems of the "Underweight Infant." Dr. Allen gave members a most concise and lucid summary of the whole question. He first considered the weakly and underweight new-born infant, advocating the use of supplemental feeding, normal saline subcutaneously and intraperitoneally, and insulin in doses of one to two units twice a day. He emphasized the extreme value of supplementary feeding where the infant was not gaining and where no cause could be found. All possible sites of infection had to be carefully examined, however. A symptomless acute otitis media might explain a drop in weight. On suitable treatment being instituted the latter would again rise. Dr. Allen then described the chain of circumstances resulting from nasal catarrh and nervous unrest in infants, and in conclusion outlined an extremely simple system of bottle feeding.

360 Lisburn Road, Belfast.

J. C. C. CRAWFORD,
Hon. Secretary.

BRITISH MEDICAL ASSOCIATION
TYRONE DIVISION

A MEETING of the Tyrone Division of the B.M.A. was held in the Tyrone County Hospital, Omagh, on Thursday, 23rd January, at 4.30 p.m.

Those present were—Doctors Leary (chairman), Lagan, W. Lyle, Eaton, Mann, Hill, Warnock, Chambers, Ekin, Johnston, McVicker, P. J. Campbell, O'Brien, Gillespie, Pringle, Devlin, Wilson, Murnaghan, Pratt, and Martin (hon. secretary).

Mr. Fraser gave a very lucid and instructive lecture, illustrated with lantern slides, on "Varicose Veins." He dealt, first, with the anatomy and the flow of blood; he then gave a classification of the different types met. He then dealt with the injection treatment, the solutions in use, the contra-indications for injection treatment, its failures and the cause of the latter, the technique, and stressed the importance of injecting a large dose of quinine hydrochloride and urethrane, e.g., 3 to 4 c.c. into an empty vein, rather than injecting 2 c.c. into a vein filled with blood, and the elevation of the leg immediately after injection for two or three minutes, with the application of a tight bandage, preferably Elastoplast adhesive type. Where there was any doubt present concerning the advisability of injection, he drew attention to the importance of the application of an Elastoplast bandage, the reaction of the veins to the prolonged pressure being the best guide.

A discussion followed, in which the majority of the members took part freely.

Dr. Mann proposed a vote of thanks to Mr. Fraser for the very lucid, interesting, and instructive lecture which he had delivered, as he had been informed at very short notice, owing to Mr. Macafee's being unable to fulfil his appointment to give us a lecture on Gynæcology. In his opinion it was the best lecture we had heard, and he hoped we would have the pleasure of hearing him at some future date, and that we would appreciate a printed leaflet of this lecture, if he could see his way to have same printed and send them to the hon. secretary.

Dr. Lyle also spoke in appreciative terms of the value of this lecture to all present.

An ordinary meeting of members followed. The financial report for the year 1934 was presented by the secretary, passed, audited by Dr. Lagan, and signed by the chairman, treasurer, and hon. secretary.

Dr. W. Lyle proposed that the annual subscription of two guineas be paid to the management of the Tyrone County Hospital in recognition of their kindness in supplying the members with tea at their meetings; this was seconded by Dr. Murnaghan, and passed.

A reply from the Ministry of Home Affairs, Northern Ireland, *re* our application to have some preparation of ipecachuana in the Ministry's list of medicines, was as follows: "That the list for the forthcoming year has been sent to the printers, and it is therefore too late to consider the resolution. I am, however, to add that the

matter will be considered when the list is again being revised." This is included in the minutes so that head office may see how the Northern Ireland Ministry deals with important matters like this.

J. M. MARTIN,
Hon. Secretary.

Holmedene, Clogher, Co. Tyrone.

BRITISH MEDICAL ASSOCIATION NORTHERN IRELAND BRANCH

THE opening meeting of the Branch was held on 22nd November, 1934, when Dr. Armstrong handed the presidential office over to Professor P. T. Crymble. He made reference to the assistance which he had received from the members of the Branch, and paid a tribute to Mr. Woodside, who had acted as hon. secretary for the preceding five years. He introducted Professor Crymble in a happy speech, and wished him a most successful year as president of the Branch. Professor Crymble, having thanked Dr. Armstrong, referred to the losses sustained by the Branch in the deaths of Professors Sir William Whitla, Andrew Fullerton, and John A. Milroy, and Doctors J. C. Nicholson, R. C. McCullagh, and J. H. Gillespie. He then proceeded to give his presidential address, on "Abdominal Surgery in Children," which has been published *in extenso* in the "British Medical Journal" (2nd February, 1935). This paper was very much appreciated by the large audience, especially the coloured illustrations of diseased appendices.

Reference was made to the forthcoming meeting of the British Medical Association in Belfast in 1937, the invitation extended by the Branch having been accepted by the Central Council of the Association. This event will be looked forward to by many, and is sure to act as a stimulus to the work of the Association. Its organization will, however, entail a very large amount of work during the next two years, and it will be necessary for the medical profession as a whole to support the Branch in arranging the many details. It may seem a long way ahead to discuss the meeting, but experience in other centres where the meeting has been held has shown how necessary it is to begin early.

The second meeting of the Branch was held on 24th January, when Mr. H. L. H. Greer read a paper, "The Ante-Natal Care of the Expectant Mother, with Reference to the Prevention and Treatment of the Toxæmias of Pregnancy." Mr. Greer dealt with the incidence of toxæmias in one hundred consecutive cases of pregnancy as experienced in private practice, outlining the routine observations on the patients and the treatment of such abnormalities as arise. He discussed various etiological factors in relation to the toxæmias, and his remarks provoked an interesting discussion by many of those present, all of whom expressed their appreciation of the paper.

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

73 University Road, Belfast.

REVIEWS

MODERN OPERATIVE SURGERY (CARSON'S). Edited by G. Grey Turner, M.S., F.R.C.S., F.A.C.S. Second Edition. 1934. London : Cassell & Co., Ltd.

"Modern Operative Surgery" was first published in 1924, and now ten years later we are given a second edition. The responsibility for the publication was mainly due to H. W. Carson, and it is a sincere regret that he did not live to complete the preparation of this second edition. His place has been taken by the well-known Newcastle surgeon, G. Grey Turner, recently appointed Professor of Surgery in the Post-Graduate Medical College.

Carson's idea was, in his own words, to give us "an authoritative survey of the whole range of modern surgical operations; my aim as editor being to exclude operations that have lost their usefulness, and among new operations to include those only which have proved their value."

A book on operative surgery to be of value must be one of two kinds. It must be either a review of operations intended for senior students and for the general practitioner, or a guide to the operating surgeon. In this latter type the reader wishes to be informed about the best operation for each condition, the type of case in which each operation is indicated, the type of anæsthetic, the after-treatment, and the difficulties that are likely to be met with during the operation. Above all, each step in the operation must be accurately described, and every difficult step in the operation made clear with diagrams and illustrations. In short, a book on operative surgery, to be of use to the operating surgeon, must be up to date, it must be authoritative, and it must be a real guide. "Modern Operative Surgery" aims at fulfilling these conditions.

The policy of choosing twenty-seven authors, each one a leading light in his own branch of surgery, to help in compiling the book, gives authority to each operation described. At the same time this policy has the disadvantage of tending to produce a certain want of balance. An author may be distinguished for his advocacy of certain methods, and for this reason is inclined to be biased in favour of these methods; yet the general surgical opinion may not be in agreement. Thus an operation that is little employed may be described in detail to the exclusion of another maybe more recent operation that has proved more useful.

To approach the book in more detail, it consists of two volumes comprising some 1,700 pages. It includes sections in the special branches as well as in general surgery. There are sections devoted to radium; the eye; the ear, nose, and throat; and to gynæcology, so that the whole range of surgery is covered.

There is an excellent section on plastic surgery by Sir Harold Gillies. This section includes the operations for hare-lip and cleft palate. This latter part is rather disappointing. It is mostly taken up with operations for the correction in adults of badly planned operations in infancy. Modern operations for the lip and the cleft palate are hardly mentioned, and which, correctly performed, would not need correction in adult life. Veau's methods are only mentioned by name in connection with the palate. There is nothing about his operation for hare-lip and the reconstruction of the floor of the nostril. The method of Dennis Browne in closing a cleft palate is not mentioned. Professor Grey Turner evidently saw the deficiencies of this section, and has added an appendix on cleft palate. But even this lacks the smack of more recent work. He is content to describe a method from which only twelve per cent. acquire normal speech, as opposed to methods for which ninety per cent. normal speech is claimed. The description of Wardill's method of narrowing the nasopharynx is, however, happily included.

The chapters in orthopædic surgery by Elmslie and Verall are above the usual standard in textbooks. Hey Groves gives a very full account of the many operations for dealing with fractures. But it would have been preferable had he given the details of the Johansson technique for using the modified Smith-Petersen nail in treating an intracapsular fracture of the neck of the femur, instead of the older superseded operation he has chosen to describe.

The chapters on the surgery of the sympathetic system will fill a want, and will prove very useful to the progressive surgeon. It is good to see an account of the surgical treatment of nerve injuries, embodying the sifted experiences of the Great War.

The chapter on neurological surgery is sound, but might be a little modernized. There is no mention of such details as evacuating the fluid in the cerebello-pontine angle before dislodging the lobes to inspect the anterior surface. More space might have been devoted to the approaches to intracranial tumours, at the expense of the surgery of the vault.

In the section on laryngology the description of Trotter's lateral pharyngotomy is welcome, but the chapter on tonsillectomy is very disappointing. One looked for a detailed description of the modern operation for the extirpation of the tonsils, and the technique for their removal under local anæsthetic, to be met with the opinion that local anæsthetic is used on the Continent and in America, and the operation may be difficult! The method described leaves the lingual area behind, and the illustration serves only to emphasize this defect. No mention is made of Waugh's technique or of its modifications.

The surgery of the intestinal tract is well done. There is an excellent account of the treatment of hernia: though the subcuticular suture for umbilical hernia in small children has established its usefulness and deserves to be mentioned.

Injection methods of treatment are given scant attention. There is no mention of the injection treatment of hæmorrhoids or of anal fissure, and the description of the treatment of varicose veins is so meagre that it is of little practical use.

On the whole, the book fulfils the aim of the editor, and will prove of value to surgeons who need a work on standard operations. Criticisms are only made in the hope that the few deficiencies will be remedied in the next edition, which is sure to be called for.

—G. D. F. McF.

CATECHISM SERIES. PHYSIOLOGY, Part 1. 1935. Fourth Edition. Edinburgh: E. & S. Livingstone. 86 pp. 1s. 6d.

This little booklet contains a remarkable amount of useful information in a very small space. It deals with the physiology of the muscle and nerve, the circulatory system, the autonomic nervous system, the blood and reticulo-endothelial systems. Under these headings are collected in the form of questions and answers most of the fundamentals of the physiology of these systems. The student preparing for the second medical examination will find, set out in a very accessible manner, many of the facts and figures which must be committed to memory, and can only be obtained at considerable trouble from the larger text-books. This applies especially to the sections on the heart and blood-vessels.

It can confidently be said that a perusal of this booklet before an examination would be valuable to refresh the student's memory in the very limited time at his disposal.

THE CONDUCT AND FATE OF THE PERIPHERAL SEGMENT OF A DIVIDED NERVE IN THE CERVICAL REGION WHEN UNITED BY SUTURE TO THE CENTRAL SEGMENT OF ANOTHER DIVIDED NERVE. By Sir Charles Ballance. 1934. London: MacMillan & Co. pp. 45. Price 7s. 6d.

This publication gives an account of a series of important experiments carried out at the research laboratories of the Royal College of Surgeons (London), with a view to obtaining information on the results of nerve suture. The author describes first the changes which take place in the peripheral part of a nerve, after section of the nerve trunk, and then points out that in suture of divided nerves there is nothing in the nature of a true anastomosis, as the peripheral part of the nerve does not take any real part in the union. The restoration of

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function is due to outgrowths from the axis cylinders of the proximal and somatic nerves in the cat, and examining these nerves histologically some time after union has taken place. By using somatic and sympathetic nerves it is comparatively easy to determine to what extent the peripheral nerve is replaced by the proximal one. It is shown that in all cases the functional part of the peripheral nerve is provided by the proximal one, i.e., in a junction of the proximal end of the cervical sympathetic to the distal end of the hypoglossal nerve, the fibres of the hypoglossal nerve are replaced by sympathetic fibres.

A detailed account of the experiments is given. The nerves used are the cervical sympathetic, hypoglossal, superior laryngeal, phrenic, glossopharyngeal, and facial, and each experiment is well illustrated by diagrams and photo-micrographs. The book is well worth the attention of all serious workers in neurology.

HANDBOOK OF ANÆSTHETICS. By J. Stuart Ross, M.B., B.Ch., F.R.C.S.E., and H. P. Fairlie, M.D. Edinburgh: E. & S. Livingstone. pp. 299. Fig. 66. Price 10s. 6d. net

The publication of a fourth edition of Ross and Fairlie's Handbook of Anæsthetics is sound proof of its value and popularity. Since the first edition was published many advances have been made both in technique and in the pharmacology of anæsthetics; and in the present edition, as in those of the past, these advances have been carefully analyzed and co-ordinated. There are useful chapters on the preparation of the patient, choice of anæsthetic, accidents of anæsthesia, endotracheal anæsthesia, rectal etherization, and anæsthesia in labour. There is also a special chapter on local anæsthesia, contributed by Mr. W. Quarry Wood. The book is written in an easy style, and the printing is clear and easy to read. It can be strongly recommended to the attention not only of senior students, but of practitioners who have not had the opportunity of keeping abreast with modern trends in the practice of anæsthesia in hospital practice, as containing in succinct form all the more important points in recent advances in this important branch of medicine.

function is due to outgrowths from the axis cylinders of the proximal and somatic nerves in the cat, and examining these nerves histologically some time after union has taken place. By using somatic and sympathetic nerves it is comparatively easy to determine to what extent the peripheral nerve is replaced by the proximal one. It is shown that in all cases the functional part of the peripheral nerve is provided by the proximal one, i.e., in a junction of the proximal end of the cervical sympathetic to the distal end of the hypoglossal nerve, the fibres of the hypoglossal nerve are replaced by sympathetic fibres.

A detailed account of the experiments is given. The nerves used are the cervical sympathetic, hypoglossal, superior laryngeal, phrenic, glossopharyngeal, and facial, and each experiment is well illustrated by diagrams and photo-micrographs. The book is well worth the attention of all serious workers in neurology.

HANDBOOK OF ANÆSTHETICS. By J. Stuart Ross, M.B., B.Ch., F.R.C.S.E., and H. P. Fairlie, M.D. Edinburgh: E. & S. Livingstone. pp. 299. Fig. 66. Price 10s. 6d. net

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