In the series under review there are fifty-five separate indications for the performance of the operation, including such diverse states as failure to progress (twelve cases), advanced age of mother (twenty cases—average age 39), breech presentation (thirty-eight cases), previous repair of perineal tears, and unwillingness to undergo the pains of labour. In no fewer than 2,212 cases the indication given is contracted pelvis, surely an unwarranted slur upon modern feminine physique.

And now as to the risks of the operation. Can it be defended upon the grounds of safety? In these 3,486 cases there were 231 maternal deaths, giving a maternal mortality of 6.6 per cent. This mortality must be compared with the gross maternal mortality following childbirth at present occurring in England and Wales, which may be taken at somewhat about 0.45 per cent. It follows that Caesarean section has a mortality sixteen times as great as the mortality attending all obstetric cases. When, moreover, we remember that the Registrar-General's figures include some 170 deaths following Caesarean section (1932), the increased danger of the operation is abundantly obvious.

It will no doubt be argued that it is not fair to consider this mortality *en masse* of the operation as an argument against its so frequent employment, and that it is unfair to results which may be expected in the hands of competent operators. It may be said that these results include cases in which the Caesarean section is done as a last resource—in infected cases or in grave maternal states. All this is true, but may I point out that the mortality rate in 1,763 operations performed in famous maternity hospitals by experienced and distinguished operators amounts to 5.8 per cent. The figures are published and open to all to read, and are probably much better than those which obtain over the length and breadth of the land.

Factors Responsible for Increase

It is not within the scope of this paper to adduce reasons or excuses for the high mortality attending the operation, but it is perhaps germane to to-day's discussion to point out any factors which appear conducive to the enormous widening of the indications for its performance, which widening in its turn is the cause of the amazing frequency of the operation.

First and foremost may I express my profound conviction that the purely surgical outlook upon obstetric problems lies at the root of this upas tree at present flourishing in the fair garden of obstetrics. The dictum of Hilton in the management of pent-up pus is being adopted as the rule for the release of the often only apparently pent-up baby. "Let it out," say the surgically wise but obstetrically foolish, and so it is done. With the knowledge that a uterus can be so easily emptied by a Caesarean section comes a contempt for nature, with her more deliberate, painful, but infinitely safer technique. This is especially noticeable in the modern treatment of cases of disproportion, where Caesarean section is employed either without giving nature any chance at all or after a travesty of the trial labour. It is the experience of all of us that nature's power of overcoming moderate degrees of disproportion is infinitely greater than we imagine to be the case; while to believe that a trial labour can be truly so called until true second stage pains have been present for some hours, is to be ignorant of the fundamental facts of the mechanism of labour.

A second factor which has produced this orgy of operations is one almost wholly educational. It is the failure to appraise by full and complete examination the exact conditions obtaining in a given case. The indication "failure to progress" is a good example of what I mean, for the use of such an expression is tantamount

to an admission that the operator is ignorant of the local obstetrical condition present.

Such an appreciation of a difficult case is only made possible by a prolonged practical training in obstetrics and in the conservative practice thereof, and the responsibility for improved conditions in this respect lies upon other shoulders than those of the teachers of obstetrics who have laboured for years to effect improvement. It is essential that the practice of obstetrics be in the hands of obstetricians and not in the hands of surgeons who do obstetrics.

A further factor which is responsible in part for the present condition of things is the increasing value given to the life of the baby in the marshalling of the facts which are to decide the treatment. This is inevitable in view of a falling birth rate and deliberate limitation of families, but I am confident that too much stress is being laid upon the infant's life, to the sacrifice in many cases of the mother.

Lastly, in this connexion it is, I think, a fact that we do not sufficiently realize that when we subject a woman to a Caesarean section we shoulder the risk of an abdominal operation the mortality of which, if we put it at 1 per cent., is still five times greater than that 0.2 per cent. which most of us regard as an almost minimal mortality in childbirth. We also add "previous Caesarean section" to the difficulties of those who may have to order the management of a future labour.

It is my firm conviction that, as at present practised, the state of Caesarean section is a prostitution of what, under proper conditions, is a beneficent operation to a desire for speedy delivery in cases where the only real requirement is skilled obstetrics.

TREATMENT OF CHRONIC NON-SPECIFIC ARTHRITIS WITH INTRAMUSCULAR INJECTIONS OF SULPHUR

BY

DAVID KRESTIN, M.D., M.R.C.P.

PHYSICIAN, WITH CHARGE OF OUT-PATIENTS, AT THE DREADNOTCH
HOSPITAL; ASSISTANT PHYSICIAN TO THE LONDON JEWISH
HOSPITAL

Substances producing febrile reactions have a recognized place in the treatment of chronic arthritis. While personal experience with intramuscular injections of sterile milk, casein, and similar preparations has been disappointing, improvement has occasionally followed the intravenous injection of T.A.B. vaccine. The constitutional reactions with this substance were so variable, however, and in some instances so severe, that it was seldom practicable to give more than two or three injections, thus restricting improvement.

In 1921 Meyer-Bisch¹ claimed good results from the intramuscular administration of suspensions of sulphur in oil. In this paper the results obtained in fifty cases of chronic non-specific polyarthritis similarly treated are given. A 1 per cent. suspension of sulphur in oil was used, as introduced by Schroeder² in 1927 under the name of "sulfosin" for the treatment of neurosyphilis. Intramuscular injection of this preparation is followed in from ten to twenty-four hours by a febrile reaction, of such degree that it can readily be controlled and varied to suit individual patients.

General Therapeutic Considerations

It is extremely difficult to assess the value of any treatment in chronic arthritis, for, excluding such specific conditions as gout and gonococcal infection, striking im-

provement is occasionally seen to occur spontaneously or after the most divergent therapeutic measures. For this reason only those patients were chosen who had already received, without success, prolonged and thorough courses of established forms of treatment, such as the removal of septic foci, vaccines, physiotherapy, various drugs, and in some cases sojourns at spas. Reference to the table (p. 1146) shows that many of the cases were of months' and some of years' duration. Whatever the previous record, every patient, on coming to the out-patient department, received a further period of treatment by one or more of these methods, lasting generally not less than three months.

The routine included the radiological examination of teeth, sinuses, and two or more affected joints; any obvious source of infection was treated. It was seldom necessary to remove more than one or two teeth, though many of our patients were edentulous on arrival. A rather high proportion—about one in twelve—were found to have pus in the maxillary sinuses; these were referred to the throat department, and where practicable an autogenous vaccine was given. Nearly all received some form of treatment in the physiotherapeutic department and various drugs by mouth and injection. Metabolic and endocrine factors were considered, and treated where they appeared to be important. By such measures a gratifying number of patients improved to a satisfactory extent, and in some early cases appeared to recover completely.

The best results seemed to follow the use of iodine by mouth (the liquor iodi simplex, *B.P.*) and intramuscular injections of "gorun" (quinoline-carboxylic acid + hexamethylenetetramine). Colloidal sulphur and such sulphur-containing substances as contramine and iodolysin did not appear to help, and so were given up early. Gold was not used in this series, as it is at present the subject of a separate investigation. The number of patients who failed to derive any benefit whatever from such out-patient measures was relatively small, and to these only was further treatment by intramuscular sulphur offered. No selection was made so far as site, type, and chronicity were concerned, but since all except three were admitted to hospital, where accommodation for such cases is necessarily limited, the younger and more robust were generally chosen, although older patients were not excluded.

Details of Treatment

The drug is supplied in ampoules, which are warmed and thoroughly shaken to produce a partial solution and partial suspension of the sulphur in the oil; a glass bead in the ampoule facilitates this. The injection is made deep into the buttock or outer aspect of the thigh, using a medium-bored intramuscular needle; if too fine the lumen may become blocked with particles of sulphur. The sensitivity of the patient is first tested with a preliminary dose of 0.5 c.cm., after which further injections are given every five or six days in steadily increasing amounts, depending upon the severity and duration of the reactions.

There is some local pain and occasionally swelling and induration at the site of the injection shortly after it has been given, but this can be reduced or even completely prevented by infiltrating the area about ten minutes earlier with "A.B.A." or a similar anaesthetic. A hot, moist application also relieves pain, and aids resolution. Local suppuration or sloughing did not occur. In ten to twenty-four hours a general reaction follows, which varies according to the sensitivity of the individual and the size of the dose. A rise in temperature is the most notable feature. In young and robust patients a maximum rise to 103° F. is aimed at, but in elderly or feeble subjects it is usually sufficient to attain 100° F.

At the same time, and generally varying with the degree of pyrexia, constitutional symptoms are complained of, such as malaise, headache, aching pains in the muscles and limbs, and, rarely, nausea. Vomiting only follows large doses, and should be prevented. The skin becomes hot and flushed, and perspires freely.

In patients who subsequently made good progress a constant feature was an increase of pain, stiffness, and swelling of the affected joints; the absence of this usually indicated slow or poor recovery. Rigors were absent. These symptoms generally subsided in about twenty-four hours, but in very susceptible subjects, or with very large doses, they sometimes lasted for thirty-six or even forty-eight hours. During this period comfort was obtained with the usual analgesics and sedatives. Between the reactions the patients felt well, and were able to get about if the joints permitted. During the pyrexia a leucocytosis appeared, which usually averaged about 20,000 per c.cm., but was occasionally much greater, and in one instance reached 51,000; the increase in white cells was due almost entirely to polymorphonuclear leucocytes. After four or five days the blood count returned to normal.

By varying the dose and frequency of the injections according to the age, general health, and more particularly the individual sensitivity of each patient, the reaction could always be kept within the limit of tolerance. The highest dose used was 10 c.cm., but in many instances it was unnecessary to employ doses larger than 4 c.cm. or 5 c.cm. In "successful" cases diminution of pain and swelling, with increased mobility of the affected joints, was observed after the third or fourth dose. The number of injections required, however, varied greatly with the severity and chronicity of the disease. In this series it ranged from four to twenty, and the period occupied by active treatment from six weeks to eight months. After the third dose massage, passive movement, and some form of heat therapy were found useful between injections. Complications or unpleasant effects have so far not been observed, and anaemia, albuminuria, or loss of weight was not noted even after prolonged therapy. No patient became worse during treatment.

Results

The results of treatment are summarized in the table. To assess these the nature and extent of the joint lesions must be taken into account. The classification of the arthritides is beyond the scope of this paper, and terms with an aetiological or pathological implication, such as "infective," "atrophic," and "hypertrophic," are avoided, as these are still controversial. For our purpose the cases are classified according to the main anatomical changes determined by clinical and radiological examination, showing the extent of synovial, peri- and par-articular tissue, and cartilaginous and bony involvement. The term "osteo-arthritis" is employed to describe those cases in which the pathological changes are almost entirely limited to the bone and cartilage. Since the results of treatment appear to depend very considerably on the extent to which bone and cartilage are affected, the cases are divided into four groups:

- A. The bone involvement is slight or absent.
- B. The bone changes are moderate and such as can be detected only in x-ray films.
- C. Bone changes are advanced and can be detected without radiological examination; in many of these partial dislocation of the joint and deformity are present.
- D. Osteo-arthritis; frequently affecting the larger joints and spine of elderly individuals and in which the soft tissues show little or no involvement.

This paper is based upon the first fifty cases in which treatment was commenced. Five patients refused to continue treatment after the first or second injection.

The results are arranged in four columns:

1. *Good*.—The symptoms disappeared completely; swelling disappeared altogether or nearly so, and the range of movements returned to normal.

2. *Considerable Recovery*.—Pain ceased completely; and swelling largely disappeared; the range of movements improved to little short of the normal.

3. *Partial Improvement*.—Though definitely better, the joints did not regain useful function.

4. *No Improvement*.—The condition of the joints remained unchanged.

Since these were tabulated further cases have been treated with fairly similar results.

obvious swelling and full range of movement in both knee-joints.

(2) A single woman, aged 22, in the same group, had noticed progressive pain, with swelling and limitation of movement, in the right wrist for six months. There were similar but less advanced changes in the left wrist, and the proximal interphalangeal joints of the first and second fingers of both hands. The left maxillary antrum contained pus, and this received treatment until it was clear. No other source of infection was found. The chest was clear and there was no cough; no radiographical examination was made. Since all medical and physical therapy had been ineffectual, she was admitted to hospital and given a course of seven injections of sulphur. Very slight improvement followed. She was discharged on October 30th, 1931, as an "unsuccessful" case.

Results of Treatment (Fifty Cases)

	No.	F.	M.	Average Age	Average Duration of Symptoms	Minimum Duration of Symptoms	Maximum Duration of Symptoms	Results			
								1 Good	2* Considerable Recovery	3 Partial Recovery	4 Not Improved
A. Bony changes slight or absent	24	16	8	37 years	12.4 months	2 months	48 months	15	2	4	3
B. Bony changes moderate ...	7	5	2	52 "	10 years	2 years	15 years	3	3	1	—
C. Bony changes advanced ...	9	7	2	43 "	14.5 "	1 "	27 "	—	4	3	2
D. Osteo-arthritis ...	5	2	3	64 "	18 "	3 "	23 "	—	2	1	2
Refused to continue treatment	5	—	—	—	—	—	—	—	—	—	—

Reference to the table shows that although no group is debarred from the prospects of some degree of recovery, the best results are to be expected in younger patients with relatively shorter histories and the absence of advanced bony or cartilaginous damage. Improvement may be anticipated only in the soft tissues about the joints. When there is much wasting and contracture of the muscles the improvement will be less, and when deformity due to such changes combined with partial dislocation is present the chances of recovery become still less, though pain and stiffness may be relieved. Thus in estimating the chances and degree of recovery the extent of bony and cartilaginous damage must be determined. This necessitates the help of radiographs, since the earliest manifestations of such damage cannot otherwise be recognized. Crepitus, due to relatively advanced bony involvement, may be masked by thickened and oedematous synovial and periarticular tissues, or by effusion.

These results may be illustrated by the essential features of the following representative cases.

Group A.—(1) A married woman aged 36 had had pain and swelling of the right knee for four years. During the last nine months it had become much worse, and other medium-sized joints were affected to a less extent. For four months she had been unable to stand on her right leg.

Various forms of out-patient treatment had been given at different institutions for about four years without effect. One tooth with an apical abscess was removed, and autogenous vaccine from this source was administered. The tonsils and sinuses were considered healthy. A cervical erosion was treated. Since the arthritis was becoming worse the patient was admitted on August 24th, 1930. The general condition was good and the temperature normal. The right knee was greatly swollen; the periarticular tissues were thickened and a moderate effusion was present. Movement was restricted to about 5 to 10 degrees. Similar but less marked changes were present in the left knee, and pain and stiffness without swelling in other joints. Four weekly injections of sulphur were given, the highest dose being 4 c.cm. Improvement was rapid after the first injection, and was well maintained, with diminution of the swelling. Gentle massage with passive and active movements was then used. The patient was discharged after eight weeks with absence of

Since then the patient had received many varieties of treatment at various hospitals and special rheumatism clinics without success. In June, 1934, fresh joints became involved, and those originally affected were very much worse. On December 22nd, 1934, the patient returned with clinical manifestations of an acute and progressive pulmonary tuberculosis. This was confirmed by radiological and bacteriological examinations. The chest symptoms were of three weeks' duration. The possibility that a latent tuberculous infection of the lungs was present from the beginning, and accounted for the intractable nature of the arthritis, cannot be dismissed.* There is no evidence that the joint condition is tuberculous.

Group B.—A nurse aged 30 had had progressive pain and swelling in the wrists and fingers of both hands and in other middle-sized joints for seven years. For the last six months before examination movement at the wrists had been absent and it was limited at the finger-joints. The hands were held in a position of flexion, with slight ulnar deviation of the fingers at the metacarpo-phalangeal joints and hyperextension of the terminal phalanges. The swelling in these joints was mainly periarticular, and was emphasized by wasting of the muscles. Attempts at movement were extremely painful, and were accompanied by bony crepitus. Radiographs of the joints showed rarefaction of the ends of the bones, separation, and irregularity of the articular surfaces. Similar but less advanced changes were present in the elbows, knees, and ankles. Various therapeutic measures had been tried without success, and for the past six months she had been unable to work. When examined the teeth and tonsils had been removed.

After a preliminary course of physiotherapy and iodine by mouth, without effect, she was admitted on August 24th, 1931. Six weekly injections of sulphur were given, each producing a good reaction. Massage and passive movements were commenced after the third injection. Improvement was early, obvious, and rapid. On discharge from hospital on October 15th, 1931, the general health was good and there was practically full range of voluntary movements in all joints. Movements still elicited crepitus, but were painless. There was a little periarticular swelling of the wrist and some fusiform thickening of the proximal finger-joints. The

* Since this paper was written two patients with a chronic quiescent pulmonary infection have been encountered, in both of whom a relatively early chronic arthritis has proved extremely resistant to all forms of treatment, including intramuscular sulphur and gold.

patient was able to resume full-time work, and has continued at work in comfort up to the present time. She has been periodically examined, and her condition has remained stationary since her discharge from hospital.

Group C.—A domestic servant, aged 26, exemplified a progressive case of "subacute infective polyarthritis" with advanced bony changes. For more than twelve months she suffered from pain, limitation of movement, and swelling, beginning in the right wrist and progressively affecting most of the other joints, including those of the jaw and cervical spine. She had been unable to walk for six months, and during the last two had been completely bed-ridden. Since the onset many forms of "in-patient" and "out-patient" treatment had been tried at several hospitals and her teeth and tonsils removed without avail.

When admitted on June 21st, 1930, the patient was an ill-looking girl with rapid pulse, moist perspiring skin, and an irregular pyrexia up to 100° F. Considerable swelling and immobility of most of the medium-sized and smaller joints were present. Each elbow was flexed to about a right-angle, and the fingers were flexed and deviated to the ulnar side; the knees and hips were bent up and could not be straightened. The swelling was greatest in the elbows, wrists, and knee-joints, and was due in great measure to the periarticular tissues, but to a less extent to effusion into the joints, which could hardly be moved; attempts to do so produced great pain and elicited coarse bony crepitus. She was unable to feed or to help herself. The mouth could be only partly opened, and movements of the neck were accompanied by pain. Radiographs showed advanced changes of the articular surfaces of the bones.

After three weeks on a liberal diet, sedatives, iodine, and vapour baths, the general condition improved and the temperature settled; the condition of the joints, however, remained unchanged. Injections of sulphur were now started, and two separate courses, each consisting of ten weekly injections, were given, with an interval of eight weeks between them. The highest dose in each course was 8 c.cm. After the first three or four doses slow but steady improvement commenced. Gentle massage and passive movements were started after the fifth dose, and later some active movements became possible. During the last four weeks in hospital she walked about the ward with a stick for support. She was discharged on April 28th, 1931, and by that time had gained 2 st. in weight. All the joints were greatly improved and the swelling had much diminished, though considerable periarticular thickening around the knees, wrists, and fingers was still present. The extent of the movement possible varied in different joints; in both wrists and knees passive movement was possible to within 30 degrees of normal, and active movement to a less extent. Coarse bony crepitus was still obtained when most of the joints were moved.

Since this patient lived a long way from London, re-examination was possible only once, twelve months later. Her condition then was much the same as at her discharge; she was able to do light work in the kitchen, and get about easily with the help of a stick. Pain was slight, and absent in wet weather.

Group D.—A woman aged 62 may be cited as a case of osteo-arthritis. She had progressive pain, stiffness, and limitation of movement in the spine, shoulders, hips, and other joints for over ten years. During the last six months before admission she was unable to walk, and divided her time between the bed and a bath-chair. Various forms of treatment had been tried since the onset of the trouble, but without arresting the progress of the disease. On admission to hospital on January 6th, 1931, she was bed-ridden. The larger joints, such as the hips, shoulders, knees, and spine, showed considerable limitation of movement, but no swelling; radiographs demonstrated characteristic osteo-arthritic changes.

Six injections of sulphur were given, the largest dose being 5 c.cm. Improvement commenced after the second injection, and the patient was able to walk freely and without pain, with the help of a stick, by the date of discharge, March 2nd, 1931. This patient has been regularly followed up. The improvement has been maintained, and further treatment has been unnecessary. When last seen in September, 1933, she was managing a small cottage, cooking for three people, and was able to walk about a mile with the aid of a stick.

Relapses

Of the cases which definitely improved after treatment about one-fourth subsequently had a return of symptoms. In these the relapsed condition was always less severe than that preceding treatment, and in some it was quite mild. Simple therapeutic measures were generally sufficient to effect improvement. The shortest period in which a relapse occurred was four months, and the longest period so far was two years. It is noteworthy that recrudescence of symptoms occurred most often in Groups A and B, in which the patients were often younger and the disease had frequently been active and comparatively rapid in progress. Many of these would undoubtedly be considered as "infective." Since there is no reason to believe that intramuscular sulphur affects the cause, recurrence is not surprising, and stresses the need for careful inquiry into causative factors.

Contraindications

In no instance was the disease made manifestly worse, nor has any harmful effect been observed provided that a non-acute quiescent phase is chosen. Though induration and pain at the site of the injection sometimes occur, abscess formation has not been encountered.

Treatment was not given:

1. During the acute phase of arthritis, which was first allowed to subside. This requires special emphasis, since an exacerbation may result if the acute phase is chosen. Complete rest and relief of pain are then essential.
2. To elderly feeble or emaciated individuals.
3. To nervous patients, or to those having hysterical or psychopathic tendencies.
4. To patients with active organic disease other than arthritis—for example, pulmonary tuberculosis.
5. To very obese patients; these do not stand this form of therapy well.

Mode of Action

Sulphur taken by the mouth or in the form of baths has enjoyed a reputation in the treatment of "rheumatic" disorders since the days of Pliny. Apart from its aperient action and the effect on the bacterial flora of the bowel, the influence on arthritis of sulphur taken orally is doubtful. Investigations of sulphur metabolism are beset with so many difficulties that one hesitates to draw conclusions from them. Nevertheless Cawadias³, on the basis of a relative increase of the total sulphur excretion in the urine of the patients suffering from chronic rheumatoid arthritis, considered that there was an increased katabolism of sulphur-containing protein in this condition.

Has sulphur any specific influence when administered intramuscularly? It is tempting to attribute the results obtained in the previous series of cases, in part at least, to such action. It must, however, be admitted that there is no direct supporting evidence. Experiments on rabbits have shown that the drug disappears from the tissues in the course of a few weeks after it has been injected. The manner in which this is accomplished is at present uncertain. The first attempt to use the drug in this way for the treatment of arthritis was made by Meyer-Bisch and Basch¹ in 1921. They found that the sulphur and nitrogen output in the urine following the injection was diminished, and concluded from this that an abnormal sulphur metabolism was beneficially influenced.

Whatever specific effect may be claimed for sulphur there can be little doubt as to the importance of the 'non-specific reactions, since improvement in the patients appeared to depend upon the consistent occurrence of pyrexia and leucocytosis. The nature of such reactions is but little understood, but they seem to be associated

with a general stimulation of metabolic processes and defence mechanisms.

Holböll and Herborg⁴ showed that intramuscular injections of sulphur constantly produced a leucocytosis from 20,000 to 30,000 per c.mm., the increase being due almost entirely to polymorphonuclear cells, and Power⁵ demonstrated that in rabbits this was accompanied by a definite leucoblastic hyperplasia of the bone marrow. Such a polymorphonuclear leucocytosis was a constant feature in our patients. If such leucoblastic reaction is accompanied by an increased mobilization of bactericidal or other antibodies as Gay and Claypole⁶ believe, we may have a partial explanation of the beneficial effect of treatment. More obvious, however, are certain vascular changes which may be observed in the affected joints following the injections, for pain, tenderness, stiffness, and swelling are all temporarily increased, and the skin becomes hot, red, and moist with perspiration. These cutaneous changes are also noticed to a less extent over the rest of the body, and it is possible that improvement in the joints may be the result of greater vascularity, accompanied by a corresponding increase in the capillary permeability and the lymph flow from the area. Such changes may be explained partly by the pyrexia (Davis and Petersen⁷).

Investigations by Mackay⁸ offer a reasonable explanation of the pyrexial reaction. He found that after intramuscular injections of sulphur into rabbits there follows in from twenty-four to forty-eight hours an acute tissue necrosis with debris formation, accompanied by a polymorphonuclear leucocytic infiltration, which subsides with regeneration and clearance of the debris in about thirteen days. He suggests that the fever is due to absorption of protein liberated by the necrosis at the site of the injection. It should be noted, however, that with the doses used in the treatment of chronic arthritis no residual disability in the injected muscles follows, and that pain and infiltration, should they occur, are always temporary, seldom lasting longer than twenty-four or thirty-six hours.

Summary and Conclusions

1. The treatment of chronic non-specific arthritis by intramuscular injections of sulphur is described, and its advantages over other pyrexial forms of therapy is discussed.
2. The cases considered form a group of fifty patients, in whom other recognized forms of treatment (not including chrysotherapy) failed to give benefit.
3. The analysed results show that considerable improvement may be expected in a proportion of patients in whom the changes are limited to the soft structures about the joint, and are not permanent in nature. Less improvement is to be anticipated when damage of a permanent kind is present, such as involvement of bone and cartilage or partial dislocation and deformity.
4. A tendency to relapse when aetiological factors are still active is noted.
5. Certain contraindications to sulphur treatment are mentioned, particularly the acute phase of the disease.
6. The mode of action is briefly discussed.

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ACUTE BENIGN LYMPHOCYTIC MENINGITIS

(ACUTE ASEPTIC MENINGITIS)

BY

W. R. F. COLLIS, M.D., F.R.C.P.

M.R.C.P.I., D.P.H.

PHYSICIAN TO NATIONAL CHILDREN'S HOSPITAL AND PAEDIATRICIAN
TO ROTUNDA HOSPITAL, DUBLIN

A type of acute benign meningitis—as distinct from serous meningitis—has been recognized for some years on the Continent and in America. Little mention of the condition is to be found in the medical literature of Great Britain and Ireland, however, and no place has as yet been given it in English textbooks. Hence the cases given below and the following discussion should be of some general interest, as it appears that cases of recovery from a form of meningitis resembling tuberculous meningitis are not too uncommon here.

Case Record

A girl, aged 5½ years, was admitted to the National Children's Hospital on November 10th, 1934, complaining of severe headache and vomiting.

History.—The child had been quite well up to five days previously, when she had complained of headache, which became more severe at times; this was soon accompanied by vomiting, which had become very bad the night before admission, when the patient became delirious. The previous history showed that she had had pneumonia in infancy and whooping-cough two weeks prior to the present trouble. The father, mother, and other children were quite well. The mother stated that one of their children had died three years previously with somewhat similar symptoms, and that the doctor "had called it tetany."

Examination.—On admission the child appeared very ill and lay listless in bed. The temperature was 99.4° F., the pulse 134, and the respirations 30. Circulatory and respiratory systems showed nothing abnormal. There was some rigidity of the back and neck. The knee-jerks were present, but the left one was reduced. The right plantar reflex gave a flexor response, the left an extensor. No ankle-clonus was elicited. The ankle-jerks were present. Kernig's sign was positive on the right and negative on the left. The arm reflexes were not elicited. There was some loss of muscle tone on the left side. The eye movements were normal, the disks were not blurred, and the eye grounds were normal. Special examination of the ears by Mr. Wilson showed them to be perfectly healthy. The Mantoux tuberculin test was negative in a dilution of 1 in 100 old tuberculin. The white blood cell count showed 11,200 total leucocytes, the differential count being as follows: polymorphs 58 per cent., lymphocytes 39 per cent., monocytes 2 per cent., and eosinophils 1 per cent. A table showing the result of the cerebro-spinal fluid examinations is given below.

Date...	10/11/34	14/11/34	28/11/34	11/12/34
Protein ...	0.03 gram %	0.09 gram %	0.015 gram %	0.015 gram %
Globulin increase	—	Slight	—	—
Chlorides ...	0.66 gram %	0.71 gram %	0.72 gram %	0.71 gram %
Sugar ...	—	Diminished	Good reduction Fehling's	Poor reduction Fehling's
Cytology ...	* 2,155 cells per c.mm.	121 cells per c.mm.	9 cells per c.mm.	5 cells per c.mm.
Monocytes	98 %	98 %	—	—
Polymorphs	2 %	2 %	—	—
Z. N. Film Culture	No T.B. seen Negative	No T.B. seen Negative	—	—
Method of Collection	Lumbar Puncture	Cistern Puncture	Lumbar Puncture	Lumbar Puncture

* The laboratory reports that there is reason to believe that this cell count is slightly too high, due to counting error.