ANNALS OF THE RHEUMATIC DISEASES

THE TREATMENT OF THE RHEUMATIC DISEASES IN THE UNITED STATES AND THE CONTINENT OF EUROPE

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PREFACE

THE Empire Rheumatism Council in March, 1938, selected me for the Sir Alexander Walker Travelling Scholarship to study the measures taken for the treatment of the rheumatic diseases in the principal foreign centres. Sir Alexander Walker, whose generous gift provided the means for this tour of investigation, had expressed as his intention a desire to provide for workers in British rheumatism clinics, existing and about to be established, information gathered by direct observation as to the methods employed in Europe and America in the war on rheumatism. He believed that this would give some useful guidance in planning for Great Britain a national scheme of treatment. This, having had the cordial approval of the Scientific Advisory Committee and the Research Advisory Committee of the Empire Rheumatism Council, I took as my "general instruction"; and, sensible of the honour of being chosen for so important a task, have sought to give effect to it to the best of my ability.

Leaving London in May, I travelled to Holland, Denmark, Sweden, Germany, France, Italy, Roumania, Czecho-Slovakia, Canada, the United States in that order (Appendix I. gives a detailed itinerary), and returned to England in March, 1939. The report of my observations is now presented.

The idea that it would be useful to begin with a survey of methods of treatment at present in general use in Great Britain, after careful consideration, was rejected. Such a survey, to be comprehensive, would have had to be very lengthy, and it would have covered mostly familiar ground. But, where necessary, in reporting on foreign systems, I have referred to British

ideas and practice on the particular matters dealt with. This seemed the best course to follow for the convenience of practitioners (and of members of the lay public interested in the problems of rheumatic disease); in a busy world it is desirable to come as promptly as possible to the marrow of the matter.

To report on methods of treatment I recognised as the task. I found, however, that it was essential, because of the quite indivisible association between systems of treatment and the ætiological facts, or surmises, on which they are founded, to give some attention to that side of the matter. There has not been attempted—could not, within the limits of this report, have been attempted—a complete conspectus of European and American opinion on the problems of ætiology. But to record the ætiological views held by different eminent workers in the field of rheumatic disease whom I had the advantage of meeting—views on which they largely base their systems of treatment—will be, I am confident, useful. The fact that these vary, sometimes to an extreme degree, illustrates the complexity of the task which medical science faces in bringing under control the rheumatic diseases. That wide variance of views is not a prompting for discouragement. In time, ætiological uncertainties should be solved by perseverance in research; and, meanwhile, treatments having their origin in theories which are as yet not proven may be wisely given clinical trials. From such trials, if carefully controlled and recorded, there may come approaches to proof.

To some extent international disturbances hampered the work of investigation in Europe; indeed, at one stage circumstances threatened to become perilous. Only a small part of the planned tour, however, had to be abandoned. I was greatly aided by many letters of introduction kindly given to me. The Foreign Office, at the instance of Lord Horder, secured the assistance of His Majesty's representatives in the countries visited, assistance which was of inestimable value in places overcast by war clouds. Dr. W. S. C. Copeman, the Hon. Medical Secretary of the Council, was able to put me in close personal touch with his friends in several centres. Dr. Van Breemen, Secretary of the International League against Rheumatism, was most kindly helpful in Europe, and Dr. Philip Hench of the Mayo Clinic in the United States. To these, and to many others, I express my sincere thanks.

To the Empire Rheumatism Council I leave the duty of expressing gratitude to Sir Alexander Walker for conceiving the idea of, and granting the means to put into effect, this voyage of exploration. Apart from what value its "log" may prove to have (on which it is not for me to express an opinion), I learned from many quarters that our scientific colleagues abroad were impressed by the evidence that Great Britain was now embarking upon a strenuous effort to take a full part in the world war on rheumatism, and that in doing this recognised the great value of keeping in close touch with foreign work on the subject.

I.—OBSERVATIONS ON ÆTIOLOGY

In Europe and America, as in Great Britain, there may be noted a strongly increasing interest in the ætiological factors of rheumatic disease. Research workers are growing in numbers and intensity of application to particular problems. If I may venture a generalisation which is perhaps, with many exceptions, correct, European workers are toiling through the maze with somewhat more positive confidence that they have the right key than their colleagues in Great Britain. One hears more often the phrase "I am sure" than "I think."

To record in the first place observations regarding that most vexatious of this group of diseases—rheumatoid arthritis.* Until recently ætiological research has generally sought to incriminate the streptococcus as its cause. Because of the prevalence of streptococci in the upper respiratory tract, in the bowel, and in other foci of infection among patients suffering from rheumatoid arthritis, most bacteriological work has been directed towards this group of organisms, though lately in several quarters there has been (as the result of many disappointments in obtaining a definite verdict against this accused) a tendency to search for a virus source of infection.

In America, Cecil, Stainsby and Nicholls, working at the New York Hospital with a very elaborate technique, have been able to grow the hæmolytic streptococcus from the blood of patients suffering from rheumatoid arthritis, and have decided that this organism is the causative factor. But this verdict has not been generally accepted. Dawson and his group, working

* Throughout I follow the nomenclature agreed by the R.C.P. Committee on Rheumatism.

at the Presbyterian Hospital (New York), were unable to confirm the findings. They observed that the blood serum of about 70 per cent. of their rheumatoid patients agglutinated the hæmolytic streptococcus. Yet in 30 per cent. of cases of unquestionable rheumatoid arthritis the blood serum did not agglutinate this streptococcus. They concluded, therefore, that it is not a specific reaction in this disease. They consider, however, that it is of some diagnostic value, and use it as such.

Rosenow, at the Mayo Clinic, is able to grow an "arthrotropic" strain of non-hæmolytic streptococci from the upper respiratory tract of his arthritic patients, and he considers this the causative organism. Burbank (New York) has observed mutation of organisms causative of rheumatic conditions, and therefore is able to correlate the work of those who indict hæmolytic or non-hæmolytic streptococci or staphylococci. His observations are not generally accepted.

Other workers, such as Jarlov (Copenhagen), find that they can produce arthritis in experimental animals by injections of streptococci. But many do not agree that this arthritis is the same disease as human rheumatoid arthritis.

Lowenstein is able to isolate an attenuated form of the *Bacillus tuberculosis* from almost all cases of rheumatoid arthritis, and such observers as Secher (Copenhagen) and Francis Hall (Boston) find these experiments difficult to contradict. There are others who hold that tuberculosis plays some part in the production of rheumatoid arthritis, but these are in the minority. From European centres I gathered no observations of special interest on the points referred to above—viz., as regards the possible relation of streptococci, hæmolytic or non-hæmolytic or other organisms to rheumatoid arthritis.

In the matter of the importance of septic foci as agencies in causing rheumatoid arthritis I chronicle a very wide divergence of views among American and European authorities. Many research workers in America ascribe a large part in the ætiology of rheumatoid arthritis to the "septic focus." But I noted that Cecil (New York Hospital), once a firm believer in this theory, has recently modified his views. Graham (Toronto) reports that an investigation which had been made in that city into dental infection occurring in diabetes mellitus, gastro-intestinal disease and rheumatoid arthritis showed an equal incidence in all three

diseases. Other workers observe that a "suitable soil" is necessary for infection to lead to the development of the disease, and that this accounts for the fact that only a very small minority of patients with infected teeth or tonsils develop rheumatoid arthritis. Fletcher (Toronto) suggests that patients do not become suitable soil for the development of rheumatoid arthritis until one or two generations of their ancestors have been chronically under-nourished and thus have "prepared the soil."

On the other hand, in Germany a very high degree of importance is attached to the septic foci as the causative factors; sometimes to the exclusion of all other factors. It was very interesting to note the development of this theory—and the consequent system of treatment—at Aachen. There, Slauck, Gehlen and their entire group agree that all chronic rheumatic diseases can be associated with the presence of such septic foci. They hold that toxins from the focus, whether it be in the teeth, tonsils, appendix or genital tract, may attack joints or tissues directly or, in the case of rheumatoid arthritis, through the nervous system. They explain that these toxins attack the autonomic ganglia and the anterior horn cells of the spinal cord, and that thus we get muscular wasting, muscular fibrillation and capillary spasm, the last accounting for the pallor and oedema of the affected joints. Slauck claims to be able to demonstrate muscular fibrillation in the small muscles of the foot in all cases of rheumatoid arthritis, and that it is, in fact, a type of chronic anterior poliomyelitis. They claim at Aachen that treatment depends firstly on the discovery and removal of a septic focus. If the removal of one discovered focus does not cure, there should be search for, and eradication of, further foci which *must* exist if the condition continues to progress. Following the extirpation of all septic foci, repair of the peripheral circulatory defects should be sought by physiotherapy.

Throughout Germany the septic focus and its treatment are prominent in the minds of rheumatism workers, and I noted how often chronic appendicitis was diagnosed as the causative factor.

As to the part that endocrines play in the production of rheumatoid arthritis, American opinion is divided. Whether there is such an entity as "menopausal arthritis" seems, in the opinion of the majority of workers, doubtful. Bauer and his group record that 16 per cent. of the women in their series developed

rheumatoid arthritis within three years before or after the menopause, but they show that this is the percentage of women in the general population within the same age group. They observe, however, that there is a definite increase in the incidence of the disease during the decade following the menopause. Summarising the majority of opinion of American students, it is that there is no proof that endocrines play a primary part in the production of arthritis.

On this point Sundelin (Sweden) observes that there is much secondary glandular dysfunction after rheumatoid arthritis has developed.

Observations made by Hench (Mayo Clinic) are of great interest in the ætiological study of rheumatoid arthritis. He drew attention to the fact that the existence of jaundice may exert in certain cases a beneficial effect on rheumatoid arthritis. He has noticed and reported also the beneficial effect of pregnancy. This observation was also pointed out to me by Touw (Leyden).

Hench has also noted that operation under anæsthesia often brings about an improvement in the general condition of his rheumatic patients (an observation which all cannot confirm). He is seeking some common factor in these three phenomena that may "activate a relief mechanism," and speculates whether the liver cannot be the connecting link between them; that possibly there may be a hyperhepatosis that needs correcting or a hypohepatosis that needs stimulating. In this connection it is interesting to note that Boots (New York) has observed a similarity in the cyanotic palms of patients with rheumatoid arthritis and of patients with cirrhosis of the liver, and he questions whether the liver is not involved in both conditions. Regarding this, one must consider the French concept of "hépatisme" in relation to rheumatic disease.

Observations on psychological factors in the development of rheumatoid arthritis are being carried out extensively in the United States. At the Hospital for Chronic Diseases (New York), research has been undertaken by psychologists into the part played by such factors. They claim that this part is a very large one. These observations, perhaps, may be taken as bringing us back to the consideration of "promotive factors" preparing

the soil for the onset of rheumatic disease, including in such factors worry and other mental strain, as well as faulty physical régime and predisposition arising from hereditary causes.

Such "promotive factors," perhaps, had better be separated from consideration of ætiological factors. Strictly speaking, they are hardly "causes," rather conditions which are favourable for causes to operate. Therefore they would come more appropriately in the province of treatment. Medical practice in dealing with a morbid state in a patient usually has to study not only the attacking infection, if that can be determined, but the general conditions which may be assisting the attack.

To turn now to ætiological factors of rheumatic fever. In this disease, as in rheumatoid arthritis, there is a strong and growing tendency among research workers to regard the case against the streptococcus as non-proven, and to turn their attention to a virus as the possible causative factor.

Danielopolu (Roumania) told me that he regarded rheumatic fever as resulting from an infection with a specific virus. This virus, he holds, may attack by itself or, as commonly happens, have the portals of entry opened and the subject's resistance weakened by a previous streptococcal infection.

In America most observers are now studying the natural history of the disease, and collecting a vast amount of data about its incidence. The work of Duckett Jones (House of the Good Samaritan, Boston) impressed me as important. In this hospital a series of 1,700 cases of rheumatic fever have now been studied. All the work done has not been able definitely to inculcate the streptococcus, and attention has now been directed to a virus. A year ago Duckett Jones and his colleagues isolated a virus from the heart tissue and pericardial fluid of a post-mortem subject who had died with active rheumatic fever. This virus regularly produced in mice an infection with pulmonary and cardiac changes; but this infection they do not yet claim to be the same as human rheumatic fever. Ferrets and swine are susceptible to the virus, but it dies out in passage through ferrets, and can thus be distinguished from the influenza virus, which increases in strength in passage through ferrets. They observe that neutralising antibodies in the serum of rheumatic fever convalescents will protect mice against up to 1,000 lethal doses of the virus. They thus conclude that they have a virus prob-

ably related to rheumatic fever. Duckett Jones does not think that this virus is connected with the elementary bodies found by Schlesinger and Signy.

The relationship between rheumatic fever and rheumatoid arthritis remains a doubtful question. Many English observers regard them as separate entities. But in Germany and in rheumatism centres of Scandinavia they are regarded as having a common ætiology, and the development of rheumatoid arthritis from rheumatic fever is regarded as not unusual. I was told at the *Forschungsinstitut für Rheumabekämpfung* (Berlin): "The textbook manifestations of acute rheumatic fever are now comparatively rarely seen, for the manifestations of arthritic infections are swinging from the acute to the chronic in the course of the evolution of the disease."

Dawson (New York) holds very definitely that there is a connection between the two diseases, and thinks they may be the differing response of individuals to the same ætiological factor. Other workers do not observe this connection, taking the view that whilst one does find an occasional case of rheumatoid arthritis with rheumatic carditis, and also occasionally a case acute enough to be regarded as rheumatic fever, but which develops into rheumatoid arthritis, such cases are not commonly regarded as representing a significant percentage in the total incidence of rheumatic disease.

Curiously, little work on the pathology of rheumatoid arthritis is being done in Europe. In America considerable work has been done, but there I found wide disagreement. Dawson and his group (New York) hold that the nodules of rheumatic fever and rheumatoid arthritis are fundamentally of the same pathological structure. Bauer and Bennett (Boston) find the two types of nodule by no means easy to differentiate histologically, and think that there is nothing specific in the histological structure of joint tissue in rheumatoid arthritis. On the other hand, Hench and Ghormley (Mayo Clinic) observe that the histological structure of the joint tissue in rheumatoid arthritis is quite definitely specific.

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To record now some observations on the rheumatic disease which in our nomenclature is styled fibrositis. In Great Britain

we accept and consider ourselves familiar with the condition which we term fibrositis, and it is generally accepted in Europe. But in America I found among some observers what was to me at first a surprising scepticism as to its existence at all. Dawson states that he has not seen the condition. Bauer acknowledges that there is a syndrome which the English term fibrositis, but observes that there is little evidence that fibrous tissue itself is primarily affected. He suggests that much more investigation is needed on this subject, and that perhaps muscle and muscle proteins which undergo certain chemical change produce this syndrome. Hench and Slocumb (Mayo Clinic) accept the English concept of fibrositis and have done much work on it. They feel strongly, however, that English workers are apt to accept far too complacently Stockman's work without confirmation. Their observation of the condition is at present directed to establishing its pathology by biopsy and autopsy.

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The relation between gout and rheumatism all know to be a matter of some controversy. In Europe I found "gouty arthritis" widely recognised as an entity, and gout considered as one of the factors in the ætiology of chronic polyarthritis. In Berlin "gouty arthritis" was diagnosed with certainty in cases where the blood uric acid was over 4 mgm. per cent. At Aix-les-Bains they are firm believers in arthritis of a mixed type, of infective nature, yet associated with a high blood uric acid and a gouty tendency. In America, however, many workers observe that "they never see gout," and that it is purely a European disease. Yet that gout does extensively exist in America has been amply proved by Hench. His observations on the provocation of attacks of acute gout by surgical operations, and by the administration of certain drugs such as salyrgan, may prove of value in the prevention of such attacks. Galantha's pathological work (Mayo Clinic) on the morbid anatomy of gout and her technique for the staining of uric acid crystals in histological sections has done much to show how urate deposits are laid down in this condition. No American observer that I met is able to accept gout as playing a partly causative rôle in rheumatoid arthritis, nor to agree with the European concept of chronic gouty arthritis independent of attacks of acute true gout.

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Osteo-arthritis is generally regarded in Great Britain as a degenerative change in joints following wear and tear and trauma. Some observers, however, consider it to be a true manifestation of infection. Thus Burbank (New York) and his group not only accept it as such, but claim to be able to reproduce it bacteriologically in laboratory animals. Many observers are not content that our knowledge of the ætiology of osteo-arthritis is sufficient. With Hench I was able to examine a woman of 101 who had spent a life of hard work on farms and whose joints most certainly have been exposed to considerable wear and tear, and she had no vestige of senescent or degenerative arthritis.

Of considerable interest in regard to the actual development of the joint lesions in osteo-arthritis have been Phemister's (Chicago) observations on bone necrosis in caisson disease. This is a very rare manifestation of the disease in which massive necrosis takes place in the spongiosa and ends of the long bones; there follows considerable regeneration from the corticalis and a condition of osteo-arthritis results. These observations have led Phemister to surmise whether this is not due to fat or nitrogen embolism in the internal arterioles of the bone, and whether osteo-arthritis may not develop from such an interruption to the blood supply.

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The connection between psoriasis and rheumatoid arthritis has led to much speculation. Hench believes that there is an entity, "psoriatic arthritis," which can be distinguished from rheumatoid arthritis. He bases his belief on the observations: (a) that where the diseases co-exist, the exacerbations and remissions of joint and skin diseases are associated; (b) that there is a close anatomical relationship between psoriasis of the finger-nails and the arthritis of the terminal interphalangeal joints; and (c) a parallelism in the response to therapy of the two conditions. Neither Dawson nor Bauer (in whose series 2·7 per cent. of patients showed psoriasis as well as arthritis) can accept such a clear-cut line between psoriatic arthritis and rheumatoid arthritis.

Similarly, and basing his conclusions on similar observations, Hench claims that the arthritis sometimes associated with ulcerative colitis can be differentiated from rheumatoid arthritis, and is, in fact, a separate condition. Fletcher (Toronto) finds

that about 50 per cent. of patients suffering from ulcerative colitis have suffered at some time from arthritic manifestations. But again the majority of observers only go so far as to note that in some way patients suffering from ulcerative colitis are more prone to rheumatoid arthritis.

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In view of the present interest taken in a possible virus causing rheumatoid arthritis, Dawson's observations on the arthritis caused by the virus of lymphogranuloma venerea seem particularly significant. He has shown conclusively that among the coloured population of the United States there is a type of arthritis always associated with a lymphogranuloma infection and a positive Frei test. This arthritis is characterised by painful swelling starting in the larger joints and spreading to the smaller. It is indolent and resistant to treatment, but never leads to joint destruction as seen radiologically. It has been confused until recently with gonococcal or with rheumatoid arthritis, but Dawson's work seems definitely to have established its independence. It is only likely to occur as an extreme rarity in Great Britain.

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Of interest, too, in the clarification of the problem of joint diseases is the syndrome being observed at the Mayo Clinic which they term angio-neuro-para-arthritis. This is a condition first described by Solis Cohen (Chicago), and one which Hench and Slocumb regard as a true entity. It may occur in any age or sex, and is characterised by recurrent painful swellings around or near the joints, but with no true endo-arthritis. The attacks of swelling last for two or three days, occurring at intervals of days or of years. Attacks may be associated with fever and elevation of the sedimentation rate, but this is not constant. As the signs may disappear as quickly as they appear, prolonged observation of the patient is necessary to establish the existence of the condition. Hench and Slocumb consider that they have been able to differentiate the condition from gout and rheumatic fever.

These observations on ætiology—whether put forward as conclusions or as theories—coming as they do from workers whose views demand serious consideration, impress the fact of

how much uncertainty has yet to be cleared up on the subject of the causative factors of rheumatic disease. They lead to a sympathetic understanding—though not necessarily acceptance—of de Pap's statement that the main ætiological problem is whether we can ascribe rheumatoid arthritis to any single cause or whether it is the result of many coincident causes; and Pemberton's view that rheumatoid arthritis is not a single disease, but the result of a combination of diseases.

II.—METHODS OF TREATMENT ABROAD (GENERAL RÉGIME; DRUG, ENDOCRINE, VACCINE, PHYSICAL AND OTHER THERAPY)

Medical science knows no barriers of national boundaries, and aspires to make available to all the world whatever any individual may discover of value to relieve human suffering, so there are no closely guarded secrets to be sought out by an explorer. Any who claim to have "secrets" come under suspicion. Nevertheless, exchange of knowledge by correspondence can never reach the ideal of perfection, and it is therefore recognised as a valuable part of professional education to take opportunities to study at first hand theories and practice in foreign centres. Such direct investigation can give information hardly attainable by a study of written records, because in many cases a method can be effectively studied only in the laboratory or the clinical ward of the worker who has evolved it, and who can personally explain the basis on which it is founded, and the exact technique which should be followed in its practice.

From the very valuable opportunity given to me to devote almost a full year to investigate methods of treatment of the rheumatic diseases in Europe and America I certainly gained much knowledge, and I shall endeavour to chronicle it in the most convenient form, first making reports under various headings, and then seeking in a "discussion" to record what seem to me points of special interest for British treatment centres.

It is conventional, when giving an account of systems of medical treatment, to deal first with general measures and then to proceed to the particular. Although, by following that convention in this survey, certain points of major interest may not be brought to the immediate forefront, it will be probably best not to depart from it.

GENERAL TREATMENT.—There is more agreement on the general methods of caring for the rheumatic patient than on the particular, although even regarding the latter there is some divergence of opinion. Still, a large measure of agreement exists; and it suggests that, despite the regrettable deficiency in exact knowledge of the ætiology of the rheumatic diseases, the medical practitioners of different countries have at their disposal means of treatment which can cure a large proportion of cases, and give much alleviation in still larger proportion.

There is almost universal concurrence that the sufferer from rheumatism and the person judged to be predisposed to rheumatism need a special degree of precaution from physical, bacterial, chemical or psychological trauma than the normal individual. This leads, in plans of treatment, to advice in regard to diet, clothing, housing conditions, climate, etc., on which, as before noted, there is a wide measure of agreement, but on some points differences of opinion which will be noted in due course.

In the matter of diet, the result of my investigations in Europe and America led to the general conclusion that less importance was attached to what may be termed "specialised" diets than is the case by some workers in Great Britain. On this point I must note, however, that it was not within the scope of my inquiries to visit any of the numerous special dietary clinics dealing with all classes of ailments, but only treatment centres specially devoted to rheumatic disease. Most of the medical staffs of these are coming to the conclusion that an optimum diet with a full quotient of accessory food factors is necessary for the rheumatic patient. The changing fashions of high or low protein diet, which had had their day, were coming to be considered as fanciful, and the general consensus of opinion was in the direction of seeking the optimum diet for the individual patient, not a system of diet applicable to classes of rheumatic sufferers.

Much work has been done (and continues) on vitamin metabolism in the rheumatic diseases, but the general impression was that the lowering of such vitamin metabolism was secondary to the general condition, and not causative. There is thus agreement that the rheumatic patient needs a generally wholesome mixed diet in accordance with his capacity of assimilation.

The question of climate in its relation to the incidence of rheumatism, if it is studied from the observations of workers in

different countries, remains very open. It is the general impression in Great Britain that cold and damp conditions, clay soils and seaside localities are all potentially unsuitable.

There appears to be as much rheumatism on the granite hills of Sweden as on the flat islands of Denmark and Holland. It is the custom of Scandinavian countries to place their sanatoria for the treatment of rheumatism by the seaside, often on peninsulas reaching out into the Baltic. When I put the question, I was told that in these countries there was no feeling that the seaside was unsuitable for rheumatics and that "anyway our Baltic is more of a lake than a sea"!

Generally, in Europe I found a disposition in countries with a high proportion of coastal area to hold that "sea air" was good for the rheumatic patient; in countries with little coastal area, a disposition to recommend patients to get away from the sea; in countries favoured with extensive highlands, a tendency to attribute a good deal of importance to altitude as a favourable climatic factor. This suggested that a praiseworthy local patriotism had some influence in coming to opinions on this matter.

But on this question of climate there is no doubt that the incidence of rheumatic disease falls off definitely and sharply as one approaches the warmer climates. In Northern European spas one would always note patients exhibiting the stigmata of rheumatoid arthritis in varying degrees, but not nearly to the same extent in Southern Europe. (At Terme di Agnano, near Naples, the only case of rheumatoid arthritis I saw was in a German visitor.)

In the United States a centre for the treatment of rheumatic conditions has been established at Tucson in the desert climate of Arizona, for here indigenous rheumatism, though it occurs, is very rare. The results of sending sufferers from the Northern States to Arizona have not been so successful as had been hoped at first.

Very little positive scientific work on the influence upon rheumatic conditions of damp, of barometric pressure and of the nature of subsoil has been done abroad. Seegal (New York) has carefully recorded his patients' subjective response to changes in barometric pressure, with the result that there was no confirmation of the usual impression that the rheumatic patient can act as his own barometer.

From the evidence I would conclude that in the cool temperate countries—which are undoubtedly the chief areas, though not the only areas, marked by a great incidence of rheumatic disease—there is little definite importance to be attached to local climatic conditions. Certainly individual idiosyncrasies will allow some rheumatic patients to do better inland or in high country, and others by the seaside (the same principle seems to apply to asthma patients).

As to the value of rest in the major rheumatic diseases, I found general agreement as to its necessity, but in cases of ankylosing spondylitis there was a measure of disagreement on this point, which will be noted later. I was, however, impressed by Seegal's statement that merely to prescribe rest was insufficient, and that, if they were checked by careful and exact history-taking, the patients' ideas of the suitable length and nature of rest were often found inadequate. He holds that an exact prescription and description of rest is necessary when this is to be ordered.

DRUG TREATMENTS.—European and American treatment centres agree generally with British opinion that in the present faulty state of knowledge of the ætiological causes of rheumatic disease the use of drugs must be empirical and not specific.

Aspirin, or one other of the salicylate group, is the drug chiefly used in the treatment of rheumatism in all countries. Because of its antipyretic action in rheumatic fever, because of its analgesic property, because of its relative harmlessness and ready accessibility, it has won a place in the armoury of the attack on rheumatism that has scarcely been challenged. Throughout Europe and the United States I found aspirin being prescribed whether by the mouth, as in Great Britain, or mixed with bee venom and injected as "arthrorheumin" in the German clinics. Nowhere did I find any claim that it was curative or anything but analgesic, and in every country visited there was voiced the complaint, especially from those interested in arthritis, that their patients had been treated with salicylates for many months before seeking expert advice, and thus allowed to advance beyond the hope of adequate treatment and doomed to spend the rest of their lives crippled beyond the help of man. The view was expressed that, allowing full value to aspirin when rightly used, its employment to mask symptoms and to postpone adequate treatment until too late was a grave evil, against which

both medical practitioners and the lay public should be warned. Indeed, it was more than once suggested that a necessary task in planning a scheme of rheumatic treatment was to relegate aspirin to its proper place; not to regard it as a cure, but merely as a valuable adjuvant in relieving symptoms.

The use of gold in rheumatoid arthritis occupies a high place in the interest of those investigating drug therapy in rheumatism. Speaking broadly, its use is accepted in Europe, but viewed with scepticism in America. There is, however, a great divergence of views among those who advocate its use in Europe. Forestier in France, the pioneer in this method of treatment, has in his long experience worked out a dosage which is followed by the majority of those who use gold. In Scandinavia, France, and in Central Europe his technique is generally followed, and in Great Britain methods similar to his are usually accepted. Van Breemen and the *Forschungsinstitut für Rheumabekämpfung* (Berlin) give minute doses, not usually exceeding 20 milligrammes, with a total course of only $\frac{1}{2}$ gramme. Van Breemen spoke very strongly on this point, claiming that although gold was a valuable weapon in the treatment of arthritis, its use was being brought into disrepute by the ridiculously high dosage, with its attendant dangers, used by some.

At Professor Secher's clinic in Denmark (where the use of gold in treating tuberculosis was inaugurated, following Mollgaard's experiments) I found that he uses very heavy doses of gold in the treatment of that disease, giving as much as $\frac{1}{2}$ gramme as an initial dose. But he told me that, such were the dangers of toxic manifestations of gold therapy in rheumatoid arthritis, he was tempted to abandon its use until he had elaborated a method of preventing such manifestations by the administration of very large doses of vitamins prior to giving gold injections. Vitamin C is chiefly used; vitamins A and B are also given; all in massive doses. Secher claimed thus to have obviated the dangers of gold toxicity. His conception of the nature of the toxic reactions following the use of gold is interesting; he believes them to be a manifestation of the disease process itself, and not of the toxicity of gold. He claims that Mollgaard did not get toxic reactions with "normal" doses of gold in healthy experimental animals, but did so in tuberculous animals, where the gold "liberated the toxins." In cases where the sedimentation rate is not elevated (*i.e.*, in osteo-arthritis) he claims that no toxic

manifestations occur after using gold; and that if toxic reactions do occur, and the original dosage is persisted in, the subsequent reactions will be smaller and will then cease, owing to the gold successfully combating the morbid condition. Secher is aware that his views are revolutionary and do not receive general support, and certainly they are not approved by other workers with whom I have discussed them.

In America the attitude of most of those interested in rheumatic diseases is characterised by a strong desire to "follow what is scientific and factual as opposed to what is empirical." This has led them to look askance at gold, on the mode of action of which there is no agreement. They point out that its use in chronic rheumatoid arthritis started from an analogy between that disease and chronic tuberculosis, an analogy which they cannot accept. They emphasise that its use is acknowledged to be accompanied by certain definite dangers.

American opinion is inclined to regard new-fashioned treatments which are based on theory rather than on scientific fact with an understandable cynicism. It is pointed out that they have seen so many such treatments have a short vogue and then pass into obscurity. Nevertheless, the continued use of gold in Europe and the many favourable reports published on its use are making their impression. Both at the Presbyterian Hospital (New York) and in the arthritis clinic of the Massachusetts General Hospital a serious attempt is now being made to investigate the value of gold in the treatment of rheumatoid arthritis.

There is in America little attention given to the use of sulphur in the treatment of rheumatism. American workers instanced it as an example of fads that had had their day and perished, pointing out that it was natural that those spas which had a proportion of sulphur in their mud or water emphasised this as a favourable point, but that they could give very little scientific proof of its value.

In Holland and in America an attempt has been made to assess the value of injections of salts of manganese in the treatment of forms of arthritis associated with psoriasis, but in both quarters the results had been disappointing.

A considerable number of workers have attempted to treat rheumatoid arthritis with prontosil, invariably with disappointing or equivocal results (though its value in gonorrhœal arthritis

is recognised, and is referred to later). Lately the newer form of that drug, M. and B. 693, is being tried out in certain cases of rheumatoid arthritis. It is too early yet to note results, but they will be awaited with interest.

ENDOCRINES.—Much interest is taken in several countries in the endocrine aspect of rheumatic diseases. In Holland both in Van Breemen's clinic (Amsterdam) and in Touw's clinic (Leyden) oestrogenic substances are being used in the treatment of certain forms of arthritis. At the Amsterdam clinic a careful "control" series was worked out by the use on the "control" subjects of inactive substances similarly administered, the physicians being unaware of whether they were giving the active or the inactive preparation. The results showed that 15 per cent. of the patients receiving the active preparation were improved, whilst none of those receiving the inactive substances showed any improvement at all. Rasmussen (Copenhagen), treating a series of cases with oestrogenous endocrine preparations, claimed to be getting good results. He is also attempting to stimulate ovarian function by diathermy. In Berlin also endocrines are used for the treatment of rheumatic diseases, as part of a many-sided plan of campaign rather than as a single measure. Oestrogenous compounds are given in small doses; at the same time other therapeutic measures are employed. It is not given in large doses as the main line of treatment.

It was at the Robert Brigham Hospital (Boston) that I found most enthusiasm for endocrine therapy of arthritis and other rheumatic conditions. Here Francis Hall has been interested for some time in arthritis occurring at the menopause and in castrates. He was so encouraged by his results in these types of patient that he went on to treat general patients suffering from rheumatoid arthritis, with many good results. He emphasises the necessity of large doses and uses 50,000 international units of progynon parenterally twice a week.

There seems no doubt that some patients are at least subjectively improved by the administration of oestrogens. But this by no means proves that the forms of rheumatism from which they suffer are due primarily to endocrine dysfunction. In diseases such as rheumatoid arthritis it is well known that all physiological functions are depressed, and the response to endocrine therapy in some patients may be merely due to the restitution of some function secondarily depressed by the morbid

condition. But, apart from true arthritis, there is no doubt that certain manifestations of the menopause, which by their nature may be termed rheumatic, are definitely improved by judicious endocrine therapy.

FOREIGN PROTEIN.—The use of foreign proteins by injection is still advocated in many clinics for the treatment of arthritis; in this category comes the use of typhoid vaccine as a form of shock therapy.

Many types of foreign protein are used. Sterile milk is administered by Jarlov (Copenhagen), and he claims good results. Fehlow at the *Hubertus Krankenhaus* (Berlin) uses beef and pork blood. At the *Forschungsinstitut für Rheumabekämpfung* yatren casein is extensively used in "all forms of rheumatism, including polyarthritis." They claim that when small doses of this are injected a local and general response is obtained and that the blood sedimentation rate and general condition of the patient respond well. Neuro-yatren, a mixture of non-specific staphylococcal vaccines with yatren, is also used there, and I found this preparation used likewise in Roumania, where they claimed favourable results, but do not regard the staphylococcal vaccines as in any way specific, but rather use them to produce a protein shock.

In America typhoid vaccines are used at many centres to produce protein shock in rheumatic diseases. They are so used at the Mayo Clinic. Crain of the Walter Reed Military Hospital (Washington) also told me he found them very useful. The drawback of typhoid vaccine has usually been that any improvement obtained has been only temporary, but modern physical and orthopaedic measures may enable this improvement to be maintained.

I did not find that the use of bee venom had entirely died out. In Berlin they claim that it has a specific effect on the autonomic nervous system apart from the value of its histamine content. Similar views were held in Central Europe. But it is my opinion that bee venom therapy is one of the passing phases of rheumatic treatment.

VACCINES.—Vaccine therapy must claim considerable attention in any record of rheumatic treatments, for this therapeutic measure is claimed to have an ætiological basis.

Vaccine therapy is probably the most widely investigated and discussed form of treatment of rheumatic conditions (especi-

ally rheumatoid arthritis) in the world to-day. Some have rejected it after trial; others use it because they hope to see some of the wonderful results claimed by its sponsors; others are enthusiastic and regard it as truly scientific and based on a sound ætiological concept of the conditions. But in the minds of many other workers on rheumatic conditions, the prolonged use of vaccines is considered utterly unjustified and the concept to be based on erroneous and unscientific theories.

Vaccines used in the treatment of rheumatism are of different classes: they may be polyvalent; they may contain specific organisms only, or they may be autogenous. Here one is struck by the divergence of opinion among those who most vigorously uphold the use of this form of therapy, and the extent of this divergence is further emphasised when their ideas on ætiology are considered.

At Van Breemen's clinic (Amsterdam) more than 800 cases have been treated with stock vaccine over a period of many years. Plaat, who carried out the work, was very disappointed in his results. In Trencianske Teplice (Slovakia) Lench has used the same stock vaccine (an English preparation) and has been equally disappointed. Sideman (Chicago) used this vaccine on a large series and worked with controls. He had found an equal percentage of improvement in patients who had received vaccine and in the controls, and therefore could find no beneficial results from vaccine therapy beyond any psychological effect.

In regard to autogenous vaccines, more favourable results are reported. Jarlov (Copenhagen), who has done much work on this subject, claims good results from autogenous vaccines grown from dental infections in the patient, and his work has been favourably confirmed by other Scandinavian workers. In Sweden Sundelin reported that vaccines from intestinal streptococci had given ambiguous results.

I found the views of Reichert (Pistany) on vaccine therapy very interesting. He had made cultures from foci of infection and of intestinal streptococci, and had grown these cultures on ascites agar. With the vaccine prepared by boiling these cultures he had had some remarkably successful results; but these were in the minority of patients treated and, on the whole, he had been disappointed. He considered, however, that the explanation of why such good results could be obtained in some few

cases should be sought, and that therein lay the possibility of great benefit from vaccine therapy.

In the United States vaccines are very extensively used. In Johns Hopkins Hospital (Baltimore) the majority of patients attending the arthritis clinic receive hæmolytic streptococcal vaccines, and Wainwright is getting good results. At the Mayo Clinic vaccines prepared from non-hæmolytic streptococci from the upper respiratory tract by Rosenow are used to a considerable extent. Burbank (New York) has done much work on the bacteriology and serology of the rheumatic conditions, and uses vaccines as one of many methods of treating his patients. He reports much benefit derived from the correct use of this form of therapy.

The injections of dead organisms for the production of immunity to diseases they cause is a sound and proven procedure of preventive medicine. In rheumatoid arthritis we find that such injections of organisms are used by some workers as a curative procedure, although it is by no means generally accepted that these organisms are causative of the disease. There are many groups of workers using different organisms, each in the belief that the organism which he favours is responsible for the production of rheumatoid arthritis.

To the unprejudiced observer, these facts make the acceptance of the soundness of this form of therapy difficult. Yet many who work with vaccines claim that their use is aimed at the desensitization of the patient to the toxins of that organism which produces his disease. Thus Rosenow claims that his vaccine contains antigen, but little or no toxin. At present it is very difficult to see one's way through the maze of vaccine therapy. In our present state of knowledge of the ætiology of rheumatism in general, and of rheumatoid arthritis in particular, the use of vaccines cannot be either endorsed or rejected. With a more exact knowledge of ætiology may come the definite establishment of this method of therapy.

PHYSICAL TREATMENTS.—In Great Britain physical methods almost universally are considered to play an important part in the treatment of rheumatic conditions. In some centres for the treatment of these conditions, and particularly the spa establishments, physical methods are used predominantly and are considered the most effective for the treatment of almost all forms of rheumatism. There will be recorded observations on the use

in foreign countries of physical methods at (a) clinics not associated with spas, (b) spa centres.

One of the hopes entertained when this investigation was undertaken was that from the study of foreign methods of treatment there might be gathered data which would help to establish a standard form of physical therapy for the various rheumatic ailments. I found, however, that different foreign clinics disagreed with each other widely, and often emphatically, about the most suitable form of therapy for different conditions.

Taking lumbago as a stated condition, in Great Britain the infra-red rays are considered as probably the most valuable form of physical therapy. But in Amsterdam that condition is treated by ultra-violet rays; in Leyden by long-wave diathermy; in Denmark by cold wet packs at the *Bispebjerg* Clinic and by short-wave diathermy at the Finsen Institute. In all cases those ordering a particular treatment are confident that they are choosing the best method.

The therapeutic value of heat was almost universally acknowledged at all centres I visited, but the methods of applying it varied widely. Little emphasis, however, was placed on the value of physical therapy at the *Forschungsinstitut für Rheumabekämpfung* (Berlin). Treatment of any form of rheumatism there is practically limited to various forms of injection therapy, and, beyond a little massage, almost no physical treatment is given.

Except at the spa establishments hydrology is very little used in Europe. At Amsterdam the hydrology room was deserted, as they had come to the conclusion that hydrological methods were not of sufficient value in treating rheumatism. In America, where I visited some lavishly equipped physiotherapy departments, I found that hydrology was considered to have its most valuable sphere in morbid conditions other than rheumatic.

To note now some observations on methods which seemed to me to be new. Rasmussen at the *Bispebjerg* Hospital (Copenhagen) said that he did not feel that heat alone was a sufficient stimulus of metabolism and circulation to warrant its extensive use as a physical agent; he had therefore developed a technique of cold wet packs which is now generally used in his department. Patients are first placed in a radiant heat bath for five minutes, and are then placed on a couch and wrapped in cold wet sheets; around these several dry blankets are rolled, and the patients

rest like this for an hour. The change from the radiant heat to the wet packs is momentarily unpleasant, but the patients soon become soothed, and a proper hyperæmia of skin and subcutaneous tissue is claimed to result. Professor Secher stated that he had himself undergone this treatment and had faith in it. At Skodsborg a modification of this method of therapy was used; hot wet packs took the place of the cold ones.

The Pittsburg (U.S.A.) School of Medicine, Department of Hygiene, has established a Research Fellowship in heat and fever therapy. Murry Ferderber, the Research Fellow, told me that he carried out animal experiments with various types of heat, and had found that moist heat increased the circulatory volume by 108 per cent. more than infra-red heat and by 62 per cent. more than the heat generated by short-wave diathermy. He had devised means of applying moist heat locally which are simple and safe. Although his work is by no means complete as yet, I think it is a valuable research into the physiology and therapeutic application of heat.

Fever therapy has been much discussed and developed during the last few years in the treatment of rheumatic conditions. One of its most useful applications has proved to be in the treatment of gonorrhœa and gonorrhœal arthritis. But just when its use and scope were being accurately worked out, the advent of prontosil and its derivatives in the sphere of chemotherapy gave promise of substituting methods as effective and much simpler than those of the difficult and complicated fever therapy. At the Mayo Clinic the demands on the fever therapy department have very considerably fallen off with the advent of prontosil. Nevertheless, those who worked with fever therapy have contributed a valuable advance to modern therapeutics, and there is little doubt that this form of treatment will still maintain a certain place. It is particularly in gonorrhœal rheumatism that fever therapy is most important, and I shall refer to it later in that regard.

Both Krusen at the Mayo Clinic and Ferderber at Pittsburg find a definite use for pyretotherapy in generalised arthritis, and Krusen holds that fever therapy in small repeated doses for the treatment of rheumatoid arthritis is easier to control, less unpleasant and more efficacious than injections of typhoid vaccine.

A recent form of physiotherapy is the application of deep heat by ultra-short-wave diathermy. On its introduction this

was hailed by some in Great Britain as a panacea, and I was interested to note how far it had established itself in foreign centres. It was generally considered useful and efficacious, but not as representing more than a slight advance over other forms of heat application. Ferderber of Pittsburg considered it inferior to moist heat in the production of increased blood flow. Many workers held that its greatest scope will be found outside the field of the rheumatic diseases and in the treatment of pyogenic infections.

In the use of X-rays as a therapeutic agent for arthritis considerable interest is being taken. In Copenhagen I attended a meeting of radiologists at which the topic for discussion was the treatment of rheumatism. The majority of these claimed that by the local and general use of X-rays the condition of rheumatoid arthritis could be rendered clinically inactive in 60 per cent. of cases. But their colleagues, not specialising in radiology, were not inclined to accept these results. At the Robert Brigham Hospital (Boston) Kuhns, however, regards local irradiation as valuable and successful in certain chronic and obstinate infective arthritides, which would not respond to other forms of therapy; and at the Finsen Institute much attention is being given to the application of X-rays to arthritis. This radiological treatment of rheumatic diseases appears to me symptomatic, and not based on an ætiological concept.

OCCUPATIONAL THERAPY.—Occupational therapy in rheumatic disease attracts much attention abroad. In Great Britain until recently we have not been interested in this. In the Scandinavian treatment centres facilities for occupational therapy are always provided and are enthusiastically approved by the medical staffs. No great hospital in the United States is without its occupational therapists. At the Mayo Clinic particularly was I struck by the scope and value of this work. There, various types of apparatus are designed so that every joint can be brought into normal movement. Miss Pattee, the occupational therapist in charge, emphasises the fact that not only is active movement thus usefully obtained, but that occupation adds an interest to the lives of those patients whose physical disabilities might easily lead them into a life of miserable introspection.

ACTIVE AND FORCED MOVEMENTS.—The value of stimulating movement (at the correct time) in rheumatic diseases is universally acknowledged, as the aim of all treatment is the restoration of

function. In Great Britain and in the United States—following our views on joint and muscle function—the use of forced movements is not considered beneficial except in a limited number of cases. But on the continent of Europe the use of power-operated machines of the Zander type to obtain forced movements is still common. One can see patients strapped into these machines and left with the power turned on. It seemed to me that either the range of movements obtained was within that of the affected joint, so that neither the machine nor the patient's muscles were subject to strain, or that, to avoid the inevitable pain and muscular resistance to the forced movements, the patients twisted themselves within their straps until the action of the machine was minimised.

Apart from such forced movements, the value of carefully graduated and supervised *active* movements is generally accepted in Europe and America. In Sweden at the *Nynas Kuranstalt* their value was strongly stressed and physical exercise every morning for all patients medically fit for it is compulsory.

In the American rheumatic hospitals the value of correct posture and postural exercises is emphasised, and patients are always instructed in these. The ideas originating from the Robert Brigham Hospital are being widely accepted. I do not, however, wish to give the impression that they insist on exercise as a continuous adjunct of treatment, but hold that it must come at the right time, be correlated with adequate rest, and not pursued beyond the limits of tolerance of the affected joints.

* * *

Observation of methods of treatment of ankylosing spondylitis showed certain points of disagreement. In England, France and the United States rest is usually described as the prime factor in the treatment of this condition. In Central Europe and in Germany movement is prescribed and persisted with. (I was not impressed with the results of such treatment.)

At the Robert Brigham Hospital (Boston) they follow a method of fitting plaster jackets, which limit abdominal and foster thoracic breathing. They seemed to be getting very good results.

Forestier in France is working on the treatment of ankylosing spondylitis by the injection of radon along the line of the vertebræ, and he claims that this renders the condition inactive. The

radon is injected subcutaneously with air along the affected areas in doses of 6,000 micromillicuries every other day until the patient has had between 60,000 and 120,000 micromillicuries. The patients who had had this treatment seemed to be enthusiastic about its effects. There is possibly some connection between this treatment and X-ray therapy of this condition which is being tried in England.

* * *

There have recently been two great advances in the treatment of gonorrhoeal arthritis—first by fever therapy and then by chemotherapy with prontosil and its derivatives. Just at the stage when fever therapy had been explored and developed sufficiently to give satisfactory treatment for this condition, chemotherapy suddenly provided in prontosil a simpler and apparently equally efficacious method of treatment. It is possible now to review the situation in the light of recent developments.

In the United States, where fever therapy was elaborated, much work is now being done on the new chemotherapy, and it has been established that a minority of cases may be resistant to chemotherapy or to fever therapy. Both Dawson (New York) and Krusen (Mayo Clinic) found this. But a combination of chemotherapy and fever therapy seems usually to overcome even these resistant cases. Thus two rival forms of therapy seem to be able in alliance to overcome those forms of gonorrhoeal arthritis which resist the powers of either singly.

III.—METHODS OF TREATMENT ABROAD (OBSERVATIONS ON HOSPITALS, CLINICS AND SPAS)

To record now some observations on the various foreign spa centres visited.

Spa therapy in the treatment of rheumatic conditions denotes a great deal more than the physical use of certain muds and waters. It brings the advantages of dietetic and physical régimes, of change of climate and surroundings, and usually of mental relaxation. Thus spas have established for themselves in ancient and modern times a great reputation as healing centres for rheumatic patients, and have attracted a clientèle giving them unrivalled opportunities for the study of the ætiology, pathology and treatment of this group of diseases. Unfortunately not all the foreign spas make the best use of these opportunities.

One is forced to say that, with certain notable exceptions, the attitude of the foreign spa practitioner is that the mud or water of his particular spa, owing to minute differences in the sulphur, radium or other content, is superior to that of others, and alone provides a sovereign remedy for most of the ills to which the human body is heir; that the magic whereby such cures are effected is inherent in the spa water, independently of the ætiology or pathology of the condition; and that for the maintenance of health it is essential that at least three weeks of every year should be spent in "taking the cure" under the direction of the chosen practitioner.

So great is the faith professed in the efficacy of each particular spa water that at the majority of the spas I found facilities for administering it through every orifice of the human body. Thus it is given by intra-nasal atomisers for upper respiratory tract infection and sinusitis; by inhalation of vapour for bronchial conditions; by mouth for any hepatic or intestinal condition; by rectum for colonic irrigation; vaginally and urethrally where local conditions may seem to demand it; and, of course, the patient meanwhile takes immersion baths and drinks the waters.

Such claims probably have prompted certain American workers to deny categorically that spas have any important place in the treatment of rheumatism.

But there are spas in Europe where men of high calibre work, men who have not been bemused by the fact that they happen to work in localities where thermal mud and water abound, and who have approached rheumatic problems from a standpoint of scientific investigation. These are fully aware that spa water therapy is not the complete answer to the rheumatic problem. Such workers, taking true scientific advantage of the material at their disposal, can gather at their spa establishments most valuable knowledge.

The first spa visited was Varberg in Sweden. This is a seaside spa, open in the summer only. Here there is ample opportunity for physical therapy of standard types, but chief importance is attached to mud therapy. The method is to pack the patient with dark green sea mud, heated to 50° C. for twenty minutes. Afterwards the patient is immersed in sea water and the mud removed by washing him with bunches of freshly picked seaweed. In certain cases, instead of the mud, hot treacle is used for the pack.

The washing with seaweed is invariable. In some types of rheumatic disease hot mud packs are valuable. They provide moist heat, which stimulates the circulation, and the weight of the mud exerts a salutary effect on blood flow. Some also claim that if traces of radium or sulphur are present in the mud, these, too, are specifically beneficial. The use of fresh seaweed to remove the mud is probably founded on an idea of its iodine content having value.

The *Landesbad* centre at Aachen is sited around the thermal saline waters of that district. It is admirably equipped for physiotherapy and for hydrology with the local water, but owing to Slauck's theories of the ætiology of rheumatic diseases, what may be termed "spa treatments" takes a secondary place at this centre. They are used merely as a form of physiotherapy (probably their correct place). Slauck's theories of rheumatic ætiology (which have been noted in the chapter on ætiology) are not in any way influenced by the fact that he works at a spa. The *Landesbad* is a hospital for the treatment of rheumatic conditions among members of the National Socialist (Nazi) Party. It has about 400 beds, of which eighty are for women. Expenses are met by the Party. Those who cannot gain admission to the *Landesbad* stay at one of the numerous spa hotels in the city and are looked after by the local practitioners. They do not have the same opportunities for in-patient treatment or hospital and laboratory investigation. The chief interest of Aachen lies in Slauck's theories and the methods by which they are applied.

Aix-les-Bains is the foremost spa in France for the treatment of rheumatism. The State runs the spa establishment and receives the fees for treatment. The nature of the treatment to be received is prescribed by the member of the local *corps médical* whom the patient chooses and whom the patient pays independently of his treatment expenses. Private patients stay at hotels. The "cure" lasts from two to three weeks, and costs between 700 and 800 francs in the first-class baths, 400 to 500 francs in the second-class baths, and about 300 francs in the third-class. The nature of the treatment does not vary in these different classes, the difference being in the degree of luxury of the accommodation. Doctors' fees for private patients range from 400 to 2,000 francs, according to the means of the patient and the length of the treatment. A hospital, the Reine Hortense, is provided for the poor. This is an efficient, well-

staffed establishment. The maintenance fees in small wards are 32 francs a day, and in big wards 28 francs a day. In addition, patients pay about 2 francs per treatment received. The expenses of these poor patients are often paid by the various municipalities who send them for treatment.

The Aix spa treatments follow the various recognised forms of hydrotherapy, especially the well-known Aix douche. But hydrotherapy is not considered the complete answer to the rheumatic problem. As Jacques Forestier said to me: "We do not pretend to remove arthritis and ankylosis by hydrotherapy, but it is firmly established that the general condition and the resistance of the patient are improved thereby."

At Aix there is being undertaken an attempt to investigate the action of hydrotherapy by animal experimentation. At Forestier's suggestion, Professor Enselman of Lyons is working with guinea-pigs on their responses to treatment with Aix water and studying calcium and sulphur metabolism in bone and cartilage.

A recent instalment at Aix is a solarium designed solely for treatment with the sun's rays. It is controlled by Saidman and is of "windmill construction," the wings containing the cubicles, revolving to face the sun from dawn to evening. The different wave-lengths of the solar spectrum are applied therapeutically. It is an impressive structure, and likely to have distinct psychological effect on the patients treated. There is no doubt that the concentration of the sun's rays and the selection of such rays as the infra-red and ultra-violet can be of use in the treatment of certain rheumatic conditions; but apart from the psychological effect, I think that the comparatively cheaply and easily produced radiations from electrical lamps and some forms of gas heaters may be equal in efficacy.

Italian spas are regarded by the public more as centres where they can combine healing with pleasure—taking a holiday and "undergoing a cure" at the same time. There are many semi-quiet volcanoes where the ground bubbles with a great variety of muds, hot waters, and gases. These are used with the usual techniques. The spas are State property, and facilities are offered for patients of modest means to "take the cure" reasonably. The treatment fees include the cost of the services of a physician. When I asked the physicians at Termini di Agnano about their conceptions of the ætiology and pathology of the

rheumatic conditions I was informed that they were chiefly interested in the correct application of their spa therapy and were not employed to spend their time in research. No hospital facilities are available, and this would naturally tend to make any serious research impossible.

Termi di Abano, however, is associated with the neighbouring University of Padua, and it was a pleasure to meet Professor Renosto, who worked at the University and the spa. He is an experienced pathologist, and has worked for a long time on the ætiological problems of rheumatism. The difficulties and negative results of such work had led him to devote himself to rheumatism from the standpoint of the clinician and therapist. He was therefore in attendance to prescribe treatment at the spa of Abano. It was my impression that the incidence of rheumatism, and especially of rheumatoid arthritis, is not so great in Italy as in the northern European countries. Perhaps this is the reason for the comparatively smaller degree of attention to research into its problems.

But on discussing this point with Dr. Paolo Ravenna, who worked with Professor Robecchi at Acqui, he told me that he felt that there was a considerable amount of both articular and non-articular rheumatism in Italy, but that the majority of medical men were not interested in it. At Acqui there is hospital accommodation for rich and poor, the latter being treated through their insurance companies. There is much more laboratory equipment here than at any other Italian spa, and a vast store of material not only in those patients seeking treatment at the spa itself, but also from the Casa Cottolengo in the neighbouring city of Turin, this being a large charity hospital for the poor suffering from chronic diseases. At Acqui they found themselves as uncertain of the true ætiology of rheumatoid arthritis as we do, but tended to regard it, not as a streptococcal infection, but as due to a virus. They also considered it as a separate entity from rheumatic fever. They regarded osteo-arthritis as a non-infective phenomenon, as the majority of workers in Great Britain do.

At Acqui they regarded spa treatment as dangerous in the acute phases of rheumatoid arthritis, but of great value in its quiescent stage and in osteo-arthritis. Of more specific treatments I found that they considered gold of great value, and that Ravenna and Rinaldi had been working on the use of sodium

glycerophosphate in rheumatoid arthritis. This is injected intravenously; it causes an almost immediate hunger, with subsequent increase in weight, and also gives the patient a pleasant euphoria. Ravenna, however, told me that he thought probably that the effects of this drug were more transient than those of gold.

In Roumania I met Professor Danielopolu, the foremost rheumatologist of that country. He works at the *Institut Cardio-Rheumatologique* at Eforia Tekirghiol on the Black Sea coast. He told me that the study of rheumatism has only recently been taken up in Roumania, and that the Institute is but three years old. It owes its situation to the abundance of radio-active mud and is conducted on the routine spa lines. Under Government control, the high fees of the rich contribute to balance the low fees of the poor.

Budapest is a spa enjoying certain special facilities. It is a University town with a flourishing School of Medicine; it is the capital city of the country, and it has a copious supply of mud and thermal water. The combination of these three circumstances is, I think, unique.

The various bath establishments in Budapest are owned by the municipality or by limited companies. The University and the medical profession help in staffing them. Hungary has been severely hit by recent economic conditions, and financial support is hard to obtain, but lately plans have been approved to establish a rheumatic research unit in one building. Such a unit, with branches in various hospitals, indeed already exists, having thirty beds under the direction of Professor de Pap for the study of rheumatism. Its effectiveness will increase considerably when all its work is concentrated under one roof.

The treatment at Budapest exploits fully the natural resources of the spa, but by no means is this regarded as the alpha and omega of rheumatic treatment. Every suggested form of therapy is carefully examined and used if it proves valuable. Research is actively encouraged, and as high a scientific standard is maintained as is possible.

The commonest way of meeting expenses of the cure at Budapest is to pay a lump sum for the "all-in cure." Prices vary from £15 to £30 for three weeks' accommodation, medical attention, and treatment. There is one criticism which cannot be avoided—viz., that there is nothing to prevent patients ordering their own treatment without medical advice. The medical

profession are naturally opposed to this system, and if the patient is allowed to order vigorous thermal treatment for himself without medical advice, it is not surprising that undesirable results sometimes occur.

The spa at Pistany in Slovakia offered an interesting comparison. At Pistany the whole of the spa establishment, including the hospital buildings and the hotels, was at the date of my visit (it may be different now) owned by the Winter family. At first it seemed anomalous that a medical institution should be owned and directed by laymen, but clearly there was admirable control of the facilities for treatment. It was the aim of the Winter family to provide accommodation and effective treatment for all pockets, and in this they succeeded. In contrast to Budapest, the spa owners will allow no one to take any form of treatment except under medical advice; all doctors practising in Pistany are allowed to order treatment. The hotels vary from the *de luxe* type to very comfortable and moderate establishments for the poorer patients. In addition, there is a 600-bed hospital for the treatment of insured patients suffering from rheumatism. Thus all classes are well provided for.

Perhaps the situation with regard to the medical fraternity is not quite so satisfactory. A number of sincere, intelligent, and scientifically honest physicians practise in Pistany, and with them I had many interesting discussions on rheumatic diseases. But there are also some physicians who maintain nursing homes of their own and conduct them somewhat in a commercial spirit. Their interests do not seem to go much beyond exploiting the facilities of the spa.

In the Pro Patria Hospital, where the insured patients were treated, Kollar is the physician in charge. He is a whole-time worker, paid by the spa owners, who provide him with every facility for therapeutic research. Careful examination and full investigation of every patient is made. The average permitted stay of three weeks is, however, regarded by the medical staff as being far too short. It hampers the adoption of effective therapeutic measures for severe chronic cases.

Two points impressed me on my visit to Pistany: firstly, that enlightened private ownership of such an establishment can prove benevolent and helpful to medicine and science; secondly, that the co-operation of insurance societies can be obtained and maintained on a mutually satisfactory basis. It is to be hoped

that this valuable institution has not been prejudicially affected by recent political changes.

The neighbouring spa of *Trencianske Teplice* (the hot springs of Trenc) does not aim to attract foreign support, nor does it offer, as does Pistany, a variety of holiday attractions. Private patients stay at hotels which are not financially connected with the baths establishment. This is municipally owned. There are several sanatoria owned by the Public Utility Corporations, such as the State railways. One-class accommodation and treatment are provided for employees requiring it. The system of treatment centres round mud and hydrology, and needs no special description. Franz Lench, the physician in charge of the establishment, is a man of scientific mind, and is highly regarded by the profession in his country. He investigates the efficacy of all forms of treatment. He told me he had been disappointed in vaccines, but encouraged by gold.

Trencianske Teplice, relying solely on its own nationals as patients, was enjoying a busy season in spite of the international situation. It is held in high regard by the medical profession of the country.

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To note now the work at foreign treatment centres not associated with spas, but with general hospitals or with sanatoria, or carrying on as clinics devoted solely to the treatment of rheumatism.

The *Instituut voor Physische Therapie* (Amsterdam) is an out-patient clinic for the treatment of patients suffering from rheumatic diseases. Its income is inadequate, and it is housed in an unsuitable converted building, but its staff is notably strong. The director is Van Breemen, whose enthusiasm and self-sacrifice in the cause of combating the rheumatic scourge are known throughout the world. He has an enthusiastic group of whole-time workers and outside consultants to assist him. The equipment is good for physical therapy and for investigation. But the workers all agree that they are hampered by the lack of in-patient facilities for investigation and treatment, and regret that the health authorities do not co-operate in providing such facilities.

Two types of patients pass through the Institute—insured patients referred by the insurance companies, who pay for their

treatment at an inclusive rate (about 5,000 of these are treated annually), and private patients referred by general practitioners for consultation and treatment if necessary. It is pointed out that these patients are often referred at a far later stage than they should be. About 200 private patients are seen annually. The uninsured poor are not treated here. Although described as an Institute for Physical Therapy, treatment is by no means limited to physiotherapy; all suggested forms of treatment are investigated and carried out if deemed advisable. Physiotherapy, however, plays a large part. Research facilities are limited by inadequate accommodation and by the absence of in-patients, but, nevertheless, much valuable work in the investigation of therapeutic measures is being done. A careful survey of housing and other home conditions as promotive factors in the rheumatic diseases has also been carried out. The Institute has the advantage of being the headquarters of the *Ligue Internationale contre Rhumatisme*.

The *Forschungsinstitut für Rheumabekämpfung* (Berlin) is a somewhat similar establishment. As its name implies, it is a centre for investigation into the treatment of rheumatism. (Again it is inadequately housed in a converted building.) Its staff, led by Professor Julius Rother, work on the treatment of rheumatic diseases more by chemical and endocrine than by physical treatments. Ætiological research is not carried out. The Institute treats the insured poor and patients referred to them by the Party Arbeitsfront, which has a central medical bureau for all workers needing medical aid.

The Scandinavian countries are well known for their provision of sanatoria for the investigation and treatment of rheumatic diseases. The first of these I visited was the *Skaelskørr Gichtsanatorium* on the island of Seeland in Denmark. (*Gicht* [gout] is synonymous with rheumatism in Scandinavia.) This sanatorium was built in 1934 by the insurance companies. It accommodates 128 patients, who come from all over Denmark; there is always a waiting list. The equipment and general arrangements were impressive. There are physiotherapy departments adjoining the wards on all floors; complete laboratories; a very pleasant sun roof and an adequate department of occupational therapy. Its situation, near an inlet of the sea, seemed to me bleak and windy, and also it appeared to be understaffed. The medical staff is led by Nyfeldt, who carries on researches on

the relation of focal infections in arthritis and on the artificial production of arthritis in rabbits by bacterial inoculation.

Patients sent by the insurance companies stay for three months on an average. The value set on its system of treatment may be assessed by the fact that there is always a waiting list of patients. Treatment follows the usual lines prevalent in European establishments not in the spa class, being a combination of drug and hormone therapy and physiotherapy. The range of drug therapy is comprehensive; I saw patients, for instance, who had had gold, then arsenic, then prontosil, then campolon.

The *Nynas Kuranstalt* (Nynashamn, Sweden) is a modern 250-bed sanatorium for the treatment of chronic diseases; almost all the patients are rheumatic. It is owned by the State Insurance and Pensions Board. The main hospital block faces south-west, towards the sea, and contains the wards, treatment rooms, occupational therapy rooms and recreation rooms. I was much impressed by the thoroughness of the records, which included a footprint of each patient. Moreover, the "follow-up" system is admirable, the patients returning at regular intervals for re-examination and further treatment if necessary. The medical staff is headed by Dr. Sundelin, a keen and painstaking worker. His knowledge of rheumatic problems was obviously thorough, and he was familiar with all forms of physical and chemical therapy. He told me that, as this was a centre for the rehabilitation of chronic invalids, he had the responsibility of deciding when his patients could resume their occupations. In coming to decisions on this point he had been helped by instituting a system of intelligence tests which often showed interesting indications in regard to those patients who did not seem to be responding to therapy. This struck me as an interesting point. Many clinicians in this country agree that cases of rheumatism do best when those who are treating have the keen co-operation of those who are being treated. In certain cases where the patients adopt too passive an attitude, treatment is apt to be less effective. Sundelin found that such a type was liable to show an intelligence quotient below the normal. The large gymnasium is a feature of the *Nynas Kuranstalt*. There, when permitted by the medical staff, the patients carry out gymnastic exercises with a typically Swedish enthusiasm.

The *Hubertus Krankenhaus*, with thirty beds, is Berlin's centre for the in-patient treatment of rheumatic diseases. It is

under the direction of Dr. Fehlow. As it is conducted in association with the *Forschungsinstitut*, physiotherapy is very little used. Dr. Fehlow's conception of the rheumatic diseases is that they are the result of many causative factors, such as focal infection and endocrine and metabolic disturbances; and the patients receive treatment based on these lines. It is the view of the workers at this centre that the condition must be treated fundamentally and ætiologically, and not merely symptomatically. This, of course, is entirely in accordance with British ideas, but, as such difficulty is found in building up a conclusive ætiological concept of the rheumatic diseases, treatment, according to the British point of view, must be largely symptomatic until causative factors are clearly decided. The director is keen, enthusiastic and extremely hard-working, but I was not always able to follow his facile explanations of the ætiology of the cases he was treating.

The Robert Brigham Hospital (Boston, U.S.A.) has 150 beds for the treatment of chronic, but not incurable, diseases; the majority of the patients suffer from rheumatoid arthritis.

It was founded by a charitable bequest, and the fees paid by patients are kept as low as possible; patients from the immediate vicinity may be treated free. The equipment is very fine, and everything is provided that might possibly prove beneficial to the patient. The staff consists of orthopædic surgeons and physicians, and it was of value to note the close co-operation in treatment between these two groups. I was particularly impressed with the spirit of optimism that pervades the hospital; the psychological value of such a spirit in the treatment of rheumatism is amply proven.

It is to the group led by Osgood and Swaim at this hospital that we owe much of our knowledge of the valuable help that can be obtained from orthopædic measures in rheumatic diseases, especially rheumatoid arthritis. The cardinal points in treatment there are that rest is an essential form of therapy for rheumatoid arthritis; that correct posture is essential for the restoration of normal joint metabolism and function; and that rest and correct posture can be very largely achieved by their technique of plaster-of-Paris splints and casts. Of the value of this scheme of therapy there can be no doubt. Rest is being considered more and more important in treatment, and the value of splintage has been established throughout the world.

Much valuable work also is being done in surgical intervention for the repair of deformity. But it is fully understood that the mere straightening of deformed joints does not necessarily lead to restitution of function if other factors are not considered. Such is the success of the methods employed at this centre that figures show that 85 per cent. of patients treated are able to earn their living after discharge.

The "follow-up" of former in-patients is carried out with admirable care. As far as the wishes of the attending staff go, no patient, once admitted, is allowed ever to feel that the hospital has washed its hands of him. Patients are encouraged to return for periodical "check ups," and are taught to regard the hospital as a centre for advice on medical and general problems arising from the fact that they are suffering from articular rheumatism. Very much can be learned of the care of the arthritic from a visit to the Robert Brigham Hospital.

General hospitals in foreign centres vary greatly in their attitude towards rheumatic patients. Many have no special departments to care for them and the patients are treated by the general physicians. In other hospitals they are cared for in the departments of physical medicine, and these departments commonly develop into rheumatism clinics, although not specifically so termed. It is not necessarily to the disadvantage of the patient that a hospital has no special department for dealing with rheumatic complaints. In several hospitals which I visited the general physicians had a particular interest in rheumatic problems, and devoted many of their beds to rheumatic sufferers. But it is also true that in some general hospitals the sufferer from rheumatism can evoke no especial interest, and is passed from one department to another until he loses the hope of relief.

The *Bispebjerg* Hospital (Copenhagen) is an impressive establishment built on the pavilion plan, with beautiful lawns and gardens between the numerous single-storey ward blocks. On my expressing admiration of this to Professor Secher, he assured me that it might be beautiful, but it was certainly inconvenient and uneconomic, as imposing many miles of unnecessary walking on the medical and nursing staffs. Here the sufferer from rheumatism is cared for in the general wards by Professor Secher (who is greatly interested in such diseases and is a protagonist of gold therapy) and by Rassmussen in the department of

physical medicine. No rheumatic sufferer could complain of lack of interest in his care at the Bispebjerg Hospital.

The *Almindelig* Hospital (Copenhagen) corresponds closely to our rate-supported hospitals. It is fortunate for the rheumatic patients that Dr. Ejnar Jarlov is particularly interested in their cases. Treatment here follows the lines usual in Great Britain.

In New York the modern hospitals are vast institutions built on the "skyscraper plan." This assists centralisation, and the ample provision of high-speed elevators reduces to a minimum the time spent on travelling from one section to another. The modernity and the lavishness of their equipment are remarkable. In spite of economic depressions, far more money is made available in America for medical equipment and research than is the case in Europe.

At the Presbyterian Hospital, the "Medical Centre" (New York), there is an arthritic department under the directorship of Dawson and Boots. These are general physicians with a particular interest in arthritis, especially in its ætiological problems. They are inclined to deplore the multiplicity of new treatments for the rheumatic diseases, which they point out—under present conditions of deficient knowledge of rheumatic ætiology—are not founded on scientific concepts of the causes of the disease. They are convinced that the majority of such treatments are valueless and can only have an ephemeral vogue. Their scepticism about theoretical concepts of disease and insistence on scientific fact was refreshing after some of the glib but unconvincing theorising met with in some other quarters.

The methods employed at this centre, both in the ward and in the out-patient clinic, are "to study the natural history of the disease until we can get some facts on which we can work." The directors consider that rest, adequate diet and general management will do as much for arthritis as any specific therapy. This clinic is essentially "arthritic," and as such does not have referred to it cases of non-articular rheumatism. It was here that were expressed most strongly the doubts entertained by some Americans about the existence of fibrositis. But in the "arthritis clinics" the physician in charge, usually working on a full-time basis, sees only cases which have been previously "picked and sorted"; therefore, he does not have referred to him the cases of non-articular rheumatism with which we are so familiar, as these are not cases of arthritis. Personally I

feel that as much fibrositis occurs in the United States as in England.

On Welfare Island (New York) a large hospital has just been built for the care of chronic invalids. This is partly staffed from the Presbyterian Hospital, and under Dr. Seegal there is an enthusiastic group of workers engaged in research work on the chronic diseases. A considerable number of arthritic patients are observed here for periods extending even up to three years (contrast this with some hospitals in Europe where a patient is fortunate if he gets more than three weeks' hospitalisation). As at the Presbyterian Hospital, the objective of the work in rheumatism is "to study the natural history of the disease," and this study is intensive. Not only is the laboratory investigation very thorough, but much psychological research is being carried out.

The New York Hospital has recently been rebuilt, a lofty white building by the riverside. One of the leading physicians, Cecil, is greatly interested in the rheumatic diseases, and much research work on their ætiology has been done. Associated with him in the arthritic clinic is Angevine, who works both on the clinical and pathological aspects of the rheumatic diseases. I noted a willingness to investigate the claims of drug and other methods of therapy of the rheumatic conditions. Much valuable work on infective theories of causation of rheumatism is being done here.

At the Massachusetts General Hospital (Boston), which is staffed by the teaching staff of Harvard University Medical School, there is a group working under Dr. Walter Bauer, endowed for research into chronic rheumatic problems. The work being done here is remarkable. Ætiological problems are kept in the forefront, and the disease is studied from every possible angle. There is a State scheme in the Commonwealth of Massachusetts to provide for the treatment of arthritic patients. This supports twenty beds, and patients may stay for periods up to six months. Work goes on simultaneously on the ætiology, cytology, pathology and chemistry of the rheumatic diseases. This "arthritic clinic" admits only patients who have been through the wards, for it is thought that a complete knowledge of the patient can only be obtained in this way. Treatment follows general methods, with special attention to posture and postural exercises.

At the Johns Hopkins Hospital (Baltimore), relying on the

fact that work in New York had shown that the serum of a majority of the patients suffering from rheumatoid arthritis would agglutinate hæmolytic streptococci, treatment of this condition is carried out almost entirely by means of injections of streptococcal vaccines.

At the Abington Memorial Hospital (Philadelphia) Pemberton carries on work which has won for him a world-wide reputation. He takes an extraordinary degree of care over every detail in the investigation and treatment of his patients. His treatment is directed towards the thorough eradication of "septic foci" and the maintenance of healthy function of all the body, especially the large intestine. Research work on the biochemistry of the plasma proteins is being carried out. Pemberton's enthusiastic devotion and attention to the minutiae of his patients' troubles earn him their respect and confidence.

The Mayo Clinic presents a picture different from that of the hospitals already described. It is essentially a consultative centre, where specialist advice on diagnosis and treatment can be obtained. It is not, as most hospitals are, situated in a district where it can serve its patients by continued attention. The majority of patients arrive from other districts, receive advice and depart. There are admirable hospital facilities in connection with the clinic, but most patients are not prepared to avail themselves of these, except, perhaps, for a few days during which certain essential investigations can be carried out. The numbers passing through the clinic are truly prodigious, and a wealth of material is at hand for research purposes. The arthritis section at the Mayo Clinic, which is directed by Hench and Slocumb, is therefore faced with somewhat different problems from those met by other American workers. Their patients usually do not expect to be admitted to hospital for a course of treatment, but come for diagnosis and advice just as they might in England consult a specialist who would advise their family doctor. But among the very great numbers of patients who pass through the clinic there are some willing to undergo hospitalisation, and the beds controlled by the section are always full of patients presenting interesting problems of diagnosis and treatment. Thus much can be learnt at the Mayo Clinic of great value in the therapeutic sphere. There is also available a great volume of results of scientific research on ætiology. (The section on ætiology shows how wide their researches have been in that direction.)

Treatment prescribed at the Mayo Clinic is based on broad lines. The general resistance of the patient is built up by high caloric, high vitamin diets; septic foci are removed; physiotherapy and non-traumatising exercises are used for affected joints, and vaccines are considerably employed to desensitise the patients to the toxins of harmful organisms. But it is in advice on after-care and on home methods of treating rheumatic diseases that the arthritis department of the Mayo Clinic is particularly noteworthy.

A careful and exact "home-therapy" scheme has been elaborated at the Mayo Clinic. A large proportion of patients are Mid-West farmers, who have access only to small towns where opportunities for physiotherapy and other treatments may be unobtainable. The Mayo Arthritis Clinic, therefore, assisted by the physical medicine department, has developed a system whereby the patient is educated in the causes and care of his own disease. He starts his visit to the clinic by attending a course of three lectures given by the medical staff, and illustrated by films, on the causes and cure of rheumatism. This is sufficiently elementary and dogmatic to appeal to the lay mind (and not of negligible value to the medical practitioner; I derived no small benefit from attending the course). The patient is carefully instructed in such matters as diet, rest, clothing and exercise in so far as they affect rheumatic diseases. Furthermore, with the co-operation of the department of physical medicine, a system of simple but effective home physiotherapy methods has been evolved. Those whose homes are without electricity are shown how heat therapy can be carried out by means of "bakers" using solidified petrol. Simple radiant heat lamps and baths for home use are described in detail, and uncomplicated but yet effective means of carrying out physical treatments, where expert care is not available, have been admirably designed.

The department of occupational therapy plays a valuable part in this system of home treatment and after-care; patients are instructed as to what work about the home or farm will benefit their particular case and what will be harmful. Thus the patient who returns home from the arthritis department of the Mayo Clinic, and who may not be within easy reach of expert advice and treatment, has been well educated in his own care. The trouble taken in planning this scheme is rewarded by the interest and gratitude of the patients.

Admirable is the degree of care of out-patients of the American Rheumatism Clinics. This is provided by the devoted work of social service workers, usually women University graduates. The home conditions, the means of livelihood, the diet and the habits of out-patients are investigated. The workers are well trained and, with a knowledge of economics, dietetics and hygiene, are able to report and advise expertly. Naturally, in its operation such a system meets with a certain amount of criticism as being unduly "interfering." But this criticism is rarely met with and never justified. The social workers have no aim but the benefit of the patient. Through this social service patients who have neglected their treatments can be traced and charitable funds justly distributed. Above all, the clinics can keep in touch with their patients. This, in the treatment of rheumatic diseases, is of prime importance; the co-operation between physician and patient should be thorough and long-continued. The Americans can give us valuable guidance in after-care and supervision of the patient who has sought expert advice.

Bringing now to a conclusion this survey of systems of treatment abroad, and before entering upon a discussion of what lessons may be learned from them, I may note an interesting American system for treatment of traumatic rheumatic manifestations of an occupational origin. In doing so, I wish to emphasise that I record the facts from the point of view solely of a medical observer, without any suggestion of criticism of British industrial social welfare arrangements, which, in my opinion, are as good as any in the world.

I was fortunate to have an introduction to Dr. William O'Neill Sherman, Surgeon-in-Chief of the medical services of the vast United States Steel Corporation at Pittsburg. He practises now largely as an operating surgeon, but is also concerned with traumatic rheumatic manifestations occurring among the employees of that Corporation. These aches and pains following trauma are of common experience in heavy industry, and can prove very expensive to health insurance schemes. Usually heavy industry in the United States pays an amount annually equivalent to 8 per cent. of its wages bill in sickness compensation. The United States Steel Corporation has reduced the rate to 3 per cent. This has been achieved, in Sherman's opinion, by the employers taking over all medical care. Patients

injured at their work are treated in the firm's own hospitals and wards. The patient is not made to feel that, as he is injured, the employer wishes to be rid of him. He is given to understand that his job awaits him as soon as he has been restored to health. This psychological approach to the patient, Sherman stated, has proved most successful, and the majority of sufferers return to full work even after long periods of incapacity.

Certainly an industry which, on account of its conditions of working, is liable to an increased incidence among its employees of rheumatic (or any other) disease follows the lines of both wisdom and justice in seeking to organise preventive measures (in so far as they are possible) and the promptest and best curative measures. I think this is widely recognised in many industries in Great Britain, and voluntary good-will in this field is reinforced by measures of social legislation. But control by the employing firm of medical treatment of its employees may have objections, not so much on medical as on other grounds. It seems to me that the system developing in our mining industry, whereby the employers and the workers co-operate in this matter, and control is largely in the hands of the workers, is better. But that is perhaps outside the province of a medical observer. One clear conclusion can be drawn from the Pittsburgh experience—the great economic benefit of organising prompt and efficacious treatment of morbid conditions arising in industrial occupations.

The next section will endeavour to summarise the practical suggestions to British Treatment Centres which may be gathered from the observations noted. Obviously those suggestions may be influenced in some degree by my personal opinion, and others may attach more importance to a different set of facts (or theories). What I have tried to do is to record fairly all that came to my notice, aware that all may not make from them the same deductions.

IV.—RECOMMENDATIONS FOR BRITISH TREATMENT CENTRES

Before setting out on this investigation of foreign Treatment Centres and their methods I had entertained the hope that it would be possible to attempt some check, however tentative and imperfect in form, of results achieved by different centres. The great advantage is obvious if one could report that in such-and-

such a centre certain methods are given a paramount place, in another centre other methods, and that reliable statistics of results suggested that the methods of one centre were apparently more successful. Unfortunately, I found that there was no prospect of coming to any conclusions on that point which would have the slightest scientific value.

The root of the difficulty is the lack of precise knowledge of the ætiology of the rheumatic diseases. Lacking that precise knowledge, various workers pin their faith to various methods, and are apt to claim as a result of their own methods a standard percentage of improvement or of cure, usually from 60 to 70 per cent. The claim has usually this much basis of correctness: that there will be always a great number of cases which will show good results from rest, from general régime, from the confidence which can be inspired by the practitioner; and these results are quite irrespective of particular methods of medication, inoculation, etc. Indeed, in America I encountered more than once the somewhat cynical comment on recorded results of any method: "Oh, the usual 70 per cent. of improvement."

Further, there is the bewildering confusion in the classification and nomenclature of the rheumatic diseases. What is diagnosed at one centre as a certain condition may be diagnosed quite differently at another centre. Finally, there is rarely attempted anything like complete records of case histories (I except from this some centres which are giving close attention to what they term "the natural history of the disease"). Thus there can be no attempt at a comparative check of results attained by varying systems of treatment.

The lesson is that, in a national plan of treatment in our country, the importance of full and clear records should be kept in mind, and these records should be based on an agreed classification and nomenclature. Some are inclined to regard this as "mere paper work" and a waste of time. But it is essential for any attempt at standardising treatment to have definite knowledge of the results of various methods.

In securing that definite knowledge, any system of records is liable to be affected in some degree by that "confidence in the practitioner" mentioned. It is a commonplace that a medical attendant who has supreme confidence in his own methods, and can inspire patients with that confidence, will obtain successful results, which another might not get from the same methods.

This, the psychological factor, plays a most important part in the treatment of diseases the actual causation of which is still obscure. (It does not apply, of course, to any extent in the treatment of those diseases of which the causation, whether bacteriological or biochemical, has been positively ascertained, and the treatment of which is a matter of skilful and careful routine.) It is specifically important in the rheumatic disease. The rheumatic patient, with a chronic and often crippling disease which gives him great opportunities for introspection and self-pity, if he is treated by a physician who inadvertently betrays his belief that nothing much can be done, reflects that attitude. But if the physician is obviously keenly interested and full of confidence, the patient almost invariably responds. It is for this reason that physicians using very different methods can achieve success, even practitioners considered by the majority of the profession to use unscientific and unorthodox methods, but who yet can win the trust of their patients. Sideman of Chicago impressed me with the statement that he had carefully assessed the influence of his own moods on his arthritic patients, and found how easily either his own discouragement or hopefulness could be reflected in them; and Burbank of New York told me that he sought primarily for subjective and not objective improvement in those he treated.

The most careful system of records could not wholly eliminate from its results this psychological factor, though it would do so to a large extent, as, presumably, a method of treatment would not be accepted as "standard" unless it proved successful in the hands not merely of an individual or of a small group of workers, but in general use.

Nothing in the above paragraphs should be interpreted as implying any derogation of the confident practitioner who can heal by measures which are not generally successful. We are discussing methods applicable on a national scale; and that means methods which can be learned and efficaciously applied by every skilful doctor.

EDUCATION IN SELF-HELP.—In planning treatment on a national scale in Great Britain—defining that as to make available for all sufferers the most effective means of relief, and to all threatened sufferers the most effective means of prevention—the most useful guidance appears to me that gathered from American observations.

Education in self-help is the leading feature in the best efforts there to combat the ravages of rheumatic disease. That is no novelty in medical practice; the great physicians of all times have accepted as their guiding principle that in dealing with disease afflictions generally the most efficacious course is to rally to their aid a determination on the part of the patient to get well, and to enlist this determination in assisting the healing forces of Nature. Drugs and other adjuvants have their highly important place, but are often secondary to promoting the will to recover. In the rheumatic diseases, especially in their early stages, this is always true; and even in the later stages it is usually most helpful, though the cruelty must be avoided of attempting to insist in hopeless cases on efforts of self-help which are probably useless and certainly painful.

The rheumatic diseases, however, present particular problems in this regard, for there are, among the great mass of sufferers, two sections, both fairly large in numbers, who have to be given special measures of attention, guided by opposite considerations. There is the section suffering—or imagining they are suffering—from aches and pains which they think justify a restful and, on the whole, not unpleasant term of treatment; there is the section which is disinclined to take the warnings which skilful diagnosis would detect as clear indications of the onset of dangerous rheumatic disease. It is, therefore, of prime importance that education in self-help should be under sound direction. “Sound direction” would be the key to successful results. Such direction would keep its advice strictly to simple, well-proved matters; would discard all empirical experiments, and avoid reference to methods which had any element of danger to the patient. The purpose would not be to encourage self-drugging or self-experimentation (*e.g.*, with radiation treatments, some of which are dangerous and some useless), but to instruct the sufferer how he or she can co-operate in a carefully explained plan of remedy.

The methods adopted at the Mayo Clinic arthritis department (noted in Section III.) seem to me a good model to follow in the treatment of rheumatic disease in Great Britain. Some modification of those methods to meet differing national conditions of living would be necessary, but I believe that the general idea is sound, and that a British scheme of treatment could usefully seek to develop “home therapy,” based in the

first instance on sound advice and subsequently safeguarded by periodic supervision of the patients. Many of the rheumatic treatments are expensive in time and in money. If the number of treatments at clinics can be largely reduced by the substitution for some of them of such "follow-up" methods as can be followed in the home, the economy would be great. But there must be the effective safeguards that such home measures are in the first place soundly advised, and in the second place kept subject to skilled supervision at proper intervals.

The organisation of such a system would be a task the difficulties of which would be justified by the results. Its basis would be the preparation of good educational material—in films, in lectures, in leaflets. Its executive working staff would be district Treatment Centres, adequately staffed for diagnosis, for methods of treatment, for education in home therapy, and for the necessary degree of supervision of patients in their homes and their places of employment. A great part of this supervision could be entrusted to social service workers with the necessary degree of knowledge.

The great desideratum in dealing with the rheumatic sufferer—or the individual who is diagnosed as predisposed to rheumatism—is that he or she should be able to continue in normal occupation and recreation; should be spared, to the degree possible, visits to clinics; but at the same time should be safeguarded against drifting into serious disability, either from the lack of remedial measures or from following wrong methods. "Home therapy," under careful supervision, would help greatly to attain that desideratum.

CLIMATIC CONDITIONS.—Whilst it is generally accepted that the subtropical and tropical climates have a very small indigenous incidence of rheumatic disease, this may be due partly to other living conditions than those of sun temperature—*e.g.*, to diet and clothing habits; possibly, also, to the rarity of rheumatic infective agencies in those regions. Rheumatic disease thus may be in its incidence largely a "disease of civilisation," promoted by the living conditions of great aggregations of population. As noted, an American experiment of removing rheumatic sufferers to a hot, dry climate, contrary to expectation, has given no definitely encouraging results.

From the evidence collected I should conclude:

(a) That there is no necessity to attach great importance to

the locality of a rheumatism treatment centre, whether it is by the seaside or in an inland, hilly district.

(b) That whilst an individual patient will often, as in many other morbid conditions, benefit by a change from one climate to another, this does not warrant a general rule seeking to banish sufferers from any particular localities. For the great majority, the prospects of relief or cure are equal wherever they live, provided that they follow as sound a hygienic system as possible in regard to clothing, shelter, etc.

Rheumatism Treatment Centres should, as part of their system, give simple and practical advice to patients as to how they can take safeguards against the climatic conditions of their locality. This advice could be based on a set of general principles with modifications for particular localities.

OCCUPATIONAL CONDITIONS.—Obviously some occupations are specially promotive of many of the forms of rheumatic disease. Such occupations are those which:

- (a) Diminish the amount of sunshine and fresh air.
- (b) Impose constant repetitive movements bringing into play only a small section of the muscular system.
- (c) Impose cramped positions at work.
- (d) Subject workers to quick alternations of heat and cold or to constant wet conditions.
- (e) Subject workers to frequent minor bruising and tearing injuries.

A detailed investigation should be set afoot into the conditions of industrial occupations which are especially promotive of rheumatic disease, with a view to drawing up a plan of practical advice for each industry concerned as to how such promotive conditions can be best avoided or mitigated, or their consequences relieved by remedial measures.

Rheumatism Treatment Centres should, as part of their system, note occupational factors appearing to affect their patients. Such notes should be communicated to those in charge of the investigation suggested above. Rheumatism Treatment Centres should give advice to their patients, where occupational factors are concerned, as to simple measures of precaution (such as physical exercises) which could be remedial.

Knowledge of the principles of "occupational therapy" should be gained by practitioners treating rheumatic patients.

PHYSICAL TREATMENTS.—There was observed in foreign centres practically general agreement as to the value of heat, massage, and radiation for the rheumatic sufferer, with some differences of opinion as to methods and degree of application. The evidence collected suggests, in regard to heat, that there is no reason to believe that the more elaborate and fanciful methods, calling for some special apparatus or some particular medicated mud, are more effective than simpler means, except to the degree of psychological effect secured. On this point of the application of local heat it is my view that under a system of education in self-help, under skilled supervision referred to previously, it may be possible to make greater use of home application of heat. It is, of course, by no means uncommon in British practice for the medical practitioner to recommend such home treatments to his patients. What I wish to suggest is that British Treatment Centres might make it part of their routine to consider the possibilities of this in suitable cases, giving advice as to where the heat should be applied—which would not always be where the patient thought necessary—and how best it could be applied under home conditions.

Methods of massage abroad follow the same principles generally as in our country. At some centres, as will have been noted, there is less use of (though not necessarily less importance attached to) massage than is usual in the best British clinics. The reason for this may be economy. Again referring to “self-help,” it would perhaps be possible in certain cases to utilise it to some extent in reducing the number of attendances for massage at clinics. Ignorant massage is, of course, a source of evil, rather than of benefit; but with skilled advice at the outset, professional massage might be supplemented with some simple home massage.

Remedial exercises could certainly be carried on by the patient—again with skilful advice at the outset, and the necessary degree of periodical supervision afterwards—in the home.

In all the simple physical treatments the objective of a Rheumatism Treatment Centre should be education of the patient to do all that is possible in the way of self-help and thus save time at the clinic.

DRUG TREATMENTS.—Foreign observations on the dangers consequent on regarding aspirin and other drugs of the salicylate group as curative instead of merely palliative of symptoms I

have recorded in Section II. These reinforce British medical conclusions on this matter. Since most of the advertised nostrums for the "cure" of rheumatism are compounded chiefly of the salicylate drugs, and since even some medical practitioners are inclined to rely on their use, there should be constantly included in educational literature on the subject of rheumatic disease a warning on this point.

The favourable and unfavourable views in regard to the value of gold injections for the treatment of rheumatoid arthritis have been noted in Section II. The Empire Rheumatism Council has a special clinical research committee (of which I am a member) at work seeking definite conclusions on this matter, and that committee will keep in touch with similar investigations in America (where the weight of opinion at present is generally sceptical as to the value of gold treatment). There is also, it will be observed, controversy among those who have faith in gold as a curative agency regarding the dosage—whether this should be heavy or otherwise.

Until the results of the investigations now being carried out are known, it would be probably the wisest course for Rheumatism Treatment Centres in our country to consider this method of treatment as on trial and not as yet generally accepted. Its use should be restricted to clinics having on their staffs practitioners with experience of its administration.

Prontosil and formulæ allied to it have claimed such dramatic attention recently in the treatment of other diseases that it is natural that they should be tested in the rheumatic group. Reasoning by analogy, it should be very useful in that form of arthritis (gonorrhœal) in which the infective agent is clearly established, and this agent is highly susceptible to chemical therapy. In practice that reasoning apparently has proved sound, and prontosil should be admitted to the armoury of practitioners in dealing with that particular form of rheumatism.

VACCINE TREATMENTS.—The evidence collected abroad in regard to the value of vaccine treatments for rheumatic disease is to a high degree conflicting, as has been noted in Section II. It is, on the whole, unfavourable in regard to stock vaccines; somewhat more favourable as regards autogenous vaccines and specific organism vaccines. This subject has been somewhat fully discussed in the chapter referred to. My conclusions are:

1. That in view of the present lack of ætiological certainty

regarding the causative factors of rheumatic disease, it would not be wise to accept vaccine treatment as a principal practice in Rheumatism Treatment Centres.

2. That at one or more Treatment Centres, properly equipped for the purpose, there should be carried out, under a rigid system of controls, a series of independent tests of vaccine treatments; that this centre or centres should seek to establish close co-ordination with any existing clinics at home or abroad giving special attention to vaccine treatments.

3. That, pending results of this investigation, vaccine treatments should not be discouraged in cases where other methods of treatment have not given good results, but that control records of results in those cases should be obtained as far as that is feasible.

SEPTIC FOCI.—The contrasting opinions held by workers in foreign clinics in regard to septic foci in relation to rheumatic disease confirm, I venture to say, the present general view in Great Britain—viz., that they are important, but not so generally or vitally important as was considered by some at one period. In one form of arthritis, the gonorrhœal, where the specific infection is known, they are clearly causative. In other forms the relation is not so clear as to justify a routine extirpation of teeth and tonsils suspected of being septic.

There does not seem to be a case for recommending to British Rheumatism Treatment Centres departure from the present "middle course" taken by the majority of the medical profession; to regard an ascertained focus of infective organisms as something which should be removed, but not holding that there will follow as a certainty the end of the rheumatic infliction, nor neglecting other curative measures.

THE TIME FACTOR.—The wide variations of judgment abroad in regard to the term of treatment necessary will be noted, ranging from three weeks (which is common) up to three years. It is clear that these judgments are based far more on economic than on medical considerations; the term is what it is thought can be afforded, not what will effect a cure.

As affecting this treatment time factor, the one clear conclusion is that the best hope is in providing treatment in the early stages. The period of treatment—in the sense of treatment as invalids—would then be *nil* in a very great number of cases. The patient could go on with his or her ordinary avocations.

Where cases have been neglected to the stage at which seriously morbid conditions have been allowed to develop there can be no hard-and-fast limit set. Cure, or such progress towards cure as will make a fairly normal life possible with proper precautions of régime, etc., may be a matter of weeks, months, or years.

British Treatment Centres should therefore base their policy on sedulous endeavour to gather in the early cases, and not attempt to set any time limit to advanced cases. They should be kept under treatment, either in bed or as ambulatory patients, until all that can be done is done for them.

After-care supervision following any period of treatment is most important in this respect. The best system of this I found in the United States. There the social services auxiliary to the Treatment Centres provide the treating physician with pertinent facts beyond what can be elicited by medical examination, and also see that the subsequent course of each case is accurately and sympathetically followed, with a resultant benefit to the patient and an increase in the knowledge of the course of rheumatic disease. It is not only beneficial to the patient's physical condition to have some out-of-hospital help and supervision, but also of great value in sustaining morale.

SPA TREATMENT.—Spa treatment in Europe is more widely, in America less widely, used than in Great Britain. On the question of its value in the rheumatic diseases I cannot do better than to quote Lord Horder (*International Bulletin*, vol. xxxvi., 1938):

“It is, however, the opinion of most physicians that spa treatment is of definite value in a great number of cases. The psychological effect is frequently remarkable; the patient feels that something definite—something ‘sensational,’ if I may venture that much-abused word—is being done for him, and in response rallies his own inner resources of healing. Then the change of air, of diet, of régime generally has usually some beneficial effect. All this apart from the degree to which any specific curative effect of the spa waters can reinforce the ordinary course of therapeutic treatment.”

That the resources of the excellent British spas are not used as fully as they might be is well known, and negotiations are going on between the British Spa Federation and the British Medical Association to seek practical methods of extending their usefulness in treating the poorer classes of patients. The chief diffi-

culty is the economic one. In a measure that difficulty could be relieved by the establishment, in close neighbourhood to the British spas, of what might be called "occupational and treatment hostels," where patients likely to need prolonged periods of treatment could follow some light gainful industry, agricultural or manufacturing. This would take up some of the burden of their maintenance and make their lives happier.

In conclusion I can only express the earnest hope that there will be gleaned from this report some practical hints for a sound and economical plan of treatment of the rheumatic diseases.

APPENDIX

ITINERARY

The following is a record of the centres I visited and the workers I met. I wish to express my sincere thanks to all these workers for their great assistance.

HOLLAND

June 7 to 15:

Instituut voor Physische Therapie of Amsterdam.

Wilhelmina Gasthuis.

University Hospital of Leyden.

Drs. Van Breemen, Van Dam, Plaat, Professor Snapper and Dr. Touw.

DENMARK

June 16 to July 3:

Bispebjerg Hospital.

Almindelig Hospital.

Finsen Institute.

Skodsborg Sanatorium.

Skaeskor Gichtsanatorium.

Professor Secher, Drs. Rasmussen, Jarlov, Johannsen, Anderson, Jacobsen.

SWEDEN

July 3 to 10:

Vanforeanstalten Cripples Hospital.

Nynäs Kuranstalt.

Varberg Sanatorium.

Varberg Hospital for Diseases of Bone and Joint.

Drs. Gordh, Sundelin, Edstrom.

GERMANY

July 10 to 25:

Forschungsinstitut für Rheumabekämpfung, Berlin.

Hubertus Krankenhaus.

Landesbad, Aachen.

Professor Rother, Drs. Fehlow, Ludwig, Gehlen, Lemmerz.

FRANCE

July 25 to August 12:

Aix-les-Bains, Etablissement Thermale.

Reine Hortense Hospital.

Drs. Forestier père et fils, Drs. Françon, Merklen, Certonciny, Graber
Duvernay, Saidman, Herbert, de Lavis Trafford, Robert, Tixier
and Professor Enselme.

ITALY

August 13 to 30:

Termi di Agnano.

Termi di Abano.

Fonte di Fiuggi.

ROUMANIA

BUCHAREST, August 31 to September 6:

Professor Danielopolu.

HUNGARY

BUDAPEST, September 7 to 14:

Drs. Pap, de Chatel, Külley, Tölgyes, Charmant.

CZECHO-SLOVAKIA

September 15 to 25:

Pistany.

Trencianske Teplice.

Sliac.

Drs. Kollar, Veres, Cmundt, Schmidt, Reichert, Neuwirth, Lenoch.

U.S.A. AND CANADA

NEW YORK, October 15 to November 3:

Presbyterian Hospital.

New York Hospital.

Bellevue Hospital.

Hospital for Chronic Diseases.

Rockefeller Hospital.

Drs. Dawson, Cecil, Swift, Boots, Tyson, Müller, Angevine, McEwen,
Dodge, Seegal, Burbank.*BOSTON, November 4 to 10 and subsequently :*

Massachusetts General Hospital.

Robert Brigham Hospital.

City Hospital.

Boston Dispensary.

House of the Good Samaritan.

Drs. Bauer, Short, Coggeshall, Swaim, Osgood, Hall, Nissen, Kuhns,
Keefer, Pratt, Tannhauser, Duckett Jones.*MONTREAL, November 12 to 16:*

Royal Victoria Hospital.

Dr. Taylor.

TORONTO, *November 17 to 20:*

Toronto General Hospital.
Drs. Fletcher, Graham, Gardiner.

PHILADELPHIA, *November 21 to 28:*

Abington Memorial Hospital.
Drs. Pemberton, Scull, Bach.

November 30 to December 3 and subsequently :

Johns Hopkins Hospital, Baltimore.
Marine Hospital.
Drs. Wainwright, Long, Ceder.

MAYO CLINIC, *December 15 to January 8, 1939:*

Mayo Clinic.
Drs. Hench, Slocumb, Krusen, Ghormley, Ryneerson, O'Leary,
Craig, Love, Sacasa, Rosenow.

CHICAGO, *January 9 to 15:*

Drs. Irons, Phemister, Hunt, Vrtiak, Kovac, Sideman, Jordan.

PITTSBURG, *January 16 to 20:*

Drs. O'Neill Sherman, Ferderber, Margolis.

WASHINGTON, *January 21 to 24:*

Billings Hospital.
Walter Reed Hospital.
Drs. Yater, McEnerney, Crain.

NEW HAVEN, *January 25:*

Yale University School of Medicine.
Dr. Paul.

And again to New York and Boston until February 18, 1939.