was negative; a throat swab put up on a blood-agar plate showed a rich growth of *S. viridans*; *S. haemolyticus* was absent.

June 30th. (Fourth day in hospital, and alleged fourth day of disease).—The general condition of the patient was vastly improved; irritability and headache gone, neck much looser. Kernig's sign was still positive, though not nearly so marked. The morning temperature was 101° F. and pulse 110; in the evening, temperature was 98° F. and pulse 76. No lumbar puncture was performed.

July 1st.—Patient very much better. Temperature normal, pulse about 100. No headache, no neck rigidity; ? slightly positive Kernig's sign. As one still felt that the case might be tuberculous meningitis, and as the bacillus had not been found in the cerebro-spinal fluid, lumbar puncture was again performed: 50 c.cm. of slightly opalescent fluid was obtained; the pressure, although still above normal, was less than on the previous occasions; sugar content normal, slight increase in protein; numerous lymphocytes in the fluid (about 100 per c.mm.), polymorphs 3 per cent. In spite of prolonged centrifuging of the fluid and very careful examination no tubercle bacilli were found, the fluid being quite sterile.

July 2nd-3rd.—The boy appeared very fit and well. The temperature and pulse were normal. Lumbar puncture was carried out on both days: about 50 cells per c.mm.—lymphocytes 90 per cent., polymorphs 10 per cent. No organisms found.

July 4th.—Patient maintained his excellent progress. He was sleeping well at night, and taking his food well during the day. Reflexes everywhere were active. Kernig's sign quite negative.

July 6th.—Lumbar puncture was carried out again: cerebro-spinal fluid was quite clear, and under normal pressure; no increase of cells; protein and sugar within normal limits. The fluid was perfectly sterile.

July 20th.—A lumbar puncture gave perfectly normal cerebro-spinal fluid.

July 21st.—The patient, having made excellent progress, was discharged from hospital extremely fit and well.

The patient reported again at my request on September 20th. The parents stated that the boy had been in excellent health since discharge from hospital. On clinical examination he appeared fit and well. The Mantoux test was repeated, but was again negative.

COMMENTARY

The first case is interesting, as the high percentage of polymorphonuclear cells in the cerebro-spinal fluid for the first few days suggested, in the absence of organisms, an attenuated or abortive form of cerebro-spinal meningitis. On the fifth day in hospital (ninth day of disease) the change in the cells of the cerebro-spinal fluid from polymorphic to lymphocytic predominance suggested that the case was one of acute aseptic meningitis. In one case recorded by Laubry and Foy³ an almost identical transitional change in the cells was noted.

The second case is also interesting, as it very closely resembled tuberculous meningitis. The absence of the tubercle bacillus in the cerebro-spinal fluid, the negative Mantoux test, the absence of a suggestive tuberculous history, and the favourable course of the disease, with an ultimate excellent recovery, all point to the case being one of acute aseptic meningitis.

In conclusion, I wish to thank Dr. W. T. Benson, medical superintendent, for permission to publish these two cases.

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A CASE OF PYREXIA OF OBSCURE ORIGIN

BY

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AND

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A male patient, aged 28 years, came to see one of us (C. G.) on June 10th, 1931, on account of malaise. He gave a history of having had pleurisy when at school, followed by pyrexia of two months' duration. Three years ago he had a further attack of pleurisy of short duration.

The history given on the above date was that he had spent a holiday in Cornwall, and, soon after his return, developed a slight sore throat and headache confined to the vertex (June 3rd). Examination revealed no physical signs; the temperature and pulse were normal. On the following day the patient took to his bed, and was found to have a temperature of 103° F. and pulse of 88. He was sweating profusely. From June 12th to 15th he had a daily rigor, with temperature of 103° and pulse of 76 to 88. The fever lasted two hours, and subsided to the accompaniment of profuse sweating. Apart from general discomfort when the fever was at its height, the patient had no symptoms whatever, a peculiarity which characterized the entire illness. The course of the pyrexia and pulse rate from this time to the termination of the disease is shown in the accompanying chart. It will be observed that there are three main waves of temperature unaccompanied by a proportionate rise of pulse rate.

June 13th.—The spleen was just palpable, and could be felt from time to time during the next fortnight. On this

and the next three days a few pink spots were noted on the skin of the upper abdomen.

Special Investigations.—Three blood films made at the height of a rigor were found to be free from malarial parasites; the differential count was: polymorphs 35 per cent., lymphocytes 53 per cent., eosinophils 1 per cent., hyalines 11 per cent. Three Widal tests over the course of the first sixteen days were negative (including paratyphoid). The urine was sterile. Absence of leucocytosis was noted in the report on the blood films on every occasion.

June 26th.—We saw this case in consultation. There was complete absence of physical signs, except for a temperature of 101° and pulse of 82, with suggestion of dicrotism. The tongue was clean and moist. In spite of the negative agglutination tests we felt that intestinal infection by some

member of the food-poisoning group was probable. The subsequent investigations were carried out by Dr. C. Dukes. Leucocytes 3,300 per c.mm.; agglutination test completely negative for typhoid, paratyphoid, A, B, and C, Salmonella

bacteria, dysentery Sonne, and *Br. abortus*; blood culture was negative.

July 4th.—Differential count showed: polymorphs 42 per cent., lymphocytes 45 per cent., monocytes 11 per cent., eosinophils 1 per cent., basophils 1 per cent.; many of the lymphocytes were immature and difficult to distinguish from monocytes. The faeces contained Gram-negative, motile, non-lactose-fermenting bacilli, producing acid and gas in glucose and mannite. The report continues: "These are the reactions of paratyphoid A, B, and C, and Salmonella bacteria, but I have tested six different colonies and find that none of them agglutinates with serum prepared against paratyphoid A, B, and C, or Salmonella bacteria. Such atypical members of

this group are well known. There is no definite evidence that they are pathogenic in the sense that the paratyphoid bacilli are pathogenic, but they are often associated with intestinal diseases."

July 7th.—Polymorphs 57 per cent., lymphocytes 33 per cent., monocytes 9 per cent., eosinophils 1 per cent.

July 14th.—Leucocytes 2,600 per c.mm.

August 4th.—Leucocytes 3,200 per c.mm.

September 15th.—Normal blood picture.

The treatment given was simply that for typhoid, with the exception of a vaccine made from the stools. This was followed in a few hours by a rigor and temperature of 104°, and thereafter the fever abated in the course of a few days and the disease came to an end. As, however, the patient was clearly working up for a pyrexial wave at the time, the effect of the vaccine, if any, is not proved.

The points of interest in the case lie in: (1) the three waves of fever; (2) the clinical signs suggestive of typhoid; (3) the absence of agglutination reactions; (4) absence of abdominal or any other symptoms, except initial constipation; and (5) a swing of the differential count towards normal when the temperature was rising for its last and highest wave. (Unfortunately the effect of the patient's serum on the non-lactose fermenters was not investigated, but it seems highly probable (*vide infra*) that agglutination would have occurred.)

Two very similar cases have subsequently been seen by one of us (A. H. D.) in which a slow pulse, leucopenia, relative lymphocytosis, palpable spleen, and continued fever have pointed to the diagnosis of typhoid or paratyphoid fever. In both, the agglutination tests were completely negative to the entire food-poisoning group, though carried out by independent pathologists on three occasions. In both, atypical organisms of the type mentioned were found in the stools, and these were, in fact, agglutinated by the patients' serum in dilution of 1 in 400.

CONTROL AND TREATMENT OF ARTHRITIS *

BY

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Under this title I wish to discuss the conditions of living favouring the development of rheumatic diseases, and the general measures which may help to lessen their frequency and severity, more particularly in the case of arthritis. It is obvious that the first step must be to correct those errors of living and defects of environment which act as causes. Prevention and treatment must therefore be along the same lines. As all forms of arthritis do not spring from the same causes, a simple classification is first necessary. I prefer to group the various types under three main heads: (a) infective or proliferative arthritis (often called rheumatoid); (b) degenerative arthritis (osteo-arthritis); (c) metabolic arthritis (mainly gout, a disease with which this paper is not concerned). While mixed forms are not uncommon, it is not generally difficult to put cases under one or other of these headings. There is still a great deal to be learnt about all three, but the trouble is not so much want of knowledge as prevalence of error. One is the parent of the other, and error, firmly rooted in the mind of the public, is one of the chief obstacles to be overcome.

The pathology of tuberculosis and the history of progress in its treatment during the last half-century forms a valuable analogy. The idea was firmly implanted that the sufferer from tuberculosis must be kept warm, over-

clothed, and with windows firmly closed to exclude draughts. With the patient's resistance thus weakened, the development of the tubercle bacillus promoted, and its dissemination favoured by the absence of fresh air and sunlight, the consequence was that the death rate rose steadily. Rheumatic diseases are more common to-day than were tuberculous diseases at any time, and, though less deadly, the toll they exact from industry is far greater. It is therefore urgent that the problem should be tackled in the same way, and the first step in prevention must be the correction of prevalent errors and habits. The same factors are at work as in tuberculosis—namely, a micro-organism widely distributed and harboured at one time or another by every one of us without obvious ill effect, until there comes into play one of many factors reducing the specific resistance of the tissues to it. Among the more important of these factors are: (a) Hereditary predisposition—the arthritic diathesis, an inherited susceptibility to all forms of rheumatic disease, which may show itself by hypertrophied tonsils, by an abnormal susceptibility to variations in meteorological conditions (especially temperature and humidity), and by some forms of endocrine deficiency. Hereditary factors cannot be prevented, but if recognized early they may be contested. (b) Unfavourable conditions of living. The effect of damp houses in predisposing to rheumatic fever applies equally, I believe, to arthritis; but to the evil results of damp must be added those of light deficiency, especially in respect of the resultant shortage of vitamin D. In this direction much can be done. In our country it is impossible to secure the conditions which seem to favour a high resistance to rheumatism. Wyatt has shown that in Arizona the climate, with its combination of heat, low humidity, and much sunshine, renders arthritis practically unknown, despite the fact that bad teeth and other septic foci are quite as prevalent there as anywhere else. What is the effect on the organism of these three climatic factors? Heat renders it unnecessary to wear much clothing. What is worn is loose-fitting, and permits the air to circulate freely over the skin of the whole body. Heat plus low humidity leads to free skin action, and to an active cutaneous circulation. Ample sunshine, through its ultra-violet constituents, favours the development of vitamin D, and probably as a consequence a full degree of calcium retention in the tissues, especially in the bones. To these factors should, as likely as not, be added an active open-air life, and a diet in which uncooked fruit and vegetables take a leading part. As such a climate is unattainable for the vast majority of the people of this country—though if it were it might have serious drawbacks in other respects—we must consider how far its effects can be obtained here.

PHYSICAL FACTORS IN ARTHRITIS

The first essential appears to be the maintenance of the skin functions in fullest activity. The most important of these is the capacity of the skin to accommodate itself to variations in temperature by dilatation or contraction of its capillaries—a function which, in the variable climate of this country, is of the utmost importance. The first step in this direction is to wear reasonably light and loose-fitting clothes. An apparent illustration of this is that the women of the present day, despite the scantiness of their clothing compared with that of twenty years ago, seem far freer from rheumatic diseases, and can bear changes of temperature far better, than men. In my own experience, it is those who are heavily clothed, and whose bodies are constantly bathed by a hot humid atmosphere inside their clothing, who suffer most from rheumatic fibrositis and arthritis. Further, the materials of which much of women's clothing is at present made are permeable to ultra-violet rays.

* Read to the Section of Hydrology and Climatology at the Annual Meeting of the British Medical Association, Eastbourne, 1931.