Summary

Two cases showing objective neurological changes are described.

Hypochromic anaemia and a disturbance of gastric function were common to both cases.

The possible aetiology is discussed.

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RHEUMATISM AND CLIMATE

BY

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Rheumatic diseases are prevalent in North Europe, particularly in countries bordering on the North Sea, and to a less degree in Japan, North China, South-East Australia, Tasmania, and New Zealand, where climatic conditions approach those of Britain. The incidence of such disease diminishes progressively with the increase of tropical conditions from latitude 50° to that of 20°, being severe in latitude 50°–40°, not common in 40°–30°, rare in 30°–20°.

Rheumatic fever is reported to be unknown in hot tropical regions where there is no seasonal change of climate—for example, in Perak, Singapore, Central America, West Indies, Nigeria, and Gambia. Cases, however, are known to occur in the Punjab. In hospitals in New Orleans the incidence of mitral stenosis (rheumatic in origin) is stated as one-twentieth of that in Boston hospitals, while in Miami 1.3 per cent. of heart disease is reported as rheumatic in origin, in England about 32 per cent. In Switzerland, in the lower Alps, rheumatism is common; not so in the high Alps, where the dry cold and sunny and relatively calm atmosphere have curative effects. In Finland the greatest amount of rheumatic troubles is in the south-east; there are few cases in the open and colder regions of the north, although lakes and rivers are there abundant.

In a temperate climate such as Massachusetts one in ten of the inhabitants over 40 years of age are reported as suffering from rheumatism, and one in four of those of 70 to 80 years. In the U.S.A. there are twice as many cases of chronic rheumatism as of heart disease, ten times

as many as of tuberculosis, seven times as many as of cancer.

The financial loss due to rheumatic troubles is enormous. Twenty times more prevalent in the wage-earners than in the propertied class, they affect women nearly two and a half times more than men. Dental infections, tonsillitis, and respiratory infections are frequently associated with rheumatic affections: the last seem to be particularly provocative of rheumatic fever. The influence of herd infection is shown by the experience of the Presbyterian Hospital Training School, U.S.A. A group of healthy young women enter every six months as nurse students. They are carefully examined before and after admission. As the result of three months' work in wards full of patients suffering from severe respiratory diseases these students frequently are affected with sore throats and other respiratory infections, and any old rheumatic troubles are then likely to recrudesce.

Influence of Housing and Working Conditions

G. Edström, investigating the influence of housing and working conditions in Sweden upon the cause of rheumatic diseases, concludes that bad housing and working conditions have a large productive and also a deteriorating effect, for the rate of fully recovered patients is much greater among those who have lived under good or fairly good conditions. "It is nearly as important for the causation and prognosis of the chronic rheumatic infections to make more healthy the environment as to stop the local infection." Poynton likewise had drawn attention to the ill effect of the micro-climate of the house. The quickest reaction from rheumatic conditions, says Neergaard, is brought about by staying in a warm dry region, as in the desert sanatoria in Arizona, or in the high mountain sanatoria in Switzerland, where it is sunny, calm, and dry. In both conditions most of the time can be spent in the open air, where the deteriorating conditions of shut-up rooms do not act.

The influence on mortality of (a) social class and (b) crowding is shown by the following figures cited by M. Greenwood.

(a) In 1930–2 the mortality of the highest social class (males) was 13 per cent. better than the average mortality, while that of the lowest social class was 12 per cent. worse. For wives the respective figures were 19 per cent. better and 13 per cent. worse.

(b) For the two worst social classes the worst area had a mortality 50 per cent. greater for males than that of the best, and 47 per cent. for wives. In Durham the cottages in the rural areas are often mere hovels; nevertheless the mortality is 36 per cent. better than that in the county boroughs, and yet educationally and economically the rural folk are just as poorly off as the borough people.

It is noteworthy how sickly-looking people brought into a garden city, such as Letchworth, from some crowded part of London blossom into virile healthy citizens. Many authors regard cold, and above all cold and damp conditions, as causative of rheumatism. As changes of weather are commonly credited with making affected joints ache it is suggested that cold reduces the defensive mechanisms against infection. Against this supposition is the fact that people like the Eskimos and Lapps, greatly exposed to cold and mist, do not suffer from rheumatic troubles. Moreover, civilized people in temperate climates, who suffer from these most, live almost all their lives indoors in badly ventilated, artificially heated, and more or less polluted houses in towns, where the population is dense.

Protective Influence of Open-air Life

The cold and often foggy Arctic regions are among the healthiest in the world. Drift-wood does not decay there, because in these regions microbes and moulds cannot grow in the cold; thus infections do not spread and wounds heal easily. Arctic explorers may sleep out in the wet snow, get their clothes soaked, be chilled, and suffer frost-bite but not catarrh or pneumonia. In Shackleton's expedition of 1914-17, after the ship broke up, in spite of great and continual hardship there was no disease among the crew of fifty-six excepting a little scurvy when fresh meat failed. So, too, with Scott's 1902 expedition, lasting three years; with the same number of crew, often badly clothed and fed, there was no serious illness, no colds, sore throats, or rheumatism, only a little scurvy when fresh food was deficient.

In 1936 the Russian, Dr. Nikitin, with 104 men, lived on drifting ice-floes for between two and three months and endured danger of freezing to death, but no "cold" or "infections" occurred. The Eskimos, uncontaminated by civilization, are very healthy and free from infections and rheumatic troubles, having splendid teeth and no scurvy while fed on their natural diet. Of average height, they are plump but powerfully built, with yellow skin darkened where exposed. Cheerful, hospitable, and kindly, with remarkable powers of endurance, they take great care of their clothing, for this renders them independent of weather and enables them to carry out aquatic hunting. It consists of two layers of fur—seal or reindeer. The air in the interstices of the fur, inside the hairs, and between the two layers of clothing, acts as an insulator and prevents loss of body heat while allowing evaporation of sweat. The well-developed layer of fat beneath their skin acts also as a natural garment; a thick coat of blubber protects warm-blooded whales and seals from ice-cold water. The footwear is made of two layers of fur, and dry grass may be put under the soles and changed each evening, great attention being paid to care of the feet.

Their food consists of raw meat—seal, walrus, whale, reindeer, and bear—fish, and in the summer game and eggs. Liver, blood-soup, and pieces of hide to chew are regarded as delicacies, while maggots growing in meat in summer are eaten raw with relish. Much blubber is consumed, as fat is a concentrated food and has more than twice the heating energy value of dry protein. While largely living on raw animal food, the Eskimos when inland in summer eat berries and the herb angelica. They also consume the paunches of reindeer, containing half-digested moss. No salt is needed with their animal food, while much water is drunk.

In summer the Eskimos dwell in tents made of skins stretched over a framework in double layer, the fur of the inner layer of skin being turned inwards. Such a tent may hold three or four families, each with its own cubicle, in front of which burns a lamp. The lamps when properly attended to do not smoke, and afford both light and heat. There is a hole at the top of the tent, and through this hole the great difference of temperature within and without the tent keeps up a free ventilation. The stench within may, however, be very strong. As the temperature may be 80° to 90° F. the Eskimos go naked indoors. The tents are moved before the surroundings become polluted; dogs act as scavengers, while the outside cold keeps in check all decomposition. For winter they cover the framework not only with skins but with moss, peat, and blocks of snow. When travelling they very quickly build a hut of such blocks cut with their knives.

In the centre is a hearth, while a hole in the roof affords ventilation.

The Eskimos are very susceptible to respiratory and other infections as soon as they come in contact with civilized people; they suffer then from tooth decay, tuberculosis, influenza, measles, etc., and particularly so when they change their natural food and dwellings for those of civilization and white men introduce immorality and disease. Normal children taken from Siberia to Moscow did badly; now schools are put up in their birthplace. In Alaska, where hygiene is taught and enforced, Eskimos are doing well, being quick to adopt useful civilized methods. Their fertility is high—for example, 42 per 1,000 in Greenland—and where the struggle to live through the winter is great they kill off the girl infants and practise polyandry. An expectant mother thinks nothing of stopping and giving birth to a baby when out on the ice fields. Hiding it under her fur garment, she hurries on after her people.

The Lapps, about five feet high, are bow-legged, tough, and hardy people. Their clothing, tents, huts, and food are much the same as the Eskimos'. Infants are washed in warm water, at first daily and then occasionally, but never after 2 years of age. Older Lapps wash their hands only; sweating cleans the bodies of Eskimo and Lapp. Cooking-pots are well washed, spoons are licked clean, and knives cleansed by use. The fur bedding is taken out of the tent daily and well aired on the snow. Their food, mostly animal, is eaten raw or dried. They never fry food. Reindeer milk and cheese are taken, and angelica and sorrel in summer. The Lapps also are free from tooth decay, catarrhal infections, and rheumatic troubles so long as they live their own lives in the wilds. On the unfrozen Murman coast in the fishing season, when the ports and houses are crowded and dirty, respiratory and gastric complaints, tuberculosis, and rheumatic troubles are in evidence among the Lapps who come there. The Indians in British Columbia and in California, living their own lives in reservations, show no signs of chronic rheumatism, except a little osteo-arthritis of the spine in old age. Rheumatic fever with carditis is more frequent in the northern than in the southern reserves.

In temperate climates the difference in incidence of rheumatic fever between summer and winter in some cities approaches that of latitudinal difference. Thus in Cincinnati rheumatic fever is six times more frequent in March than in August and September. In Chicago the difference is much less. This difference has led many to believe that protection from sudden weather changes would go far to reduce the likelihood of rheumatic attacks, but the absence of such from Eskimo and Lapp exposed in the wilds to very severe weather conditions disproves this view. In the Tropics the open-air life is as protective as the Arctic cold.

Conclusion

The literature contains many speculations about the influence of cold and damp, cyclonic disturbances, the electrical state of the atmosphere, etc., but the evidence shows that it is conditions produced by dirty, artificially heated, and ill-ventilated houses, and density of population, which cause decay of teeth, catarrhal infections, and rheumatic troubles, the ill effect of these conditions being intensified by a diet in which the protective foods are deficient. Women suffer from rheumatic troubles more than men, because the latter by going to work change to better conditions, while at home wives give them the best

of the food. The fear of cold intensifies the ill effects of the indoor environment.

In the preparation of this paper I have been assisted by Dr. Novakovsky, who has collected evidence from numerous books on Eskimos and Lapps, and from Russian and other sources.

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HEPATIC INSUFFICIENCY IN SCARLET FEVER

BY

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Nephritis is one of the most frequent and serious complications of scarlet fever. There are, in addition, cases in which, though no frank nephritis develops, symptoms and signs point to some involvement of the urinary system. At present there is no method by which the onset of this complication may be anticipated, and treatment must wait until symptoms develop, and may even then be half-hearted on account of doubt as to the diagnosis. It was therefore decided to carry out a careful clinical examination of cases of scarlet fever as a routine in the hope that some warning might be detected in the cases which later developed nephritis.

Investigation

The material was drawn from cases admitted to Belvidere Isolation Hospital in which a diagnosis of scarlet fever had been made. In each instance this diagnosis was confirmed by two medical officers. The number of cases investigated was 219. These were divided into three series.

Series 1 (63 Cases).—All were well-marked cases of scarlet fever, no mild or atypical ones being included. The investigation was carried out from the time of admission until the day on which the patient was allowed up (this was normally the twenty-first day of illness). Twelve of the sixty-three developed nephritis.

Series 2 (144 Cases).—Here all cases of scarlet fever admitted to the hospital over a period of three months were included, and the investigation was carried out for four to five days in the third week of illness. Seven in this series developed nephritis.

Series 3 (12 Cases).—These cases were all on a diet poor in protein (2.5 grammes daily) during the investigation, which was carried out for five days.

It was observed that the relation between the specific gravity and the urea concentration of a specimen of urine varied in a rather significant manner. The results have therefore been analysed from this aspect. Normally the specific gravity of urine varies with changes in the amount of urea in the urine, as a large proportion of the total dissolved solids of the urine is in the form of urea. It was considered that if some equation could be found to express this relation it might be of value in assessing the composition of the urine. The following equation has been suggested, and has been used in comparing the results of the cases:

The percentage of urea in the urine, multiplied by 10, minus the last two figures of the specific gravity estimation of the same specimen: the figure thus arrived at has been called the urea factor of a specimen of urine.

Example: If in a specimen of urine the percentage of urea is 2 and the specific gravity 1020, the urea factor is found as follows:

$$2 \times 10 - 20 = 0$$

This urea factor depends upon the proportion of the urea in the dissolved solids in the urine. This arbitrary figure was found to be normally about zero.

Results

It was observed that there was a general fall in the urea factor throughout the first three weeks of the illness, and that the figure was at its lowest at the critical period—that is, at the period when nephritis most commonly

CHART I

CHART I: SERIES 1 CASES.—This shows that there is a steady fall in the urea factor until the nineteenth day, and that thereafter it rises slightly. The lowest figure is -2 on the nineteenth day.

CHART II

CHART II: SERIES 2 CASES.—Here there is a fall from the seventeenth to the eighteenth day, and then the figure remains almost steady until the twenty-first day. The lowest figure reached is on the twenty-first day, and is 1.1.

CHART III

CHART III: NEPHRITIC CASES.—Here the urea factor is much lower than in the previous two charts. The lowest figure reached is -5.2.

CHART IV

CHART IV: SERIES 3 CASES.—Here the figure is seen to remain above zero although the patients were on a low protein diet.

occurs, namely the end of the third week. In cases with nephritis, however, the urea factor was found to be lower than in the non-nephritic cases. This fact is best seen by an examination of the accompanying charts.