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RHEUMATISM IN CHILDHOOD

being

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by

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INTRODUCTION.

Rheumatism in childhood with its diverse manifestations, many of which were unthought of in the earlier descriptions of the disease, is the cause of much of the heart trouble that is found not only in childhood but in later life, and as treatment, to be successful, demands a knowledge of every condition which may be a manifestation it is the purpose of this Thesis to attempt a review of these, and to note what work has been done to clear up the Etiology of the disease. . There are in late years many workers in this field, and although on certain points there is not yet perfect agreement many questions have been cleared up, resulting in the more successful prophylaxis and treatment of the condition. When the remaining points have been settled there is good reason to hope that still more will be possible to prevent the decrepit hearts which are yet all too common in medical practice.

HISTORICAL/

HISTORICAL.

Rheumatism, according to the ancient writers, was a condition in which a "rheum" or mucous discharge flowed down from the brain, and caused pain and distress in the affected part; and previous to the seventeenth Century it was joined up with Gout, and all other joint affections, and was labelled Arthritis, any differentiation being solely as regarded the degree of the condition, or the situation of the affection; thus any arthritic condition in the feet was known by the general name Podagra. Ballonius, whose work "De Rheumatismo et Pleuritide" was published in 1642, some 26 years after his death, is credited with being the first to note a distinction between gout and rheumatism, and to use the term Rheumatismal in something like its present sense. This distinction was emphasised by Sydenham, who, in 1670, pointed out the different age of incidence of the condition, and that rheumatism attacked the young and vigorous. He also noted its greater frequency in the Autumn, and that it rarely killed the patient. Since these days various conditions, such as gonorrhoea, pyaemia, and haemophilia, formerly included under rheumatism have been shown to be distinct entities, but while a process of limitation has thus been going on in one direction, there has been almost more an expansion in another, and most of the manifestations/

manifestations of the disease, as it exists in children, belong to this expansion. It was not until 200 years after the work of Ballonius that heart involvement was recognised as one of the elements of the disease, as it was in 1835 that Bouillaud first wrote that it was to be regarded as produced in the same way as the joint inflammation. Prior to that date cases had been recorded where there was arthritis and at the same time cardiac disease, chief among the recorders being Sir John Pringle in 1761, Pitcairn in 1780, and Scudamore in 1827, but these were not linked up as part and parcel of the same malady.

Chorea was the next condition included among the manifestations of rheumatism, Botrel, in 1850, going so far as to claim that all cases of chorea were rheumatic in origin.

Hamilton¹ in 1809 quotes Maximillian Stoll of Vienna as recording in 1787 the case of a girl "subject to rheumatism which being neglected terminated spontaneously in chorea," but in none of his own cases is mention made of any rheumatic connection although a case^{1a} of Professor Home of Edinburgh, a girl of 15, had pains in her legs and arms which she ascribed to cold.

With these exceptions, heart involvement and chorea, and the fact noticed by several but specially impressed by Cullen in 1772, that rheumatism was not associated /

associated with suppuration, there was no further substantial gain in the knowledge of the disease until 1881, when Barlow and Warner² at the International Medical Congress read their paper on the Rheumatic Nodule, in which they indicated its proneness to occur in children, and its value both as diagnostic in, and prognostic of, the condition. But it is to Cheadle³ that is due the credit of the greatest advance in our knowledge of the wide spread manifestations or symptom-complex of the disease, and though much work has been done since that date, (1888) there is little in our present knowledge which was not then pointed out by him.

Many theories of the causation of Rheumatism have been advanced at different times. Cold and damp, noticed often in connection with attacks, was one of the first theories, but this was proved weak in the fact that the disease does not affect most those who should stand cold worst - the aged; that it is found in temperate regions, and not the very cold; that it affected less the chiefly exposed joints of the fingers and toes, preferring rather the knees and ankles; and that it often involved fresh joints in cases, days or weeks away from the cold, and in bed.

Next came ^{the} Lactic Acid Theory. This acid, a product of tissue metabolism, is formed in large quantity during exercise/

exercise, but for the same reason its elimination is then most active. Anything interfering with the skin's action, for the elimination is largely through the skin, would interrupt the elimination, and accumulation would occur. Prout it was who made the definite suggestion that rheumatic symptoms were from the accumulation of this acid in the blood, probably due to the effect of cold on the skin, and that it was the materies morbi. In support of this, the urine, the sweat and even the buccal secretions were found to be distinctly acid. But the theory found its condemnation in the failure of the alkaline treatment which the hyperacidity seemed to demand, and no explanation could be offered of the left side of the heart being specially involved when both, if the condition was due to a general acidity in the systemic circulation, should have been equally. This theory breaking down, Latham, in his Croonian Lectures, suggested a modification of it, a combination of lactic acid and uric acid as the cause, the uric acid acting on the nutrition centres of the joints and causing the inflammation, but this again was unsatisfactory as it was difficult to believe that uric acid could cause so different conditions as gout and rheumatism; in addition to which uric acid in excess is not proved in rheumatism.

Then again there was the neurotic theory advanced by/

by J. K. Mitchell in 1831, but that proved untenable as the conditions found in rheumatism were different to those found in spinal degenerative changes, and besides there was no explanation in it of cardiac involvement, now recognised as equally rheumatic with the joint symptoms.

Haygarth thought there were several analogies between an ague and rheumatic fever, and from this arose the Miasmatic Theory, which is interesting as the origin of the modern medicinal treatment of the condition. As it had been found that the tree, whose bark was most effective in the treatment of malaria, grew best where the disease was most prevalent, MacLagan⁴ searched in localities which, from their position and climate, were favourable to rheumatism and found the willow as the outstanding growth. From these he extracted the bitter principle Salicin, and his treatment with the Salicyl compounds introduced in 1876 marks the greatest step in the cure of the condition, the arthritic illness and the acid sweats, then the chief scene in the rheumatic picture, being reduced to days against its former weeks or months.

In the meantime germs were being looked for. In 1875 Klebs observed cocci in the cardiac valves, and in 1877 Popoff isolated a micro-coccus from the blood in a case of Rheumatic Fever, which on injection into rabbits caused arthritis, endocarditis, and pericarditis.

Mantle/

Mantle⁵ published a paper in the British Medical Journal, 25th June, 1887 "On the Etiology of Rheumatism considered from a bacteriological point of view," and to him seems due the credit of first stating this proposition. He extracted fluid from the knee joint in seven cases, and in sixteen others he tested the blood, obtaining sometimes a bacillus, at others a diplococcus. He at that time admitted that the test of their specificity would be their reproduction of the disease. Personally he failed, being allowed by the Home Office only two experiments, and giving evidently an insufficient dose.

In 1891, Achalme described his bacillus. It was anaerobic and spore bearing, and had been isolated from cases of acute rheumatic fever. This particular bacillus was also described by Thiroloix and Coyon, but it is now generally thought to have been an accidental finding. On inoculation the disease it produced did not resemble rheumatic fever, it was more like malignant oedema.

Singer found Staphylococci and Streptococci, and he advanced the theory that the disease is simply an attenuated form of pyaemia, but against that is the absence of suppuration even in rapidly fatal cases.

Other outstanding investigators Dana in 1894, Wasserman in 1899, Poynton and Paine in 1900, Beaton and Walker in 1903, and Beattie in 1904 isolated out a diplococcus which, with some small points of difference, seems/

seems uniformly to act by producing the lesions of rheumatism, and this is by most writers considered the specific microbe of/infection.

.ETIOLOGY/

ETIOLOGY.

Poynton and Paine⁶ in 1900 announced that they had obtained in eleven successive cases of acute rheumatism a diplococcus named by them the *Diplococcus Rheumaticus*, and that on inoculation into rabbits it had produced acute non-suppurating polyarthrititis, endocarditis with vegetations, pericarditis and, occasionally, a condition which they regarded as comparable to chorea; and since then they have continued to separate out successfully the same organism with the same consistent results. It has been obtained by them from the blood, the valve vegetations, the nodule, in the pericardium and joint structures (beneath the endothelial lining), from the exudation of rheumatic pneumonia, from the kidneys, and from the interstitial framework of the tonsils (Poynton⁷). They admit its occasional difficulty in finding which they attribute to its small size (.5u in diameter), the fact that it is rapidly destroyed at the site of the local lesion; and that in clear effusions it is often much diluted. In 1903 Beaton and Ainley Walker⁸ isolated a streptococcus, sometimes in long chains, at other times in groups of two, from fifteen cases, ten of which were pure, the other five contaminated. Eight of the cases were living subjects, seven were from the hearts blood post/

post mortem. On cultivation and under the microscope their organism resembled an ordinary streptococcus, but it showed some points of difference in growing rather more freely, and forming rather more acid and that more quickly. Though they noticed that, in the tissues of animals and in cultures when recently removed from the body, it tended to lie in pairs, they called it the *Micrococcus Rheumaticus*. Taking three different specimens, one from an acute rheumatism with endocarditis, a second from a chorea dying of heart failure, and the third from the urine of an acute rheumatic chorea, they inoculated seventeen rabbits and got pyrexia and acute arthritis in all cases and sometimes pericarditis or endocarditis or both. In large doses death eventually ensued, but never pyaemia, and in small doses arthritis and cardial lesions, when any, recovered. In one case by repeated dosing they produced four successive attacks.

Vernon Shaw experimenting in 1903 with cultures of Poynton and Paine's, Walker's, and Wasserman's micro-organisms came to the conclusion that they were identical and were the causal agents of a condition in animals which exhibited the salient features of acute rheumatism in man. This is the case for the *Diplococcus*, and opinion is generally favourable to it. Some hold, however, that the case is non-proven. While admitting/

admitting that the cause is a micro-organism, they consider that the particular one is still unknown (Bulloch⁹).

Whatever the organism, the path of its entry into the system is usually by the throat, but it is possible that in cases where there is no throat affection, the route may be through the bronchial mucous membrane, especially if there already exists some catarrhal condition of the part, or through the wall of the intestine damaged by some condition such as mucous colitis (Mackenzie¹⁰), and in the few cases recorded in very early infancy it must be carried by the maternal blood.

Besides the micro-organismal or exciting cause, there are certain factors which predispose to the condition. An important part is borne by inheritance, 70% (Church¹¹) showing a family history; and double inheritance seems to intensify the tendency not only to the disease but in its severity and persistence. The rheumatic constitution is, according to Duckworth¹² a very definite one. In early years the child may have no appearance of delicacy, having a satisfactory development, but some defects may be noted in the vascular system such as a dilatation of the facial capillaries with a languid circulation in the small vessels, leading to cold extremities and a tendency to chilblains; and a curious fact and one frequently noticed/

noticed is that red haired children seem to have a special tendency to the condition. Pollock¹³ puts it that a tendency to rheumatism exists in certain persons as there is a tendency to snow storms in the Winter or gales at the equinoxes, so that what is necessary is not only the proper seed but a suitable soil.

Amongst the causes which operate to prepare the soil would be anything which tends to lower the resistance, such as anaemia, exposure to wet and cold, poverty and previous attacks. Wet and cold are common factors. Newsholme in his Milroy Lectures 1895 brought forward much evidence to show that wet and cold weather after a period of heat and drought are especially favourable, and that the disease requires a low level of ground water; and in their greater exposure to the weather and their insanitary homes may be found an explanation of the greater frequency of the disease among the poor. Previous attacks, predispose, probably accounted for by the presence of the deep lying nodulation and valve vegetations; but for the reason that these lesions are deep lying there is little tendency to direct infection as there is small chance of the liberation and dissemination of the infective agent. Cases are, however, recorded which seem to show direct infection, Hawthorne¹⁴ giving five cases which, with one exception, were all seen and the diagnosis confirmed by two or three independent medical/

medical men, where this seemed to have occurred. In certain damp and low-lying districts the condition is endemic, and some particular houses have an unenviable reputation. No age is exempt, but the disease is rare under 3 years. Holt¹⁵ records a case in a child at a little over 12 months old; Pocock treated an infant 12 hours old, born during a rheumatic attack in the mother, the mother recovering, with heart lesions, and the child without; and Poynton¹⁶ gives a case of a child dying on its second day where the mitral valve was actively diseased and in the vegetations were great numbers of streptodiplococci. The mother in this case had suffered from severe rheumatism during pregnancy.

Up to 15 years of age, there is a slightly greater tendency to the disease in the female, the heaviest incidence being from the age of 10. From 5 to 10 the sexes are about equal, but up to 5 the male is the greater sufferer.

THE/

THE MANIFESTATIONS.

Rheumatism in the adult is marked by its sudden onset with high temperature, many painful joints and profuse acid perspiration, but in childhood these, the "classical events" of the disease, according to many text-books, are much less noticeable. The temperature, unless in the presence of pericarditis, acute tonsillitis, or pneumonia, rarely exceeds 100° to 101°F. acid sweats are almost unknown; and when joints are involved, which is not constant, they are fewer in number and there is as a rule much less pain and swelling; but in the place of these other equally rheumatic conditions as chorea, subcutaneous tendinous nodules and erythemata come much more into prominence; indeed some of them are almost entirely associated with the disease in early life. Instead of the sudden illness of the adult form, there may never in the young be more than a slight malaise, so slight that it is occasionally overlooked altogether; and yet with this there may be progressive disease of the heart leading on to after misery and uselessness. It is this tendency to get heart involvement which gives the seriousness to the condition, and no matter with what manifestation it starts, and it may start with any or with any group, the rheumatic road always leads in/

in that direction.

In this paper the various manifestations are treated of in special sections and a number of cases seen in country practice are put on record under those sections which are devoted to their outstanding symptoms, but in all there is the same story of heart implication (more or less) and for that reason Carditis among the separate sections naturally takes pride of place.

CARDITIS.

Heart implication in rheumatism is not a complication, it is the essence of the disease as it occurs in childhood, and the younger the patient the more apt is the heart to be involved, the more apt to have recurrence, and consequently eventually the establishment of graver cardiac lesions.

Sir Thomas Watson says that he has known only two persons, prior to the age of puberty, pass through acute rheumatism with an untouched heart, and in these he expresses doubt as to the genuineness of the condition being rheumatism. Church¹¹ gives 80.5% of cases under 10 years of age showing heart implication, and Carey Coombs¹⁷ 72.5%. These figures show cases in which the heart is involved and by some physical sign, or otherwise, show it, but there are cases where it can be believed there is involvement, and the organ completely/

completely recovers. In a few cases, however, the heart may escape altogether, but these are very few, and for clinical purposes it is best to consider that all cases are thus affected. MacLagan^{4a} states it as a pathological fact that the tendency of a given portion of fibrous tissue to be affected by the rheumatic poison is directly as its functional activity, and in this way explains the more frequent involvement of the heart in childhood.

The first incidence of rheumatism is generally on the heart, and in cases seen for the first time, it may be for slight muscular pains, or loss of flesh or appetite, gross cardiac lesions may be discovered. On the other hand, heart involvement may come anywhere in the rheumatic series. There may be no subjective symptoms, and the discovery is only made on examination, led up to by the existence of some other guiding symptom. Occasionally it comes on in an acute form with pain, dyspnoea, delirium, violent sickness, or extreme prostration, but this is usually in a case where the organ has already been damaged by some previous attack, whether noticed or unnoticed.

All the structures of the heart are apt to suffer. Some hold that there is a myocarditis in every case, but certainly it is present whenever the pericardium is affected, and generally when the endocardium is. In children there is a great tendency to get a pancarditis/

pancarditis, and to this tendency must be attributed the fatalities of the condition at that age. In adults an endocarditis tends rather more to remain an endocarditis, and a pericarditis, a pericarditis.

The involvement of the heart may be produced in two ways, either by being itself the seat of the rheumatic infection, from the presence in any of its layers of rheumatic nodules, or the myocardium may be poisoned by the toxin, manufactured by the organism whatever the side of its growth, and circulating in the blood. The circulation of ^{the} toxin produces dilatation of the various chambers, more especially of the left ventricle and Lees¹⁸ maintains that dilatation of the left ventricle, more or less, is invariably present and is an inevitable manifestation of the disease, and one of its earliest symptoms. Its presence or absence may be proved by the extension outwards of the left cardiac dulness - which, in the child, should be about the left mammary line, and when the heart is involved may be one or two fingers-breadths further out.

The incidence of heart manifestations in the disease may be studied in reference to inflammation in each of its three separate coats, the endo-, meso-, and peri-cardia.

ENDO-CARDITIS.

Though any one of its coats may be the first to be/

be involved, generally it is the endo-cardium, and this may be alone (generally with the meso-cardium) or in association with, or after or before any other of the recognised rheumatic manifestations. Endocarditis may be the only gross expression of rheumatism in the individual. It may be subacute and insidious, or acute and progressive, in which case it is especially often connected with subcutaneous nodules.

Subendothelial nodules, exactly analogous to the tendinous nodules, are found throughout the heart, but they are especially found in the region of the mitral valve, and in less number around the aortic. They project into the heart from the auricular side of the valve cusps, become covered with fibrin thus forming the vegetations, and when they get older they contract, are converted into fibrous tissue, and pucker the valves, thus causing incompetence. From this the characteristic condition found is a mitral systolic murmur with, in addition, any variation added from the implication of other parts. But mitral systolic does not necessarily imply valve lesion - it may be due to the toxic action of the poison on the myocardium producing dilatation, and from that an inability on the part of the valves to become properly closed. A "temporary" systolic from dilatation is generally the first impurity to be heard, but this may be continued into the permanent systolic of valve deformity. Before the/

the formation of a murmur the signs may be very vague, there may only be some quickening or irregularity of the heart's action as discoverable in the pulse.

Barr¹⁹ gives among the early signs of endo-carditis a dull first sound and a delayed radial pulse so that there is an appreciable interval between the hearing of the one and the feeling of the other, and claims that by this means endo-carditis may be diagnosed some days before a murmur is heard.

The soft blowing systolic murmur at the apex, accompanied by accentuation of the Pulmonary second sound indicates mitral leakage, and is due to the thickening and rigidity of the flaps and chordae which lead to imperfect closing of the valve. Another early sign is reduplication of the second sound at the apex, probably due to a retarded opening of the mitral. After the involvement of the mitral, the aortic is generally next to show incompetence, with a soft blowing diastolic murmur heard there.

The order of events in heart affection is incompetence, then stenosis, and as the condition passes on from the one into the other, there is naturally a modification in the sounds heard at the heart valves. The true presystolic of advanced stenosis is very rare in childhood. Occasionally there are no signs of heart affection to be made out during a rheumatic attack, not even dilatation, and yet in the course of
a/

a month or two distinct evidence may be obtained. In these cases there may have been an endocarditis only, and this overlooked from the absence of symptoms. (Gossage²⁰).

PERICARDITIS.

In the pericardium one gets the formation of nodules; there may be one or two or many, and they may be confined to a small area or spread all over the sac. The inflammation leads to roughness and effusion, the latter generally small in amount and early absorbed. The sac is, as a rule, covered with plastic lymph and, if present recovery takes place, this may be the starting point of adhesions and future embarrassment of the heart. But there may be adhesions without embarrassment, depending altogether on their situation.

Pericarditis may be the first event, or it may occur anywhere in the series. As a rule it is found P.M. in fatal cases. It may be acute, subacute, chronic or recurrent. The first evidence may be vomiting, or disturbance of the cardiac rhythm, or an audible rub, which is generally heard first towards the base. When vomiting comes on without any apparent cause in a child who has other evidences of rheumatism, and especially if there be some rise in temperature, the pericardium should always be examined. If pain were present this examination would be demanded, but, as/

as in these cases there often is no pain and as any discomfort complained of might quite readily be put down to the pyrexia, the condition has special opportunities of being overlooked. Pain, when present, or discomfort may be referred not to the praecordium but to the epigastrium and gives thus another opportunity for overlooking. The only guide to the condition may be an increase in the deep cardiac dulness which, at times, is very great, extending from the right nipple line to the left axilla.

Pericarditis adds greatly to the gravity of the case. Still²¹ records 25 deaths from 53 cases within four months - 9 being within a fortnight.

MYOCARDITIS.

Practically always where the endo-cardium is affected there is an involvement of the muscle layer underneath, and always where there is pericarditis this is found. In the myo-cardium has been proved the presence of fibrous nodules such as have been described in the endo- and peri-cardium. The chief location of these is in the left ventricle around the mitral and aortic orifices, but in greater number around the former. The presence of these and the production within them of a toxin gives paresis of the muscle around and thus dilatation of the heart chambers. Dilatation also occurs from the toxin circulating in the/

the blood but in those parts in the region of the valves named, parts which are bathed in their own local toxin, extra dilatation occurs. And from the fact that the mitral has outside its fibrous ring a muscular band, absent in the case of the aorta, which band is in the part specially supplied with toxin, it becomes more quickly paralysed and gives at an early stage the incompetence which is recognised as the first and characteristic sign of the heart's involvement from rheumatism. As a result also of the toxin produced in the heart muscle, fatty degeneration may occur in the fibres, and another reason for ventricular dilatation is established. Myocardial inflammation may eventually lead to constriction of the orifice from cicatricial contraction around it. Loss of tone may on the other hand remain, and lead to permanent enlargement, with incompetence as a consequence.

The myocardium may be thus affected in two ways, dilatation being caused by myocardial poisoning or myocardial inflammation; in either case incompetence of the valve is produced as shown by the mitral systolic murmur. The mitral systolic most often indicates the presence of myocarditis; a mitral diastolic, occasionally heard, generally indicates the absence of myocarditis, and is produced by poisoning.

On the very slight cases there may be no distinctive physical signs, but in severe cases there may be marked/

marked dyspnoea with a diffuse and feeble apex beat.

The ultimate prognosis of a case is influenced more by the amount of the involvement of the heart muscle than the development of a valvular defect. Carey Coombs²² in 89 autopsies found 46 where the serous lesions were quite inadequate to account for death; in these, therefore, and probably in many of the other 43, the myocardial lesions must be held as responsible for the fatal termination.

The following cases have been chosen to illustrate this section of the paper, the first one because it was the case which drew the writer's attention to the subject, and the second because of its early fatality from heart implication. These cases are the only fatal ones which fall to be recorded, and both had red hair. The first was an accidental discovery in a casual surgery consultation.

R.C. female, aet.9; was brought in April 1899 for pains in the thighs which had troubled her off and on for some weeks. They were now interfering with her walking; she was less inclined to "play" and she could scarcely get off to sleep at night. She was a sharp, pretty, bright-eyed girl with hair of the redness sometimes called Titian red. Examination revealed no swelling in the muscles or joints, but the casual examination of the pulse (casual is written advisedly/

advisedly for the child seemed very little ill) led to the discovery that it was very irregular. On a more thorough examination and enquiry into the family history, it was found that there had been breathlessness but since the pains had become worse this had not been complained of. The heart showed a rough systolic mitral murmur conducted to the axilla. The temperature was 99°F. the throat was apparently healthy and the tongue clear. The mother and a brother of the patient were at the time abroad for their health. The mother had had rheumatic fever twice, and the brother had heart disease. (The brother died a year later from heart disease.) All the other members of the family were said to be, and were afterwards found to be, healthy. The patient had never had any condition resembling rheumatism until the present pains which were looked on as "growing pains". She was put to bed for five weeks and with rest and tonics improved, requiring no further treatment until December of the same year for a slight sore throat which reacted quickly to salicylate, and the heart did not seem to be any further affected.

Further history. The Spring following patient went, with her family, to live abroad. She became a hopeless little invalid - this learned from reports sent home - developing arthritis and various other conditions, and dying three years later from "Pneumonia".

R.E./

R. E. Male, Age 10. A thin, white faced, red haired boy was seen for pain and swelling in both elbows and wrists. He looked ill, being propped up slightly in bed for breathlessness. Temperature 100° . Examination revealed diffuse apex beat, mitral systolic murmur, and a number of small nodules along the flexor tendons of the wrists with larger ones over the olecranons. One sister had died of acute rheumatism, and a brother had suffered from rheumatism in the joints. The patient had never been strong and had complained frequently of sore throats and pains in his muscles, but had never been treated for rheumatism. On the fifth day of the illness vomiting supervened, with marked dyspnoea and severe pain over the praecordium, and an elevation of temperature to 103° . Death occurred two days later from acute pericarditis.

ARTHRITIS/

ARTHRITIS.

This is the outstanding condition in Adult rheumatism, but in childhood it is less prominent, Dunn²³ in 233 consecutive cases finding it present in only 45% and showing less swelling, tenderness and pain, with fewer joints affected, and an average duration of under two days. Some hold that it is present in every case, though slight and evanescent, and that it more often than not is the starting point of the rheumatic series of events; but there are cases where the closest cross-questioning elicits no history of it at all, and yet there may exist the severest cardiac lesions. When present and complained of arthritis does not present the same picture as in later years, as the child may be able to walk about notwithstanding the fact that the knee and ankle are the most commonly affected joints. The wrist comes next in order, and after that the metacarpophalangeals, with the rule that the smaller the joint, the more serious is the condition likely to be. There may be only one joint involved, and if that one happens to be the hip it may closely resemble starting tuberculosis; a number may be implicated and the affection may then be symmetrical. When the condition passes from one joint, it may proceed to another, but/

but it may return again and again to a particular one having in the intervals visited several others. As a rule there is no local change of any moment in the affected joints, and when the acute condition has passed off even stiffness is quite exceptional.

The fact that a child has arthritis does not necessarily mean that it is a subject of rheumatism, and treatment should never be continued for more than three days where the symptoms are not abating without a reconsideration of the case, a careful examination of the other systems, and a strict scrutiny of the family history for evidences of tubercle or syphilis. Rickets, gonorrhoeal arthritis - not altogether uncommon in the very young - and osteomyelitis may be confounded with rheumatism, and delay in the proper treatment of the last might be especially dangerous, but the ordinary picture of this is quite un-rheumatic with its sudden onset, high temperature, rigors, great pain and delirium.

The rheumatic affection may not be in a joint, but in the extra-articular fibrous tissue in close relation to one, as in the commonly affected hamstrings which, causing the characteristic walking on the toes to save the muscles, gives the appearance of an incipient talipes; it may be in the neck in connection with the fibro-cartilages between the cervical vertebrae and producing a form of wry-neck, or it may be away from/

from a joint amongst the intercostal or abdominal muscles, or muscles of the limbs giving "pain in the side or stomach", or the so called "growing pains" so common as the earliest history in many cases. These may be the only evidences of rheumatism in the locomotory system, and the presence of any of them demands that the condition of the heart should be most carefully inquired into.

The following cases show different types of the involvement of the locomotory system.

J. D. Male, Age 8, had pain and some swelling in both wrists and a temperature of 100.2°. On the following day his right shoulder became affected, and during the first seven days almost every joint in the upper extremities had to be protected for pain, as well as both his knees and ankles. There was no sign of impurity in the heart sounds to begin with, but on the fourth day a soft mitral systolic appeared, associated with dilatation of the left side of the heart.

There was no history of rheumatism on either the father's or mother's side; but the child had unduly exposed himself to cold while his widowed mother was working. There was no other manifestation of rheumatism in the case.

He recovered with permanent damage (incompetence) of the mitral valve. Three years later - age 11 - he had/

had a similar attack, and again at $13\frac{1}{2}$ years, and now at the age of $16\frac{1}{2}$ he is working and evidently in good health, but with slight mitral stenosis.

D. D. Age $5\frac{1}{2}$ (brother of above) was seen three months ago for pain in the epigastrium. This child had always been healthy and was attending school until two days before he was visited. At first there was some semblance of impurity in the first sound at the apex, this becoming a distinct murmur, and it remains after six weeks in bed. This long period was because of the difficulty in getting rid of the pain, neither poultices nor fomentations seeming to help it. The internal remedy was the salicylate - up to 60 grs. per diem.

J. W. Male, Age 4. A delicate nervous child, had suffered from wry neck for four or five days, following his riding a tricycle in a very cold wind. The muscles were distinctly sensitive to touch. Both parents are definitely rheumatic personally and by inheritance. Five grains of Sod. Salicyl and 10 grains of Sod. Bicarb. every three hours cleared off the condition within two days, and the heart remains free from involvement.

J. M. Female, $13\frac{3}{4}$ years; had for seven days pain in the side and back, changing to the limbs; has had frequent/

frequent slight sore throats, bad at night they are generally better in the morning. There was a slight diffuse redness in the throat, and a soft mitral murmur; was quite healthy until she had Scarlet Fever, fifteen months ago, after which she was breathless for two or three months. Pains have cleared off under the influence of anti-rheumatics, but heart murmur remains.

RHEUMATIC NODULES/

RHEUMATIC NODULES.

These are very characteristic of the rheumatism of childhood, being found according to Cockayne²⁴ and Still^{21a} in about 10% of ordinary cases, though in selected hospital cases with definite articular rheumatism Still found them in as many as 50%. Coutts²⁵ puts them down as found in 20% to 30% of all cases.

The subcutaneous fibrous nodule practically ceases with the advent of puberty, although a number of cases have been recorded in adolescence and more advanced years, Fitcher (quoted by Hawthorne²⁶), recording one at the age of 49. They have been seen too, but rarely, in cases of rheumatoid arthritis, after influenza and in syphilis after the administration of Iodides. These are the exceptions - the rule being that they are rheumatism in the child and, according to Cheadle,²⁷ indicate concurrent and usually progressive cardiac disease which in the event of the nodules being large or numerous has an ominous significance, as they "indicate grave danger of a carditis which is uncontrollable and advances almost inevitably to a fatal ending."

MacLagan^{4B} says they bear to the rheumatism of childhood the same relation that arthritis bears to that/
that/

that of adult life, and again that their grave import is not because of any serious effects which they themselves produce, but because they are all but invariably accompanied by progressive disease of the heart.

Hillier in 1868 first described these nodules, noted in a case of chorea with pyrexia and organic cardiac disease, but no articular rheumatism. Thirteen years later, in 1881, Barlow and Warner² showed their frequency and significance as to diagnosis and prognosis. Of their 27 cases, all had heart disease, and 8 proved fatal. But to Cheadle is due to a great extent the furthering of the knowledge of them, and to him is due their name of subcutaneous fibrous nodules.

They may appear in connection with any of the other manifestations of rheumatism, but are mostly associated with endo-carditis and peri-carditis, and are most common where there is definite rheumatic arthritis. They generally are subsequent to heart involvement - but rare cases are seen where, some short time after - a few days or weeks - one gets the first indication of endocarditis. They never seem to be the only manifestation, but there is no single phase of rheumatism in childhood where they have not occasionally been found, and they have been noticed in cases of chorea where there was no other clinical

* evidence/

evidence of rheumatism. Their eruption is generally preceded by a rise of temperature for three or four days, and their seat of election is over the bony prominences. Over the olecranon is an almost constant situation; other positions are the knuckles, the condyles of the humerus and femur, the spinous processes of the vertebrae, the malleoli, the occiput, the crest of the ilium and the spine and crest of the scapula. They are also found in tendons which are comparatively superficial, as the flexor tendons of the wrist. Symes²⁸ figures them in the palm, and the periosteum of the nose. They are found in the subcutaneous tissue, and are generally movable, but they may be fixed to the periosteum, especially of the skull and the patella. Often they are much more easily seen than felt, and to demonstrate them one has, in cases, to put the skin of the part on the stretch, by flexing the elbow for the olecranon position, or bending forward the head to show on the spinous processes. As regards number, there may be only one; three or four are common, and occasionally a large number are present, over 200 having been counted in one case, and there is often noticed an appearance of symmetry in their arrangement.

Pain is rarely associated with them, but in the case of large ones where the tightened skin is pressing them against nerves, they may be somewhat painful. Tenderness to touch is rare. Occasionally there is redness/

redness over them, and erythema multiforme around the affected joint may exist with them (Ibrahim²⁹).

In size they vary from a pin head to that of a walnut. Their growth may be very rapid, and their duration short, one or a crop appearing and disappearing within a few days - but they may continue to grow, or fresh ones to appear, for several months, Cheadle²⁷ giving their duration as from three days to five months. (In the adult, where rare, they seem often more persistent.)

Histologically, the nodule consists of fibrous tissue with some round and spindle shaped cells, and in the interior there is a homogeneous mass of fibrin and necrotic tissue. Externally there is no capsule. They are generously supplied with blood, many blood vessels passing into them. They are homologues of the valve vegetations, and of the lesions of the rheumatic condition found elsewhere in the heart and other organs, and they have yielded the diplococcus from the interstices of their swollen connective tissue. The prognosis, always more or less anxious, depends on their number and size, a great number or large size suggesting a worse outlook. Even small ones and few must be regarded with anxiety, as they tend to have in association with them damage to a, until then, healthy heart, and further damage to one that has already been damaged. But it should not be forgotten/

forgotten that the endocarditis associated with nodules, has in very occasional cases seemed to disappear, and the heart to return to a condition of perfect health.

Only two cases of this condition have been noticed - one of which was recorded in the rapidly fatal case under carditis - the second case is up to the present showing no urgent symptoms.

A. R. Male, 6 years. Has been a weakly child since he had measles at $2\frac{1}{2}$ years. Tonsils and adenoids were operated on at 4 years of age, but a little adenoid growth is again noticed at the back of the throat. He sleeps well, but is always wearied. Over the right tendo Achilles is a distinct nodule which causes limping and pain. The heart shows a mitral systolic murmur. The mother has had much muscular rheumatism in shoulders and arms and sciatica, and has double mitral murmur. Father is healthy but his father has long been rheumatic.

CHOREA/

CHOREA.

There exists some considerable difference of opinion as to how far this is a manifestation of rheumatism. Some there are who would make all cases come under Rheumatism, others who would give a proportion of even as low as 30%.

Still^{21B} regards it as just as good evidence of rheumatism as a gumma is of syphilis, and says elsewhere that if rheumatism be an infectious disease which may affect the heart, the brain, and possibly the lung and pleura, it would be as reasonable to deny that tuberculous meningitis was tuberculous because there was no pulmonary tuberculosis as to deny that the brain affection chorea is rheumatic, because there is no arthritis, that it may be the first and only manifestation to appear.

In 380 cases he finds;-

183 with previous or recurrent articular rheumatism
with or without heart disease or nodules.

8 with cardiac bruit and rheumatic nodules.

2 with nodules without bruits.

12 with systolic and diastolic apical bruits.

3 with aortic diastolic and apical bruits.
208 and

48 with systolic apical bruits only.

This gives 54.3% certainly rheumatic and including the last group of which a considerable proportion must be/

be rheumatic 66.8%. These figures taken with the conclusions of Batten (Lancet Nov.5, 1898) who, following up cases not at the time proved rheumatic, found that 53% eventually suffered from cardiac or articular rheumatism, brings out 75% - 80% within a few years in the class of those provably rheumatically affected, leaving some 20% in whom the chorea would be the only manifestation. Dyce Duckworth³⁰ gives 85% of choreas with personal or family rheumatic history, and he believes that more would be shown if accurate histories could be got; he considers it a true cerebral rheumatism. Carey Coombs³¹ gives 94% of cases in patients under 16 as definitely rheumatic, and Simon³² maintains that it is nothing else but one of the numerous manifestations of rheumatism. Coutts,²⁵ on the other hand, is of opinion that more than half of the cases of chorea go through life without exhibiting any of the more definite signs of the disease. Other authorities might be quoted, but sufficient has been done to show that there are great differences of opinion, although all are agreed that there is a marked connection, and this has reason in it for, as MacLagan⁴⁰ puts it, Rheumatism being essentially a disease of the motor apparatus the condition will hark back on the motor centres in the brain giving by their excitation, in certain cases, the choreic movements. The age of incidence also bears a strong/

strong resemblance to the incidence of the other manifestations, 80% of all cases being between 5 and 15 years and 50% being before 10 years. Very few cases are seen under the age of 5 (Guthrie Rankin³³). The heavier incidence in the female sex, the proportion being about 5 to 2, is explainable by the more emotional temperament of the sex. The rheumatic child is the nervous child, and any undue excitement, mental strain, shock, dental caries (Pedley³⁴) which have all been observed as determining factors of the condition, would tend to affect most the more susceptible female, especially at the age of her greater development.

Chorea may accompany or follow any individual manifestation or group of manifestations, or it may inaugurate the morbid series in which case enquiry may discover the existence of endocarditis or arthritis in some other member of the family, but even if this fails the condition runs the same course, there is the same tendency to recurrence and the same liability to cardiac involvement and it is therefore one's duty to look on all such cases with great suspicion and to treat them as if they were rheumatism. When the condition has formed there is no difficulty in the diagnosis, but as the best results are obtained when the condition is not beyond its incipency it should be remembered that the existence of night terrors, undue irritability or the persistence of headaches in a child are often the starting/

starting point of the disease, and when any of these are associated with a positive personal or family history the warning they hold out should not be overlooked.

The following cases have been chosen as showing the developed condition and the incipient case.

J. T. Female, Age 9. Had growing pains in the legs about a month ago, associated with a slight sore throat. She had several times before had sore throats but this was thought little of as the family were "throaty" (one sister and one brother afterwards required tonsillar operation for marked hypertrophy). The patient became fretty and restless, and advice was sought for some jerky movements; the girl was beginning to "make faces" and wriggle about when spoken to. Examination of the heart showed a slight impurity in the area of the apex. The condition passed on to a general chorea which seemed not to benefit by salicylate treatment (this however was not pushed hard, being given $7\frac{1}{2}$ grains every four hours), but she recovered under the administration of Liq. arsenical $mii\frac{1}{2}$ ter in die increased daily by $m\frac{1}{2}$ s per dose until mx per dose were taken, and the drug reduced in the same way as it had been increased. A long holiday from school was given and she returned after six months with, however, a permanent valvular lesion. Within a fortnight there was evidence of a return of the condition, and she was immediately put back to bed.

Arsenic/

Arsenic was again administered and recovery of jerking soon happened.

During the intervening ^{seven}/years - she is now 16 $\frac{1}{2}$ - there have been occasional slight sore throats, and occasional joint pains, but she has been treated for these at home by rest in bed and with Blaud's capsules. She is at the present time in fair health assisting in the home, but shows a double mitral murmur.

P. B. Female, Age 11. Developed what was thought to be an influenza, and was unable to rest or sleep for five days because of a violent headache. Bromides evidently had been tried but with little effect. She was brought home to the country, and got a little rest for a night or two, but on the twelfth day from the start of the illness the headache returned with great severity and the temperature reached 101^o. The headache was much in excess of what the temperature warranted. The child looked very ill and showed an incessant blinking in the left eye - the one that was near the light as she lay in bed. There was nowhere else any irregularity of movement. There was some irregularity of the pulse, and on auscultation a soft blowing systolic was found in the mitral area. The family history was that the father was not strong, suffering from some form of neuritis; the mother had had no illness although she admitted she fainted on the least/

least provocation. No rheumatism by that name was known in the family though the maternal grandmother of the patient had pains "due to old age". The child had glands removed from the neck, their nature not known, and her tonsils tipped with the guillotine, but they now showed crypts filled with mucus. Absolute rest was ordered. Soda salicyl grs.5 with Sod. Bicarb. was given every two hours and that night the child slept better than she had done since the commencement of the illness. The next day the headache was quite cleared away and blinking stopped and the patient was anxious to get up, but she was kept for three weeks longer in bed as passive exercise at the end of a fortnight showed itself on the heart's action. There still remains a murmur to mark the illness.

RHEUMATIC/

RHEUMATIC SORE THROAT.

Sore throat is one of the common manifestations of rheumatism, and a history of it can be got in something like 80% of cases (Havilland Hall³⁵). Sometimes the condition is very slight, in which case close investigation of all symptoms is necessary to elicit this knowledge, as the slight feeling of stiffness and soreness may be attributed by the patient and friends to the effects of an ordinary cold; and occasionally it is quite overlooked because of the somewhat more severe lesions of arthritis, or the movements of a chorea. Quite frequently it is an early symptom, but it may occur anywhere in the series; it may be the only symptom of the rheumatic state. When examined, a general congestion is discoverable in the throat in a typical case, extending over the margins of the soft palate, the tonsils, the pillars of the fauces, and the posterior wall of the pharynx. With the unusual redness, there may be actual swelling in any or all of these parts, and in severe cases some oedema of the mucous membrane, especially of the uvula, may be noticed.

The rheumatic sore throat may be distinguished from the non-rheumatic in the fact that in the former the pyrexia is not marked - the temperature being in the/

the region of 100°F against 102° - 104°F in others; the glands at the angles of the jaws tend less to be involved - in the pure cases they never are; and there is much more pain than the appearance or the temperature would lead one to expect. In the ordinary sore throat, any pain is in connection with swallowing, whereas in rheumatism it tends to be on any movement and extends up to the ears, and there is pain and difficulty in speaking. When the diagnosis cannot be cleared up from the appearance and symptoms, the presence of a family or personal history of rheumatism or of any other lesion would help; and repeated attacks of throat affection without any obvious exciting cause always suggests the condition.

Repeated attacks, however slight, tend to produce hypertrophy, and Langmead³⁶ has found tonsils large enough to warrant removal four times as often in rheumatic than in non-rheumatic children, in 27.8% against 7%. Though the local changes may be, and often are, very slight, yet virulent rheumatism may be in association with them. The throat is regarded as one of the chief portals of entrance of the micro-organism into the system, and from a case showing mild hyperaemia only, Poynton and Paine have isolated their diplococcus. The organism may remain stationary in the deeper structures of the part, but inject steadily and directly into the blood stream its toxin, forming insidiously/

insidiously the major lesions of the condition. Indeed Poynton³⁷ found that when rheumatism primarily affected the heart - that is when the heart was practically the only definite rheumatic affection - it was most commonly subsequent to sore throat.

The question of the throat affection is therefore one of the greatest importance when one comes to consider the prophylaxis and treatment of the disease.

The frequency of sore throat is indicated in the histories of the cases recorded in this paper, but the following is a further case interesting as being strongly suspicious of rheumatism introduced possibly by way of the throat after operation.

G.W. Male, 7 years. Ten months ago had adenoids and tonsils operated on and he remained in improved health until about a month ago when he began to complain of pains in the thighs, behind the knees and in the heels. These seemed to be slight as though lame at times in the course of an hour he was again running about freely. A fortnight ago he caught cold and seen some days later he had a mild bronchitis without temperature or heat symptoms. Two days later the temperature rose to 100.4°F; there was a patch of pulmonary congestion on the left side behind, and complaint was made of pain in the muscles of the legs. The pulse was 100 and slightly irregular, and the first sound at the apex impure. Examination of the throat revealed congestion over/

44a.

over the fauces and soft palate and the presence of a little adenoid material. The condition has improved under salicylates and a mild expectorant, but the heart impurity still remains.

RHEUMATIC/

RHEUMATIC SKIN AFFECTIONS.

Though rare in rheumatism, rashes are rather less so in the rheumatism of childhood. Poynton³⁸ had 40 cases in a series of 600 or almost 7%, and Cockayne²⁴ found them in 4%, his figures excluding, however, erythema. nodosum.

Rashes may appear with the other manifestations or independently; they may be the first clue to the rheumatic condition, or a definite evidence of its recrudescence. They are more frequent when subcutaneous nodules are present, (Warner² in his 27 cases showing 10), and their next most frequent association is with carditis minus the nodules, that is in the most insidious and least tractable of the manifestations and Cockayne looks on them as a sign of grave rheumatism with something of the same sinister significance as the nodules themselves. Cheadle³ in 8 cases of extreme gravity in one year, 4 of which were fatal from persistent pericarditis and endocarditis, had erythema of the marginate and urticarial kind in 4, 2 of the fatal cases and 2 others. Perhaps the toxins from the deep seated areas of chronic inflammation are their cause.

Rashes may be very extensive or very limited and are most marked in the region of the joints. They may/

may cause no discomfort: there may, on the other hand be considerable urtication, this depending on the amount of exudation present. Sometimes they are quite fleeting, disappearing in a night and so easily overlooked, or they may last as long as 10 days.

When a rash has shown on an individual there is a tendency for the appearance of one again, but in subsequent attacks it may be of a different type, and several distinct kinds may be present at one time. Poynton³⁸ noting a case with erythema, purpura and psoriasis.

Among the rashes seen are:-

- (1) Sudamina. This is rare in children, as the acid sweats with which it is associated are uncommon.
- (2) Urticaria. Simple urticaria is rare in true rheumatism but rashes of an urticarial character are more common in children. It may be one of the earliest symptoms, but is less common than the ringed and papular erythemata.
- (3) Erythema papulatum is usually met with on the extensor surfaces near the knees and elbows and is often symmetrical. More rarely it occurs on other parts of the limbs and on the trunk. It tends to appear in successive crops each lasting for a few days. This forms in dark purple red papules about the size of a split pea and slightly elevated. They often become slightly haemorrhagic and nearly always leave a brown/

brown stain as they fade away.

(4) Erythema circinatum or marginatum are rings which gradually spread, it may be to several inches in diameter. The ring is pink and slightly raised and the central area of a livid hue.

(5) Erythema gyratum: where the rings coalesce and form irregular serpentine figures.

4 and 5 are commonest on the limbs, less often on the trunk and face, but when in the latter position they may assume a butterfly appearance. They may be very evanescent or last as long as 10 days.

(6) Erythema nodosum has node like swellings coming out in crops symmetrically on the legs, feet and thighs, and occasionally on the upper extremity.

Bright red in colour it gradually assumes the colours of a bruise and fades away. The long diameter of the node is in the length of the limb. It is occasionally seen in connection with real rheumatism, Cheadle having a case in a child of $8\frac{1}{2}$ years with subcutaneous nodules, and no other manifestation, but Poynton does not look on this as a rheumatic manifestation, as cardiac disease is rarely associated with it (Rather is it regarded by some as an early sign of tuberculosis).

The following case seems to have been a true rheumatic manifestation. L.R. female age 9, has suffered frequently from sore throat and during her last/

last attack in November last she had a slight pyrexia 99.5° with a tumbling excited pulse 115. Pains in the legs were complained of but nothing was to be seen there. On the following day erythema nodosum was strongly marked on practically the whole area from the knee to the ankle down the front of both limbs. The simple protection of these with cotton wool and dry flour, and the internal treatment with the salicylate was sufficient to clear off the painfulness of the condition though it took a considerable time to get rid of the slowly fading marks. The heart has not returned to normal though, notwithstanding the frequent affection of the throat before, there was nothing unusual discovered in it prior to this attack. There is a positive history in both parents.

(7) Purpura occurs as a rheumatic rash, in spots of moderate size over the lower part of the legs. It is often seen at the end of a long and exhausting attack of rheumatism, and has usually followed pericarditis.

(8) Psoriasis is also a manifestation of the condition at times.

OTHER/

OTHER MANIFESTATIONS:-

Anaemia is more marked in the rheumatism of children than in that of adults. Blanching is in them very quick and very decided, often being quite marked in two or three days from the onset of symptoms, especially where there is valvular disease of the heart or pericarditis. There is found a rapid fall in the number of red blood corpuscles, and the micro-organism has been found in the blood. Some maintain that the children of rheumatic parents are habitually anaemic (Goodhart) and that this anaemia is the predisposing cause of the disease.

Pleurisy is common in Rheumatism, being noted by Cheadle³ as one of the manifestations of the disease; it may be the only evidence of the complaint, but it is frequently associated with carditis. Its existence is often found post-mortem. In some cases it is a direct extension of mischief from the pericardium, and its common situation is on the left side where the lung overlaps the pericardium, but it is also found in the corresponding position on the right side. The signs are the ordinary ones of pleurisy, a rub being heard generally over the lower ribs. Usually it is fibrinoplastic, rarely with much effusion, but occasionally cases demand paracentesis. When in the late stages of heart disease, along with consolidation of the lungs, there/

there may be a good deal of fluid. Sometimes it exists without friction, and when friction is coarse there may be an pleuro-pericarditis, a condition simulating but rather more favourable for the patient than pericarditis alone. The diplococcus has been isolated from the effusion.

Pneumonia is not common. It is found occasionally in the later stages of heart disease, associated with pleurisy at the left base. Generally it is broncho-pneumonic, and fleeting in character. An abrupt rise of temperature during the illness would suggest it and would be sufficient reason for looking particularly into the state of the lung. The physical signs may be more extensive than the area involved, due commonly to collapse of the lung around the pneumonic area. The micro organism may at times get its entrance into the system through the bronchial mucous membrane; it is certainly found in such a lesion.

Peritonitis, occasionally met with, seems to select the upper zone of the abdomen, and is generally fibrinoplastic. Loud peritoneal friction has been heard in some of these cases, and many adhesions have been found P.M. around the liver and spleen.

Appendicitis. Considerable difference of opinion exists as to whether this occurs as a manifestation of rheumatism, and whether cases so named are really appendicitis/

appendicitis, as right sided pleurisy, monarticular rheumatism in the right hip, and constipation have on occasions given the appearance of an inflamed appendix.

Eustace Smith³⁹ considers that many cases of appendicitis are truly rheumatic and Ross Mackenzie¹⁰ quotes a case of a boy of nine which strongly suggests an actual rheumatic appendicitis. The boy had a distinct family history of rheumatism. He had definite resistance and tenderness around McBurneys point with a temperature of 101° F. On the third day acute pain appeared in the right knee and ankle joints and two days later there was arthritis with effusion in the right elbow and left wrist. On the 10th day a mitral murmur came on which was persisting nine months after. The symptoms cleared up under salicylates. The following case presented some of the clinical picture of the above. R.H. female aged 8 was out of sorts for a few days during an influenza epidemic of the muscular type, in which her father and mother had been affected, but she had been able to go about during the day. She went to bed supperless and wakened 3 hours later with severe pain in her "stomach" which fomentations did not relieve. On examination the pain was referred distinctly to McBurneys point where there was a feeling of fulness. The temperature was 100°.5. Being in the middle of the night and in the country, a dose from
a/

a prescription containing lig. morphinae which had been given to one of the parents was administered and 5 grs. of aspirin every 4 hours, in addition to a continuance of fomentations. By morning the pain was much better, there was reduced tenderness but a very evident mass remained in the appendix region. This encouraged a continuance with the drug and slowly in the course of seven or eight days the mass cleared away, but a fortnight more in bed was required to clear off the heart murmur which was noticed on the third day of illness.

In conclusion cases of nephritis, meningitis, neuritis, mastitis, epistaxis and mucous colitis have been recorded which seemed to be rheumatic in nature. They are certainly rare, but it is well to remember that they may occur for with the condition properly diagnosed there is great hope in their treatment.

TREATMENT/

T R E A T M E N T.

Where there is from the family history of a child a tendency to Rheumatism and after previous personal attacks the greatest care must be exercised in an endeavour to prevent in the first case the formation and in the second the settling down of the rheumatic state and one of the first duties incumbent on the physician is to impress on parents the possible consequences of any laxness on their part in the observance of any instructions given. This is most essential: the child at the commencement of its rheumatic career is probably very little out of sorts and chafes at restraint as soon as the acute condition for which treatment has been demanded is improved and this often induces parents to relax a little their vigilance and allow their patient out of bed "just a day" or two before they should. The day or two too early may mean all the difference between good and indifferent health for the future - it may mean the starting point of a life of uselessness from ill-health. Speaking generally and as far as is practicable such a child should be removed from damp cold localities to others more dry and bracing and equable in climate, and from gloomy or ill ventilated houses to those of more hygienic construction. His clothing/

clothing should be attended to and warmth and comfort supplied for the body in the form of woollen or flannel underwear, for the feet by good weatherproof boots, and for night time by light warm and scrupulously dry bed clothing. Good sustaining food should be provided, open air life, in suitable weather, encouraged, plenty of opportunity for sleep allowed, and everything done to promote a condition of good health; but always providing that where there has been any manifestation of the condition the attempt to secure health must not be by violent exercise as cardiac disease coming on as it often does so insidiously might be thereby aggravated. Moderation in study should be insisted upon and competition for prizes and any excess in school work forbidden and this especially in the female child because of its especial tendency to the development of Chorea. To prevent the organism getting into the system is the first aim and as the chief route is by the nasopharynx, means should be adopted to secure, if possible, the perfect health of this part; and any indication of pain or tenderness, hypertrophy of the tonsils or growth of adenoids should be attended to at once. So important is the throat as the point of invasion of more micro organisms than those of rheumatism that it should be thoroughly investigated in every pyrexial condition in childhood.

Where there is any, no matter how slight, manifestation/

tion of rheumatism the heart should be examined systematically, and regularly, by percussion and auscultation, on all occasions of seeing the patient and he should be kept in bed, in those cases where nothing unusual can be made out in the heart until the temperature has been some days normal, and in cases where a murmur or dilatation is found for two or three weeks longer. If endocarditis or pericarditis have been severe, the time in bed should be extended to a month or more after the cessation of active symptoms, but it should not be unduly extended as the child requires fresh air. Before allowing him up, the state of the pulse should be noted before and after passive exercise, and should it continue quicker, for say 10 minutes, as a result of the passive exercise, then it is probably wise to continue the restraint for a little longer. By rest in bed is meant absolute rest mentally and physically, and no getting up for any purpose whatever. Even the routine examination of the heart should be associated with as little movement as possible, and it is an advantage for this, and for the easy removal of the bed garments to have them opening all the way down the front. The bed-gown should, by the way, be of soft fine flannel, and the patient should lie between the blankets, during an attack.

Salicylate of soda is the drug, par excellence,
for/

for the condition. This should be given, because of its rapid elimination, in frequent doses, every two or three hours, and, starting at the rate of 1 grain per year of age and, depending on the severity of the symptoms, increased after 24 or 36 hours. As a rule pyrexia and joint symptoms are easily overcome, but the treatment has to be continued longer and increased for the other manifestations. Occasionally the drug is badly borne on increasing the dose, but this is no reason for discontinuing it altogether. Rather give a 2 or 3 hours rest and restart at a slightly reduced dose when there may be no further return of inconvenience from it on again increasing. The symptoms which might necessitate this interruption in the treatment are vomiting, noises in the head, vertigo or slight delirium. Certain cases seem specially susceptible to these untoward symptoms and it may be necessary in them to give some other preparation as aspirin, or salicin, or quinine.

The great advantage of sodium salicylate is that it can be given with an alkali - in this respect different from aspirin - and the alkali seems to be demanded by the acidity of the trouble.

Sodium Bicarbonate is the alkali most frequently employed, given in double the quantity of the salicylate. In giving the salicylate it is necessary to have a daily/

daily evacuation of the bowels, and the rule is laid down that there should be no increase in the dosage on any day that the bowels have not moved. Lees⁴⁰ recommends very large doses (having given to a lad of 16 as much as 600 grains of the salicylate and 1200 grains of bicarbonate in a day) and dosing every 2 hours through the day, with a longer interval through the night. His method is every 2 hours from 6 a.m. till 10 p.m. and one dose between 10 p.m. and 6 a.m. and he claims to cure all the manifestations by this method of large and frequent dosing. While it may not be necessary to push the drug so far, the best results certainly seem to be got from its generous use, 150 grs. to 200 grs. being a common quantity per diem. When the symptoms have passed off, the drug should be taken away gradually - by lengthening the interval between the doses and lessening the dose. This tailing off should continue over a week or two.

In addition to this general treatment, there may be special treatment required for certain conditions. The pain of pericarditis may require the exhibition of Opium, which is best given in the form of Dovers Powder; or locally the application of belladonna and glycerine may be sufficient. An ice bag may be used, taking care that the extremities are kept warm by means of hot water bottles, but when there is right-sided dilatation/

tion a few leeches should first be applied over the lower ribs of that side, taking care that there is not too much blood lost. In the stage of convalescence cardiac tonic may be necessary.

For the throat, a spray or gargle of Sod. Salicyl 10% is helpful in addition to the internal medication. The treatment of tonsils afterwards must be carefully attended to as they may be the seat of deep foci of the disease. The use of the guillotine may not reach these, and simply act by stirring up, from the local inflammation caused by the operation, fresh activity of the micro organisms; or there may be a fresh

absorption through the somewhat extensive raw surface produced by this instrument. Schichhold⁴¹ recommends the slitting up of the lacunae, and, in from 3 to 5 sittings, the biting off of the tongues of tissue left by this process, and by this means he practically drags out the tonsil leaving at each stage only a small raw surface. He claims to get good results and the operation seems one that can be advocated, but with the general recommendation that in all cases of operative interference there should be a period of internal and local treatment with the salicylates.

For the ordinary simple arthritis it is usually sufficient to wrap up the part in cotton wool, and place the limb, over pillows or cushions, in the position that secures the greatest repose but if the pain/

pain is severe, and the same thing holds for pains away from the joints as in the side or abdomen, the painting on or the very gentle rubbing in of methyl salicylate in full or $\frac{1}{2}$ strength with olive oil is the most comforting treatment. When methyl salicylate is used, the part should not be wrapped up.

Some cases of chorea seem to be little influenced by the salicylates, although Lees claims to cure them all by giving large doses. In those cases where failure results from the rheumatic specific, gradually increasing doses of liquor arsenicalis is as a rule found sufficient. The drug should be as slowly worked down from its maximum as it was worked up to it.

A vaccine treatment of rheumatism has been tried and some good results are claimed, but this method is still very uncertain from the difficulty of obtaining pure cultures, and in the standardisation of the product, and since treatment to be effective must be prompt the only lines that can yet be recommended to proceed on are by the drug which has been shown to be specific for the condition.

There only remains to consider the question of food. In the rheumatic seizure milk should be the staple article, begun in small amounts and gradually increased and given every 2 or 3 hours. The addition of some alkaline water while adding to the palatability would/

would also be of benefit to the patient, but if an effervescent water is chosen it should be given partly exhausted of its CO₂ as the accumulation of gas in the stomach might further excite the heart's action.

For thirst still soda water with a dash of lemon is comforting and useful. In those cases where the strength is much reduced it may be necessary to give an increase to the dietary.

Weak meat broths should first be tried, and their effect watched carefully. All increases or changes should be made with caution, a little from day to day. When there is a return to solid food the most easy of digestion should come first, sole, whiting, plaice, farinaceous foods; and chicken should come before the red meats.

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