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A STUDY of RHEUMATISM in CHILDHOOD  
Based on a SERIES of CASES observed during 30  
years of General Practice.

by

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## SUMMARY.

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### I. INTRODUCTORY.

Importance of the Subject.

Frequency of Rheumatism.

Its serious effects. The contrast with  
adult Rheumatism.

### II. ETIOLOGY.

Predisposing causes - Heredity. Age. Sex.  
Climate.

Exciting causes - Chemical, Bacterial and  
other theories.

### III. CLINICAL MANIFESTATIONS.

1. Cardiac symptoms
2. Arthritis and "Growing Pains".
3. Throat symptoms.
4. Erythema Nodosum.
- 5./

III. CLINICAL MANIFESTATIONS (Contd.)

5. Subcutaneous nodules.

6. Chorea.

7. Appendicitis, obscure fever, epigastric  
pain, headache, anaemia, &c.

IV. DIAGNOSIS.

V. PROGNOSIS.

VI. TREATMENT.

A. Curative.

B. Prophylactic.

VII. BIBLIOGRAPHY.

VIII. CONCLUSIONS.

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Furthermore the subject is one which can best be studied by the General Practitioner. It is essentially a "clinical" subject, for as yet there is no accurate scientific method of diagnosing rheumatism. Clinical experience is here more important than laboratory investigation.

As I have already remarked the practitioner sees the early stages of disease. He knows the family history, he is able to trace the various disease processes during a period of years, and in this respect he possesses great advantages over the hospital physician who so often sees disease only in its advanced stages and is seldom able to follow up his cases.

Everyone is familiar with the symptoms of acute rheumatic fever as it occurs in adults. The swollen and tender joints, high temperature and profuse perspiration constitute a picture which cannot easily be mistaken. In the child, however, the disease is much less clearly defined. It presents features which differ widely in the extent to which certain structures are involved in the existence of certain manifestations peculiar to/

to childhood, in the relative vulnerability of certain tissues at different periods of growth. One might tabulate as follows the points in which acute rheumatism in childhood differ from the same disease as it occurs in adults.

1. The onset is stealthy and insidious.
2. The symptoms are varied and numerous.
3. The heart is more frequently affected.
4. The joints are less frequently affected.
5. Hyper-pyrexia is uncommon.
6. Nervous symptoms are commoner.
7. Subcutaneous nodules are more frequently seen.
8. Anaemia is more profound.

To these points I shall refer later in dealing with the symptomatology, but in the meantime, I would submit that there is a great field open to the practitioner in detecting and treating those early rheumatic manifestations in children which are responsible for the great majority of cases of heart disease in later life.

ETIOLOGY.  

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1. PREDISPOSING CAUSES.  

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## HEREDITY.

There can be no doubt that acute rheumatism is strongly hereditary. Very frequently it is found in several members of a family.

GOODHART in Guy's Hospital Reports, Vol.25, gives an interesting family history. The father and mother were rheumatic subjects and five out of a family of six children under fifteen years of age (indeed all the members of the family except a baby of 14 months) had either had acute rheumatism or heart disease.

STEINER instances a still more striking case where a rheumatic mother had twelve children of whom eleven showed rheumatic manifestations before the age of twenty. The hereditary tendency of rheumatism is, of course, specially marked when transmitted from both parents.

## AGE.

Acute/

Acute rheumatism is rare under the age of four and is most commonly found between that age and fifteen. Eighty per cent of the cases occur between the ages of four and nine. In young children the manifestations are very varied but in older children the attack tends to assume the adult type, characterised by arthritis and severe constitutional symptoms.

#### SEX.

The sexes are probably affected with equal frequency by rheumatic manifestations. Elsewhere I have noted the peculiar liability of girls to chorea, and of boys to endocarditis.

#### CLIMATE.

Acute rheumatism is undoubtedly commoner in temperate and changeable climates and is said to occur more frequently in this country than on the continent of Europe. As regards seasonal variation it is most commonly encountered in autumn and spring and its incidence is favoured by dampness and cold winds. It tends to affect dwellers in downs rather than those in rural districts. Often there is a history/

history of chill or of exposure to wet, and it would appear that acute rheumatism is particularly prevalent in those districts which show the heaviest rainfall.

## 2. EXCITING CAUSES.

The pathology of rheumatism is a vexed question, although of late the tendency has been to regard it as of microbial origin.

### 1. Chemical Theories.

Theories of its chemical causation were at one time much discussed and widely accepted. The symptoms were supposed to be due to an excess of lactic acid in the circulating blood and in support of this theory RICHARDSON claimed to have produced endocarditis and arthritis by the injection of lactic acid solutions into the peritoneal cavity of dogs. His experiments, however, have not been confirmed.

HAIG, whose researches are so well known,  
is/



is of opinion that the retention of uric acid is the main factor in the production of rheumatism and there is much to be said in favour of his view which still has the support of several authorities. The point is an important one as having a direct bearing upon the dietetic treatment.

## 2. Infective Theories.

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The most convincing evidence, however, points to the infective origin of acute rheumatism.

Discussing the matter, CHEADLE, (to whose clinical investigations we owe so much of our knowledge of rheumatism as it occurs in children) says:-

"The occasional epidemic prevalence, the variability of type, the occurrence of tonsillitis, endocarditis, and erythematous eruptions; the implication of joints; the relapses, the occasional supervention of hyperpyrexia, the specific power of salicylic acid, are all suggestive of an infectious disease".

MANTLE of Harrogate, was the first to draw attention/

attention to its bacterial causation in a paper published in the British Medical Journal of June 1887 entitled "The Etiology of rheumatism considered from a Bacterial point of view". From seven cases of this disease he obtained fluid from the knee joints which produced growths upon gelatinised meat infusion. He also demonstrated bacteria in the blood in sixteen acute cases, and in 10 cases of rheumatism in childhood. Unfortunately no animal experiments were made so as to determine the question of the specificity of the organisms. The question was at a standstill until in 1900 POYNTON & PAINE wrote a paper to the "Lancet" in which they claimed to have isolated from cases of acute rheumatism a diplococcus which they thought was the cause of the disease. The results of their experiments were confirmed by BEATON & AINLEY WALKER (British Medical Journal 1903 Vol.1. p.237) and also by BEATTIE and although BULLOCH, HORDER and others have been sceptical as to the constant presence of the diplococcus in rheumatic cases, this view as to the etiology of rheumatism is widely held.

Two/

Two views regarding the etiological problem may be said to hold ground at the present time: they are the following:-

1. That there is no specific organism, but the disease is a form of septicaemia which owes its origin to staphylococcal or streptococcal infection.
2. That the specific organism is the diplococcus discovered by POYNTON & PAINE.

The first view is widely held, though open to grave objections. Acute rheumatism is far commoner than any form of pyaemia, and the cases in which a definite focus of infection can be traced are few: because septic organisms have been isolated from rheumatic cases, it does not follow that they are the cause of the disease.

The cardinal rules of investigation must be adhered to, - i.e., the organism must be found in every case of the disease: must be isolated and cultivated outside of the body, and must produce similar/

similar lesions when inoculated into susceptible animals.

These requirements have been satisfied in the work of POYNTON & PAINE, and their view of the etiology, is, perhaps, the soundest in the present state of our knowledge.

One remarkable feature of the *Diplococcus Rheumaticus* is its power of producing formic acid when grown on certain media.

WALKER & RYFFEL have investigated this point, and have been able to extract formic acid from the bodies of the organisms themselves.

Further investigations alone can prove to what extent this acid is responsible for the rheumatic symptoms.

No consideration of the etiology of Rheumatism would be complete without some reference to the work of PONCET of Lyons. Along with LERICHE he published in 1909 a monograph entitled "Le Rheumatisme Tuberculeux", in which he contended that numerous manifestations which we are wont to recognise as "rheumatic", are, in reality, of a tubercular nature.

The work is illustrated by numerous cases/

cases and photographs in support of his contentions, but the views have, at least in this country, met with scant acceptance.

A friend of mine, who is in charge of a large sanatorium, tells me, that he has, for some time been keenly interested in this question, but has hitherto, failed to trace any connection between tuberculosis and rheumatism.

### III. CLINICAL MANIFESTATIONS.

#### I. CARDIAC SYMPTOMS.

The dire effects of the rheumatic poison upon the heart are well known, but as I have already pointed out, those terrible sequelae of rheumatism would be less frequent were the significance of apparently trifling symptoms more fully appreciated.

MOORE in the "Lancet" of May 1909, states that the heart is affected in every rheumatic case, and indeed he proposes the term Heart Fever in preference to Rheumatic Fever. Whilst not altogether in accordance with this view, I am disposed to agree that the altered terminology would serve to focus attention more closely on the all important cardiac manifestations of rheumatism.

Acute Rheumatism affects the heart much more frequently in the child than in the adult; indeed it is not uncommon for an adult to pass through one/

one or often more attacks of rheumatic fever and still possess a sound circulatory system; but in the child the most trivial symptom of rheumatism - such for instance as tonsillitis, or growing pains - may leave in its train a grave cardiac lesion. The involvement of the heart seldom betrays itself in any very obvious symptoms. It may be that such complaints as breathlessness, præcordial pain, or rise of temperature draw the physician's attention to the heart, but as often as not the discovery of heart trouble is only made in the course of the routine examination of a child brought on account of some apparently trivial rheumatic complaint.

Lesions of the endocardium are most easily recognised on account of their physical signs and for this reason, have bulked largely in literature and in the mind of the practitioner, although in reality the myocardium is the most important tissue of the heart.

I shall, however, discuss endocarditis first although I do not regard it when uncomplicated as the most serious of rheumatic heart affections/

affections.

Endocarditis may occur at any stage of the rheumatic process - early or late - alone or in combination with chorea, subcutaneous nodules, or growing pains, or all of these may be combined. My own experience leads me to suppose that slight arthritis and endocarditis is a very frequent combination.

Auscultation of the heart in an early case reveals the presence of a soft blowing systolic murmur heard loudest at the apex and conducted towards the axilla, significant of involvement of the mitral valve, or merely of cardiac dilatation. The systolic murmur is the one most frequently heard and is, in the majority of cases, the only auscultatory sign.

At a slightly later stage one may, in some cases, in addition to the murmur, have a reduplication of the second sound at the apex. The second part of the reduplication being, in fact, a mid-diastolic murmur. This murmur does not indicate a true mitral stenosis, but is due to the blood/



blood rushing through the mitral orifice into a dilated left ventricle.

Under careful treatment by rest, these murmurs may disappear, but if care be not taken the lesion is apt to become permanent and at about the age of puberty the mid-diastolic murmur becomes pre-systolic in time and indicates the presence of a true mitral stenosis.

STILL has drawn attention to the prognostic significance of these various murmurs, and has shown that the systolic murmur is amenable to treatment; the mid-diastolic may be so in some cases, but the pre-systolic murmur rarely disappears when once it has established itself.

Aortic murmurs are uncommon, for, although rheumatic aortic disease does occur in children, it rarely produces a murmur. Aortic lesions are never found alone, but are invariably accompanied by mitral disease.

In the vast majority of cases, however, mitral incompetence is the only lesion present, and the systolic murmur at the apex the only auscultatory/

auscultatory sign. While I do not wish to minimise the importance of auscultation, I am inclined to lay much greater stress upon the results of a careful percussion of the deep cardiac dulness. The murmur is by no means the most important of physical signs, for, as MACKENZIE has pointed out again and again, we must regard the heart as a muscle and what we must determine in all cases is how far this muscle has been affected by disease, and to what extent its functions have been impaired.

Hence the great importance of percussion, whereby we may determine any loss of tonicity of the heart, as it reveals itself in the presence of dilatation.

Cardiac dilatation occurs very readily in children and its presence may be ascertained in many cases before any murmur has had time to develop.

Pericarditis not uncommonly accompanies acute rheumatism in children. When it is found, it is always accompanied by a marked endocarditis, and in many cases also by myo-carditis, the result of direct extension of the inflammatory process. The pericardium is more commonly attacked in young children/

children and more frequently in boys than in girls. There may be no special symptoms, on the other hand the child may suffer from praecordial pain and breathlessness, and the temperature may be markedly raised. Vomiting is not uncommon at the outset. Physical examination reveals the presence of the characteristic friction, often over quite a small area at the base. The cardiac dulness is markedly increased, this being usually the result of dilatation. Pericardial effusion is seldom met with in children.

The prognosis of pericarditis is distinctly bad. STILL had only 9 recoveries in 53 cases. As a rule the child wastes rapidly, becomes anaemic, and dies of heart failure, and should he survive the acute stage, he seldom recovers from the after effects of the disease, for when organisation of the inflammatory deposit takes place, the heart is enclosed in a firm fibrous sac. Hence its action is greatly impaired and it cannot grow along with the rest of the body.

Whilst endocarditis and pericarditis have been long recognised, much less attention has been/

been paid to inflammatory affections of the myocardium, although as I have already remarked, this tissue constitutes the main substance of the heart. Although myocarditis cannot be detected by ordinary physical methods it is nearly always present in rheumatic heart affections. It may be due to actual invasion by the rheumatic virus, in which case there are demonstrable histological changes, or it may be the result of a toxæmia, the poison being elaborated elsewhere.

It would perhaps be more advisable to class together the three morbid entities described above and make use of the term "carditis", so intimate is their relationship with one another.

So far, I have described the cardiac lesions of rheumatism in the stage of full development, at which stage they can be detected by our usual physical methods of examination. But the fact upon which I now wish to lay special stress is the importance of recognising heart trouble before the actual development of physical signs. Most writers have adopted the maxim "In all cases of rheumatism/

rheumatism examine the heart", and upon this I venture to improve by saying "Examine the heart of every sick child" - for, only in this way can cardiac trouble be detected in its early stages. A slight enlargement of cardiac dulness and a blurred first sound occurring in a child who has been suffering from some rheumatic manifestation, are danger signals which cannot be overlooked. But I venture to believe that the disease may, in many cases be diagnosed at an even earlier stage than that at which physical signs have become evident.

We may, in many cases, make a diagnosis before structural changes have taken place and before a murmur can be heard. And thus we may forestall the disease process and defend the heart tissues from the ravages of the rheumatic poison.

In my experience the indications of a very early or "threatened" heart involvement are as follows:-

Firstly.- According to HUTCHISON, the child of rheumatic type is, as a rule, dark, with clear/

clear dark eyes, peculiarly white skin, and massive teeth, especially the upper incisions which are large and square.

Secondly. One frequently finds the rheumatic temperament. This is characterised by a very unstable and easily excited nervous system.

Thirdly. There may be increased rapidity of the pulse and slight rise of temperature, especially in the evening.

Fourthly. Slight praecordial pain may draw attention to the heart.

Fifthly. Subcutaneous nodules may be present.

Sixthly. A definite rheumatic heredity may be traceable.

There is nothing very definite in the above symptoms; indeed one might be tempted to diagnose mucous colitis, or a dyspepsia of the second dentition, but if one has a composite picture of the symptomatology in one's mind's eye and if several of the above phenomena are present in combination/

combination, there should be no difficulty in diagnosing an early stage of rheumatic carditis.

I have several times encountered such early cases, of which the following may serve as a typical example.

F.J. aged 9 years, of anaemic appearance, had been complaining 2 days of indefinite pain in his legs. There was some pain in the left ankle on movement, but very little tenderness and no swelling. Temperature was 99.5°, pulse 85, tongue coated and skin dry. The chest showed nothing abnormal. His mother had rheumatic pain in her joints, she said, a year or two previously. The child was sent to bed and a calomel aperient given. Milk diet and a mixture of Sod. Salicyl. and Sod. Bicarb. ordered. Two days later the pains had quite gone, but I found the pulse more rapid and there was a soft blowing systolic murmur at the apex. Under prolonged rest this murmur became fainter and ultimately disappeared in the course of 8 or 10 weeks. There has been no recurrence of the trouble and the child is now strong and well.

## 2. ARTHRITIS and "GROWING PAINS".

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As I have already observed, one never finds rheumatism in children assuming the severe arthritic type of adult life. There may, however, be joint manifestations of a slighter degree. Perhaps the child complains merely of a little pain in one joint, sometimes even in the hip joint; and there may be neither tenderness nor pyrexia. When more than one joint is affected, it is the smaller joints - knuckles, wrist, etc., that the disease selects, and in this case, the part is often swollen and puffy and slightly tender. The joint effusions frequently extend into the bursae and tendon sheaths in the neighbourhood, particularly the flexor sheaths of the fingers or wrists. This is a type which I have several times had the opportunity of observing.

As a rule, these arthritic phenomena subside very rapidly under treatment by rest and salicylates. They are not always easy to recognise and may be mistaken for scurvy, poliomyelitis or syphilitic epiphysitis. To this fact I shall return under the/



the heading of diagnosis.

Quite distinct from arthritis is the characteristic symptom which is so often designated by parents "growing pains". This, it need hardly be said, is a misnomer, as natural growth is a painless process; and the complaint must never be dismissed as trivial. Those pains are, in my experience, usually referred to the hamstring muscles, but may be felt in the front of the thighs or shins. One can hardly overestimate the importance of recognizing as pathological those slight pains in the limbs of children. They furnish evidence of rheumatism quite as definite as the tender swollen joints of adults. To the practitioner they should always be a danger signal, and should demand a careful physical examination of the child, so that a judicious prophylaxis may be instituted against the development of cardiac mischief.

The mildness of the symptoms may be judged from the case of J.M. aged 9 whom I attended some years ago, for indefinite pain in the thighs and legs which had been troubling her for some weeks. She had always been healthy previously. Her temperature was 99 and the pulse was 95. The tongue was furred and/

and her appetite poor. There were no other signs of rheumatism. She was restless at night and slept badly. Her father was a sufferer from chronic rheumatism. She was sent to bed and a mixture of Sod. Salicyl. and Sod. Bocarb. was given. In a few days she was quite well, but two months later I was again sent for to see the child when I found her suffering from pain and tenderness on both ankle joints and she had a temperature of 100. Rest in bed with milk diet and Sod. Salicylate were ordered, and three weeks later she had quite recovered without showing any heart trouble.

### 3. THROAT SYMPTOMS.

Tonsillitis is, as everyone knows, a very frequent disease among children and although much has been done to elucidate its etiology, the problem can hardly as yet be stated to have reached a satisfactory solution. Having paid particular attention to this matter, and having traced the sequelae and noted the family history in many cases, I am forced to/

to the conclusion that in many instances the disease is of rheumatic origin.

The signs which prompt me to regard a given case of tonsillitis as rheumatic are:-

1. The gradual onset, somewhat like that of diphtheria, as opposed to the rapid evolution of an ordinary septic tonsillitis.
2. A general reddening of the palate and pharynx; the inflammation not being entirely confined to the tonsils.
3. The absence of definite glandular enlargement.
4. The comparatively slight fever. It may be 100 or so, as opposed to 102 or 103 such as one gets in follicular tonsillitis.

Although these signs may not appear sufficient to enable one to diagnose a throat as definitely rheumatic or non-rheumatic, they will be recognised by every practitioner as descriptive of a class of case which he very frequently encounters. And if we bear in mind the rheumatic origin of so many of our/

our tonsillitis cases, we will be less likely to fall into the error of overlooking the commencing cardiac trouble which so often accompanies the throat symptoms. Indeed it is a sound practice to insist on rest in bed in all cases of tonsillitis and a careful investigation of the heart should invariably be conducted.

It is interesting to note that the original case from which POYNTON & PAINE cultivated their "diplococcus rheumaticus" was one of endocarditis following on an attack of tonsillitis. The organism, isolated from the tonsil, produced endocarditis when inoculated into a rabbit.

ST. CLAIR THOMSON states that it is still uncertain whether the so called rheumatic diathesis simply predisposes the tonsil to infection, or whether the tonsil acts as a port of entry for the rheumatic poison. The point is one of great importance in view of the fact that enucleation of the tonsils has recently been suggested as a rational means of treating acute rheumatism.

In the course of my practice I have seen many cases of rheumatic tonsillitis alone and in combination/

combination with other rheumatic symptoms. For instance, G.J. a boy of 14 years had for some years suffered from sore throats and in addition there was some suspicion of tubercular mischief at the apex of one of his lungs. During one of these attacks of sore throat, whose rheumatic nature I had diagnosed from the presence of the signs I have discussed above, I discovered a mitral systolic murmur accompanied by some degree of dilatation. He was treated by prolonged rest, and during convalescence I was able to trace the gradual diminution in the intensity of the murmur and recession of the dilatation. At the end of three years, it was not possible to discover any cardiac affection.

I have already made brief mention of the relationship between tonsillitis and chorea, and the investigations which have been conducted in this matter are of great interest. BRANSON examined the throats of 75 cases of chorea and ascertained that 21% of the patients had been operated on for enlarged tonsils and adenoids, 88% were the subjects of adenoid growths and 62% had enlarged tonsils.

PYBUS, in his Hunterian lecture, 1915, has recommended removal of the tonsils for chorea in all cases/

cases where the tonsil might be the source of infection. In some cases removal of adenoids is also indicated. The operation, he states, does not at once cure the condition, but it cuts off further infection. My own case, cited elsewhere as an example of chorea, has gone far towards convincing me of the soundness of these arguments.

#### 4. ERYTHEMA NODOSUM.

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It is by no means certain that Erythema nodosum is in all cases of rheumatic origin, indeed some writers would have us suppose that it may be the result of the action of a great variety of toxins. It is, however, in many cases accompanied by the constitutional disturbances suggestive of acute rheumatism. I have noticed frequently pain and swelling of the joints, and sometimes the affection is preceded by an attack of tonsillitis.

In many cases the rheumatic heredity may be traced; and endocarditis is a not uncommon sequel. ADAMSON, however, says that in a large number of cases carefully examined, he has never detected any sign of heart trouble.

The/

The affection is rare above the age of twenty, and occurs in girls twice as often as in boys. A propos of this, it must carefully be distinguished from erythema induratum, which also affects young women, this being a tuberculous affection with characteristic features of its own. The lesions of Erythema Nodosum are in most cases distributed symmetrically on the legs below the knees. Sometimes they occur on the back of the forearm, but in those cases the legs are always also affected. They consist of raised swellings varying in size from half an inch to one and a half inches in diameter, purplish in colour and somewhat tender; their soft consistence is almost suggestive of the presence of pus, but they never suppurate. As a rule they come out in crops, each crop lasting about fourteen days, during which colour changes occur analogous to those seen in an ordinary bruise. Diagnosis in typical cases is a matter of no difficulty. What I particularly wish to emphasize, however, is the fact that many, I would not say all, cases of erythema nodosum are rheumatic. From this it follows that cardiac trouble should always be looked for.

I quote the following as an example of the disease:-

F.S. age 13, girl, subject to sore throats, complained of pain in the legs, headache and some nausea and this she said, was followed some days later by the rounded swellings on the front of both legs. Temperature was 101 , pulse 96. When I saw her the second day of the rash, there were several swellings on each leg but none anywhere else. She had a sister who had severe rheumatism some years before, she told me. The patient was sent to bed, the legs covered with wool and Sod. Salicylate given in 10 grain doses every 6 hours. In a week she was better and there was no tenderness of the swellings. There was a further crop a few days later but in a month she was quite well.



## 5. SUBCUTANEOUS NODULES.

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Though rare in adults are a very definite evidence of rheumatism as it occurs in children. GOODHART & STILL give their frequency in all rheumatic cases including chorea, as not above 10%. They consist of small fibrous masses varying in size from a millet seed to a walnut, round or oval in shape, and rarely tender, except when growing in dense structures such as the palm of the hand. (THOMSON). They are commonly found over bony prominences and are freely moveable beneath the skin. While most commonly met with on the back of the elbow and the front of the knee, they may be found over the knuckles in the wrist tendons, on the spine of the scapula, - over the vertebral spine, along crest of ilium, - around the malleoli on the occipital crests, and they are often found on the lobe of the ear. As a rule only three or four are present, but there may be thirty or forty and in one of CHEADLE'S cases one hundred were counted. They may disappear within a few days or may last for several months. Histologically they consist of fibrous tissue, the fibres being/

being arranged concentrically round a core of fibrin.

POYNTON & PAINE have shown the presence of their organism in the centre of the early nodule and regard their structure as similar to that found in the lesions of peri and endocarditis.

As first pointed out by BARLOW & WARNER in 1881, the presence of subcutaneous nodules should always arouse grave suspicion as to the condition of the heart. Indeed they may almost be regarded as foretelling a fatal issue at no distant date.

VOELCKER studied several hundred cases of subcutaneous nodules and knows of only one recovery unaccompanied by peri or endocarditis.

My personal experience of nodules is too limited to warrant any definite expression of opinion.

## 6. CHOREA.

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VOELCKER defines chorea as "a rheumatic affection of the central nervous system, characterised by the temporary withdrawal of restraint and manifested by incoordinate movements, loss of power, and by psychical and emotional instability, and tending to complete recovery".

The association of chorea with rheumatism is widely recognised. POYNTON & PAINE conclude that the cause of chorea is to be found in the action of bacterial poison on the brain and they believe that the infection is of a rheumatic nature. From a choreic subject they isolated organisms which when inoculated into rabbits, produced a condition resembling chorea.

A large proportion of sufferers from chorea have developed, or develop later on, the symptoms of rheumatism. It may be that irritability of nerve elements in a rheumatic subject determines an attack of chorea, for in a rheumatic family, one member may develop/

develop arthritis, another endocarditis, and a third (the nervous child) chorea. ODERY SYMES states that a rheumatic history has been traced by various observers in from 50 to 71 per cent of cases. Of 303 cases seen by STILL, 54% showed definite evidence of rheumatism. Chorea is rare under the age of five, commonest between five and ten years, three times more frequently encountered in girls than in boys, and commoner in towns than in the country.

STEPHEN MACKENZIE states that, while rheumatism is the predisposing cause, there is in about half the cases an exciting cause: in the shape of fright, worry or overwork.

The clinical picture of chorea is familiar to all. The movements are of a "jerking, wriggling "shrugging and grimacing" type (WYLLIE) and affect the limbs, trunk, face and even the tongue. They are increased by emotion or voluntary effort, and cease altogether during sleep.

STURGES has well described the movements as an "exaggerated fidgetiness". In well marked cases, the child is never still for a moment, incessantly jerking its limbs about, every muscle appearing/

appearing to twitch, the tongue is protruded and withdrawn, the shoulders shrugged, and indeed, all manner of irregular movements follow one after another incessantly. The lower limbs appear to be somewhat less affected, but the gait is uncertain, as if one knee had suddenly given way. Invariably, there is a marked degree of muscular weakness, and in some cases, wasting is a prominent feature. The mental condition is peculiar, the child laughing and crying by turns, in a purposeless and almost hysterical manner. Headache is a common symptom, and this is interesting in view of the fact that certain observers, notably POYNTON & HOLMES (Lancet Oct. 13, 1906) have described thrombotic changes in the capillary vessels of the cerebral cortex. In some cases, the incoordinate movements of chorea are more marked on one side than on the other, the so called "hemichorea", but personally I have never met with such a case.

With regard to the other rheumatic symptoms accompanying chorea, CHEADLE remarks, that subcutaneous nodules are the most frequent. In my own cases endocarditis was the most frequent accompaniment and this is in accordance with GEE'S remark that he had never seen a case of chorea in which endocarditis/

endocarditis was not found on 'post mortem' examination. One of the cases cited below was also suffering from enlarged tonsils, a combination to which I shall have occasion to refer in dealing with the tonsillar manifestations of rheumatism.

The circumstances were as follow:-

Last year, when visiting a patient in the country, I was asked by the butler to see his daughter A.M., aged 10 years. I found her suffering from a somewhat distressing chorea of several months duration. She was anaemic, emaciated and unhealthy looking. She had an old standing cough. There were no obvious signs of rheumatism.

As to family history, the father was troubled with pain in his knees and ankles.

Her temperature was normal, pulse 90. With the exception of an accentuated second cardiac sound and a faint mitral systolic murmur, the chest was free from disease. She had large tonsils and adenoids.

I ordered rest in bed and gave her progressively increasing doses of Liq. Arsenicalis, but, at the end of a month, as there was no improvement, she/

she had her tonsils and adenoids removed by Mr Paul. Six weeks later, the chorea was distinctly better, and she was rapidly regaining flesh and colour. In three months she was quite well, with the exception of a faint mitral murmur, which has persisted up to the present time.

An interesting sequence of events is illustrated by the following case which occurred in my practice some years ago.

I was urgently summoned, one morning, to see a young girl, C.J., aged 11, who was suffering extreme pain in the hip joint. She would not permit me to touch the part and even screamed with pain if the cot was moved. Temperature was 103°, pulse 130.

Recognising some serious arthritic condition, I asked Mr Stiles to see the case, and he operated the following day, finding an acute streptococcal infection of the joint. The patient made a good recovery, but with a stiff joint.

Two months later, I attended her during a severe chorea which lasted two months.

Six months later she developed a sore throat/

throat - followed a few days afterwards, by an attack of endocarditis. No rheumatism could be traced in the family, but her paternal Uncle had the worst and longest attack of acute rheumatism I ever knew, he being laid up for nearly three months in the Edinburgh Infirmary.



## 7. APPENDICITIS, &C.,

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Under this heading I shall mention a few of the less important rheumatic manifestations.

### APPENDICITIS.

In the British Medical Journal for Nov.28 1908, there appeared an article by Dr.EUSTACE SMITH in support of his view that many cases of appendicitis are rheumatic in nature. He goes so far as to say that every case of appendicitis should receive salicylate treatment. The idea is an interesting one, seeing the appendix is, like the tonsil, largely composed of lymphoid tissue, and may well be attacked by the same disease processes. Furthermore POYNTON & PAINE produced appendicitis in a rabbit in one of their experiments by the intravenous injection of the Diplococcus. I am myself no partisan of these views, being entirely in accordance with the present day tendency to regard appendicitis as invariably a surgical malady, to be treated in all cases by operation at the earliest possible moment.

EPIGASTRIC/

EPIGASTRIC PAIN is often an early symptom of rheumatic attack. I have frequently seen this rather puzzling manifestation, whose exact origin is still obscure. It cannot be the result of gastritis, as it bears no relation to the taking of food etc.; not can the pain be due to rheumatic invasion of the muscles of the abdominal wall, for it is unassociated with tenderness and is not aggravated by movement.

EPISTAXIS.

This is most frequent in rheumatic children and although I regard it as in most instances, a symptom of adenoid growths, its occurrence should lead to an enquiry regarding other rheumatic phenomenon, and especially to a careful investigation of the condition of the heart.

NIGHTMARE.

I have elsewhere noted the peculiar tendency of rheumatism to attack children of nervous temperament. Attacks of nightmare should, at least, warn one of the possible existence of rheumatism.

STILL/

STILL found that among 37 rheumatic children, 17 suffered from nightmare.

#### OBSCURE FEVER.

I believe that rheumatism should be classed as one of those affections which give rise to fever of obscure causation, at any rate, I have seen several cases of pyrexia without the symptoms, which recovered rapidly under treatment by anti-rheumatic remedies.

#### HEADACHE.

Finally it may be mentioned that headache, often associated with anaemia, is of frequent occurrence in rheumatic families.

I V . D I A G N O S I S .

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The diagnosis of rheumatism in childhood is a matter of little difficulty, if the pleomorphic nature of the malady be borne in mind. In some cases, however, it is largely a matter of conjecture, and, as we regard many obscure complaints in the adult as "gouty", so do we, and with greater justification regard such symptoms in the child as "rheumatic".

Too often the slight and vague nature of the symptoms, leads the parents of the child to disregard them, so that the doctor is not consulted until the heart is irretrievably damaged.

A correct diagnosis can only be arrived at after ascertaining all the facts of the case and piecing together the various evidences, of which one alone would be insufficient as a basis for an opinion.

The joint manifestations occasionally give rise to difficulties of diagnosis. In young children these are often simulated by infantile scurvy, in which one encounters swollen and tender joints, accompanied/

accompanied by fever, but the condition of the gums and coexistent haemorrhages will usually obviate any error.

Poliomyelitis, in its acute stages; and epiphysitis also resemble rheumatic arthritis, but the progress of the case soon renders diagnosis clear..

## V. P R O G N O S I S .

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During the acute stages of rheumatism death is uncommon, and is very rare in a first attack. The disease is apt to be overlooked in children, but if the condition be only recognised and appropriate treatment given, the prognosis is more favourable in children than in adults.

The appearance of Subcutaneous Nodules is of the very greatest importance and, if endocarditis be present, is of grave omen, often foretelling a fatal issue.

CHEADLE says large nodules usually foretell death at no distant date.

In older children, the presence of severe chorea with arthritis, is of bad augury, and is often attended with high fever.

Relapses are extremely common and the isolated manifestations may be distributed throughout the whole period of childhood, so that it is well/

well to inform parents of this possibility.

One attack of rheumatism is unusual and every succeeding attack adds to the gravity, as regards the heart, either by imitiating endocarditis or increasing the damage sustained in a previous attack.

It maybe stated too, that the prognosis of rheumatism in childhood, will depend, not only upon the nature of the attack, but upon the age, heredity and surroundings of the patient.

I am of opinion that the outlook is better when the disease tends to assume the adult type, i.e. arthritis.

VI. T R E A T M E N T.a. CURATIVE.REST.

One cannot too strongly insist upon the importance of absolute rest in bed in the treatment of all rheumatic manifestations. STILL is of opinion that the child should be strictly confined to bed for three or four weeks even in cases where there is no suspicion of heart affection.

The patient should be between blankets and should be clad in a loosely fitting flannel night-dress which may be opened down the front throughout its entire length, and also along the sleeves.

Daily sponging with warm water and vinegar will be very acceptable.

DIET.

In the early stages of the disease the diet should be restricted to fluid and should consist of milk, suitably diluted, and with the addition of 10 grains of citrate of soda to every half pint. The consumption/



consumption of about four pints of milk in the 24 hours should be aimed at. In addition, homemade lemonade, rendered alkaline by bicarbonate of soda may be partaken of freely.

It is interesting to note the beneficial effect of those alkaline drinks, in view of the fact of the acid producing properties of the diplococcus to which I have already referred under the heading of etiology.

Considerable dissension prevails regarding the giving of animal broths and extracts.

SIR JAMES BARR withdraws milk and all starchy articles, contending that the acidity of the excretions which prevail in rheumatism forbid the administration of all foods which form the production of lactic acid in the alimentary canal. In place of milk he advises the use of chicken, fish, eggs and soups.

Personally I am inclined to adhere to the older dietetic treatment, although in patients who dislike milk, I do not object to the use of such articles as plasmon, sanatozen etc., nor to the addition to the dietary of well stewed fruit which helps to/

to render the milk more palatable.

### DRUGS.

With the introduction of the salicylic treatment, all other drugs, such as the alkalis which were so warmly recommended by Dr. Fuller, fell into disuse; No drugs can alleviate the symptoms of acute rheumatism as can the salicylate compounds. The question of the best preparation and the best dosage to employ are still matters of dispute.

Salicylic acid of itself is too irritating for internal administration. Although it is the most powerful anti-rheumatic drug we know, and the action of all salicylic compounds depends on the extent of their conversion into it within the body.

Salicin is a less depressing drug than salicylate of soda and is less liable to give rise to toxic symptoms. It is, however, a weaker preparation and may be given in doses of 15 to 30 grains every two or three hours. The solubility of this drug in cold water is slight and it is best administered in hot water, in which it readily dissolves.

Salol and salicylate of quinine, owing to their/

their small salicylic acid content, are of less value.

Acetyl-salicylic acid, which is at least equivalent to salicylate of soda, possesses the disadvantage that it cannot be prescribed along with alkalis.

Salicylate of soda is the drug most frequently used, and may be given in doses of 10 to 20 grains every four hours. By this treatment the rheumatic process is rapidly controlled, indeed the therapeutic effect may well be compared to that of quinine in malaria or mercury in syphilis. The rapidity with which relief is obtained is somewhat of a disadvantage, as it is difficult to persuade the patient that the treatment must be continued for a very considerable time.

It is well to administer at the outset, large doses at frequent intervals, so as to bring the patient under the influence of the drug as rapidly as possible.

In doing so, symptoms of intolerance are frequently produced, such as nausea and headache and later on vomiting, haematuria and a train of symptoms of acetonæmia, similar to that seen in the terminal stages of diabetes. All these unpleasant and dangerous effects may be avoided by giving with each/

each dose of sodium salicylate, twice the amount of sodium bicarbonate, and at the same time guarding against the occurrence of constipation. Administering the drugs in this fashion LEES was able to give doses greatly in excess of those commonly used. His initial dose was 15 grains for an adult, 10 grs. for a child, given every two hours during the day and every four hours during the night, (ten doses in the 24 hours) together with twice the quantity of sod. bicarb.

Every day or every second day he increased the dose by 5 grains of sod. salicyl. and 10 grains of sod. bicarb. until the limit of tolerance had been reached. LEES finds that the amount of sod. salicyl. required in an ordinary attack of rheumatism is from 100 to 250 grains daily and that children require nearly as large a dose as adults, for in them the rheumatic infection is specially virulent.

I have, for years, adopted this plan of administration in my practice and have had no reason to be other than satisfied with the results.

During recovery I find it advantageous to use milder salicylate preparations such as salicin.

I shall do no more than mention the serum treatment of acute rheumatism recommended by MENZER, as I have no personal experience of its use. Nor am I in any better position to pass any judgment on the vaccine therapy which has come into vogue, although I believe such treatment is full of promise.

I have never seen any good come of the Phylacogen treatment of Schäfer, and am opposed to its use in the rheumatism of childhood.

The/



The above notes apply to the treatment of all rheumatic manifestations of childhood, but I shall add a few details regarding the management of chorea.

While the drug treatment of this condition is undoubtedly important, general measures are of greater moment. All attempts at education should be abandoned, and, if the child is already attending school, it should be withdrawn. Absolute rest is advisable, at least in the early stages; and some slight mechanical restraint, such as pinning down the bedclothes, is often welcome to the patient, who has been tossing about and wrestling within a tangle of blankets. The sides of the cot may well be padded, as a protection against injury. Food should be light and easily digested, consisting of milk, eggs and jellies for the most part.

Sleep is of the utmost importance to the choreic child, and it is useful to remember that this may often be promoted by a warm bath at night.

Treatment by physical methods, after the fashion of Fraenkel's exercises for locomotor ataxy is often of value, especially during convalescence.

The/

The child should be encouraged in such movements as are required in drawing or piano playing, and use may be made of various toys and kindergarten apparatus, and such games as draughts or dominoes.

LEONARD GUTHRIE says that a child may be considered cured when it can build a two-storied house of cards. In these ways we may help the child to regain control of its muscles.

#### DRUGS.

In the early stages, salicylate treatment has probably some effect in shortening the attack, and may be best administered in the large doses recommended by LEES. When the disease has fully established itself, the use of these drugs is less effective, even in full doses, and it is better to resort to other remedies.

Arsenic is often useful, but must be prescribed with care, on account of its liability to cause neuritis and gastric disturbance.

As a rule it is administered in ~~progressive~~ ly increasing doses, commencing with M3 and increasing/

increasing drop by drop up to M10, but the administration must never be unduly prolonged.

MURRAY considered that the safest and most efficacious method is to give large doses for a short period. He gives M15 of Liq. Arsenicalis, well diluted, thrice daily after food, for not more than one week. I have in my practice achieved remarkable results by the use of this method, but the effect must be carefully watched. I have seen within three days of such administration, symptoms of intolerance in the shape of gastric pain and vomiting.

ERGOT, in large doses is warmly recommended by EUSTACE SMITH. To children of all ages, he gives a drachm to a drachm and a half of the liquid extract every four hours.

TRIONAL is the drug favoured by VOELCKER who advised its use in five grain doses three times a day. By this means the nervous system is soothed and the choreic movements kept in abeyance. If drowsiness is caused, the drug ought, for a time, to be stopped./



stopped.

CHLORETONE has been employed in a similar manner, but it is not so safe a drug as trional. If the chorea is of so severe a nature as to amount to mania, a small dose of hyoseine (gr.  $\frac{1}{500}$ ) is occasionally a useful expedient.

ANTIPYRIN may be an excellent sedative in cases of chorea. THOMSON recommends its use in doses of five to 10 grns. When given in full doses it undoubtedly allays the symptoms to a marked extent.

On account of the liability of the drug to cause albuminuria, a careful watch should be kept on the urine both before and during its administration.

#### B. PROPHYLACTIC.

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For children who have already exhibited some rheumatic symptom, or who are predisposed to infection by reason of heredity etc., a great deal may/

may be done in the matter of prophylaxis.

As regards a place of residence, clay soil should be avoided and damp, low-lying places are notoriously bad for persons of rheumatic tendency. On the other hand, high altitudes exposed to cold winds, are equally injurious.

The rheumatic child should avoid all undue exposure to cold or wet. Damp clothing should be at once changed, whether it be the result of exposure to rain or of perspiration on a hot day. The child need not be debarred, however, from participating in games.

The diet should be liberal and nourishing. Excess of sugar must be avoided, but there is no need to prohibit altogether the use of red meats.

It is most important to treat at once all symptoms, however trifling, and for this purpose 10 grs. of salol will be found the least irritating and most easily taken of the salicyl. compounds. Its only disadvantage is the occasional occurrence of carboluria.

CONCLUSIONS/

C O N C L U S I O N S .

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From the above study of rheumatism one may draw the following conclusions: -

1. That rheumatism in the child is a disease of great frequency and vast importance.
2. That it differs to a remarkable degree from the acute rheumatism of adult life.
3. That in the present state of our knowledge it should be regarded as an infective disease.
4. That of all the varying clinical manifestations the cardiac symptoms are the most important and should always be looked for, and, although the early signs are few, they should be taken into consideration.
5. That even such trivial symptoms as "Growing pains" should be taken seriously.

6./

6. That more attention should be paid to the role of the tonsils in rheumatism.
  7. That subcutaneous nodules are of grave prognostic import.
  8. That Chorea may be definitely regarded as a rheumatic manifestation.
  9. That as regards treatment the salicylates in large doses as recommended by LEES are of the greatest value.
  10. That for the milder manifestations salicylin or salol may be administered.
  11. That in Chorea arsenic is preferable - given in large doses for short periods.
  12. That in cases of children predisposed to rheumatism prophylactic measures should never be neglected.
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## B I B L I O G R A P H Y.

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In compiling this thesis I have referred to the following works, acknowledging in the text each source of information.

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