THESIS ON THE ACUTE RHEUMATISM OF CHILDHOOD

for

the M. D. DEGREE

by

John Hume, M. B. and C. M. Edin., D. P. H. St. And.

M. D. Th. Edin. 1914
INTRODUCTION.

I choose this subject for my thesis as I am impressed by its importance, and the urgent necessity of recognising it in whichever one of its many diverse phases it may show itself. One frequently comes across cases of heart disease in early youth the origin of which is often quite unknown to the patient's friends, but is easily recognised by a competent physician to be a result of early rheumatism of childhood.

When contrasted with rheumatism in the adult many points of difference are found not only in the extent of its manifestations but also not having the same sequence of events, nor the same order as in the adult form.

For instance in the adult we find it mainly shewing itself in the joints, but in the child the joint affections are at a minimum, and there is a greater preponderance of heart mischief whilst any joint manifestations are late. The tendency to heart disease in early rheumatism is so real that it is incumbent on every practitioner to recognise rheumatism in childhood no matter under what guise it may appear.

Parents ought to be educated to the fact that growing pains are merely a variety of rheumatism and require as careful attention as any of the other variations in which it shows itself.

Take/
Take chorea for instance, a disease which is largely rheumatic in its origin and requires vigorous treatment, and necessitates careful examination of the cardiac sounds. How often does one find the relatives of the patient look surprised when in those cases we inquire into the history for rheumatism and suggest that condition as the probable cause.

Again in childhood recurring sore throats should excite one's suspicion, for although each attack may in itself be mild it is often the forerunner of grave cardiac lesions which would in all probability have been avoided had the rheumatic origin of the sore throat been recognised.

Early recognition of the rheumatism of childhood is imperative on every practitioner so that prophylactic measures can be adopted to arrest the disease and prevent the extensive damage we often find in early adult life the result of unrecognised or badly treated cases of rheumatism of childhood.

The public are more conversant with the phenomena of adult rheumatism - swollen and painful joints, high temperature, and copious perspiration with an unpleasant odour.

They are not then to be blamed if they fail to recognise this disease, and in many cases the practitioner has not "spotted" the case sufficiently early until some grave lesion threatens to appear and leads him to revise his diagnosis.

The early symptoms are often in themselves trivial, and would always be so did not this disease tend to progress and make heavy inroads/
inroads on the health of the patient.

Many cases doubtless do not go beyond the initial stages but many of them do, and we have no certainty in even the most insignificant early case that the condition will be arrested, hence the slightest cases demand vigilant treatment if one would conscientiously safeguard one's patient, and so prevent the development of the disease. Careful observation and investigation on the part of practitioners have ascribed to the initial stages the importance one attributes to them and the necessity for their recognition and removal before any permanent damage has been done.

In my opinion it is not assigned a sufficiently important position in the teaching in hospitals. This is in all probability due to the fact that the only cases met with in hospitals are advanced cases and the case is then described by its present symptom as heart disease and not by the real cause - rheumatism of childhood. The phenomena of childhood rheumatism are more varied than in the adult form and each of those phenomena requires to be considered by itself from its clinical aspect. I shall consider these clinical varieties and give some account of the recent work on the subject and shall illustrate these by cases coming under my own observation.

HISTORICAL OUTLINE.

In the writings of the early part of the 17th century we occasionally come across the word "rheumatismal" but on reading those works it is/
is found to simply mean a condition of pain in a joint or joint pains. (1) Baillou published a book in 1642 in which he describes cases of rheumatism, gout and osteo-arthritis and makes no attempt to differentiate between those conditions. No real progress was made in grasping the causation or treatment of those states as clinicians quite failed to distinguish between gout and rheumatism.

A great step forward was made in 1670 when Sydenham published his Observations and brought before the medical world the theory that there were many different points between the two conditions gout and rheumatism. This view was hotly disputed by many who were well known for research as it then existed. Gradually however Sydenham won round the profession to his views and in his subsequent articles he refers to the fact that rheumatism is as a rule prevalent in the autumn, and does not often attack the aged but rather the young and vigorous. He also noted that it did not confine itself to one joint but rather travelled from one joint to the other and often implicated several joints simultaneously. The publication and acceptance of Sydenham's theory mark the beginning of a new era in the study of rheumatism and enable us to put our views on a solid foundation and arrange the symptoms of our cases so that we can more easily differentiate between those conditions and improve and perfect the treatment to give speedy and lasting benefit to the sufferers from these maladies.

The cause of rheumatism was for long believed to be faulty chemistry the result of perverted metabolism. Lactic acid was held by many to be/
be the immediate cause and in the Cromian Lectures Dr. Latham states that in addition to lactic acid there is uric acid present which acts as an irritant to the nervous centres. Haig, a London physician gives it as his opinion that any condition causing pyrexia may determine the precipitation of uric acid and cause joint symptoms. This observer attributes many diverse actions to uric acid in which whilst there may be a slight superficial resemblance we find the clinical courses of the various diseases attributed to uric acid to be widely different. We are forced to admit that the chemical theory is inconclusive and medical men have to consider other probable causes. Many advocated a nervous origin but were unable to advance any definite proofs.

For nearly a century after Sydenham's time there was very little done in advancing the knowledge of rheumatism.

In 1772 (2) Cullen as a result of his investigations stated that rheumatic joints do not suppurate.

Pitcairn who evidently kept careful records of his cases noted the connection between rheumatism and heart disease. His observations were edited by Baillie in 1794. Curiously however (3) Haygarth in 1805 makes no reference whatsoever to the connection between rheumatism and heart disease in his otherwise very good description of acute rheumatism.

Battington and Curry(6) in 1811 referred to the frequency of heart disease accompanying rheumatism and they lean to the opinion that/
that the connection is not accidental, but rather for some reason they cannot explain are cause and effect.

Hillier(7) in 1868 described subcutaneous swellings occurring during rheumatism in childhood. He gives an account of a case of chorea associated with rheumatism in a child in which such swellings were present on the head, knees and wrist. Those swellings he says were "hard round lumps about the size of a horse bean attached firmly to the bone but with the skin over them quite movable." He also asserts that they are "neither red nor tender on pressure." He really regarded them as a rheumatic periostitis. Nugent a French physician gave a very exact description of nodes or swellings he had observed in his early rheumatic cases but it was reserved to Cheadle in 1888 to definitely prove their relation to this disease. He described them as subcutaneous tendinous nodules.

Dr. Mantle(8) in 1887 found both diplococci and streptococci in many rheumatic joints. This statement would seem to explain why the curves formed by the statistics not only of the mortality of acute rheumatism but also of its occurrence are similar to those of infective diseases. A large amount of statistical evidence to support this view was brought forward in 1895 by Dr. Newsholme. In 1900 the diplococcis rheumaticus was isolated from the blood by Poynton and Paine(9). They found it was extensively distributed and demonstrated it also in the tonsils subcutaneous nodules and cardiac/
cardiac vegetations of persons afflicted with acute rheumatism. They cultivated this organism on artificial media and inoculated animals with it, and got as a result symptoms identical with those of acute rheumatism.

Shaw(10) and Singer(11) largely confirmed those results during their bacteriological investigations of this disease.

The etiology of rheumatism has given rise to much discussion, and Poynton and Paine in the Lancet in 1910 show that no other organism is found in rheumatic lesions in animals except the diplococcus rheumaticus. They also state that various micrococci may produce experimental endocarditis as they may also produce endocarditis in man, but that various micrococci are not found in human rheumatic endocarditis which will reproduce the disease. Further they state that experimental pericarditis may result from various infections but that only one can produce rheumatic pericarditis in man and also experimental pericarditis.

Horder(12) combated the view of Poynton that the diplococcus rheumaticus was the essential cause of acute rheumatism as in 30 cases of acute rheumatism he had been unable to isolate any organisms from the blood stream and on the other hand he had demonstrated the organism in 28 out of 31 cases of ulcerative endocarditis. Horder suggested that Poynton and Paine described a terminal infection, but the latter have proved that several of the patients from whom they isolated/
isolated the diplococcus lived for several weeks, and other cases were alive and well after the lapse of several years.

Zurich and Schiehold (13) removed the tonsils in 125 cases and claim to have cured the acute rheumatism by so doing in 98 of those cases. They showed that the tonsils were swarming with microorganisms although apparently healthy on the surface.

Dr. Waugh (14) of Great Ormond Street Children's Hospital London advocated the removal of the tonsils in rheumatic children. He noted that the tonsils in those cases were often much enlarged and unhealthy looking.

Achalme (15) in 1897 in investigating the bacteriology of acute rheumatism discovered an anaerolic bacillus but when cultivations of it were inoculated into susceptible animals they did not produce the symptoms of acute rheumatism.

There has been no farther advancement in the bacteriology of acute rheumatism during the last ten years.

The rheumatism of childhood although probably identical in etiology with the adult form differs in many points between its symptom complex and that of the disease in adult life. This difference is probably largely brought about by the factors present in childhood and absent in adults, viz:-- the action of the glands that predominate in childhood as the thymus gland, etc. in influencing the cause of acute rheumatism and hence we get various phases arising independently and/
and apart from each other. In childhood the phases may be grouped together as in the adult form, but oftener we find the series of rheumatic events spread out over the years of childhood. In a single case at one time you may have an endocarditis and at another time a chorea or a tonsillitis each phase existing by itself, yet each one is as essentially an expression of rheumatism in the child as is joint affections in the adult form.

Whilst accepting the microbic origin of the disease there are factors which contribute their quota in bringing about the rheumatic condition. This is notably seen in "chill", and also in the geographical distribution of the disease.

In high altitudes where there are wide limits in the temperature in the 24 hours we get many cases of rheumatic fever. It is of comparatively frequent occurrence in Egypt, The Cape, and Mexico, whilst it is not so frequent in lower moister localities of a more even but equally high temperature. Many cases are got at the Mediterranean naval stations probably due to the great fall of temperature which takes place during seven months of the year after sunset. The seasons also play a part in the prevalence of rheumatism. The monthly curve of the incidence of rheumatic fever is similar to that of typhoid fever. It is lowest in February, March, April, May, and June, and attains its maximum in October and then subsides. The similarity of the curves of typhoid and rheumatic fever supports the view/
view that the immediate cause of rheumatic fever is a micro-organism capable of multiplication outside the body.

**ETIOLOGY.**

Sex plays an important part in this condition. In the adult form we find the sexes almost equally affected with if anything a preponderance towards the male side, but in childhood we get a distinct reversion and more females are affected than males. The exact proportion is not the same until puberty, but is found to vary with each few years of life.

The Collective Investigation Committee state in their reports that in the first five years of life five times more boys are affected than girls, but from six to ten years of age they become almost equal in the proportion of 15 to 14 but from 11 to 15 years of age the proportion is suddenly reversed, and the girls who suffer are twice the number of boys. Over 15 years of age it was found that there was a gradual decline of the liability of girls to suffer up to 20 years, so that about the age of twenty years it is found that men predominate.

Another cause influencing the incidence of rheumatism is the weather. In this country the variable climate is a potent factor in conducing to that condition. It is often rife during a spell of wet weather after a hot season. The reason for its prevalence at that time is that the dry weather favours unhealthy states of the throat, and/
and upper air passages, and then the cold damp chilling the body causes local inflammation and the channels are open for infection. When there is such a spell of weather, the disease may almost become epidemic. We see then how atmospheric conditions can largely influence the number of cases quite apart from infection. In the same way damp houses favour its development, whilst damp neighbourhoods form ideal spots for its almost constant presence. Heredity also accounts for many cases. Often a description is given of a similar condition in the parents. This points to the fact that there is a hereditary influence at work. It is difficult to dogmatise, as often the evidence is doubtful or untrustworthy. This is especially so in the class it most affects, viz: the poorer class, but a considerable proportion of the friends of poorer class patients give a description of a similar condition occurring in the parents even if they do not name the disease. One has to be careful in accepting statements as regards rheumatism, as in the minds of most people it is inseparable from swollen joints, and hence the evidence must be carefully weighed and considered, as in children it may only have assumed one of its many guises. Better class people are as a rule able to give more precise information regarding their illnesses. Hence in their case the data of the incidence of rheumatism in parents is more to be relied upon. Seventy % show well marked heredity although the parents may have lived in different localities and under different conditions. Heredity/
Heredity does not in any way combat the fact that it is an infective process with which we have to deal. It only shows the existence of a predisposing cause or tendency towards the disease, in many cases a vulnerability as it were towards the rheumatic poison. When we get a history of the condition in both parents we get the disease existing in the child in an aggravated form, and often intractable, and very often we find those cases of double inheritance having a fatal issue.

No tissue of the body can escape from the effects of the rheumatic poison and no greater mistake can be made than not to bear in mind that rheumatism in childhood does not necessarily mean painful joints. In many cases the throat is unhealthy looking and quite a considerable number are ushered in by a sore throat. The condition of the throat does not necessarily require to be painful but cultures of the diplococcus rheumaticus can be easily obtained from it.

In my opinion the cause of the sore throat in rheumatism is the presence of other organisms besides the diplococcus rheumaticus, in other words the pain is due to an inflammatory condition caused by streptococci and not by the diplococcus rheumaticus.

The condition known as post-scarlatinal rheumatism is not in any way different to the ordinary variety but it results from the easy entrance into the body of the diplococcus rheumaticus by the tonsils already/
already weakened by the scarlatina. It is got after other infective
diseases as diphtheria, measles, etc. and here its symptoms are the
same as in the so-called scarlatinal form. Its occurrence after
diphtheria and measles points to the entrance way of damaged tonsils.

**PATHOLOGY.**

The real cause as I have just stated is an organism the
diplococcus rheumaticus and its entrance into the body is by way of
the tonsils. The proof that an organism causes a certain disease
is that when the organism is injected into an animal liable to the
disease it causes all the phenomena of the disease. Now this is
exactly what happens in the case of rheumatism and no matter whether
the diplococcus rheumaticus is isolated from a tonsil or from a
rheumatic heart you get exactly similar experimental results. ll.

The diplococcus is very minute and as it is feebly Grain positive
it is difficult to spot. It can stain well with methylene blue, and
when grown in different media we find it assuming various forms, and
either have it as monococci or grouped liked the staphyloccoci or in
long chains like the streptocci. In microscopic sections we often
get the tissue cells taking them up to destroy them. Its action in
the different media is the same it produces a lot of acid and clots
milk after incubation for two days. It grows on media more luxuriantly
ly than the streptococci, and it grows well on gelatine at 20° C. lll.

It is most easily obtained from inflamed squorial membranes, and
only occasionally from the fluid in the joints. It has been cultivated from the blood but sometimes examination of the blood is negative. The proof that this diplococcus is the cause of rheumatism is that when it is injected in pure cultures into rabbits it often produces inflamed joints and also pericarditis and inflammation of the valves of the heart, but no suppuration takes place.

Now it may be asked how far do those symptoms agree with rheumatism. Beattie has shown that in rabbits the inflamed joints produced have the same features of acute rheumatism in man, viz:—rapid transference from joint to joint, tendency to relapse, the contributory effects of exposure to cold and no gross anatomical changes in the joints. IV.

The fact also that it causes pericarditis and inflammation of the valves of the heart without suppuration is also strongly in its favour as being the cause of rheumatism. The pathological lesions vary with the virulence of the infection. One notable example is the rheumatic nodule. Those nodules are subcutaneous and are in connection with the fibrous structures of fascia, of tendons. The nodules have been found in the periosteum and in the pericardium. They may be any size up to that of an almond but are not as a rule larger. They may be so small as not to show but when the part is palpated their presence is felt, or if the skin is more tightly drawn over them they may be observed. They are not tender and there is/
There is no redness of the skin covering them. They vary in number but even in severe cases there is as a rule not more than 20 or 30, although in one case 200 were observed.

During the first few days they grow rapidly but afterwards more slowly. They may last only a few days or a few months. Now the peculiarity about the nodules is that they and the valvular vegetations are built on the same type. Those lesions contain special fibroblastic cells whose special function it is to rapidly destroy the organisms. Carey Coombs has done much research on those fibroblastic cells. He contends that they are the characteristic tissue element in rheumatic affections.

Those cells are large and frequently multi-nuclear and are surrounded by plasma cells and mono-nuclear leucocytes.

The nodules consist of nuclear growth in all stages of transformation into fibrous tissue. These fibrous outgrowths render the prognosis grave as they indicate valvular vegetations. The majority of cases with nodules die. If in such a case we examine microscopically a section of the mitral valve we find proliferation and cell infiltration of the sub-endothelial fibrous tissue the same process as was found in the nodule. Sometimes however, we find the nodules disappearing, and in that case we also get improvement of the valves of the heart thus proving their intimate connection. The fibroblastic cells are got both in the nodules/
nODULES AND IN THE VEGETATIONS. THE SPECIAL FUNCTION OF THE FIBROBLASTIC CELLS IS TO DESTROY THE ORGANISMS.

IN RHEUMATISM YOU GET DILATATION OF THE SMALL BLOOD-VESSELS AND WIDE SPREAD PERIVASCULAR CHANGES TAKE PLACE AND THE CONNECTIVE TISSUE SHOWS A PECULIAR GELATINOUS SWELLING AND SOMETIMES A REMARKABLE OEDema. II. FURTHER RHEUMATIC CONDITIONS DO NOT SUPPURATE.

CLINICAL MANIFESTATIONS.

IN CHILDHOOD RHEUMATISM ASSUMES MANY GUISSES AND OFTEN COMES ON GRADUALLY. THE MANIFESTATIONS IN THE CHILD ARE DIFFERENT TO THOSE FOUND IN THE ADULT NOT ONLY IN THEIR NUMBER BUT ALSO IN THEIR SEVERITY AND IN THEIR DIAGNOSTIC VALUE.

ONE IS APT TO BE MISLED BY THE APPARENTLY TRIFLING CHARACTER OF ANY SINGLE SYMPTOM AS COMPARED WITH THAT IN THE ADULT.

IT IS NECESSARY FOR THE PRACTITIONER TO FAMILIARISE HIMSELF WITH THE RELATIONSHIP OF THE VARIOUS CLINICAL PHENOMENA WHICH WHEN GROUPED TOGETHER ARE EASILY RECOGNISED AS BEING COMPONENT PARTS OF RHEUMATISM. NO ONE SYMPTOM USHERS IN AN ATTACK. IT BEGINS IN DIFFERENT CHILDREN IN DIFFERENT FORMS. IN ONE CHILD TONSILLITIS IS THE STARTING POINT, IN ANOTHER ARTHRITIS EACH CASE BEGINS DIFFERENTLY. NO MATTER WHICH SYMPTOM IS FIRST WE FIND THAT BEFORE LONG OTHER SYMPTOMS WILL FOLLOW. IN THIS PART OF THE THESIS I INTEND TO GIVE A CONSIDERATION OF THESE DIVERSE SYMPTOMS AS THEY ARE OBSERVED IN GENERAL PRACTICE NOT ONLY IN THIS COUNTRY BUT IN LONDON. THE HEART IS VERY SUSCEPTIBLE/
susceptible to the rheumatic infection and its condition is of the utmost importance, and special attention must be paid to it in the daily visit. The heart affection is very insidious, and many patients have a damaged heart and do not know it until when being examined in some subsequent attack of rheumatism it is discovered to be far from perfect.

The following cases will illustrate this point.

A boy T. K. 11 years of age was brought to me two years ago. He complained of feeling tired, shortness of breath and general listlessness. His temperature was 100°, and on examination he was found to have dilatation of the heart and hypertrophy. The precordium was bulging and a presystolic murmur was present. He was sent to bed with instructions to be kept warm and at rest. He was given salicylates and soon made a good improvement. His mother said that all the illness he had before was what she described as "Influenza." On cross examination she admitted he had had some joint pains. This first illness was undoubtedly rheumatism, and so mild was the attack that it almost escaped attention and yet it had left an indelible stamp on the valvular tissue.

J. L. was a pleasant little girl of ten years of age. She had an attack of chorea. The history her mother gave was that about a year previously she got a chill which was attributed to sitting at an open window. She became feverish and complained of a tired feeling in the legs, and sore throat. In a week or two she improved but during the previous twelve months she had not picked up but had looked pale/
pale and tired. The chorea was not very severe, and at the same time her temperature varied from 99° to 100.2°. I found she had cardiac hypertrophy and dilatation and a systolic murmur at the apex. With rest and warmth in bed and salicylates she improved a great deal. This illness then she had a year ago was undoubtedly rheumatism.

CARDIAC MANIFESTATIONS.

I am so impressed with the importance of this form of rheumatism that as a matter of routine I thoroughly examine the chest in all cases of children who are debilitated, tired, and off their food.

Sometimes even in the case of adults we see a patient who may complain of only a minor ailment but on examination is found to have valvular disease of the heart. In the majority of cases in children the heart becomes affected and every care must be taken to ward off this danger not only during the acute attack but during convalescence and in any subsequent attack. Active prophylactic treatment is necessary, and all strain of the cardiac muscles must be avoided. The prevalence of rheumatism in children is often overlooked and not sufficiently realised. This point is illustrated by Dr. Carr in the "Practitioner" of November, 1909 in which he says that 50% of the children admitted in three consecutive years to the Victoria Hospital were either suffering from rheumatic pains or other rheumatic/
rheumatic manifestations as chorea and heart disease. Still states that the frequency of cardiac affections is one of the most characteristic features of rheumatism in childhood. He found that 128 out of 170 rheumatic children had heart murmurs which in 93 cases were certainly due to endocarditis.

Dr. Moore gave it as his opinion that endocarditis was the one lesion always present in the case of rheumatic fever. In my own experience as a general practitioner I sometimes find that there is the greatest difficulty in being certain that one is dealing with a case of rheumatic fever since the cardinal signs of that condition are so often absent, or at least not pronounced. It is necessary to impress upon patients the necessity of rest as pain is not necessarily always present in the early stages of endocarditis in fact it is often absent. One often comes on a patient who has no idea there is anything wrong with his heart until oedema or some lack of compensation reveals the true state of affairs. We must be ever on the guard to ward off heart mischief and a close examination of many cases has led me to the conclusion that certain cases have a greater tendency towards heart disease than others. It is inadvisable to be dogmatic but I have almost invariably formed a tendency towards that condition in cases as (1) where the child has fine features, a clear skin, a good complexion, dark or reddish hair and bright intelligent eyes.

(2) Where/
(2) Where the temperament is unstable and excitable so that even although the child is ill it tends to be fidgety and move about a great deal. This is really a diagnostic point between this condition and that of malaise resulting from disordered states of gastrointestinal tract.

(3) Where there is considerable anemia.

(4) Whenever we get increased rapidity of the pulse a fact which should always be looked for. It is generally first got in evenings.

(5) Where the history of the immediate ancestry shows heart disease, etc.

(6) Where the pains in the limbs are often slight and indefinite and where pain is complained of in the epigastrium.

One does not find all these symptoms present in any one case and one ought to bear in mind and be on the outlook for at least the principal as increased rapidity of the pulse or anemia along with the history of the child in the early years of life. When the general practitioner does so he will have the gratification of fewer of his cases ending in chronic invalidism and I am confident that if heart disease is recognised early the majority of cases will recover in a great measure to their former state with prolonged rest and treatment. At the same time all subsequent and even trivial illnesses must be closely watched to obviate an attack of rheumatism. There are three main symptoms that occur early in heart affection, viz:-

(1) Fresh outburst of pyrexia and increased pulse rate.

(2) Dilatation/
(2) Dilatation of the heart as shown by careful palpation and percussion.

(3) Where the first sound is blurred or a blowing mitral murmur is present.

Either of those three symptoms in a case of pyrexia is quite sufficient warning that heart mischief is beginning, and which is often not limited to the endocardium but attacks the myocardium as well, in short a carditis. It is often difficult to come to an exact diagnosis of the condition of the heart but it is well worthy of close study as in such cases one is rewarded with knowing that pronounced heart disease has been averted.

Dr. Sturges VIII has pointed this out how more so in children is the heart apt to suffer in all its structures at one and the same time. Endocarditis, pericarditis, and myocarditis are all apt to occur together and the carditis to be general. The endocarditis has a priority over the other two. In fact when the carditis is general the case is apt to be fatal. Endocarditis may appear alone or at the same time in conjunction with any of the other symptoms. It is apt to occur along with slight joint pains or with chorea. When subcutaneous nodules occur at the same time the prognosis becomes more grave. The valve most frequently attacked is the mitral but any valve may be attacked. Pericarditis may arise at any stage either alone or with any of the other symptoms. It often occurs late when the heart/
heart is already dilated. It is very often found post-mortem (Dr. Sturges Vil) as when it is present the case tends to end fatally. The presence of pericarditis may be suspected by various signs, viz:-

(1) Sudden increase in the anemia.

(2) Oedema of lower eyelids.

(3) Dyspnœa with bulging and tenderness over precordium.

(4) A pericardial rub may be heard in 2 or 3 days.

(5) Might have some vomiting at its onset.

This latter point is illustrated by the following case. Four years ago I was called to attend a boy W. H. eight years of age who was suffering from acute rheumatism. There were pain and tenderness over the precordium, the face was puffy. He was pale and anemic. He had cardiac dilatation and hypertrophy and a systolic murmur at the apex. He developed nausea and vomiting and died.

Hypertrophy and dilatation came on rapidly probably as the tissues are softer and more yielding. The speedy development of hypertrophy gives good compensation, and for this reason the enlargement of the liver and extreme dropsy so common in adult cases is not as a rule met in children.

The following cases will illustrate the various points I have referred to. A patient of mine J. W. a girl 11 years of age became thin and pale. There were small swellings at the elbows and ankle. She was bloodless and debilitated and almost a year previously she had complained of pains about the joints described by her parents as "growing/
"growing pains." The small swellings or nodules appeared about a week before I saw her. She had a mitral systolic murmur and a quick pulse.

In some bad heart cases the growth is stunted. The cause of this may be involvement of the Conuary arteries due to the inflammatory condition of the heart. This fact is illustrated by the following case. I was called to see a girl A. L. two years ago. I was told she had never been strong. She was 15 years of age but would have passed for 9 without much difficulty. She was very ill and had shortness of breath mitral and aortic regurgitation. The history was that she had a severe attack of rheumatic fever at 7 years of age with involvement of the heart.

**ARTHRITIS.**

It is very seldom that arthritis occurs in children with anything like the same severity as we get it in the adult where we might almost say it is a sine qua non.

Its symptoms in childhood are as a rule very mild even evanescent and not pronounced. It may only be a slight stiffness or pain in bending the joint, and the patient may be able to walk fairly well. There is very little redness if any around the joint and little or no rise of temperature. The pain is dull not acute but near the joints we may get subcutaneous haemorrhagic effusions. Whenever there is any suspicion/
suspicion of joint mischief in a child and around the joint or joints there are marks like bruises, we should calteris paribus treat the patient at once for rheumatism. Many cases however do not show this bruised appearance and we must rely more completely on the other symptoms. It we find pain in a joint or joints of a child between the ages of three and twelve it is almost certain to be rheumatic arthritis, and if we watch the case for a few days we should soon find some other symptoms shewing itself as tonsillitis and so confirm our diagnosis.

It should at the same time be borne in mind that in young patients suffering from typhoid or pneumonia we may get painful joints. In this case then the joint condition is due to infection with the organism of the disease with which the patient is suffering, viz:- typhoid or pneumonia.

When a case is advanced and both carditis and rheumatic nodules are present a greater implication of the joints shows itself. You may then get a multiple arthritis of the wrists and of the small joints of the hands and fingers accompanied by great muscular wasting. (Poynton 1X)

Cases are occasionally got in childhood where only one joint is affected, and then we must make a careful diagnosis between rheumatism and tubercular disease. This is notably the case in the hip joint where the evidence must be carefully weighed before coming to a diagnosis. So also must we not conform an arthritis of the right hip-joint with appendicitis.

Syphilis/
Syphilis is another cause of joint trouble which we must bear in mind. As a rule in syphilitic joint disease the diagnosis is easy as generally other syphilitic symptoms are present, and not only so but as a rule tenderness is present along the long bone leading to the painful joint and the pain is more severe in the joint than when it is due to rheumatism. The age incidence is a helpful factor in syphilitic joint disease. It occurs early in life and prior to the age for rheumatism. Scurvy is another cause of painful joints which may be mistaken for rheumatism. Here again the age incidence helps as scurvy only occurs in early infancy and in bottle fed babies.

Other conditions apt to be conformed with this condition, are swelling of the wrists in tetany, the arthritic haemorrhages of haemophilia, pyaemic arthritis and acute osteomyelitis. (Cheadle). In acute osteomyelitis the temperature is high, and not only is the joint swollen but often part of the limb as well, and rigors often occur. This is a marked contrast to rheumatic joints in children where the temperature is low and there is very little swelling of the joint if any and certainly not spreading from the joint and no rigors.

A case seen by me not long ago was a boy J. L. eight years of age. He had a little puffiness of each knee and only a small degree of pain on bending it. He could walk all right. On examination I found him to have a systolic murmur in the mitral area. This case shows how a very mild arthritis is often accompanied by an endocarditis. Hence the great importance/
importance to the patient of spotting rheumatism before it has time to stamp the various structures of the body with its almost indelible mark.

Another case was that of a girl B. R. aged nine years who complained of slight pain in the legs. A week previously she had suffered from sore throat. When I saw her the pulse was 84 per minute and respirations 22 and temperature 99°. She had a systolic murmur at the mitral area. Here again the arthritis was not pronounced but the heart structure was being damaged at the same time as the joints of the legs were affected with arthritis.

We see then how grave a mistake would in many cases be made if we looked on arthritis as a cardinal symptom, and even although it is quite absent we must treat the case energetically if any other symptom is present pointing to rheumatism. Again we must be careful as we might be called to an arthritis that was occurring during a case of ambulatory typhoid. The history of the case, the age of the patient, the sex, and the concomitant symptoms must all be inquired into for on our correct diagnosis the future welfare of our patient will depend.

RHEUMATIC TONSILLITIS.

-------------------

Tonsillitis often ushers in an attack of rheumatism or it may occur at any time during the progress of that malady. It is especially prevalent in the late autumn and early spring. Felix Semon gives it as his /
his opinion that the causes of rheumatism are likewise the causes of
tonsillitis. Since his time it has been recognised that tonsillitis
is an evidence of rheumatism and is due to the invasion of the
diplococcus described by Poynton and Payne. This organism is found
in large numbers in rheumatic tonsils and appears to find a portal of
entry by means of the tonsils where it may set up an inflammatory
condition which culminates along with other symptoms into a full blown
acute rheumatism. You do not necessarily get the tonsils inflamed by
the diplococcus rheumaticus any more than you get the tonsils inflamed
by Tubercle Bacilli. In my opinion the pain of rheumatic tonsillitis
is not so much due to the diplococcus rheumaticus as to other organisms
that have gained entrance to the throat.

As a rule there are not many glands in the neck enlarged in
rheumatic tonsillitis. The tonsils are always enlarged and there is
considerable pharyngitis at the same time but there is not a general
involvement of the glands as there is in infection with the Tubercle
Bacillus. This points to the fact that the diplococcus rheumaticus
attacks the fibrous tissue rather than the glandular elements of the
throat.

Poynton and Payne XI say: "There can be little doubt we believe
that these large unhealthy tonsils are a constant menace to the
rheumatic, and that the investigations originated by George Waugh
show decisively that there abound in the depths of these disordered
tissues/
tissues strepto-diplococci which will produce with much constancy in appropriate dosage endocarditis and arthritis on intravenous injection into rabbits. We believe they may well explain some rheumatic relapses. The relation of acute rheumatism and tonsillitis to diplococcal infection is now so well defined by clinical research that it constitutes one of the most successful advances in the study of the disease. When the position of the tonsils is borne in mind it may seem a startling assertion to make the strepto-diplococci may be obtained from the depths of the diseased glands yet it is true and has happened not only in our experience but in one case was quite independently ascertained by Dr. Graham Forbes who had examined a culture from the same case."

Garrod and Cook XII found the % of cases of tonsillitis with a history of rheumatism exactly the same as the % of articular rheumatism with a rheumatic family history, viz: - 35%. In all cases of tonsillitis where there is a history of rheumatism in the family or if the child has had at any previous date pains in the joints then it can almost be taken for granted that the case is rheumatism and must be promptly treated as such so as to obviate damage to the more important structures as the cardiac tissue.

Forbes XIII as far back as 1869 estimated that 80% of the rheumatic fever cases suffered from sore throat. The differentiation between tonsillitis due to the diplococcus rheumaticus and to other causes is often puzzling, still that does not justify us in not being on the watch for the diplococcus rheumaticus as the condition of the patient/
patient is fraught with danger unless it is recognised and promptly treated. It is not so easy to find the diplococcus rheumaticus on a swab as it is to find the diphtheria bacillus.

The rheumatic throat is in accord with other rheumatic states in that it does not suppurate. The palate and sides and back of the throat are red but the muscles of the neck are often stiff and the pain on swallowing is not so pronounced as in ordinary tonsillitis.

As I have said above the glands are not much enlarged but in ordinary tonsillitis they are enlarged.

The temperature in rheumatic throat agrees with the temperature of the other rheumatic symptoms it is moderate about 100°, whereas in suppurative and lacunar tonsillitis it is usually about 102° and may run up to 104°. The family history or previous history of the patient helps us also to recognise the condition. If after having considered the case well and no definite diagnosis has been formed do not hesitate to administer the salicylates as they act promptly and quickly and soon clear up the rheumatic throat and so settle the diagnosis.

I recently saw a girl B.R. of 7 for a sore throat. The tonsils and pharynx were inflamed and swallowing was slightly impaired. Gentle pressure on the neck caused slight pain. The temperature was 100° and she lay quietly in bed and did not move about much. When her legs were grasped she complained of slight pain. There was a family history of rheumatism. I had her throat painted with tannic acid/
acid and glycerine. But next day when I went back her condition had not improved. I then gave her five grains of aspirin each two hours and on the third day she was very much better and the throat was clearing up nicely. She finally got all right. In this case the successful treatment by the aspirin settled the diagnosis.

GROWING PAINS

Pains are sometimes complained of between 9 and 13 in the legs and near the joints especially. They are by many people attributed to growth. They cannot be due to that condition as that state is purely physiological, and therefore painless. A few doses of sodium salicylate or other remedy as aspirin soon removes them and proves that their origin is rheumatic. It should be a fixed point to always examine the heart in growing pains. They may antedate other rheumatic symptoms and the parents of the child should be put on their guard as the approach of the rheumatic symptoms is so insidious that a march may be stolen upon the patient in a very short time. To be certain to prevent endocarditis in those cases do not fail to give the salicylates for every hour treatment is postponed is allowing the diplococcus rheumaticus to get a deeper hold and so go on with its nefarious work. They are most frequently got in the calves but may exist as pain in the fibrous tissues of the back of the neck or stiffness of the fingers and toes.

J.D. was a boy of 11 years and had chorea. On enquiry I found that/
that he had had sore throat two months or so previously and growing pains twelve months before his present attack of chorea. He had a mitralsystolic murmur. The friends were quite surprised when I pointed out to them that all these symptoms were indications of rheumatism. This case illustrates the necessity for treating growing pains with anto-rheumatic remedies and had that been done in all probability he would never have had endocarditis or any other rheumatic symptoms.

THE ERYTHEMATIC IN RHEUMATISM.

An erythema may be the first symptom of rheumatism, or it may occur at any stage during the course of the disease. It may exist in the form of erythema nodosum as roundish spots slightly elevated above the surface of the skin in size between a threepenny piece and a shilling. They are reddish at first but gradually assume a tint like a bruise. They occur most frequently on the fronts of the legs and on the extensor surfaces of the forearms. They are not as a rule painful but may be slightly so. The skin over them is smooth and the least thing glazed. Very often they occur along with an arthritis, but not necessarily so. They are sometimes accompanied by a tired feeling and slight temperature. Cheadle XVI. in his book says "With regard to erythema nodosum it would appear, that although it has, so to speak, an arthritis of its own, it is associated sometimes with true articular rheumatism. The eruption is attended in itself with pains of the joints and sometimes swelling. But it also arises in connection with/
with genuine acute articular rheumatism."

He also has observed erythema along with other rheumatic symptoms and he uses that fact as an argument in favour of its rheumatic nature. A very convincing argument in favour of its rheumatic origin is that it vanishes practically with a short course of the salicylates. Kuhn XV describes two forms.

(1) The idiopathic contagious type and
(2) The symptomatic form which is the usual rheumatic variety.

Sometimes the erythema assumes an urticarial form. The erythema does not as a rule keep to one part of the body but often shifts about, and each time it reappears there is a slight rise of temperature and usually some joint pains near it. The condition termed purpura rheumatica occurs near joints which are swollen, tender and painful although the temperature may be insignificant. It may be looked upon as an extreme case of erythema. Purpura rheumatica is not got very often.

**SUBCUTANEOUS NODULES.**

Subcutaneous nodules are a special feature of acute rheumatism of children. They were first described by Hillier XIV. as far back as 1868. He gives a good account of them in his book on Diseases of Children, page 239. The case he describes was one of chorea with pyrexia and organic heart disease, but no articular rheumatism.

In the Harveian Lectures on rheumatism published in the "Lancet" 1892 Cheadle XVI says he has often observed them occurring in the course of/
of articular rheumatism.

Meynet XVI gave a good description of them in the Lyon Med. 1875 page 459.

The frequency and great importance of these nodules as clinical signs in the various manifestations of rheumatism was first pointed out by Barlow XVII and Warner XVIII.

They are very seldom got in adults and in children may appear in connection with any of the other phases of rheumatism but are mostly associated with endocarditis, and pericarditis. In view of that fact their serious import is at once realised. They vary in size from that of a small bead to the size of a small bean, and lie under the skin in relation with the fibrous tissue as fascia and tendons.

They occur mainly near joints and the bony prominences as the olecranon, the margin of the patella, the ankle, the superior curved line of the occipital bone, and along the vertebrae, occasionally along the extensor tendons of the hands and feet and on the scapula and crests of the ileum.

They are painless and are easily moved under the skin. They are easily detected on palpation when they would be overlooked by mere inspection. Their exact position is in the loose connective tissues, and if one is dissected out it is seen to consist of a yellowish deposit with a net-work of fine vessels but no definite capsule can be differentiated. When examined microscopically they are found to be analogous to the/
the fibrinous deposit on the inflamed valves, or pericardium. Poynton has found the diplococcus rheumaticus in the nodules (vide The Practitioner 1813 page 400). When a vegetation on the valve is examined you get cell proliferation and cell infiltration, and those two stages are the exact counterpart of the processes in the rheumatic nodule.

They are of grave significance and indicate concurrent and usually progressive cardiac disease. As the nodules enlarge the endocarditis or pericarditis becomes uncontrollable and advances almost certainly to a fatal ending. In those cases where the nodules disappear we find the heart disease also improves. This may be due to the development of similar inflammatory cell growth on the valves which may subside as quickly as we see it does sometimes in a subcutaneous nodule. They are a distinguishing mark of the acute rheumatism of childhood and have a serious significance as regards the prognosis of the cardiac condition with which they are associated, the more numerous the nodules the more serious is the case XX. It is the cardiac manifestations they are mostly in company with. It is very rare to get them alone. They have occasionally been got accompanied by chorea, and no heart lesion. This is an interesting point in the connection of chorea and rheumatism. They are more common in girls than boys. They occur in about 10% of the cases of rheumatism and chorea according to Still XXI. Their number varies; there may be one or many. Their time of growth varies; some grow only very slowly, others more quickly, the minimum recorded time is/
is 3 days and the maximum 5 months (Cheadle) XXII. The following case is interesting as showing nodules without other rheumatic manifestations at the same time.

A. R. a girl of 9 years of age had sore throat and some vague pains throughout the body some 9 months previously to my seeing her. About a fortnight before her parents observed small swellings on each ankle and on each olecranon. The action of the heart was irregular and a mitral systolic murmur was present. There was a history of rheumatism on both the father's and mother's side. The vague pains and sore throat were undoubtedly rheumatismal, and it was probably then that the heart condition arose.

ANEMIA.

Anemia is an aid to the diagnosis of rheumatism and especially when taken in conjunction with growing pains or sore throat serves to further confirm the diagnosis of rheumatism. In several cases the anemia is very marked and the numbers of red blood corpuscles may fall rapidly and remain persistently low. Diphtheria is the only other disease which causes such a rapid blanching.

When there is cardiac involvement then the anemia becomes very profound. In the anemia of childhood I often use salicylate of soda and get in many cases improvement with that drug. This points to the rheumatic origin of many of the anemias got in juveniles. One case I/
I saw recently was a boy of ten years of age with aortic disease. He had very marked anemia. His mother gave the history that he had a sore throat about a year previously. His anemia improved with salicylate of soda.

### HEADACHE.

Headache is also got but as a rule it is more often present with chorea than with anemia. Headache may be the result of many different causes as errors of refraction, etc. but there is no doubt of it occurring in rheumatism. Apart from errors of refraction rheumatism is one of the most common causes of headache in children, and is either due directly to the anemia of the rheumatism or to a manifestation of the nervousness so common in rheumatic children or to a rheumatic infection of the meninges.

A boy R. L. ten years of age was brought to me with the complaint that he always felt tired. His mother thought it was laziness. He complained of pain in different parts and looked thin and pale. He was of a nervous disposition and often suffered from sore throats. His tonsils were swollen. He complained of more or less constant headache. He had a mitral systolic murmur. He had no refractive error. He was given sodium salicylate and in less than a week he was much better, in fact a different boy.

### STOMACH DISTURBANCE.

Pain/
Pain in the stomach may be due to many different causes but when it has no relation to the intake of food the probability of a rheumatic causation should always be borne in mind. It is fairly frequent in rheumatic children and if there are at the same time pains in the joints or aching limbs then one may be tolerably certain as regards its cause. The favourite site of the pain in those cases is the epigastrium, and sometimes it is unaccompanied by other rheumatic symptoms and then we may get valuable aid from the family history. The pains in the stomach might really be myositis of the abdominal muscles, at least when it occurs along with other pains in the limbs and joints. The diagnosis of the condition is often made plain by taking the reaction of the saliva when it will be found to be acid and not alkaline. In fact if one finds the saliva of the mouth acid anti-rheumatic treatment will be found to soon rectify the condition.

Several years ago I was called to see a boy J. K. nine years of age whose main complaint was pain in the stomach. He retained his food and had been ill for 2 or 3 weeks. Two or 3 days before I saw him he complained of pains in the legs, back and epigastrium. His temperature was 101.5°. The tongue was moist and the saliva acid. He had a systolic murmur. A few days under salicylate of soda soon cleared up the whole condition and all the symptoms were relieved.

Another cause of pain in the abdomen is a mucous colitis the result of rheumatism.

RHEUMATIC PLEURISY.
Rheumatic Pleurisy is sometimes got when there is involvement of the heart muscle. A favourite site for this pleurisy is between the pleura and pericardium. As a rule it does not give rise to large effusions. The fluid resembles that found in joints and may contain the diploccoccus rheumaticus in streptococcal form. (Poynton's paper on Rheumatism in Childhood vide The Practitioner 1913 page 400).

**NEPHRITIS.**

Nephritis has been recorded by various writers notably Poynton, Dr. George Johnston, and Professor Beattie. I have not found it myself but there is no greater reason for it occurring in scarlatina than in rheumatism.

**PERITONITIS.**

Peritonitis is sometimes found at post-mortems in rheumatic children thus showing the vulnerability of the peritoneum to the diploccoccus rheumaticus.

**APPENDICITIS.**

Appendicitis may be got during an attack of rheumatism but there is no direct proof to show that the rheumatism is the cause of the appendicitis. Poynton gives it as his opinion that it is most exceptional for appendicitis to complicate an ordinary attack of rheumatism.

**NEURITIS.**

Neuritis/
Neuritis as a result of rheumatism is very seldom found in children.

Acute pulmonary oedema is sometimes got caused by the diplococcus rheumaticus. A broncho-pneumonia is sometimes also got. Pneumonia according to Peyton is also got. XXIII.

CHOREA.

Chorea is a frequent concomitant of rheumatism in childhood, in fact it is unusual to get chorea in adult life. True chorea is closely associated with the rheumatic state. It is often got along with other rheumatic symptoms, e.g. with endocarditis, pericarditis, erythema, nodosum and erythema multiforme, with pains in the joints and above all with subcutaneous nodules. Chorea during rheumatism may occur with one or more of those conditions, or it may occur alone and be either preceded or followed by other rheumatic symptoms. One sometimes comes on a family where one child has a chorea, another endocarditis, and another pains in the joints. The majority of cases of chorea are due to rheumatism and clear up under the influence of the salicylates. The unset of the chorea is gradual, and the child becomes more irritable, more uneasy and is annoyed by night terrors and headache is often complained of. The more nervous and weaker the children there is the greater tendency to chorea during rheumatism. Girls are more frequently the victims of chorea than boys. Chorea is often associated with the early stages of mitral stenosis especially when it is persistent and/
and recurrent (Practitioner XXIV).

Still XXV. says, "For my part I may say I regard chorea just as good evidence of rheumatism as a gumma is of syphilis." Dr. Batten XXVI gives it as his undoubted opinion that where you get chorea with no other evidence of rheumatism either in the personal or family history that most of those cases are rheumatic in origin. He has shown that 53% of cases of chorea within the next few years after the chorea give clear evidence of rheumatism in either articular or cardiac manifestations.

Sir Wm. Osier XXVII found that an examination of a series of cases of chorea two years subsequent to the attack revealed 48% in which there were signs of organic heart disease. Chorea is sometimes found after scarlatina but that does not deny its rheumatic origin. In fact it clears up with sodium salicylate. In the same way an arthritis may develop during the scarlatinal convalescence and is commonly called scarlatinal rheumatism; it is really due to rheumatism and quickly clears up with the salicylates. The more nervous the child the greater the tendency to chorea. Fright or shock often precipitates an attack of chorea. This explains why girls are more frequently attacked than boys, for if chorea were dependent upon no other factor than the invasion of the brain tissue by a special toxin or micro-organism there would not seem to be any special reason why girls should be so much more often affected with chorea than boys.

Headache is common at the commencement of chorea, and its occurrence/
occurrence with chorea is specially interesting in connection with the observations of Poynton and Holmes XXVIII who found vascular engorgement of the pia mater, and underlying cortex with some small round cell infiltration of the pia arachnoid in the immediate neighbourhood of the vessels with here and there thrombosis of small vessels both in the pia arachnoid and in the cortex together with the degenerative changes in the cells of the cortex and presence of the diplococcusrheumaticus in the exudation about the vessels. Langmead XXIX mentions certain pupillary signs present in chorea called hippus, rythmical oscillatory movements of the iris; the pupils may not act synchronously, contraction to light is ill sustained and one may begin to dilate as if tired of contracting before the other. The pupil may show varying irregularity, now one, now the other being larger and it may become eccentric when contracted. Langmead says he has not found the hippus in the altered accommodation or the eccentricity of the pupils in any other general condition except articular or cardiac rheumatism, a point of interest in view of the common etiology of rheumatism and chorea. There is therefore serious risk to the patient of neglecting the earliest signs of chorea and the necessity of adopting prompt and vigorous prophylactic treatment. The child should be kept in bed until all choreic movements have ceased. The two following cases are illustrative of rheumatism and chorea.

(1) A/
A girl J. T. aged 9 was suffering from chorea and sore throat when I saw her. Her temperature was 101°. Six months previously her knees and ankles were painful.

A boy W. S. 8 years of age was seen by me in June 1910. Nine months previously he had chorea. In June there were vague pains all over and especially in the stomach. He felt tired and had a systolic murmur at the mitral area.

ONSET OF RHEUMATISM IN CHILDHOOD.

Rheumatism in childhood begins in various ways. The acute condition is often ushered in by a sore throat with moderate feverishness or as it is generally termed a "cold." During the next few days pains in the joints are often complained of, and often within a week the heart becomes affected.

Other cases may begin with chorea with very little pains in the limbs if any and there may be endocarditis along with or soon after the chorea.

In other cases gastric disturbances may be prominent at the commencement of an attack as vomiting and diarrhea with weakness fever and other manifestations, the most important of which is the implication of the heart muscle.

Some cases again show only one symptom as chorea or there may be heart disease alone.

Other cases have very vague symptoms as night terrors, loss of flesh/
flesh, breathlessness and shifting pains. In such cases inquire carefully for the history, and if any sore throat has been complained of.

**DIAGNOSIS.**

As a rule the diagnosis is not difficult, but there are some conditions from which it is necessary to be differentiated. The most important one is acute osteomyelitis. The main distinguishing points are that in acute osteomyelitis there is a sudden onset, severe pain, high fever and very marked weakness, and the development of a local focus near a joint. There is also often the history of an injury. The diagnosis betwixt the two is of the utmost importance as delay in diagnosing osteomyelitis runs the risk of the patient losing his life.

Rheumatism in childhood must also be differentiated from cases of arthritis due to gonorrhoea or sepsis. Generally arthritis of several joints in childhood is gonorrheal or septic and not rheumatic.

In scurvy the limbs generally are tender and painful and it differs from rheumatism. Another condition which must be borne in mind is anterior-poliomyelitis. In this condition there is a good deal of local wasting and a loss of reflexes whereas in rheumatism the child may get thinner but not locally, and the reflexes are not interfered with. Arthritis in childhood may be due not only to rheumatism but to many other causes as e.g. infection with the pneumococcus, tubercle bacilli, staphylococci, etc.. In such a case search must be made all over the body for evidence as regards the true nature of the condition.
Important as heart disease is in children the fact must never be lost sight of that it may have other origins besides rheumatism as you may get the heart attacked with the diptheria bacillus, or the pneumococcus, etc.

Septic infection from middle ear disease is often difficult to distinguish from rheumatism. One requires to be careful in rheumatism as in all conditions affecting children to inquire carefully into the child's personal history and often into the history of the parents.

PROGNOSIS.

The outlook in cases of acute rheumatism in children is far more serious than in the case of adults. The danger from this source is very important and the condition of the heart is often overlooked as the parents are apt to be misled by some other symptom as arthritis, or sore throat which may be in their opinion comparatively trivial.

Another great danger is the tendency rheumatism has to recur and by repeated attacks on the heart muscle brings about a fatal endocarditis. The prognosis is influenced by age. If pericarditis develops in a young child the outlook is not bright. Further if a case begins with diarhoea it is apt to be dangerous. The constitution of the child is most important. If both the father and mother have had rheumatism then the child takes it doubly severe, especially in its effect on the cardiac muscle. Further if the carditis is severe and chorea sets in there is a great tendency to a fatal result. When there are many nodules/
odules the case generally goes downhill. Mitral valvular disease often undergoes considerable improvement and is not usually fatal, but aortic valvular disease is of very grave import.

Treatment

In the rheumatism of childhood the salicylates cannot be looked upon as specifics, as they are in rheumatism of adults. In arthritic conditions they are the drugs par excellence, but in the other concomitant symptoms in children, they are not found to exercise such a beneficial effect. True they lower the temperature, but as I have shown the pyrexia is moderate and it may be questioned if this lowering of the temperature is a gain to the patient as it undoubtedly tends to ask the whole condition. Further, even if it were a specific in children one would require to be careful as regards its use, as children do not seem to deal with the salicylates with the same facility as adults. If large doses are given in delicate rheumatic children there is a great risk of salicylate poisoning, as evidenced by vomiting, depression, air hunger, and a condition of coma similar to diabetic coma (Poynton in The Practitioner) XXX.

While it is inadvisable to use salicylates indiscriminately, few doctors would hesitate to use it early in a case say for two days, four trains doses of Sodium Salicylate each two hours. When given each two hours its effect can be easily noted, and it can be stopped at once if there should be the least sign of any undesirable symptom. Should the patient be a weakly child then in place of Sodium Salicylate it would be /
be preferable to use salicin in five grain doses each three hours. Quinine is good but it must be given in cachets on account of its bitterness. The dose of quinine would be 1 - 1½ grains every four hours. It is of the utmost advantage to use an alkali as citrate of soda or potash, five grains of either each four hours. In the drug treatment of this condition full alkaline treatment is of great benefit to the patient. In the evidence of the statistics of the Collective Investigation Committee it is stated that cardiac inflammation is less frequent and less pronounced under full alkaline treatment than any other. (Cheadle in Clifford Albutt) XXXI. This is a point of the utmost importance for as I have shown the cardiac muscle is very liable to be affected in childhood, and every precaution, such as full alkaline treatment must be attended to so as to give the patient every opportunity of coming through the condition with the heart unimpaired. In all cases of pyrexia in children the examination of the heart is incumbent on the doctor whether the pyrexia is much or little. Even when the pyrexia may be very slight we may get endocarditis or pericarditis coming on insidiously or masked by some other condition which may monopolise to a large extent our attention. If there is any symptom of rheumatism in the child one must not forget the state of the heart which is all important to the patient. In fact if there is any symptom of rheumatism, no matter how mild, it is necessary to put the patient at rest in bed so as to avoid any strain on the heart muscle even although we/
we cannot detect anything wrong with it. The patient must be kept warm so as to keep the blood-vessels of the skin dilated thus relieving the pressure on the internal organs. Slight cases of rheumatism should not be treated lightly. They should be actively superintended not for the immediate condition but as one knows that a very few hours might determine permanent damage to the heart. Where we get pericarditis developing, the treatment is still absolute rest and as there is considerable pain, relief is found (as in pericarditis from other causes) by applying an ice-bag over the precordium. This relieves the general distress and tends to lower the temperature and soothes the patient. If along with the pericarditis the breathing is short and the patient distressed one or at most two leeches over the precordium gives relief. If the weakness of the patient increases heart-tonics are called for, and the best of those are digitalis strophanthus and strochinine. Opium preferably as nepenthe in invaluable in cases of marked restlessness and irritability, when the patient feels ill and does not get a position comfortable enough to allow him to rest. In cases like that small repeated doses of nepenthe act like a charm in soothing the weary sufferer, the breathlessness improves, and the tired patient sinks into a peaceful slumber. Small quantities of good brandy help in soothing the patient, and also increase to a certain extent the beat of the heart. One teaspoonful of brandy should be mixed with one tablespoonful of warm water and sweetened with cane sugar.
Small little sips should be given often so as to finish the teaspoonful in two or three hours according to age. It should be kept going for ten or twelve hours and then left off to be used again if the breathlessness or restlessness increases.

If the case is very urgent and there are signs that the circulatory system is in great danger of failing then recourse must be had to hypodermic injections of digitalis or strychnine as in the case of a failing heart in an adult. The utmost caution and watchfulness will be necessary if one decides to use those remedies hypodermically. I have already stated that the cause of this condition is the diplo-coccus rheumaticus and in view of that fact one is justified in hoping that a serum or vaccine will be obtained that may be as effectual as antitoxin in diphtheria. Much investigation must be undertaken before that stage of perfection is reached, and it is only by careful examinations of our cases and keeping correct notes of successes or failure in our treatment of them that we can come nearer to the goal and achieve that end.

Mesners Serum XXXII is made from cultures taken from the airpassages of patients suffering from the sore throat of rheumatism. It is difficult to get a pure serum from that source as it is not very easy getting pure cultures. In Mesner's opinion the serum prevents relapse and endocarditis. One objection to it is the impossibility of standardizing it. Poynton XXXIIII mentions that he has repeatedly used a serum made from the diplococcus rheumaticus but is unable to announce specially/
specially satisfactory results. He is confident that the vaccine
treatment of rheumatism is of a promising nature.

General Treatment

The tonsils in all children should be carefully attended to as
it is by means of unhealthy tonsils that the diplococcus rheumaticus
enters the body. If the tonsils are diseased and troublesome they
should be carefully and thoroughly enucleated. One should remember
that removal of the tonsils denudes a considerable part of the throat
for a time and if the diplococcus rheumaticus is present in the
upper air passages it may then easily enter the general system and
occasion an attack of acute rheumatism just after the removal of the
tonsils. It is advisable then whilst recommending removal of the tonsils
to warn the friends that the patient is not necessarily guaranteed
against a rheumatic attack in fact for a short time after the operation
there is a risk of attack. The attack coming on after removal of the
tonsils might be largely obviated by attending to the toilet of the
throat by thorough douching of the nose, spraying of throat, and well
washing and cleansing the mouth and teeth with disinfectant solution.

It would be a step forward in the preparation for operations on
the throat, nose and mouth if the toilet of those parts was thoroughly
attended to. It is surprising how much care is put on the hands of
the surgeon and his instruments to attain a sepsis and nothing is done
even in first class hospitals to cleanse these parts prior to operation.
This should be done both before and after every case of removal of the
tonsils/
tonsils but more particularly if there is any suspicion of the
diplococcus rheumaticus being present. Sometimes, however, instead
swollen unhealthy tonsils one finds a general redness and relaxed
condition of the fauces. Here again spraying the throat with eucalyptus
oil is in my opinion invaluable in preventing the diplococcus rheumaticus
developing or entering the system through the tonsils. In my cases of
rheumatism in children I advise painting or spraying the throat with Eucalypti every few hours. Warm clothing is necessary in the rheumatic
child as insufficient or damp clothing favours chills and catarrh of the
upper air passages, and lowers their resisting powers thus rendering
them vulnerable points to the attack of micro-organisms.

The diet should be light, nutritious and easily digested, and particular
attention must be paid to the state of the bowels. The intestines must
be kept as clean as possible, and if the bowels do not act freely at
least once a day a little opening medicine must be given. The
education and enlightenment of parents and school teachers to the dangers
of rheumatism in children must be undertaken. Doctors in schools should
systemically examine the hearts of the scholars and keep a book which
they might call a rheumatic case book, in which they would enter any
sign no matter how trivial which might be even remotely associated with
the rheumatic condition. In this way many cases would be brought to light
quite early, and steps taken to eradicate the mischief before it had
time to leave its indelible mark.

I have indicated the treatment not only of the acute cases but also
the/
the preventive treatment in this thesis, and grouped the various manifestations of rheumatism in childhood so as to impress on the profession the importance of the condition and its far reaching and baneful effects.

**GENERAL REFERENCES.**
-----------------------

Osler and McCrea's System of Medicine. Vol. 11.
Garrod's Treatise on Rheumatism.
Goodhart and Still's Diseases of Children.
Still's Common Disorders and Diseases of Children.
Cheadle's Lectures on the Practice of Medicine.
Holt's Diseases of Infancy and Children.
Eustace Smith's Diseases of Children.
Hillier's Diseases of Children.

**SPECIAL REFERENCES.**
-----------------------

Historical Outline.

(1) Baillou De rheumatisme et pleuritide 1642 (a posthumous publication as Baillou died in 1610).

(2) Cullen William Systematic arrangement of Disease 1772.


(6) Babington and Curry. Outlines of a Course of Lectures, Guy's Hospital 1811 in which Baillie's observations are noted.

(7) Hillier Diseases of Children 1868.

(8) Mantle/
(8) Mantle, Dr. A. Ref. in Treatise on Rheumatism, Garrod.
(10) Shaw. Ref. in Robert Hutchison's Bacteriology of Rheumatism.
(13) Zurich and Schiehold. Ref. on American Medical Annual 19th March 1910.
(14) George Waugh Clinics in Out-patient surgical department, Great Ormond Street Children's Hospital London.

**Etiology.**

**Pathology.**
11. The Practitioner page 393 part one 1913. paper by Poynton.
111. Muir and Ritchie's Pathology page 221.
1IV. (Beattie) Journal of Pathology IX page 272.

**Cardiac Manifestations.**
VI. Still Common Disorders and diseases of childhood.
VII. Dr. Moore vide Lancet 24/4/09, 1/5/09 and 8/5/09.
VIII. Dr. Sturges Transactions International Medical Congress, London IV. page 105.

**Arthritis.**
IX. Poynton/
IX. Poynton article in British Medical Journal 5/8/1911 page 256.

**Tonsillitis and Subsequent Sections.**

X. Felix Semon in article on Diseases of the pharynx in C. Albutt's System of Medicine. Vol. 1V.


XII. Garrod and Cook Lancet 21st July 1888.

XIII. Sir, James Fowler Clinical Society's Transactions, 1869.

XIV. Hillier Diseases of Children 1868 page 239.


XVI. Cheadle in the Harveian Lectures, Lancet 1896 on the rheumatism of childhood 1868.

XVI. Meynet article in Lyons Med. 1875 page 459.

XVII. Barlow see article "Rheumatism and its allies in childhood" B. M. Journal 1883 Vol. 11. page 509.


XIX. Poynton in the Practitioner 1913 p. 400.

XX. Achalme Comptes rendus de la Soc de Biol 19th march and 15th October 1897.

XXI. Still Common Disorders and Diseases of Childhood pages 454 and 455.

XXII. Cheadle article in C. Albutt's System of Medicine Vol. 111 page 49.


XXIV. vide The Practitioner page 398, 1913.

XXV. Still/
XXV. Still Common Disorders and Diseases of Childhood.

XXVI. Dr. Batten in The Lancet 5/11/1898.

XXVII. Sir. Wm. Osler in the American Journal of Medical Science October 1877.

XXVIII. Poynton and Holmes article in Lancet 13th October 1906.

XXIX. Langmead in The Lancet 18/1/1908.

XXX. Poynton in The Practitioner page 413 1913.

XXXI. Cheadle article C. Albutt's System of Medicine page 52 Vol. 111.

XXXII. Hutchison and Collier. Index of Treatment.

XXXIII. Poynton ref. in Hutchison and Collier. Index of Treatment page 798.