Acute Rheumatism
in Children,
Including its Relation to Chorea.

David Thomas
M.A. (1869), M.B. Ch.M. (1873)
The object I have set before me in writing the following thesis is the consideration of the various manifestations of the rheumatic pox as they occur in children, with a view to a clear conception of what these manifestations are; how they stand related to one another; and the importance both from a diagnostic and therapeutical standpoint of recognizing them as rheumatic in their nature.

By the term rheumatic I here refer to those rheumatic fevers, commonly called rheumatic fever as we see it in adults. This is the disease which was first accurately described and differentiated by Sydenham in 1676, and is characterized by pyrexia, multiple but transient synovitis, and frequent involvement of the heart. It is a disease chiefly of adolescence and early adult life in its typical manifestations, but that it also occurs in childhood, though often considerably modified, and can be said disguised, is admitted by all writers on the subject. My children understand and live under the age of puberty, that is to say, all under 14 or 15 years of age.

Chalmers in Bell's System of Medicine, in his article on acute rheumatic fever, states that of 253 first cases of which he has records, 6.32 percent
were under 10 years of age, while Daffy in his practice of medicine states that out of a total of 1203 cases taken from Guy’s and Bartolome’s hospitals, 48 occurred under 10 years of age.

While rheumatism is therefore on the whole a disease of adolescence and early adult life, it yet occurs with considerable frequency in childhood. At the other extreme of life it is also known to occur. Every young medical practitioner in his first entry into practice is already familiar with rheumatic rheumatism as it presents itself in adults. When he thinks of this disease he pictures to himself the patient with joints swollen, painful and tender, the pain flying from joint to joint—figurative swelling of articulation and a considerable amount of general feverishness and malaise, together perhaps with some cardiac affection, and a peri-carditis or pleurisy. Such a case is not easily mistaken for its importance easily ignored.

But in children the young practitioners too find that rheumatism does not by any means present the same classical picture; indeed, I think I may say that such is the exception rather than the rule, and yet it is the same disease with the same far-reaching consequences. How what do
We find in children? In them the joint affection may be comparatively trifling; indeed so trifling as to be overlooked altogether, or set down by the parents as merely "growing pains," and yet, and here the curse of the whole matter lies, serious cardiac mischief may be steadily and slowly progressing which shall cripple the child's whole future life, and in many cases may considerably shorten it. The whole importance of an early recognition of Rheumatism in children lies in the readiness with which Peri- and Indo-Carditis are set up in them by Rheumatism, although they may only be suffering from what are called "growing pains," as we shall see later on, may have no pains at all in the joints. Hence in his work on Disease of Children says that, although Rheumatism is less common and less severe in children than in adults, complicated with Indo- and Peri-Carditis is much commoner (Discourse of Children's Rheumatic Fever from Vol. I article on Peri- and Indo-Carditis). While Lewis Smith, as quoted by Carmichael in his book on Discourse in Children (pp. 429), says, "I have examined many children with Rheumatism at the cardiac diseases resulting from Rheumatism, and medically I found that few joints were affected and that they hurt
been but little dwelling of them a pedlar, and that
the patients were almost never confined to bed, or even
in the sitting posture, but had been able to walk about
though with restraint and complaint of pain and
stiffness, the parents in many instances supposed
that their children were suffering from "sewing
pains"; at the same time with the suddenness of
symptoms the heart was becoming seriously, and
permanently crippled. Such is the testimony of
a well-known authority on disease in children as
to the danger of weal-looking such a serious disease
as acute rheumatism in children through the com-
parative insignificance of the manifestation which
we find to be the most obvious and diagnostically
apparent in adult life.

I propose in the following pages to consider in detail
the various manifestations of the rheumatic fever
in children, seeing every parents, partly on the
result of personal observation and partly on in-
formation derived from the study of writers on the
subject. Before doing so however let us inquire
what these manifestations in children are.

We find them that there are commonly associated
with rheumatism as seen in children af-
fections of other joints besides those of the
joints, viz. those of fascia and tendons and the fibrous pericardium of the heart and pleura; affectation of the skin, viz. indurative erythema; affectation of the mucous membrane, viz. trachea; affectation of the nervous system, viz. chorea. All these pathological conditions are found to closely associate with rheumatic in children so that it is impossible to deny them a place I think in the rheumatic series, and we shall consider later on what results there are for considering them as rheumatic in nature, and also whether they are always exclusively rheumatic or not.

Let me sum up these introductory remarks with a quotation from Chandler's article on acute rheumatism in children in Bell's System of Medicine. Dr. Chandler says: "In the case of children arthritis is not the prominent or representative symptom. It would seem that at this period the joint troubles are less susceptible, the skin fibrous, the skin and the nervous system more in them in later life thus in the Rheumatism of children arthritis is at its minimum, endocarditis, pericarditis, subcutaneous nodules, chorea are at their maximum. As life advances this rule is gradually reversed; the joint affections grow more prominent and characteristic, while the other phenomena decline.
and tend to die out. Infections and peculiarities become less frequent; subcutaneous nodules as significant in early life practically cease with the advent of puberty; and though to some in connection with the rheumatism of childhood, disappears as maturity is reached. Another point that may be noted before taking up the consideration of the phenomena of rheumatism in children is the frequency of these phenomena to occur separately or combined in various ways. Thus we may have arthritis alone, chorea alone, endocarditis alone, or arthritis followed by chorea or endocarditis, or we may have chorea and endocarditis without arthritis, arthritis may come later or indeed we may have various combinations and sequences during the period of childhood (Vide Cheadle: Baillie Lectures 1879 pp. 10 et seq.)

I shall now refer to some cases illustrative of my subject, with which I have been in practice, and also mention some cases mentioned by others on this subject.

The following case first impressed on me the importance of studying the peculiarities of rheumatism in children.

John Kelly, aged 11 years, Park St, Darlington, ...
was called in to see this boy one day about the middle
of January 1876. I found him complaining of headache,
pains in the abdomen and a general feeling of
malaise. His mother said he had been complaining
for a day or two of vague pains in various parts of the
body, but not at all in the joints. His temperature was
101° and his pulse about 100 and quite regular. An
examination of heart, lungs, revealed nothing abnormal.
His urine was loaded with urates. I thought he had a
febrile cold and advised him to be confined to bed.
I prescribed a purge and a simple saline mixture.
On the following day he had still the same symptoms,
but in addition I found his pulse was slightly quicker
and rather irregular and I detected a slight left
sensation at the apex of the heart. Next day this
sensation was more marked, while he still complained
of pain in the head and abdomen, and in addition
had a good deal of pain in the muscles of the back
and neck that evening I was sent for to see him as
he had had a rise and was complaining great
ly of pain at the back of his neck. I found his temper-
ature, which hitherto had kept about 101°, had
gone up to 105° 4, which is a rare occurrence I
believe in the Rheumatism of children. Under the
use of the cold pack and a few doses of antipyrine
however, it soon fell again to its usual. The next morning when I called his mother informed me that there was an emphysema in his legs. When I examined him I found epithelial lymphoma lymphonema in both thighs, and I also saw definite case small hard round lumps, like peas on each side of the patellae and over the ankle joints, these being subcutaneous nodules. He had also complained for the first time of slight pains in the ankle joints, but there was no swelling. Neither he had always said he had no pains in his joints. From this date the pains at the back of his neck and elsewhere gradually diminished and his temperature fell to normal; the nodules also disappeared and the lymphoma disappeared. The heart murmure however persisted, there was no pericarditis or pleurisy, we had had at any time any of the feverish symptoms, remained in bed till the end of about 10 days he was able to be up but was very weak and had much weakness. When I saw him a short time after his illness, he was still unable to return to school, and suffered from shortness of breath on exertion; the apical murmure was still present and was not affected in the carotids, but the pulse was now regular. He did not return to school, but he was able to walk and work.
diet he was treated with salicylate of soda as soon as I recognized the rheumatic nature of the case, there was no history of rheumaticness both obtained in the family history.

Charles Mono, 7 years, Paradise Terrace, Darlington. When I first saw this child he complained of pain in the chest in the precordial region. I found him feverish with a temperature about 101.4° and pulse about 110 and regular. On examining his chest I heard a slight pericardial rub over the heart, but no signs of any effusion. He had no other symptoms. Next day he had slight pain in his ankle joints, but these after made a rapid recovery and was all right in a few days; all signs of pericarditis passing away. His mother had suffered repeatedly from rheumatic fever, and a sister of his had died about 2 years before at the age of 9 years of mitral disease which had resulted from a slight rheumatic attack, which had been overlooked by the parents, as they supposed she was suffering from growing pains, and it was only after she had been seen by a doctor on account of the heart trouble that this pain was elicited. As I knew about the family history I at once treated the child with salicylate of soda the same day.
Maggie Stevenson, age 11 years, Ballieston. This child suffered in November 1896 from pains in her legs, which were attributed by her parents to "growing pains." She was in the habit, claimed afterwards, of walking on the toe of her right foot as the muscles straightened her right knee joint. She had also complained of pain in the joints of her thumbs. These pains were away in time without treatment as she was seen by no doctor, and all the while the want about and was kept confined to bed. In October 1897 I was consulted about her as she was complaining of weakness and thinness of the body. She had then well marked internal disease, with a typical Dumont contracted into the axilla, and some dilatation of the heart. She gradually grew worse and eventually died of heart disease. Her elder sister Janet Stevenson was attended by me about a year ago for a similar attack of rheuma-
tism, she had pains in several of her joints, but no affection of the heart. While suffering from the joint pains, she developed right hemiplegia, and when it appeared the pains in the joints disappeared. Dr Cunliffe in his book on disease in children gives a very remarkable case which occurred in the practice of Dr John Thomson. Cunliffe says "this interesting and remarkable case, a comparison was made..."
If rheumatic manifestations is not only interesting from the well-marked nature of the signs, but so showing a peculiar feature of child's rheumatism - the alternation and recurrence of the various manifestations in a cyclical manner. The child the set 7 years came under observation in December 1867. There was no family history of rheumatism in the child. He had first pains in his joints and chiliness - a few days later he developed erythema on the face and the next day following remission another appeared with a soft systolic murmurs became audible. About the middle of November well-marked chills developed itself and the child continued ill. By the 14th January 1868 all the rheumatic phenomena left and chills had disappeared. By the 13th January he was convalescent.

In February erythema and pains in joints returned also a few nodules. Attack lasted till March. In June chills returned. There had still a systolic systolic murmurs, in July chills disappeared. In October he was examined 2 heart sounds were found clean. In March 1869 he had a return of chills; also had erythema and murmurs audible; also some effusion in the thee and the extensor tendons of wrists in the attack. By end of June all rheumatic phenomena had disappeared with the exception of a mild systolic and a systolic murmurs which had developed. In
August the tubercle returned. In October he had exti-
caries and Erythema marginatum. Tubercles presented
till the middle of December when he had a feverish at-
tack with swelling of wrists and ankles, pleuritis and
pulmonary and arthritis symphotic as well as miliary
meningitis. The subsequent intermitten fever and meningitis,
the remissions of which remarkable case show the re-
currence of tubercles and arthritis and chorea and
appearance of joint pains occurred.

Chandler in his American Lectures (1899) on the
Rheumatic State in Childhood gives a series of cases
(pp. 147-15) illustrating the different combinations
that may occur in the course of a Rheumatic attack
in a child, and also showing how the manifestations
may occur at one time and another later on in the
life history of a child.

When I was a student in Edinburgh attending the
Infirmary, Prof. Fraser in a lecture on the Subject,
in the Royal Infirmary, in the Winter Session of 1892-93,
referred to this tendency of the Rheumatic phenomena in
children to occur separately. He had then a case in
the wards of a child with hemoptysis and vitiligo.
Chorea, where there was a history of previous attacks
of chorea and also Rheumatic, but no articular
affection. He cited cases where chorea occurred
several times, followed by Rheuma, and then Rheuma
or other psychomotor affections, and never any actual
affections at all, although sometimes such might occur
during the child's approach to puberty. He pointed out
how that all these manifestations were really
manifestations of the rheumatic poison and were dan-
ger signals of endocarditis.

Before taking up the consideration of the rheumatic phenomena
in children in detail, it would be well, I think, to make
here some reference to the literature of the subject.

This I shall endeavour to do briefly here and defer consider-
ation of the views and statements of authors for the most
part till I come to deal in detail with the individual
phenomena. I find that the literature on this subject
is very extensive, especially within the last twenty
years. I shall only be able to deal with certain of the
writers, whose works I have been able to consult, and
can merely mention the names or works of others.

First of all I shall refer mainly to W. B. Cheadle, who
appears to me to be perhaps the leading authority on
this subject. He has discussed the subject in various
publications, of which the following is a list:

In the Lancet 1875 vii p. 703 he writes on heart disease in
children. Again in the Lancet 1876 vii p. 433 he writes
an article entitled "A Clinical Illustration of Certain
Phases of the Rheumatic Diathesis." His chief work has been

The subject is his Series of Harveian Lectures on the Various Manifestations of the Rheumatic State in Childhood and Early Life delivered in 1888. These lectures take a very broad view of rheumatism, based on a study of the disease as it occurs in childhood. Chisholm indeed holds that in order to get a comprehensive view of rheumatism in all its aspects you must first study it in the child, as in the adult you only get a much narrower and restricted view of its phenomena. He says: "The conception of rheumatism then which I shall endeavour to put forward and establish in this lecture is that the term 'rheumatism' - 'rheumatic' - must be held to include many various medical expressions - the series of phenomena which lodge here and must not be regarded as a special inflammation of tendons and ligaments, of synovial membranes, or as a condition of which this is always the chief feature, accompanied by complications and sequelae. The term diathesis is quite inadequate: there is something more than mere tendency - a common factor concerned in the production of the different phases - and forming the link between the several, in his lectures to discuss the various manifestations of the rheumatic priiform arthritis, ends of peri-arthritis, subcutaneous nodules, tendinitis, the various erythema, and also classed which he includes as a rheumatic phenomenon in children. Of this view in these points I shall have something to say later on. At the British Medical Association meeting
of 1876 as reported in the British Medical Journal 1876 M i p 65.
Chandler, in a discussion on Acute Rheumatism, reiterated his
views. He also writes on the subject in "Keating's Cyclopaedia
of the Diseases of Children" in 1869, and he writes an article in
Smith's System of Medicine 1877 on the Acute Rheumatism of
Childhood.

Another writer on the subject is
Dr Stephen Mackenzie. He holds similar views to those of
Dr Chandler as regards the nature of Acute Rheumatism, and
is derived from a study of the disease in children. In an
article in the "British Journal of Medicine" in January 1877, he
says: "We have learnt a great deal in the past year, and the
best we can do at present is to consider the disease as a
complex one."

Dr Mackenzie refers to the paper quoted. In addition to the paper quoted, Dr writes a
paper "on the Relations of Children's Rheumatism" in the International Medical Congress 1877 M i p 77. The address
contains some points regarding Acute Rheumatism requiring inves-
tigation (B. M. Journal 1876 M i p 97). An article in "Scottish
Medical Journal" 1876 M i p 216.

Dr Carmichael in his work on Disease in Children 1872 de-
Notes an article on the consideration of Rheumatism in children. In it he gives particulars of a case of Dr. John Thorne's, to which I have already referred, which illustrates in a remarkable way the alternation of the various rheumatic phenomena. Carrick also insists on the peculiarity with which the acute symptoms of the disease are slight in children and set down by the parents as growing pains, while at the same time serious heart mischief is developing.

Ashby in Ashby Wright's "Diseases of Children" (1896) also deals with rheumatism in children. He also dwells on the great danger of serious heart disease occurring in cases where arthritis is but slight. He says: "It is the exception for children to escape suffering from endocarditis during an attack of acute Rheumatism, and moreover pericarditis, endocarditis, may supervene with but very slight joint pain, or the latter may come on later.

Dr. J. Macalpine in his work on Rheumatism (1896) devotes a chapter to the various forms of Rheumatism, in which he describes Rheumatism as it manifests itself in children. He holds that Rheumatism is essentially a disease of the motor apparatus, and its chief deal is the fibers of the various musculature of that apparatus, and that in adult arthritis it is the chief phenomenon because the fibers lengths of the large joints are most highly developed, whereas in functional activity, in children this is not so, consequently that in them special
and tendons are more often the seat of rheumatism. We get certain forms of rheumatism resembling adult arthritis. Hirschfield quotes Harlan saying: "the heart is the seat of rheumatism of childhood. The same relation that arthritis bears to the joints of the adult bearing to the joints of infancy" (p. 313). He states that heart attacks are more common in children than in adults. The pericardium and myocardium as well as the epicardium, however, the heart muscle associated with the endocardium and is much more serious than in later life, where it is associated with arthritis. The age of the patient, Hirschfield says, and the presence of the endocarditis make these cases of heart disease associated with endocarditis so dangerous.

Hirsch in his "Diseases of Children" (1891) deals with rheumatism, and like the other authorities referred to emphasizes the importance of looking out for heart complications in all cases of arthritis in children. Mucocutaneous and arthritis are common, but heart complications are rare. He mentions that endocarditis may appear as the first sign of rheumatism and the joint be affected later on. He has met with cases in children which might readily pass for typhoid fever or sickness where there has been feverishness and no special localizing symptoms for some days, where a murmur was heard and later an joint became affected.

His in his "Practice of Medicine" (1891) deals also with certain of the aspects of rheumatism in children, especially the flimsy subcutaneous nodules.
Dr. E. Barrett is a well-known authority on the subject of Rheumatism. His "Practical Rheumatism" (1870) discusses the whole question in a very exhaustive manner. He accepts the broad view of Rheumatism held by Chandler, that there is a mixture of Rheumatism which manifests itself in many different symptoms, of which arthritis is only one, in the case of children by no means the chief. The Rheumatic manifestations, he says, (Page 9, Chapter 1) such as arthritis, induration, erythema, etc., may all result from other causes than Rheumatism but there is no other disease which can produce them all, and where we find them occurring in direct association a diagnosis in the same patient; the rheumatic origin of the whole series is hardly open to question. He believes strongly in the rheumatic origin of these in most cases, but at this point I shall refer to the work of Dr. Todd, heart writing of Rheumatism in his "Work on Diseases of Children" (p. 379). Dr. Todd says, "Children indeed suffer from typical acute Rheumatism with its fever, its pain, its swelling of the joints, its sweating, but to circumscribe it by these limits would be to ignore the larger part of the field of its workings, to form a most inadequate conception of what Rheumatism is capable of doing in childhood, or of what I shall venture to call the "compulsory" of that disease.

The above-mentioned arthritis, I have been able to emend on this subject. I have endeavored to give a general idea
of their views, but I shall require to discuss these again more in detail when I come to deal with the separate rheumatic phenomena in children such as endocarditis, chorea and sub-
entanous nodules. There are then well known authorities on the subject whose names I will not mention such as Barlow. Rheumatism, pili alba, in childhood (B.M.J. 1883 ii p 589): Barlow & Warren. Trans International Congress. 1881 iv p 116, these two authorities were the first to deal with the subject of entanous nodules on a large scale, but they collected published a series of 17 cases of these. They also pointed out their grave prognostic significance, associated as they usually are with serious heart disease. Chapman writes an Rheumatism in Early life (Brit. med. Jour. June 1886 cxv p 234) also in Read N.Y. 1886 i p 270.

These authorities all agree more or less that rheumatism in children is a much wider conception than in adults. I think there may be a tendency with some to make the conception too wide. There is no doubt I think, that where several of what are called rheumatic manifestations, such as endocarditis, anthrakitis, synovitis, & chorea occur in combination, they are really rheumatic in origin, that is manifestations of the rheumatic fever whatever it may be, a that where such occur in alternation a succession in the case of in a child they are also rheumatic. Further where we have an isolated lesion such as endocarditis a chorea and history of previous
Arthritis, a rheumatic phenomenon in the child, yet if there is a decided rheumatic family history we may be justified. I think in looking on the case as rheumatic, but if there is no such history I do not think we are justified in assigning rheumatism as the cause until we get further evidence of such cause. What we may consider arthritis as a manifestation of rheumatism in children. This symptom in children is usually a slight one, and indeed may be overlooked altogether. The younger the child, the slighter are the articular symptoms, the absence the child of -pitches fully the more marked is the arthritis; the more nearly does it approach to the classical type in adults. As a matter of fact it is rare to see a child with the same joint pains we find in rheumatism even in the adult. Very often only one or two joints are affected & these not always at the beginning of the illness. The boy, John Kelly, whose case I mentioned, had no joint pains at the beginning of his illness & when they did develop were very slight in the ankle joints, with an appreciable swelling. Another of my cases, the boy Jim, who developed peri-carditis, had only slight pains of a similar character in his ankle joints, which were only complained of after the peri-carditis had developed. I would call attention to the fact that the hamstring muscles are sometimes affected so that the child finds it tires, to walk on tiptoe with the knee bent. This symptom occurred in the case of Maggie Stevenson.
already given by me. Parents often speak of growing pains in giving the history of a child's complaint. There is a strong belief among them that these pains are due to too rapid growth and are of little new significance; but as Lindahl says, "natural growth is not a painful process." Since I think it would be very rash to assume that all such pains are rheumatic in origin, or to lay much stress on the mere statement of previous growing pains in determining the rheumatic origin of any given seizure. I have seen cases referred to of academic family and infantile children where growing pains were complained of, where no rheumatic lesion was found present, where no rheumatic family history existed, and where under the use of tonic treatment these pains, probably neuralgic, disappeared, as the general health improved. In children there is little to be expecting as a rule associated with the Arthritis, consequently symptoms of muscular strain are seldom seen. In places of the joint pains or with them there may be pains in the muscles, as at the back of the neck in my case (John Kelly). In a case I had recently of rheumatic fever in a girl of about 14 years, the attack was ushered in by severe pains located in the muscles of both thighs. The diagnosis of rheumatic arthritis in children will refer to later on.

The pyrexia in children is rarely severe. Temperatures of 100°F or 101°F are uncommonly the limit, and often the temperature remains less. This is especially noticeable in these cases where
the arthritis is slight or perhaps almost altogether. In a rule in children the temperature rises as very readily, and often for a comparatively trivial cause. An attack of indigestion may cause a temperature of 103°F in a case in a young child, but it is therefore remarkable that there should be this exception in rheumatism. Carrau in his Lectures on Rheumatism (p. 11) endeavored to explain this. He says that all rheumatic lesions can be assigned to one of two groups—one where the inflammatory process does not pass beyond the stage of active hyperemia, which begins acutely and ends soon, and he places the arthritis as the hyperemia of rheumatism in this group—the other where definite tissue changes take place, characterized by active destruction of the fibrous tissue of the affected part may extend over weeks or months, & in this group he places Endo-pericarditis & enterocaraneous rheumatides. It is, he thinks, because the latter group, which is insidious in its course, is so frequent in the rheumatism of children, that the elevation of temperature in them is not so marked as in adults.

Hyperpyrexia is admitted by rare in children. The Kelly, one of my cases, at 11 years, had a temperature one night of 105.4°F which came down however to 101°F a 102°F again. He had very slight arthritis. Chamber says (Hist. Last p. 34) he has seen in a fatal case of hyperpyrexia in a child. He says (P. of medicine, 1698) that hyperpyrexia in very restless
occur under puberty. I come now to the consideration of
the cardiac affections, rheumatic in origin, which occur in
children, and I shall consider first Endocarditis.

Endocarditis in children as in adults may accompany a
typical attack of acute rheumatism, but the chief interest in
the chief feature of it in children lies in the fact that it often be-
gins in an insidious way without undue disturbance of the
system generally with very slight arterial pains. But still
new and also often found to be suffering from endocarditis,
in whose cases no history of arthritis can be got. The endo-
cardial disease to be due to rheumatism? Of course we must ex-
clude endocarditis which of congenital origin or which is
due to a specific fever or to a definite cause. Where this is
true there yet remain many cases where no apparent cause
can be found. Goodhart (8 of these p. 812) found only
55 cases out of 248 of heart disease which were not associ-
ated with chronic a rheumatism. Chadda quoted Ford
Hunt's statistics (Harv. Lect. p. 47) and says that if from
these 55 we take the congenital, pyæmic and septic cases there
are few left unexplored. In rare cases where no arthritis
of any sort known exists, the family history may prove of importance in
determining the question. If we may get subsequenty evidence
of their rheumatic manifestations, Endocarditis having
been the first of the series. A case of my own comes this out.
A girl (Maggie McKeona) aged 14 years was seen by me
In the summer of 1876, she was undergoing many sufferings from symptoms of heart disease. I found she had a dilated heart and marked mitral dyspnea. The lung examination revealed nothing unusual. The heart sounds were normal, and the heart was not enlarged. There was no history of joint pains or rheumatism in the family. Despite these findings, she developed an attack of arteriovenous rheumatism which soon yielded to the usual remedies, but her heart condition gradually became worse and she died in the course of a few months.

In the case of J. W. Simonsen, a 11-year-old boy, who had mitral regurgitation, there was a history of slight antecedent pain, which had been regarded as of no importance by the parents. It is clear that the mitral condition was of some importance in his case had originated at an early age. Mitral regurgitation and mitral stenosis are the chief prevailing diseases of endocarditis in children. The younger the child, the greater appears to be the tendency for the heart to be affected. Charnley states that endocarditis is nearly twice as common in children as in adults. At Church in the St. Paul 11th Refract Vol. XXII p. 173 give the percentage of cardiac affection as 83% between 10 and 50-69% between 40 and 70, 57% between 20 and 70. The endocarditis which accompanies rheumatic fever is that accompanying scarlatina, but it has been claimed as rheumatic by some. While others hold that scarlatina is for the most part not rheumatic, this, I shall not attempt to discuss when dealing with chronic and scarlatina.
While Endocarditis is usually present early in the rheumatic series, according to Cheadle, Pericarditis usually occurs late. It may follow the Endocarditis, or occur either late or early, along with Endocarditis. Cheure, a recent unnamed disease, or alone. It is not as common as Endocarditis, while little Endocarditis, it is usually incipient in origin. In the case of the myxoma, Pericarditis was the first symptom of Rheumatism and was followed by slight arthritis. In the case the attack was mild and painless, but according to authorities it is one of the most serious and fatal of the manifestations of Rheumatism in children, very often leading to a fatal result. In the Endocarditis, Pericarditis occurs apart from other rheumatic phenomena, as well as in association with these. Jaffe (My Medicine M73 f 93) states that in children under puberty Rheumatism is almost the only cause of Pericarditis. Warkentin however, (8 of children 216) mentions several other causes of Pericarditis in children, such as infective Myocarditis, pericarditis, extension from pleura, or as a tubercular affection. Yet as disturbing Exact, but that it is chiefly rheumatic and can be recognized as such by attention paid to the family history taken at the time of attack, as well as other rheumatic phenomena in the child. If very often occurs after Endocarditis, where the heart is already hyperplastic and dilated pleural is a fatal issue, once it has occurred it is very rare disease. Its relationship to Endocarditis,
nodules. The Chor used to refer to when I came to write of these.
Pericarditis is very apt to recur and the result is that an
imperfect thickening results producing a condition called
by. Chorle Balk Pericarditis. This condition, Chorle says,
runs to the tight grip of the inelastic fibres hence often
debilizes interferes with the growth of the child's heart so
it fails to grow in proportion with the rest of the body.
As I have already stated the accidental occurrence of Endo-
Pericarditis is a serious danger in the rheumatic fever of
children, especially when we recollect that these heart
lesions are almost as common in children as in adults.
I have not gone into the symptoms of acute or sub-
acute Pericarditis as that would have been foreign to my
purpose. As being closely allied to Pericarditis Mr. Rich-
and clinically I shall now proceed to consider
the place among rheumatic phenomena of the Substantaneous
Fibrous Nodules. These nodules were first described by
Hillier (Diseases of children) in 1838. They are often called the nodules of Myxomatous
kneit by Dr. Low and Warner, who collected 27 cases of these,
who were well in the standard authority on the subject. They
are described as firm, substantive fibreous nodules, varying
in size from that of a hemispherical to that of an almond, and
freely movable under the skin, connected with fasciae,
and I also with the pericardium. They occur commonly
over the recumbent, along the margins of the patella over the malleoli, but they also occur in many other situations, such as along the inferior pubic tubercle, along the spine of the vertebrae over the extensor tendons of the hands and feet. They occur along the patella and over the malleoli in the cry. Kelly, but I cannot say I have detected them in any other case. They are almost only found in children, although cases have been recorded among adults. Microscopically, they consist of highly vascular fibrous tissue in varying bands with scattered spindle-shaped cells and abundant nuclear growth (Chadak Harvey Lice p. 22). Chadak lists them as pathognomonic of rheumatic fever and others as small and macroscopic vesicle to the same view. Bicker in his Series of 27 cases found arthritides in 19 with distinct pain in the joints in other 6. They are found with most of the rheumatic manifestations such as aneurysm, sub-epi-cardial, nodes with chorea. Their association with the latter has been used as a proof of the rheumatic origin of the sub-epicardial of chorea. It is certainly a strong point, if they are accepted as pathognomonic of rheumatism, they are specially found associated with nodes of sub-epi-cardial and pathologically they are similar in structure to the vegetations developed on the valves in endocarditis. While abscesses similar in structure have been found in the pericardium. As Fawke says (Syphilis vs Rheumatism).
If these nodules are similar in structure and analogous to subendocardial vegetations, any mitral process which causes endocarditis might cause them. Spear (Treatise on rheumatism, 1871) states that there nodules have been observed in adults when there was no history of previous rheumatic manifestations. These nodules may disappear rapidly in a few weeks, or they may appear in successive crops. Chedda states that they are especially associated with endo- or peri-endocarditis, and that they have a serious prognostic significance when numerous and large. They are then often associated with serious progressive heart disease, and Chedda considers an emphysema of large nodules as almost equivalent to sentence of death (Chedda, 1871, p. 75). Maclay (Edin. med. J. 1877, p. 65) also states that from significance ofxa, Bower and Warnen out of their 27 had 8 which were fatal. Their chief interest then lies in their association with heart disease usually of a serious nature, and also their association with cancer. If they are not regarded as signs or symptoms of rheumatism than their presence in cases of rheumatism is often associated with other rheumatic phenomena. It is a strong argument that in favour of the rheumatic origin of the endocarditis associated with the chronic and acute forms themselves.
There are also various eruptions associated more less with rheumatism which occur much oftener in children than in adults. These are the various forms of Erythema Multiforme, Erythema nodosum, Purpura rheumatica. Statistics are quoted by various writers in support of the frequent association of these eruptions with rheumatism. Charles Warden in the 27 cases with rubella had 8 with Erythema Multiforme, 1 with Nodules and 7 with Purpura. Dr. Stephen Mackenzie gives a percentage of 34.4 in his cases of Erythema nodosum where there was evidence of Rheumatism. Erythema Multiforme may occur associated with any of the other rheumatic manifestations in children and may occur as a part of a series of such manifestations. It is associated sometimes with lesions, peri-appendicular with or without arthritis, a chorea. Erythema nodosum is also claimed as rheumatic in many cases undoubtedly it is so. There are patients in several cases, but in others there is no trace of history of rheumatism. Both Cheadle (St. Hewlett p. 49) and Mackenzie (Edin Med J Feb 1857 p. 145) regard the Erythema of Rheumatism as evidence of toxic agent in the blood, the rheumatic poison which is acting on the skin. The rheumatic origin of these eruptions is shown by their association with other rheumatic phenomena part or present or by a consideration of the family predisposition.
May come to some of the most debated questions in connection with this subject, namely the relationship between Rheumatism and Chorea. There has been a great deal written on this subject within recent years and various opinions have been advanced on the subject, but the question of the relationship between these two diseases has not yet been settled and probably will not be so for some time yet.

Sir C. Beddome in his treatise on Rheumatism (1827) refers to Chorea as an occasional sequela of Rheumatism and ascribes the Chorea to the debilitating effect of the acuteness of Rheumatism. Bright in 1839 (Ined-Chirurg. Transact. No. 42) suggested that Chorea which followed Rheumatism was due to perineal irritation from the pericarditis of the Rheumatism. Nowadays it is known that pericarditis is not rarely present in acute Rheumatism which is followed by Chorea. It is Endocarditis which is associated with Chorea in a case when there are antecedent pains in cases when there are none.

Kirkles (Ined-Chirurg. Transact. No. 636, 637) in 1863 advanced the theory that Chorea was due to embolism following Endocarditis. He held that Endocarditis occurred and that a large number of minute emboli were carried from the heart and lodged in the small arteries of the nerve centres, leading to anaemia and demineralisation.
movements. The objection to the theory are, I think, fatal to it. Chronic renal in a good proportion of cases without any endocarditis. Dr. Stephen MacKenznie states (Edin.
med. Journ. Feb. 1897 p. 140) that in 73 cases of his the proportion of chronic affection was 54.26 per cent., leaving a considerable percentage where there was uremic. Then when endocarditis chronic usually associated the signs of endocarditis frequently develop later than those of chronic. Further there are no signs of endocarditis elsewhere as in the heart or spleen, and also while endocar-
ditis occurs frequently in adults, chronic is rare in them, although in chronic in them may result from endocarditis but produces no chronic. Again post-
section examination by no means proves into the theory, although it is rare in certain fatal cases. Each embolus are stated to have been found.

A great deal might be written on the views held by different eminent men on the pathology of chronic but that would be foreign to any purpose here which is the connection between chronic & nephritis. Since Kierke’s time many well-known authorities have dealt with the relation of the kidney to his two diseases. There are those, of whom Chevalier, Ewart & Stephen MacKenznie are among the most noted, who regard chronic as a large proportion of cases, and also the
Endocarditis is often associated with it, as each manifestation of rheumatic fever and due to a common factor, the rheumatic fever whatever it may be. Others again, such as Octavius Stringer, Hemingway, express, while admitting a relationship between rheumatic fever in some cases, hold that, by far the greater number of cases have no association with rheumatic fever and that where endocarditis occurs apart from articular rheumatism, the endocarditis is not rheumatic but is due to the chorea.

Statistics, however, naturally suffice to settle the question of the association of chorea with rheumatism, but as statistics are based chiefly on the association of chorea with diffuse articular rheumatism, and do not take account of the articular forms, which we have been seen so frequently in children, they do not avail much I think. Besides a great body of evidence as to rheumatic antecedents in cases of chorea, whether as regards the personal or family history, leads to obtained at second hand from parents, of friends, and such evidence is certainly unreliable. The majority of people, especially among the poorer classes, are so insensible that such apparently trivial things as a sudden joint affection or rheumatic symptoms, or of course indolence, would never be noticed by them, or if noticed soon forgotten.
In discussing the relationship of Chorea & Rheumatism a
great deal depends I think on the point from which you
approach the matter. Those who look on Arthritis as one
of the manifestations of Rheumatism and adopt a wide
and broad conception of Rheumatism are inclined to
degrad Chorea as for the most part, if not invariably,
Rheumatic, as well as the Indurcidity, which is so
often associated with it: indeed when it is associated
with Indurcidity they regard the Indurcidity as
certainly Rheumatic. Those on the other hand who
base their conception of Rheumatism on the adult
body of the disease & to speak, regard no case as
Rheumatic unless there is distinct Arthritis, or a
history of such, are inclined to regard Chorea as
chiefly Rheumatic in origin and the Indurcidity
accompanying it as the result of the Chorea.

Dardt (Lection in Rheumatism p.125) says "I fo-
-late that much of the difference of opinion which
exists as to the relation of Chorea to Rheumatism is
more apparent than real, depending upon difference
in the meaning attached to the latter term, whereas
me person who speaks of the relationship refers only to
the occasional occurrence of Chorea after a concurrently
with Arthritis, another using the word Rheumatism
in a wider sense implies the dependence of Chorea.
but upon rheumatic arthritis, but upon the想了过程
of which arthritis is only one of many manifestations.
I shall now proceed to give the views on this relationship
of some of the leading authorities, and endeavour to
afford to draw some conclusion on the matter.
Dr. Charlie Hinde (Hawkins Lect 1888 pp. 55-98)
(p. 95-101) that there is most common due to the
rheumatic virus and that when indurated arthritis occurs
along with it, the induratud arthritis is certainly rheumatic.
There are many cases of rheumatism of knee where
no rheumatism ever develops, therefore he holds that there
are other factors necessarily present: there is a muti-
talional basis of mobility of the vernal system in cer-
tain children, the quick intelligent child, and men to
in felt than in boys. This mobility of the vernal system
is a predisposing cause of rheumatism. There is also the force
of nerves, which is a fright, which from statistics
is known to play an important part as an exciting
cause. Rheumatism acting on an excitable vernal system
acts as a predisposing cause, while some nerve shock
such as fright may be the exciting cause; while rheumatism
may also act as the exciting cause as in cases where
arthritis develop concurrently with it or shortly after.
Chandler gives examples of this. A case of mine, the girl
Stevenson, which I have mentioned is also an illustration.
Dealing with the question of the absence of the relation between chronic rheumatism and acute heart disease, most writers on the subject deal only with the evidence afforded by acute anterolar rheumatism preceding in accompanying chronic. The call attention to their data. The greater frequency with which (1) children between 10-15 are subject to acute anterolar rheumatism with organic heart disease, (2) rheumatism associated with organic heart disease, (3) anterolar rheumatism with rheuma as confirmed with (by) of the same age, (4) facts, statistics of the collective investigation committee in support of this (2). There is the fact that arthritis may follow the chorea. Such cases may be few but slight attacks of chorea may be forgotten as incident to piddliness.

31. There is the association of chorea with the aberrant form of rheumatism in children. The weight of evidence here is more a less according to the greater importance of the phases, complicated the association of independent variables, rhythm, convicility, and a various combination with chorea apart from arthritis. Chorea holds in being part of the rheumatic aetiology of chorea. Where baseride are associated with chorea, he holds that the evidence of the rheumatic aetiology of the chorea is positive (4) family predisposition hard to be considered. Given a chorea alone with a family history of rheumatism, the
Presumption is in favor of the theory being rheumatic
and this is sometimes confirmed by the subsequent de-
velopment of rheumatism in the child.

Chandler in 84 cases of his own found satisfying evidence
of acute rheumatism in the patient or immediate relatives
in 62 i.e. in 75 percent. I take it that Chandler here talks
into account the data usually neglected as far as he
can. Chandler holds that "the rheumatic tendency
of nervous susceptibility were together in the same inherited
constitutions." the exciting cause of the disease may be
acute rheumatism or fright or other nervous shock.

Dealing with cases of endocarditis associated with rheu-
ma alone, he first asserts that the murmurs occurring in
rheuma are chiefly due to endocarditis, and are not
chiefly functional, as some have held. This is sup-
ported by post-mortem evidence, as in almost all
fatal cases of chronic endocarditis is found and
the post-mortem changes in the valves are similar to those in
endocarditis occurring apart from rheuma, and chiefly
affect the mitral valve which is most prone to endocarditis.

Chandler rejects the theory of spasm or paroxysmal as the
cause of the mitral murmurs - the fact that the paroxysmal
murmur is not affected in rheuma is against the theory
of spasm - while the murmurs are not especially associated
with paroxysmal rheuma. Nor Chandler asserts that the
Endocarditis is rheumatic, this because of the frequent association of antecedent rheumatism with chorea and endocarditis as of antecedent rheumatism with each independently. As of endocarditis with three cases of chorea especially which are also associated with antecedent rheumatism. In 84 of Chendlelo's cases of chorea there was a history of antecedent rheumatism in the patient or near relatives in 62, 6 of these 62, 43 n 69 had organic heart disease, and if other rheumatic manifestations than arthritis be admitted the proportion would be great. Chendlelo discards the theory of strain, shock, a violent action of the valves as a cause of endocarditis in chorea. He says, the heart acts pretty not violently in chorea; that even when the valves do close violently together as in nephritic anemia gout, endocarditis is not set up, but the chief argument against such a theory is the occasional occurrence of endocarditis with chorea. Percarditis he says, sometimes seems apart from arthritis, with chorea & it can't be explained by strain or pressure from any more than can antecedent valves in any manner associated with chorea. Chendlelo believe, that the muscle changes in the cardiac valves in the antecedent endocarditis of children are similar to that in the subcutaneous nodules, and that as the latter may suddenly appear and disappear so may this cardiac
murmurs come and go due to a similar process in the valves, and as many so called functional murmurs be explained, from the peculiar frequency of the nodules and joints. Theriac in children resembles thistle, and the susceptibility of the tissues of these parts appears to go together, from this he argues there is a clue to the evanescent murmurs of rheumatism in children. From the same basis he builds up a possible pathologica change in the pericardia of the brain as the pathological change in adults.

Dr. Carrell (Transactions Rheumatism 1870) follows very much in the lines of Chedda. He claims rheuma as chiefly a rheu matic manifestation, though not invariably, the points out the folly of confusing predisposing and exciting causes in the division of these into rheumatic and fight. Chedda, the dichotomist, takes it as failing to take an antecedent journey of rheumatism into account, one lays them in the family history of rheumatism; he says that among chronic patients a large number have a family history of rheumatism, while a family history of rheumatism without rheumatism is decidedly uncommon. Again in the personal history, sarcoma like Chedda, holds that the slight antecedent pains occurring in children are truly rheumatic must be reckoned as such as well as the more marked cases of arthritis, while the occurrence of
Entanglements involve, embroil. The condition as a rhythm with change is equally evidence of the rheumatic origin of the change, although evidence of such may be difficult to obtain. Endocarditis, occurring alone in children, is considered rheumatic, its association with rheumatism in children, which disease is also admittedly associated with rheumatism, cannot hold, only strengthen the evidence in favor of the rheumatic origin of endocarditis in children. The emphasis is, the fact that the proportion of cases in children is highest where there is a history of articular rheumatism. Cannot believe that children is chiefly rheumatic in origin. Although cases often occur apart from any sign of rheumatism, where the exciting cause, such as fright, is marked, the preceeding stress. Where endocarditis accompanies rheumatism be. Here, rheumatic. It inclines to the theory of rheumatic that a similar change occur in the semiology of the brain in children. The fact occurs in the substantia nigra, being resistent in adults. The valves of the heart resisting in endocarditis.

Dr. Stephen Mackenzie (Edin Med Jour. Feb 1897) endorse the views of Chandra and Carrick. He says: "The evidence in my opinion is as much that change is rheumatic, without mycles or without endocarditis, that Children maintained with others that it is in itself a manifestation.
of Rheumatism. In his report to the Collective Investigation Committee of the British Medical Association on 479 cases contributed by independent observers from all parts of the country, independent Rheumatism occurred in 26%, concurrent Rheumatism in 16% and Rheumatic pains in 14% - in all 56%. This may lead into ill-defined Rheumatism to which Western the many manifestations other than arthritis, refer the Rheumatism which may follow and precede a chronic disease. Of 172 cases of Rhema Mackenzie investigated 54.26% shch did heart affection. I quote Mackenzie's statistics as a sample of those put forward by those who upheld the frequent rheumatic origin of disease. Mackenzie says that the absence of evidence of Rheumatism in cases of disease the higher is the proportion of indolentities: surely a significant fact.

Dr. MacIagan in his work on Rheumatism (1898) considers the clue to the matter lies in the fact that Rheumatism is essentially a disease of the inner apparatus, while Rheuma is essentially a disease of the outer softer tissue of the periarticular connective tissue, this involves a liability to disturbance of the inner apparatus of which the inner ganglia are an essential part. These ganglia are affected in Chorea. Hence Rheumatism is in predisposing cause of Chorea, the exciting cause may be fright or a neural shock or
gastric derangement, a may be an attack of rheumatism.

Rheumatism is a chronic affection in children, usually, in a more incidental accompaniment of the disease, not may of whom act as an exciting cause just as arthritis in old rheumatism may do. He says that little rheumatism and arthritis also affect the inner apparatus but not the outer centre, but then they occur at an age when children do not occur: the core is perhaps they might lead to rheumatism according to Bracken's views.

Chorea or rheumatism, he says, and the essential disease of youth: Rheumatism being the only disease of the inner apparatus which is so. Earlier in the same chapter on chorea he says: "Chorea is not a manufac-

toration of rheumatism. The rheumatic constitution is
by no means necessary to its production," his contention
is that any senile condition which affects the inner apparatus necessarily predisposes to chorea, an affection of the inner centre. It is

because rheumatism is the only kind at the age at

which these inner centres are so capable of being disturb

that we find the frequent association of the two diseases. At the same time we may get chorea excited by fright or otherwise apart from such

producing cause.

Neur- (Disease in Children) notes that Rheumatism is

one of the commonest causes of chorea. The future 3 cases
of Chorea followed by Articular Rheumatism, though
usually Chorea accompanies or follows the latter. The
Endocarditis of Chorea he holds is Rheumatic. He thinks
the Rheumatic Virus acts in some unexplained way
on the coordinating centres producing Chorea.

Taffee in his Practice of Medicine in the Antients in Chorea
refers to this subject. He discusses Kirke's Embolic theory
and diminishes it as untenable. He mentions mental
shock, including fright, as a frequent cause of Chorea,
while he also states the fact that Endocarditis is pres-
ent in almost all fatal cases. Similar to the Endocar-
ditis of Rheumatism, he believes the Endocarditis is
in the most part Rheumatic but quotes a case which was
due to fright, without any Rheumatic association. In
where Endocarditis was found just Mention 2 mentions
that the Endocarditis was there due to the Chorea itself.

Dr. Cattaneo5 Cattaneo read a paper on this subject at the
International Medical Congress in London in 1857, an account
of which is to be found in the 3s. act. of that Congress
vol. iv p. 185. He states that out of 111 cases of Chorea at the
Hospital for Sick Children 97 were rheumatic. He discredits the statement
of those who maintain Rheumatism in children is
often manifested by slight paroxysms of joint
pains & who dwell on the frequent implication of the heart
apart from marked joint symptoms, he argues, that it
must be a matter of extreme difficulty to accept
the evidence of another disease such as definite cases
as those of typhoid rheumatism, & (2) that if a latent
form of rheumatism is to be reckoned in the way we
are in fact maintaining an old hypothesis on a new basis;
for the old doctrine of the rheumatic origin of chorea as
asserted plainly an alliance between it & the ordinary
forms of articular rheumatism, and no me, he states,
in the country has found a large proportion of cases
immediately connected with articular rheumatism.
He says that until authorities agree on the particular
signs & symptoms which are to be accepted as valid
evidence of rheumatism, we have no common frontier
to deal with these cases. The discrepancies which
canally appear. Singer believes that acute articular
rheumatism occurs in such association with chorea
as to justify the assumption of some direct relation
existing in a small proportion of cases.
He assigns mental or psychical causes as the chief
cause of chorea. Out of a series of 132 cases 92 had
some mental shock or strain; out of another series of
45-25 had such an origin. He found a heart defect
in 45 of his 132 cases, & 16 of his 45 cases. By heart
defect he means either a virutal syphilitic aneurysm.
or uneven action. He holds that the heart suffers in children (apart from rheumatic aetiology altogether) because children affect the same parts of organs which ordinary tetric suffering afflicts, that is because it is an affection of the emotional centres. The commonest heart symptom in children, as in tetric, is increased frequency of the heart's action, but the most obvious and earliest symptom is a systolic ventricular recession due to a blood reflux through the auriculoventricular orifices, and emergence of fatigues occurs in the front of the pericardial muscles. In his book on rheumatic published in 1893, Strünges still maintain that the relation association of Chorea and Rheumatism is slight. Out of 35 cases, only about 30 had any possible rheumatic connection (p. 40). In very young children, under 5 years, however, Strünges adds a much closer connection: In 5 cases of chorea under 5 years, he had 5 intimately associated with Rheumatism. As regards the heart-muscle associated with Chorea Strünges now maintains that it is due to Endocarditis and is not usually functional, due to the action of muscle action on muscle often giving a disease clinical evidence added to clinical evidence, experience (p. 68). This Endocarditis, however, he holds, is not ph又被matic, although he states that Endocarditis in choreo children, who are ph又被matic, is also generally
Pneumatic, the subject tend to endocarditis, which is often
limited to rheumatic valvular disease. The valvular disease
does not lead to permanent heart changes. Sengers says, o when found post-mortem con-
sidered to be a break in the valve, a break in the commissure aspect of the mitral valve. It does not lead to death as rheum-
atica endocarditis does, but is only discovered occa-
sionally post-mortem, in which case it is usually com-
pletely recovered from. In a draft in Pathogenesis
(1936) Sengers suggests that the chronic rheuma-
tic are nearly allied in origin to members of a
pathological group which has arthritis as a common
feature. He suggests that many of the joint pains oc-
curring in children who have chronic arthritis may be rheum-
atic. Further, in Mitchell's account of this
view, Sengers states that the younger the child
the more prevalent is the association between rheuma-
tic arthritis, that with juvenile rheumatic fever.

an account of 50 cases of chronic arthritis. While ad-
mitting that a large number of chronic patients are
liable to rheumatism, he holds that chronic is directly
caused in some cases by infection apart from any
Rheumatic tendency whatever. As regards Endocarditis, while it may cause it apart from Rheumatism, the cases of Chorea when the heart was normal or where no Rheumatism or other illness occurred, did not eventually a cardiac membrane developed which proved ultimately to be organic, and which Hermann inferred was due solely to the Chorea; in many cases this membrane did not develop until the 23rd day of the Chorea. The idea that purulent meningitis many of the cases of Chorea with cardiac disease their changes 28 years that they all appearances followed rather than preceded Chorea & therefore he considers were due to the Chorea. Hermann in his paper an "Chorea as a cause rather than a symptom of Endocarditis" justifies cases of Endocarditis in the absence of cardiac glands & vegetations as occurring in the cardiac valves in certain other conditions this when big endocarditis pyoderma.

Dr. Egers (Chorea & Rheumatism Lancet Dec 21st 1899) gives an analysis of 146 cases of Chorea seen at the Westminster Hospital. He gives a permanent rheumatic history in 23.97% & a rheumatic inheritance in 32.19% while 66.6% claim he assigns 64.38% to. As regards the heart there was a permanent murmur in 20, 11 of whom had had acute Rheumatism,
An evanescent murmur, he calls attention to the fact that in only 13.69% of cases there is endocarditis, yet in acute Rheumatism 29.7% of cases of cardiac disease occur between 18 and 20. Lyon says it is strange if ordinary teaching is true. That acute Rheumatism at the very age when the heart is most liable to be affected, should in the case of these cases make its appearance in only half the number of cases. Lyon thinks that the majority of murmurs are functional due to the chance, that further investigation will dispel the rheumatic origin of these. Lyon thinks the large number of cases 64.38% due to venereal disease instance very significantly point to venereal disease as the most efficient cause.

Dr. Goodhart (Discourse of children) holds that Chorea is "a temporary malady of nervous brain in the nervous system of unstable child sometimes produced in chronic child may as well be the offspring of the epileptic, neurotic, guilty, hysterical or passionate race of rheumatic" (p. 584). In 141 cases 29 had Rheumatic fever, 50 were a family history of Rheumatism. He assigns a large place to mental conditions in the causation of Chorea, and calls especial attention to nightmare. He regards the heart murmurs of Chorea Goodhart declines to commit himself. He believes it
is chiefly organic but admits the existence of function.
-

- adenomas due to muscular inequality, and consequent perspiration at initial valve, and he also admits the possibility of vegetations on the initial valve resulting from this perspiration. In 41 cases of valvular disease Goodhart found that 14 had certainly, or probably, had rheumatism, 8, of them had a rheumatic family history, while in 17 with history of rheumatism could be obtained.

I have thus endeavored to give a sketch of the views of the leading authorities on children's diseases in the relation between Chorea and Rheumatism. I shall now try to consider the different opinions held regarding this question, with a view to coming to some conclusion on the matter. Be fore doing so I shall briefly refer to a few cases of my own. In 5 cases of Chorea of which I have notes there was a distinct rheumatic element in my opinion in all of them. 1. A girl (Jane Stevenson) developed Chorea while suffering from Rheumatism: (2) A boy (John Layng age 10) had Chorea about 3 months ago; had attended him frequently for antirheumatic Rheumatism a year ago; (3) A boy (John Mack age 8) had Chorea about 5 months ago - a year before he had had slight joint pains in knee and ankles, his mother telling me that he had had scurvy, and that pains had not interfered with his going about; (4) A girl (Maggie Shaw age 9)
had China about quarter ago; there was a history of Rheumatism in the family on the father's side.

At a girl of 15, whom I can name 2 or 4 years ago, sick China, had a fever with the common accompanying illness and severe fits for some years. After, while her father died of Rheumatic Fever.

Statistics as we have seen are of little help in determining the association between Cholera Rheumatism as they only take account of cases where authentic history can be traced. Previously, I usually ignore the evidence of Rheumatism, but here they do not take into account the cases where Rheumatism follows Cholera. The remarkable series of cases given by Cheshire in his Cholera Lecture of 14 to 15 are much more valuable, as they present the history of many which had been under medical treatment for months if not years, those cases present a strong argument, I think, in favour of Cholera, where it seems almost impossible from any authority present or fact, being a rheumatic manifestation as the further observation of similar cases as series 5, 6 7 and 8 shows. Certain of these were ascribed to fright at the time of fright as doubt was the exciting cause, but the subsequent development of Rheumatic phenomena down litters, I think, that the Rheumatic Virus, whatever it may be, was the predisposing cause. Things and
Eyes v. The assignment of the chief cause of
Chorea to assign to Rheumatism a secondary place,
and this certainly is borne out by their statistics. But
the authorities are inclined to limit their conception
of Rheumatism to typical antemortem Rheumatism,
and indeed Slingsby maintains (Chorea, 1873) that joint
pain may accompany chorea apart from Rheumatism altogether.
What might not contain if these non-Rheumatic cases of
them afterward develop rheumatic phenomena? These
even if they did not, is there not good ground for believing
that chorea may seem alone as a manifestation
of Rheumatism, or it may be the first manifestation?
Further as Mr. Chalmers suggests point not it is possible
to contrast Rheumatic & Right-Chorea as the first, while
Chorea evidently an exciting cause is perhaps as
much a predisposing one, while the latter is necessarily
an exciting me: Right may cause chorea in a
rheumatic child (Chalmers, Lectures Series B). If we
accept this fact as I think we must, that authorities is
why we of the manifestations of Rheumatism in children
that Rheumatism may occur with slight or perhaps
no joint pains, & also that chorea may precede all
other rheumatic phenomena as shown by a study of the
history of cases extending over a prolonged period, then I
think we must admit that chorea in most cases is
a rheumatic manifestation, though at the same time we express ignorance of the way in which rheumatism brings about chorea.

As regards the cardiae murmurs associated with chorea so frequently the question arises as whether in most cases these are organic or due to endocarditis, or not, and as whether if organic they are rheumatic in origin, or are caused by the chorea itself.

There appears to be a strong probability that the cardiac murmurs in chorea, in the most severe or initial stage, are almost always organic. In almost all fatal cases (vide Faye's of Medicine, Chorea) endocarditis is found post-mortem. Tyers believes that the majority of cases of heart affection in chorea are not organic (Lancet 21, 1859). Another cases we get 43.8 as non-organic against 13.64 as organic. These statistics are based on clinical evidence alone. The murmurs in chorea is chiefly initial and endocarditis is uncommon there, while functional murmurs are not usually developed there alone. The theories of fatigue, paroxysm leading to regurgitation and of spasm or strain as the cause are untenable, I think. This murmur seems in slight cases, as well as some usually develop slowly, while chorea affects voluntary muscles and not involuntary and instead of strain there is usually a low tension present.
Hunger in his Lancetian Lectures (Hist. med. 1 March 17 1894) p. 563) says that most of the heart failure are due to Endocardi- 
carditis, and that such may produce no symptoms whatever 
during life. When the heart is not organic it is 
perfectly as far as I know me.

Granting then that most cases of heart murmurs in China 
are organic, what is the cause of the Endocarditis? 
Chevalier, Stansfield & MacKenzie, to mention the chief 
instances, I have examined; believe that it is rheumatic 
in origin. In their opinion, it seems one, is 
well-founded. If we accept the statement that China 
is chiefly a rheumatic manifestation, as Endocarditis 
has its chief source in Rheumatism with comparatively 
scant exceptions, is it not natural to look on both as 
rheumatic manifestations when occurring together 
after from their rheumatic phenomena? That the 
Endocarditis causes the Chinese, which is the Egyptian 
theory, may be discarded, I think, as it is already given 
that the Chinese is the cause of the Endocarditis appears 
to be searching for "some mysterious condition connected 
with Chinese" as Chevalier says, instead of 
accepting the common factor as the cause of both.

Hunger says that in the Endocarditis of China small 
roundish granulations form on the edge of the mitral 
vault, and at this stage the Endocarditis of China is
Rheumatism are similar, but while the endocarditis of rheumatism goes further than this, as shown by post-mortem examination and clinical experience, the endocarditis of rheumatism leads to valvular contractility, to valves contracting with valve tonsure and denudative changes in the size and shape of the heart. Fatal cases, he says are more due to the heart condition. He admits as we have already seen that endocarditis of a rheumatic origin may also occur along with chorea.

Fayre (A practical medicine, ch. x, p. 733) states, that endocarditis of the aorta and valves found pain, in fatal cases and chorea. (Hydriaca, Sect. p. 96) states, that the changes found just mention are identical with those of endocarditis from other causes. His Surgeon admits, that rheumatic endocarditis accompanying chorea may sometimes be rheumatic, that where there is endocarditis is not rheumatic, it is in the just mention appearances are the same as the early stage of rheumatic endocarditis, it seems true to be indeed searching for some mysterious condition when he regards that endocarditis as due to chorea. It might as well affirm that chorea is the cause of the endocarditis and some times accompanies it, as of the adventitious nodules. Mouchan's view that chorea is associated with rheumatism is closer because it is a disease of the peri-cardi, the latter of the valvular affections is rather an attractive one. But
at the period of life where Rheumatism is most typically a disease of the mitral apparatus, where in fact arthritis is at its maximum, sclerosis is at its minimum, and it is in early life, below puberty, where the mitral apparatus is least affected by Rheumatism that sclerosis is at its maximum.

Werninghaus, as quoted by Paris (Diseases of Rheumatism, p. 128) brings precedent evidence of Endocarditis in this condition. By examining the pulsus. Of such cases are found in further investigation because they would have some weight.

Cheadle, followed by Paris, suggests a similar change in sclerosis where occurs in the subcutaneous bundles, viz a temporary weakening of the connective tissue in the nerve centres. They are lead to this suggestion from by a consideration of the frequent association of the Noises and Endocarditis together clinically and the fact that the tissue changes in each are apparently similar in character; then as Endocarditis sclerosis often goes together and are sometimes involuted tears as well in these cases, they argued that the changes in the connective tissue of the brain are similar to those in the heart and in the subcutaneous fibrous tissue. Paris states (Diseases, Nov. 23, 1889) that increase of fibrous tissue have been noted in the brain and spinal cord in fatal cases of sclerosis. If this be true it
would support the common rheumatic origin of all three conditions, as Rheumatism in children appears to have a special affinity for fibrous structures. At the

inches develop quickly and later disappear again. Needle

suggests that a similar pathological basis may explain

the fleeting character of certain of the exacerbations in

rheumatic arthritis; hence in children.

There is still much to be done in clearing up

making clear the relation of Rheumatism in children.

I shall now briefly refer to what has been called

Sebastianal Rheumatism. In the course of Sebastianal

either in the first week or later during desquamation

an arthritis may develop which is sometimes accompanied

by peri-aricular carditis. Chorea may also occur in cases

while

of Sebastianal Rheumatism. In the course of Sebastianal

either in the first week or later during desquamation

an arthritis may develop which is sometimes accompanied

by peri-aricular carditis. Chorea may also occur in cases

of Sebastianal Rheumatism. In the course of Sebastianal

either in the first week or later during desquamation

an arthritis may develop which is sometimes accompanied

by peri-aricular carditis. Chorea may also occur in cases

of Sebastianal Rheumatism. In the course of Sebastianal

either in the first week or later during desquamation

an arthritis may develop which is sometimes accompanied

by peri-aricular carditis. Chorea may also occur in cases

of Sebastianal Rheumatism. In the course of Sebastianal

either in the first week or later during desquamation

an arthritis may develop which is sometimes accompanied

by peri-aricular carditis. Chorea may also occur in cases

of Sebastianal Rheumatism. In the course of Sebastianal

either in the first week or later during desquamation

an arthritis may develop which is sometimes accompanied

by peri-aricular carditis. Chorea may also occur in cases

of Sebastianal Rheumatism. In the course of Sebastianal

either in the first week or later during desquamation

an arthritis may develop which is sometimes accompanied

by peri-aricular carditis. Chorea may also occur in cases

of Sebastianal Rheumatism. In the course of Sebastianal

either in the first week or later during desquamation

an arthritis may develop which is sometimes accompanied

by peri-aricular carditis. Chorea may also occur in cases
Then rheumatic phenomena, such as the urtication of chorea make it, I think, highly probable that certain cases of arthritis are rheumatic. Curiously to the arthritis of adult life, acute articular rheumatism is commoner in girls than in boys between 10 and 15 years.

The relation between inflammation, chorea and rheumatism appears to me to be very imperfectly understood.

There are other manifestations of rheumatism, such as insidious rheumy, but I think these conditions arise which present special characteristics in children or are frequent for the most part of them and it is with these I wished to deal. I shall now turn to the etiology of rheumatism. As I am dealing only with the special features of rheumatism in children, I need only here consider three points in etiology which especially affect children. As to the ultimate cause of rheumatism, nothing is yet definitely known, and it is beside my purpose to go into the question. Suffice it to say that there is a growing belief at the present day that rheumatism like so many other diseases is due to a micro-organism. There are two points in connection with the etiology of the disease in children which are worth considering. The first of these is inherited predisposition.
The statistics on this point vary with different authorities, according as they limit their inquiry to certain rheumatic manifestations or include all those other manifestations of rheumatism, apart from arthritis, which we have been shown in children. It is also to be remembered that it is easier to get a reliable family history in the case of children than in that of adults, as parents know about the ailments of their own generation and those of their children, but in the case of adults, especially among the poor, the ailments of their parents are often unknown to them. Of these ailments, as children, forgotten, Cheddie out of 32 consecutive cases (23. 2nd Jan 1895) found a definite family history of rheumatic fever in near blood relatives in 23 or 76% of, while he states that taking rheumatism and arthritis as evidence of rheumatism he got 93%. Where arthritis is, chronic rheumatism, disease were taken together, out of 150 cases, 103 gave a definite family history of rheumatism from a 58%, while of chronic rheumatism alone as accepted as rheumatic manifestations there were 13%, or 50%.

Goodhart (Diagnosis of Children p. 596) out of 81 cases found a family history of rheumatism in 44 or 57% of the best evidence isfound however in the study of individual families. Goodhart quotes an ease (p. 586).
Where with a rheumatic history in the parents, 5 of a family of 6 under 15 years of age, all except a baby of 14 months, had either had rheumatism or heart disease. Chandelle (B. March 11, 1846) mentions a case given by Keiser of a rheumatic mother who had 12 children, 11 of whom had acute rheumatism before the age of 20.

The second point in etiology is the question of sex. To adults, the two sexes appear to suffer almost equally. E.g. Eyser gives 197 males to 225 females, while Peckham gives 213 males to 177 females. In children, girls appear to suffer more than boys. Goodhart of 69 cases gives 42 girls to 27 boys. Chandelle (Harrow Lecture) states that while in all those under 20 years of age taken together girls are more liable to rheumatism than boys, it is only in the period between 11 and 15 years that this is so, then they predominate in the proportion of nearly 2 to 1. During this period girls are almost much more liable to develop subcutaneous rheumatism. However, the subject of heart disease is of some significance in determining the relationship of these affections to rheumatism.

Diagnosis of Rheumatism in Children. This is mainly a question of the other diseases of children which may be
Confused with acute rheumatism in children. There are the other manifestations of rheumatism present as well, such as erythema, endocarditis, chorea, or nodules either manifest of these then there is little likelihood of a mistake. Pyaemia may occur in children as the result of acute peritonitis, or myocarditis or from some visceral lesion as may get arthritis, endo-peri-carditis, pleurisy & pneumonia. As a rule a careful examination would detect the original cause of the Pyaemia, besides the illness would be more acute, the temperature higher & the pulse quicker & cachexia is marked in Pyaemia than in rheumatism & in the absence of fever would take place & we would get effusion in the joints. Yet in the early stage there is a considerable risk of a mistake.

The acute infective arthritis of infants may be confused with rheumatism in children. It usually occurs in infants under one year old, when rheumatism is practically unknown, there is no much risk of this, then there is the infectious or congenital syphilis.

Once again the age is a help in diagnosis, as this disease also occurs in infants. There may be present other signs of congenital syphilis. Perhaps a history of syphilis to guide me. The common type of syphilis of infants is very hard to mistakes, as there may also be
Swelling and tenderness of the joints, while again the age is unusually below that at which antecedent rheumatism occurs, there would be the evidence of Senex.

In Haemophilia a haemorrhagic effusion sometimes occurs in the joints, leading to pain and swelling. There is often a family history of bleeding to be obtained from the evidence of bleeding from the various mucous membranes of the nose, and the great tenderness with which both children get bruises.

These anterior hemorrhoids may be mistaken for rheumatic in the early stages, when there is fever and general tenderness of the limbs. But the tenderness is general and confined to the joints. When the analysis becomes evident, although in very young children this might be considered weakness merely.

Rheumatic fever may resemble certain cases of rheumatism in children at first where there are no joint symptoms but only fever, numerous pains, later on the typical symptoms of rheumatic fever would manifest themselves, or the occurrence of endocarditis or pericarditis, symptoms which would determine the rheumatic nature of the attack.

There may be other conditions which might simulate rheumatism in children, but these I think are the chief.
Prognesia of Rheumatism in Children. This largely de-

pends on the nature of the manifestations. Indeed,

peri-articular are more prone to occur the younger the

patient, they are often allowed in their early stage

to go unchecked since they may begin insidiously

to give rise to symptoms, there may be little or no

joint pain to attract the attention of parents. Hence

we may say that the prognesia is seen in children

down in adults, when the arthritis is so prominent

that no respect is paid to treatment. Besides, in children

rheumatism is very liable to recur if the heart may

then be repeatedly attacked. Ennemond says

(bony in children 6428) that next to the heart

as a source of morbidity come the plasma lung.

Treatment. I shall merely indicate the general

lines on which this is to be carried out. The heart

is the chief source of danger in Rheumatism. Referring

do in children from what I have said above, &
it is the prevention & mitigation of heart disease

that we have chiefly to consider. The examination

of the heart should be made in all cases of "burning

pains" a vague sensation made in children, or where

there are any of the rheumatic manifestations, we have

been considering. Absolute rest in bed should be

enforced at the future case of the child watched
and the parents warned of the danger that the child runs. Goodhart says of the rheumatic child "there are some of the cases where the doctor should be remunerated for keeping the child well rather than called in to cure it when actually ill." Drug treatment is on similar lines to that practiced in the case of adults. Chandler states that the take-
cyclets have no beneficial influence on any of the rheumatic manifestations except arthritis and tendinitis. He states that Dr. Fullenq Diehringer believed that cooling inflammation was less under the alkaline treatment than under any other.
The dietetic treatment adopted is the same as in adults, chiefly a milk diet.
Finally as regards the treatment of Petri, Pembe, candidiasis, the treatment of these affections in children does not differ from that adopted in the case of adults.