THE ASSOCIATION OF CHOREA WITH RHEUMATISM.

A CLINICAL STUDY

Based Upon An ANALYSIS Of 16 Cases Of

SYDENHAM'S CHOREA:

With a Note On The ANTAGONISM Between The

RHEUMATIC And TUBERCULAR Infections.

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The association of chorea with rheumatism is so familiar an occurrence in general practice, that it justifies a discussion of the subject from various standpoints. All the cases included in my series are examples of true Sydenham's Chorea, taken as they came, and no case has been admitted to the series if any doubt were felt as to the diagnosis. In this thesis I will discuss clinical evidence with regard to the relationship between chorea and rheumatism, and it may for that purpose be divided into four sections:-

(a) The influence of rheumatism, and the neuropathic tendency, in the production of chorea.

(b) The avenues of rheumatic infection in chorea.

(c) Cardiac manifestations in chorea.

(d) The antagonism between the rheumatic and tubercular infections, and the occurrence of tuberculosis in the family histories of cases of chorea.

(a) <u>The influence of rheumatism and the neuropathic tendency in the production of chorea.</u>

The relationship between chorea and rheumatism has led to much difference of opinion amongst medical men, and, although the view has been held in France for every sixty years that rheumatism, endocarditis, and chorea are different manifestations of one and the same disease, it has been vigorously debated in this country, and has only in recent years met with wide acceptance. The association can be traced in the occurrence of rheumatism before an attack of chorea, in its occurrence /

occurrence during an attack of chorea, in the large percentage of cases of cardiac disease in chorea, in the family history of rheumatism in cases of chorea, and lastly in the occurrence of rheumatism many years after an attack of chorea. Regarding the latter, Batten (1) who followed up 115 cases treated at Great Ormond Street Children's Hospital, found that rheumatism had developed in 32 per cent within six years. Apart from the rheumatic factor in the etiology of chorea, one has to note the neuropathic factor. That the latter is a very important element as an exciting cause of an attack of chorea is seen in the sex incidence, the neuropathic family history, and lastly the occurrence of fright and other emotional disturbances preceding the onset. The rheumatic child tends to be nervous, irritable, and often mentally unstable, and chorea tends to develop in those who are most markedly unstable. It is much more common among the more excitable girls. One frequently meets cases of chorea which have developed directly after a fright or a punishment, and in the majority of those cases, the child has been the subject of rheumatic infection, and the mental strain has determined the development of chorea, but in others no other evidence of rheumatic infection is obtainable.

While the onset of chorea is determined by rheumatic cerebral infection, probably the infection does not continue/

continue active throughout the course of the disease, the continuance of symptoms being caused by lesions resulting from the previous active infection. To illustrate these points, I record here a series of three cases:-

Case 1. Mina Rice. Now 42 years of age.
Case of chorea accompanied by other rheumatic manifestations, with the rheumatic and neuropathic taints in her children.

Symptoms before onset of Chorea:-

No arthritis or tonsillitis. There were growing pains in the legs, frequent headaches, tired back, and so called stitch in side. These conditions continued more or less during the presence of chorea, until she had been away from school for a considerable time. Had measles and dental troubles in early childhood.

Causation:-

The reputed cause of chorea was a fright she received between the age of eight and nine years - she had been terrified by a man and his dog one night, and on another occasion she fell out of a dogcart.

Age at Onset:-

She was eleven years of age when removed from school for a year, but the chorea had been coming on for some time/

time previously.

Type of Child:-

Dark hair, fair complexion, shy nervous girl, capricious appetite. Had been plump and healthy up to the age of six, when she had measles. She had considerable trouble with her school lessons previous to the attack of chorea.

Later History:-

Was extremely nervous and subject to severe headaches until menstruation began at the age of fifteen, and a year later she developed a severe attack of scarlet fever. The throat symptoms were very severe, and during the course of this illness her general condition gave rise to much anxiety. No history of scarletinal rheumatism. There was no recurrence of the chorea subsequent to the scarletinal attack. Nothing of interest occurred until the age of twenty, when she was anaemic for a time, and inclined to be melancholy.

Cardiac Condition:-

So far as my investigations go, the heart had evidently escaped involvement, and if it were implicated it must have been of a slight nature with full recovery to normal, for in her later married life she has come through some severe confinements accompanied by smart haemorrhages. The doctors in attendance have never mentioned cardiac defects /

defects, but have rather expressed the opinion that "She must have a strong heart". Many years ago the writer examined the heart at a time when she was subject to gall stones and found no evidence of organic mischief.

Family History:-

Father:- Often complained of pains in the lumbar muscles, and died of a pontine haemorrhage at the age of 63.

Mother:- Was a highly strung nervous woman, and had a definite mitral murmur which may have been caused by a rheumatic endocarditis. She was very subject to nasal catarrh, and later bronchitis, and died of cardiac failure following a pulmonary infarction at the age of 65.

There were other four sisters and two brothers in the family. One sister died of enteritis at the age of thir-:teen months, another was addicted to rheumatic throats, one is subject to neuritis, and the other is or was troubled with anaemia. Of the two brothers, both had bronchitis till the age of two, and one was subject to night terrors during childhood. Taking the family of six members, four stammered very markedly at times.

Married History of Case:-

Seven confinements - one instrumental, two with ex-:cessive haemorrhage; others normal but recovery always

slow. Two miscarriages. Tendency to melancholia first year after marriage and later attacks at the age of thirty three and thirty eight. Duration of attacks about two months. Is hypersensitive and subject to strange, horrible and disturbing dreams. Long attack of gallstones. This recurs in a mild form from time to time. Chronic nasal catarrh for several years after "gallstones" illness, but this has disappeared within the last year.

Medical History of the Children:-

Six boys and one girl. There has been one case of scarlet fever and one case of measles in the family. Two of the boys and the girl are subject to rheumatism and tonsillitis. The eldest boy died of septic meningitis following ear trouble. The second boy, who has had scarlet fever, has been subject to asthma for some time, bites his finger nails, but has never complained of rheumatic pains. The third boy died a few hours after birth. The fourth boy, who has been subject to tonsillitis and grow-Zing pains, suffers from cardiac mischief, and "stitch in the side". This boy stammers, and is afflicted with habit spasm. The girl of the family suffers from enuresis, and habit spasm. Nothing so far has been observed in the two youngest members of the family. Two cousins on the Mother's side, both girls, suffer from enuresis, one being subject to somnambulism, and the other being a stammerer.

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Case 2. Elizabeth Sommerville. Aged 7½ years.

Case of chorea following attack of rheumatism.

Family History:-

Father:- (This side of the family is very well-known to me).

Has had two attacks of acute rheumatism. His two brothers have also had rheumatic fever. One of the latter - he ultimately died of rheumatic carditis - developed his first attack after an operation for strangulated hernia, in the Edinburgh Royal Infirmary, and before he left that Institution - a good instance of rheu-:matism following shock. No neuropathic factor on the Father's side.

Mother:-

History of rheumatism indefinite. Subject to tonsillitis. One of her sisters had an attack of rheumatism followed by chorea, and her young-:est brother also had chorea.

The patient's sister, 4½ years of age, is of the nervous type. Enlarged tonsils, mouth breather, and subject to nasal catarrh.

Type of child:-

Is a bright specimen, fair hair and pale complexion. subject to night terrors especially when she is out of sorts. tonsils/

Tonsils enlarged, though she has never complained of sore throats. Since going to school has been addicted to "nervy" turns.

Previous History:-

Has had measles and chicken-pox. In November, 1916, had an attack of rheumatism affecting legs, arms and fingers. Previous to this illness she had been highly nervous and troubled with bronchial and nasal catarrh.

Present Illness:-

In January of this year she complained of headaches, loss of appetite, general malaise, and was subject to screaming attacks. She was very anaemic, manner excitable, and complained of her legs being sore. Wasting was marked, temperature raised, and pupils widely dilated. Pulse was rapid - a little irregular . First cardiac sound at the apex sharp, and the second pulmonary accentuated. She was exhibiting slight fidgety movements on the right side, and a few days later the choreiform movements became more evident. At this stage she presented the rather interesting ocular phenomenom, namely the pupillary sign known as hippus or a rhythmical contraction and dilatation of the pupils, which passed off in a few days, The reputed cause of this illness was a fright the little girl received on returning home from school - a strange man having accosted her at the foot of the stair leading /

leading to her Mother's house. I examined this little girl six weeks after my first visit, and found her very much improved. Heart had quietened down, first sound still a little sharp, pulse beats showed a little alteration in strength. Appetite better, and no signs of rheumatic pains or choreic movements. Arsenic in tonic doses was of great value in this case.

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Case 3. Janet Mackay. Aged 14 years.

Case of chorea followed by other manifestations of rheumatism.

Family History:-

Father:- Nothing of interest.

Mother:- Has had sub-acute rheumatism.

Aunt (On Mother's side):-

Has had scarletinal rheumatism.

No history of rheumatism in other members of the family.

Type of Child:-

A nervous, fidgety girl, rather dour, and resents being too much disciplined. Fair complexion, light brown hair, and well-nourished.

Previous History:-

Beyond an attack of measles at the age of five, there was/

was nothing of interest in earlier history. At the age of seven, chorea set in and was of some duration. She spent a few months in the Royal Hospital for Sick Children, and before being discharged, she developed Herpes Zoster. This attack of chorea was ascribed to a fright she received on returning from school. She had been stealing leaves from a tree, and someone struck her on the face for doing so. She had a relapse of a mild type two and a half years later, and another relapse at the age of twelve. During this ill-:ness she was an inmate of the Royal Infirmary, Edinburgh, for four months.

Present Illness:-

Towards the end of 1917, she developed an attack of acute follicular tonsillitis accompanied by arthritis in both ankles. There was the usual febrile disturbance, and she was aching all over. There was a recurrence of the chorea of a mild type. Tonsils much enlarged - a mouth breather. Until this illness, and since leaving the In-:firmary, her only symptoms were and have been of the nervous type, - excitability, dropping things, outbursts of crying when she did not get her own way. Took no interest in her school lessons.

Cardiac Condition:-

On examination of the heart, I could find very little beyond/

beyond slight accentuation of the first sound at the apex. At no time had she suffered from praecordial pain, or difficulty in breathing. Her Mother informs me that during the time when her girl was an in-patient of the two Institutions mentioned, cardiac mischief was never discussed.

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The following points are interesting in connection with this series of three cases:-

1. I have included case 1, a sister of my own, in this series, as it very clearly brings out various points discussed in this thesis. There is the neuropathic factor in the Mother, the history of chorea preceded by other rheumatic symptoms in the daughter, and the appearance of rheumatism and various nervous phenomena in the grandchildren. In an investigation into the relationship of chorea and rheumatism, one invariably finds a definite neuropathic and rheumatic history, and this case presents those factors very definitely. The absence of implication of the heart, might have been due to a mild infection, plus the benefits of good food, clothing and hygiene, but it also proves the rule that the heart may escape being attacked by the infection of rheumatism. The various expressions/

expressions of an inherited neurotic temperament are seen in the night terrors of a brother of this case, the evid-:ence of stammering in her three sisters, and further the presence of habit spasm, stammering, and enuresis in some of her own children.

The rheumatic taint is not very strong until one comes to her own children, but there is no doubt of the smouldering rheumatic infection previous to the onset of chorea in the case described, and further other expressions of rheumatism are seen in the history of sore throats in one of her sisters, and the clinical evidence of neuritis in another of her sisters. Another interesting point is the fact of two of my own little girls being troubled with somnambulism, stammering and enuresis.

2. The latent type of chorea in Case 11 is worth of atten-:tion, because it is a form little recognised and very often over-looked. The pupillary phenomenom was of considerable help to me in diagnosing this case. Langmead (2) explains this phenomenom to be due to the iris muscle sharing with other muscles in inco-ordinate movements etc.

Regarding the familty history, the rheumatic factor is great on the Father's side, and the neuropathic factor most distinct on the Mother's side.

3. Considering the recurring attacks of chorea in Case 111 the /

the absence of implication of the heart is worthy of notice. In all probability this is due to the fact of her having had prolonged hospital treatment, added to the fact that her Mother took her to Hospital on noticing the early chorei-:form movements. It is more than likely that this girl had attacks of tonsillitis before I was called in, but being of a mild type, although quite sufficient to cause enlargement of the tonsils, had passed off unrecognised.

4. Regarding the occurrence of stammering in the family and personal histories of choreic cases, and its frequent association with night terrors, enuresis, and somnambulism, one feels inclined to place this expression of a neuro-:pathic tendency in an important position when discussing the infection of rheumatism from the points of view of etiology and prevention.

A case of stammering in a family calls for an enquiry on the part of the medical attendant into the family and personal history of the child, and should the result of the enquiry be unfavourable, strong measures should be adopted on behalf of the child to combat and prevent the infection of rheumatism.

B. The Avenues of Rheumatic Infection in Cases of Chorea.

One of the most interesting contributions on the bacteriology of rheumatism which has yet appeared in this country is that by Poynton and Paine,(3) who have isolated a diplococcus from the joints, pericarditic exudation, inflamed valves, subcutaneous nodules, and the blood in cases of acute rheumatism. In a series of inoculations in rabbits, they have produced a condition resembling chorea, and inflammation of heart valves and joints occurred in others. With this choreic condition, they found diplococci in the pia-mater, and also in the endothelial cells of the blood capillaries dipping into the motor cortex from the surface. Much work on the subject has been done since their original paper appeared in 1900, and their researches along with others have done much to establish the identity of the micrococcus rheumaticus.

Branson,(4) in a clinical study on the avenues of rheumatic infection based upon the examination of 75 cases of Sydenham's Chorea arrived at the following conclusions amongst others:-

1. That Sydenham's Chorea and rheumatic fever are due to one and the same infecting agent.

2. That the commonest avenue of rheumatic infection is the tonsil, and next to it the nose.

3. That the first essential of rational treatment of rheumatic infection is restoration of the upper air passages to a healthy condition.

4. That the operation of enucleation should be performed without delay upon all rheumatic children who exhibit chronic enlargement of the tonsils, or of the tonsillar lymphatic glands.

With these findings I am completely in accord. There can be no doubt that diseased and unhealthy tonsils are a very frequent occurrence in rheumatic children. Again, tonsillitis so frequently occurs just before the onset of rheumatic pains in children, that it is difficult to escape the conclusion that it bears a direct relation, as a medium of infection, to rheumatism. One could apply the same reasoning to nasal and pharngeal catarrh, and that the tonsils and upper air passages require very close attention in the rheumatic goes without saying. There is still a difference of opinion regarding the removal of enlarged tonsils in rheumatic children, but it is now recognised that the enucleation of large unhealthy tonsils improves the general health, and diminishs the liability to sore throats.

Regarding tonsillectomy in the treatment of chorea, Archibald (3) gives a report of seven cases of chorea treated by removal of the tonsils, and summarises as follows:-

1. It is important to make a careful examination of the upper air passages in nervous children.

2. The close relationship between chorea and the rheumatic infection is confirmed by clinical observations and by bacteriological investigations.

3. Diseased tonsils are frequently associated with chorea and should be dealt with in its treatment.

4. Rapid cessation of choreic symptoms has occurred in his experience after tonsillectomy performed during the acute stage.

The writer has had no experience in treating chorea in this way, but certainly would strongly recommend that oper-:ation, on the re-establishment of good health, along with irrigation and thorough cleansing of the nasal passages, combined with antiseptic treatment of the nose and pharynx.

The following series of three cases illustrate the tonsils and naso-pharynx as the chief avenues of infection in choreic cases:-

Case 1. Margaret Walker. Aged 7 years.
Case of recurring attacks of tonsillitis followed by chorea.

Family History:-

Father:- Subject to naso-pharyngeal catarrh and bronchitis. Had an attack of nephritis before going abroad, and has had black-:water fever during a sojourn in the tropics.

Mother:- Has had several attacks of acute rheu-:matism and some years ago I attended her on account of diaphragmatic pleur-:isy. She has a loud mitral murmur at the apex, the bruit being propagated towards the axilla.

Has had four pregnancies - the little girl in this case, one premature labour at six months, and two labours at full time, both children still born, the last case born on New Year's Day being a "monster". It would be interesting to ascertain whether these premature pregnancies, in the absence of syphilis, were due to the infection of rheumatism acting on development, or due to the Mother's cardiac condi-:tion plus her rheumatic soil.

No history of rheumatism in any relatives. An Aunt on the Mother's side is an inmate of an asylum.

Previous History:-

When a child of eight months she was taken to Ceylon, her only illnesses there being an attack of dysentry at the age of eleven months, and a skin affection known as "Ceylon Boils". She was brought home to this country in June, 1915, and during the following winter was subject to tonsillitis and naso-pharyngeal catarrh. Up to August, 1916, there were recurring attacks of tonsillitis, and during that time I saw the patient on several occasions, and prescribed the salicylates and local treatment to the throat, the results being good. At this stage she was anaemic, thin, easily tired, and complained of headaches, a condition of affairs which I have not the least doubt was due to the infection of rheumatism/

rheumatism. Whooping cough set in in September, 1916. On account of enlarged tonsils, and the evidence of adenoids and with a view to improving her general health, it was decided to remove the adenoids and tonsils, and the operation was performed in November, 1916.

Type of Child:-

She is a good example of the nervous, fidgety girl. Fair hair, pale complexion, rather shy, and very tall for her age. One result of the tonsillar operation was to exaggerate the fidgetiness, and a fire which took place close to the Mother's house frightened her very considerably. That would be towards the end of 1916.

Present Illness:-

In January, 1917, I was called in to see the patient on account of a febrile illness. She had been complaining of pains all over the body, and two weeks previously she had had an attack of sickness and diarrhoea. She had also complained of persistent epigastric pain, and pains referred to legs and joints which her Mother took to be growing pains. Temperature was 102 F., pulse 120, and irregular. Five days later, choreic movements appeared affecting the right side, these involuntary movements becoming exaggerated on any examination, or on asking her to pick up odds and ends. There /

There was a systolic murmur at the apex, pulsation diffuse, area of cardiac dullness not increased. The course of her illness was uneventful and in six weeks she was quite herself, beyond slight signs of chorea.

After History:-

She had mild attacks of measles in April, 1917, and scarlet fever in September, 1917. I could always find the cardiac murmur present up to the time she developed scar-:letina, but it has entirely disappeared since. There was no recurrence of chorea on the return from the Fever Hos-:pital, her only complaint being pain in the right heel. On a further examination a few months ago, I found the heart normal, the little patient feeling very well, although always inclined to be on the go.

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Case 2. Davidina Barrett. Aged 13½ years.
Case of chorea, followed by erythema nodosum five years later.

Family History:-

Mother:- Is a bilious subject, and probably has gall stones. Is a nervous, highly strung woman, and on occasions complains of pains in her toes.

Father:-

Father:- Had rheumatism during the Boer War.

Brothers:- Have had the ordinary children's ailments.

Cousin:- (On Mother's side) died of rheumatism accom-:panied by erythema nodosum, and it is rather a coincidence that her illness took place at the same time as her cousin's.

Personal History:-

Had measles at two years of age, mumps at the age of five years. Never had scarlet fever. Was subject to nasal catarrh and obstruction, and sore throats previous to the onset of chorea. In 1912 she was bitten by a dog, and was very much alarmed over the occurrence. Chorea developed subsequently, the attack subsiding in a few weeks, her re-:covery being uneventful.

Type of Child:-

Has brown hair, pale complexion. Is an active, slender girl, nervous temperament, and has a nasty temper. Is rest-:less at night and speaks in her sleep.

Later History:-

Has been subject to severe headaches, is breathless on exertion, and complains of pains in arms and legs. Tonsils enlarged, has had several sore throats, including one smart attack of tonsillitis in May 1917. Towards the end of August of that year, she developed erythema nodosum. This took/

took the form of purple red elevated areas on the legs, and over the elbows, these areas being very tender on pressure. There was some degree of fever, anorexia, indefinite muscular pains, and anaemia. She was ill for the greater part of two months, the wasting and extreme pallor, being particularly noticeable, and pointing to a condition of infection.

Cardiac Condition:-

Although she complained of pains in the left breast at a point midway between the nipple and clavicle, I could not discover any direct evidence of cardiac mischief. No murmur, pulse rapid, cardiac sounds over-pronounced, first sound, if anything, sharper than usual, a condition of affairs pointing to slight dilatation. However, as one cannot be certain of the heart muscle in the rheumatic infection, I kept the patient in bed until the pulse became normal, and the heart sounds less pronounced. On examining the heart four months later, I found that organ normal. There has been no return of chorea.

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Case 3. Bruce Runciman. 24 years of age.
Case of chorea followed by hysteria later in life.

Family History:-

Father:- Had a severe nervous breakdown many years ago /

ago. His wife considers him a highly strung individual.

Mother:- No history of rheumatism. Has had neuritis. She is subject to bronchitis, and has a mitral murmur.

Sisters:- One sister is subject to tonsillitis. Has had enlarged tonsils and adenoids removed.

An Aunt of the Father's side has had rheumatism.

A cousin on the Father's side died of cardiac disease following rheumatism and chorea.

Personal History:-

Has had chicken-pox, scarlet fever, and German measles. Following the scarlet fever, tonsillar attacks developed, and between the age of eight and nine years, the tonsils were enlarged and adenoids present. The glands of the neck were enlarged previously, and required local treatment. Teeth defective from an early age.

Type of Child:-

Dark hair, fair complexion, brown eyes, and a nervous young woman. She was afraid of the dark as a child, and would not go to her room at night without her Mother. She was under-developed before the menses came on at the age of seventeen, but has come on more rapidly during the last six years.

Onset of Chorea:-

This illness came on at the age of nine. On returning home one day, some boys with a dog gave chase to her, and she arrived in a collapsed condition; the choreic movements setting in a few days /

days later. She had been of a nervous and excitable disposition previously. Towards the end of the convalescence, the enlarged tonsils and adenoids were removed. At this period she had been away from school for about two years. When twelve years of age she had a febrile illness accompanied by sore throat, severe gastric symptoms, and pains in the chest and fingers.

Later History:-

Has been subject to naso-pharyngeal catarrh and three years ago had an attack of pulmonary influenza, followed by an attack of hysteria, twelve months later. Since then she has been afraid to go to Church, and to ride in trains and tram cars.

Cardiac Condition:-

I examined her heart in January of this year, roughly six-:teen years after the attack of chorea. Heart beat quite regular first sound at the apex has a blurring quality, probably due to slight mitral mischief. Heart not enlarged. Is subject to fainting attacks, caused I would say by the anaemia present plus the neurotic element which is marked in this case.

The following points are noteworthy in connection with this series of three cases:-

1. In case 1 the family history of rheumatism is strong in the Mother, the neuropathic factor coming out in the Aunt on the Mother's side. The recurring attacks of tonsillitis previous to the onset of chorea in the child, is rather interesting.

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I have often noticed the frequency of a previous history of tonsillar mischief in chorea and rheumatism in childhood; while in adults I have repeatedly observed cases of acute rheumatism following tonsillitis. I have no doubt in my own mind of the strong relationship existing between tonsillitis and rheumatism.

Cases are recorded of rheumatism in one of its manifestations following directly on removal of enlarged tonsils. My own view is that in this case, chorea developed after the tonsillectomy, and the fire which took place a month later brought on a relapse.

2. In case 11 the occurrence of erythema nodosum five years after chorea is very interesting. Some writers consider that this condition is not always rheumatic, and may be an outcome of different infections; but in my own experience, I have always found this cutaneous manifestation to be rheumatic in origin. Galloway (6) sums up as follows:-

> "With a good deal of reason many observers have considered erythema nodosum to be definite evidence of true rheumatic fever, and probably on the whole it will be safer for the medical attendant to be guided by this opinion. The disease is known to occur with arthritis, to be associated with pericarditis and endocarditis, and in such cases, the evidence seems to be complete".

3. In Case 111 the rheumatic and neuropathic factors are fairly /

fairly evident. This girl presents the type which one associates with an unstable nervous system, develpping chorea before puberty, and later in life becoming hysterical and neurotic.

One can take all these cases as examples showing the tonsillar and naso-pharyngeal routes to be the chief avenues of infection in rheumatism.

C. Cardiac Manifestations in Chorea.

Of all the various rheumatic manifestations which may coexist with chorea, the most serious - and the chief danger, is implication of the heart, and with few exceptions fatality in chorea is attributable to cardiac disease. The severity of chorea is no criterion as to the risk of cardiac complications, the chance of grave heart disease being just as great in those lighter cases of chorea, as it is in the more severe. Irregularity of the heart is frequently present, and while this irregularity may be purely a functional condition, it is well to bear in mind that cardiac irregularity is often one of the earliest signs of endocarditis in cases of chorea. Cardiac dilatation is very common, and a murmur develops in the course of the majority of choreic cases. This murmur is usually a systolic murmur at the apex, and it is not always easy to say whether it is a sign of endocarditis or not, my own experience being that in many cases it disappears entirely on the reestablishment of good health. Even in the absence of murmur,

one cannot be sure that endocarditis does not exist, for the slight grade of change which may occur along the lines of contact of the valves may not be sufficient to produce audible change or apparent change in the circulation through the heart cavities, by any embarrassment of the organ, but subsequent chronic changes may occur which may greatly impair their usefulness. To decide this point it is necessary for the physician in charge of the case to examine the heart repeatedly, and not to forget that the choreic child is a child suffering from the infection of rheumatism, and to guard the heart by appropriate treatment, namely prolonged rest in bed.

While a double mitral murmur may be taken as fair evidence of rheumatic endocarditis, the writer would take the following murmur as an indication of an organic lesion of the mitral valve - a murmur heard loudest at the apex, with a rough quality and propagated to the axilla or angle of the scapula, and associated with some enlargement of the heart. However, one's eyes and fingers teach one more at times than the use of the stethoscope, and should the apex beat be in the normal position, and the area of cardiac dullness not increased vertically or to the right of the sternum, one could safely conclude that probably there was no serious valvular disease.

Apart from cardiac bruits due to endocarditis, others are frequently heard in the course of chorea, and may be ascribed to anaemia and debility. On auscultation a systolic murmur is heard at the base, and maybe at the apex, and is soft and blowing in quality. These murmurs never change in quality but

vary in locality, and disappear as a rule with convalescence. At the same time one is better to bear in mind that the choreic child is a case of rheumatic infection, that chorea tends to recur, that there is a constant possibility of heart infection, and accordingly the physician must do his utmost to guard the heart.

The under-noted series of seven cases fairly illustrate the effects of the rheumatic infection on the heart:-

Case 1. John Todd. Aged 9 years.

An example of rheumatism, chorea, and severe implication of the heart, ending fatally.

Family History:-

Father:- Enjoys good health. No history of rheumatism.

Mother:- Very anaemic woman. Had two attacks of articular rheumatism, two mishaps, and an attack of nephritis.

An Uncle on the Mother's side has been under my care on account of rheumatism of his knee joints.

No history of rheumatism of chorea in any other relatives.

Personal History:-

He had pertussis at three years of age, measles at the age of five years, and mumps at seven years of age. Never had scarlet fever. During the two years previous to /

to his present illness, he had been subject to sore throats and nasal catarrh. There was a definite history of fright - a boy had struck him at school, and he subsequently had complained of muscular pains and had become more nervous.

Type of Child:-

He had red hair, a fair complexion and had a well-nourished appearance. Was a bright and intelligent boy, inclined to be "starty" in his sleep, and had been complaining of growing pains for some time. Tonsils very much enlarged, evidence of adenoids, and a mouth breather.

Course of Illness:-

Towards the end of 1911, he was complaining of pains in his ankles and general malaise. The ankle joints rapidly became swollen and his wrists became involved soon afterwards. Temperature was raised, pulse rapid, there was a loud systolic murmur at the apex, and slight dyspnoea. The chorea manifested itself within a few weeks of the beginning of the boy's illness, and was of medium severity - the choreiform movements affecting his face and upper extremities. Under treatment the joints symptoms abated, the choreic symptoms subsiding later, and although convalescence was slow, he made a good recovery and was able to get about. Cardiac murmur still present.

Later History:-

Later History:-

In the following June and July he had a recurring attack of rheumatism and chorea accompanied with pleurisy of the right side. The mitral murmur still persisted. The boy picked up again, and was able to return to school. Unfortunately he had a very serious relapse about the end of December, which ended fatally. In this attack there was severe implication of the heart accompanied by return of the pleurisy on the right side with effusion, which had to be tapped. There was very great praecordial distress, a hacking cough, rapid and irregular pulse, the area of cardiac dullness being increased on account of dilatation. The mitral murmur was replaced by a double murmur, very rough in quality, and as there were so many adventitious sounds in the boy's chest, a diagnosis for or against pericarditis could not easily be made. The base of the left lung was dull to percussion, rales all over the chest, and towards the end there was general oedema, and slight enlargement of the liver. Dr Gulland saw the case with me during this attack, and tapped the pleuritic effusion to relieve the boy's breathing, but in spite of that minor operation, and cardiac stimulants, the boy grad-:ually sank.

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Case 2. Christina Jardine. Aged 11 years.
An example of chorea, rheumatism, andd irreparable damage to the heart.

Family History:-

Father. Died of lobar pneumonia. No history of rheumatism.

Mother:- Is a highly strung woman whose nerves are easily upset. Had convulsions in girlhood.

Aunt (On Father's side):- Subject to epilepsy.

Personal History:-

Had an attack of eclampsia at the age of seven months. In earlier girlhood had bronchitis, measles, mumps and chicken-pox.

Present Illness:-

Chorea developed between six and seven years of age and was of a mild type, no cause, direct or indirect, being held accountable for its occurrence. At the age of seven and a half years she had an attack of tonsillitis, the wrists and ankles becoming slightly swollen. This illness was ascribed to bathing in the sea. There was a cardiac murmur at the apex, but no difficulty in breathing. In 1916 there was a recurrence of the tonsillar trouble, and later in the year a recurrence of rheumatism affecting ankles and wrists. Cardiac murmur became more evident

and /

and the patient became more anaemic, and subject to very severe headaches.

Position in January, 1917.

She is a nervous child, easily frightened. Brown-black hair, pale complexion. Looks anaemic, and complains of severe headache. Appetite great, but very consti-:pated.

Examination of the Heart:-

There is clinical evidence of mitral stenosis and regurgitation. Cardiac dullness increased outwards - pulsation diffuse over praecordial region. A loud, sharp, rasping murmur can be heard at the apex - presystolic and systolic in time. Cardiac sounds loud in the pulmonary area. The child is not conscious of any signs pointing to her heart, but naturally is short of breath when she runs. I have lost trace of this little girl since Feb-:ruary, 1917.

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Case 3. Marjorie Robertson. Aged 12 years (May 1917)
Case of rheumatism and chorea, with severe implication of the heart.

Family History:-

Father:- Subject to rheumatism.

Mother:-/

Mother:- Admits having rheumatic(?) pains. Is a highly strung, nervous woman. Had three miscarriages. Two of her children died in infancy from eclampsia another child dying at the age of nine months from measles and broncho-pneumonia.

Personal History:-

Is the only member of the family living. Had measles, pertussis and bronchitis before the age of twelve months. History of scarletina absent. Had two attacks of tonsillitis during the early part of 1912, and later in this year had a severe attack of diphtheria.

Type of Child:-

She is a well-nourished girl, mid brown hair, fair complexion, and a very bright type; fond of school, and is making satisfactory progress.

History of Rheumatism:-

In January 1913 she developed articular rheumatism in her wrists. There was considerable pain referred to the back of the neck, and a loud murmur could be made out in the mitral area. This attack was ascribed to a chill brought on by walking to school in wet weather. After three weeks in bed, she was removed to the Sick Children's Hospital, Edinburgh, and was an in-patient for five weeks.

There was a recurring attack of rheumatism in June, 1915, this illness being preceded by a severe attack of tonsillitis /

tonsillitis which was believed to be diphtheritic, and three swabs were taken with negative results. The toes, ankles, and knees were affected, there was severe headache, and further implication of the heart. After two months home treatment, she was removed to the Edinburgh Royal Infirmary, and remained there until the following November.

History of Chorea:-

The early signs of chorea were noticed on her return from the Fever Hospital towards the end of 1912, when she was very excitable and fidgety. The choreic symptoms became more marked during the first attack of rheumatism, the choreiform movements being pretty general. After the second attack of rheumatism, she again exhibited symptoms of chorea in the form of dropping things, breaking dishes, and general fidgetiness.

Present Cardiac Condition:-

In January, 1918, I examined this girl's heart and made out the following:- there is a loud rasping murmur embracing the first sound and running up to the second sound, which is short, - more so towards the axilla. This murmur is loudest at a point within the nipple line in the fifth interspace. There is a systolic murmur in the pulmonary area and the second pulmonary sound is accentuated. Nothing in the aortic area. Signs of tricuspid leakage absent. Apex beat displaced slightly downwards /

downwards and outwards. No irregularity of the heart's action. My diagnosis in this case is mitral stenosis and regurgitation with good compensation.

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Case 4. Mary Sutherland. Aged 14 years.
An example of acute rheumatism followed by chorea.

Faimily History:-

Father:- No History of rheumatism.

Mother:- Is an anaemic woman, and suffers from rheumatism.

An Aunt on the Father's side has had chorea.

An Aunt on the Mother's side has had chorea.

An Uncle on the Mother's side died of rheumatism and cardiac disease.

Sister:- (Aged 10 years) Had chorea. Tonsils en-:larged, tonsillar lymphatic glands en-:larged, and a mouth breather. Nervous type of child, light brown hair, walks in her sleep, a fidgety, active girl. Looks anaemic and three months ago was "making faces" and complained of pains in her side.

When /

When I saw her in January of this year, she presented symptoms of chorea in a mild form - she was dropping things and a little "jumpy". Nothing in the heart. Her previous history only shows measles and chicken-pox.

Personal History:-

Pertussis at the age of two months. Measles at three years of age, and German measles at the age of ten years. No history of scarlatina or diphtheria.

Type of Child:-

She is of a fair type, red-haired, active, very nervous and impulsive. She has got very stout at puberty - menses coming on in July, 1917.

Present Illness:-

She developed an attack of acute rheumatism in October, 1915; this illness being traced to a thorough wetting. The ankle joints were first affected, the knee joints becoming involved later. She also complained of severe pains in the muscles of the legs. There was a loud cardiac bruit at the apex, systolic in time, and a rapid and irregular pulse. The chorea manifested itself two months after the onset of acute theumatism and was of mild to medium severity. No history of fright or emotional disturbance could be elicited. Previous to the onset of articular rheumatism the patient had been excitable and restless and inclined to be hysterical.

Cardiac Condition in 1917:-

On examining this girl's heart two years after the onset of acute rheumatism, I found the following:- There is no complaint of palpitation or praecordial pain, but mild exertion makes her short of breath. The cardiac murmur is still present but has a rougher quality; apex beat displaced, if anything, outwards. There is a bruit, systolic in t ime, in the pulmonary area, and an accentu-:ated second pulmonary sound. One would expect a mitral stenosis in this case.

This girl has of late complained of rheumatism in the knees, but considering the severe attacks of two years ago, she is in remarkably good health.

Enlarged tonsils and adenoids were removed in this case previous to the rheumatic attack, and apparently the operation was badly performed for there is a prominent amount of tonsil left behind.

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Case 5:- Jeanie Scott. Aged 7½ years.
Case of chorea, articular rheumatism and mitral insufficiency.

Family History:-

There is an indefinite history on rheumatism in Father and Mother, the latter being troubled with varicose veins and ulcers of the legs. Of the other five children - all

girls with fair hair and ruddy complexions - one has had scarlet fever, and another is subject to tonsillitis.

Personal History:-

Her only illness previous to the present one was an attack of measles in 1915.

Type of Child:-

Healthy, fair-haired and ruddy complexioned; was always a nervous child and got very excitable on occasions.

Present Illness:-

On going to school one day, she was very much alarmed by an infuriated cow charging down the street, and arrived home in great terror. Her Mother, noticing that she was fidgety and making faces subject to the fright, called me in ten days later. On examination I found that the patient was suffering from Sydenham's Chorea, the move-:ments principally affecting the left side. She was com-:plaining of pains in the ankles and wrists, all of which were swollen, and pains in the left breast. She looked feverish,her temperature was raised, and pulse rapid and irregular. No difficulty in breathing. There was a loud mitral murmur at the apex,pulsation very visible,and the cardiac dullness increased slightly to the left.Under treat-:ment she rapidly improved, the arthritic condition and fever abating in a fortnight, but the choreic symptoms taking longer to disappear. Although convalescence was slow, it /

it was continuaus, and latterly the little patient was able to get about. A warning was given to the Mother regarding the cardiac complication, and the effects of a recurring attack of rheumatism fully explained to her. She had returned to school and six months later had a recurr-:ing attack of rheumatism and chorea of a milder type than the first attack, and also of shorter duration. Similar treatment was adopted - Salicylate of Soda and Bicarbonate of Soda, of each 7½ to 10 grains in four to six hourly doses, and Liquor Arsenicalis as a tonic during convales-:cence, in does of two to six drops thrice daily. The mitral murmur was still present, but it showed no altera-:tion in type from the first attack. Later in the year she was examined by the School Medical Officer who gave her six months leave of absence, and during that time she was under strict supervision as regards exercise, clothing, chills, diet, and occasional rests.

Later History:-

The patient has been to school since April, 1917, and looks strong and well. Does not complain of headache, or sore throat and has a calmer nature. On examining the heart in December, 1917, roughly 21 months since the onset of this illness, I discovered that the mitral murmur still persisted. There was no rough quality about this bruit, it was soft and blowing, and, if anything, rather less /

less pronounced. She complained of no distress when playing about and there were neither signs of chorea, nor evidence of active rheumatism showing.

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Case 6.

Robert Brodie. Aged 13 years.
An example of recurring chorea, with other manifestations of rheumatism and probably mitral stenosis.

Family History:-

Father:- Had scarlet fever, nephritis, and rheumatism later in life.

Mother:- Had scarlet fever during childhood. Is an anxious, nervous type of woman.

Sisters:- Two have died of cerebro-spinal mening-:itis The other sister, Janet, now about seven years of age, had a febrile attack lasting three weeks which I think was rheumatic in origin. It started with an acute follicular tonsillitis, and there were severe headache, bilious turns, and marked exhaustion. Cardiac complications absent. She had a recurring attack of tonsillitis /

tonsillitis a year later. She is a nervous, excitable girl, easily frightened, and the type which one associates with chorea.

Personal History:-

Had measles at three years of age, mumps at the age of five years. Previous to the onset of chorea, which came on at the age of six years, he had been subject to head-aches and night terrors. He had also been feverish, stomach out of order, and complained of pains in the region of the neck. He had an attack of tonsillitis following the chorea, and when he was about nine years of age, developed scarlet fever.

Later History:-

During the early part of 1916, I attended this boy on account of a recurring attack of chorea. Later in the year the tonsils were becoming enlarged, the boy was subject to naso-pharyngeal catarrh, and as he was a mouth breather, it was decided to remove the tonsils and adenoids. About the end of December, he complained of pains in the knees, pain in the breast, and a little shortness of breath. There was a murmur, systolic in time in the mitral area, pulse rapid but no irregularity. Under treatment he rapidly improved and returned to school. Twelve months later I examined this boy's heart and found the /

the following:- There is no cardiac enlargement, heart beat regular, and the boy looks all right. When he stands the heart beats are pretty normal except for a rather sharp first sound. When he lies down there is a systolic in the tricuspid area, and one is suspicious of a presystolic mitral. I am keeping this boy under observation.

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Case 7. William Caskey. Now 18 years of age. Example of chorea, tonsillitis, articular rheumatism, and pericarditis.

Family History:-

Father:- Died of heart disease.

Mother:- Complains of rheumatism in her legs.

Sister:- The only other child, has had rheumatic iritis.

Personal History:-

Had measles and pertussis in childhood. The Mother considered him a very nervous, excitable boy. The chorea came on between six and seven years of age. No cause could be discovered for this attack. At the age of eight, he was going to school one morning, and was seized with a severe pain in the breast, and shortness of breath. A local practitioner diagnosed a weak and irregular heart. At the age of ten, he had a sharp bout of tonsillitis, the

enlarged tonsils being removed after recovery from this illness. The first signs of joint trouble were noticed at the age of twelve; the right ankle being chiefly affected. He had a recurring attack of arthritis later.

Later History:-

The chief complaint since coming under my care has been pain referred to the sternum, and shortness of breath. Rest in bed for a few days, aspirin in does of 10 grains, and a blister over the sternum quickly alleviates this condition. When I saw him first he had an accentuated first sound at the apex, and a systolic murmur, most audible inside the nipple line. At a later period there was a decided click at the apex. Dr Gulland of Edinburgh saw this lad in November, 1917, and he wrote to me on the 27th of that month as follows:-

> "This boy has always had a curious heart. The first time I saw him, I was doubtful whether the friction outside and below the left nipple was pleural or pericardial; the second time I had no doubt of its being pericardial, and he was sent to bed with a blister. To-day the heart is still slightly dilated, and there is a click at the apex, - the remains of his old pericarditis. I do not think there is anything active going on".

This patient was rejected by the Military Authorities in the Autumn of 1917, on account of his heart.

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In summarising these seven cases, the following points are worthy of mention:-

1. The two attacks of pleurisy, the second with effusion, in Case 1, are rather interesting. This is the only occasion that I have met with a case of pleurisy with effusion in a child suffering from the rheumatic infection, although I have seen this com-:plication more frequently in adult rheumatism.

Some authors declare that pleurisy is uncommon in rheumatism in childhood, but Poynton (7) points out that pleurisy is frequent and is almost always pre-:ent in the worst cases of rheumatic carditis in childhood, that it is usually a "dry" form, - as in this boy's first attack, but that there may be suf-:ficient effusion to demand tapping, - as in this boy's second attack. From the sero-fibrinous ex-:udation withdrawn in a "wet" pleurisy, Poynton has isolated his diplococcus in pure culture. The family history of rheumatism is pretty definite in this case.

2. The irrevocable damage to the heart by the infection of rheumatism is well shown in Cases 11 and 111. The former was a Parish patient, home surroundings not good, the dwelling house being in a poor locality. There was a difficulty in getting sufficient food and clothing, and as her Mother was compelled to go out and work, the little patient did not receive the rest and attention required. One always meets with the severer form of cardiac mischief in the poorer class of patient.

The neuro-pathic factor is marked in Case 11, while the rheumatic factor is evident in Case 111. The prognosis in these cases depends on the progressive nature of the lesion, and although a slight mitral stenosis is com-:patible with a long and useful life, the progressive and severe type in childhood gives a very grave outlook for the future. The best that one can hope for in these cases isthat by placing these young girls in good hygienic surroundings, and doing one's utmost to prevent recurring attacks of rheumatism, they may be able to lead useful lives.

3. The possibility of mitral stenosis is again brought forward in Cases 1V and V1, and the importance of pre-:ventitive treatment has been pointed out to the re-:spective Mothers. In case 1V the home surroundings are /

are bad, and it is also interesting from its associations with the sister's illness, and the marked occurrence of chorea in the family history. The recurring attacks of chorea in Case VI make one anxious of the cardiac condition from the point of view of prognosis. According to Poynton,(8) chorea as a rheumatic manifestation is often associated with the early stages of mitral stenosis, particularly when it is persistent and recurrent.

4. Regarding the results of the salicylates in Case V, one would naturally conclude that, if the drug cuts down joint pains, and lowers the temperature, it should also abort the choreic movements. I have no doubt in my own mind that it does good in this way, also that it diminishes the severity of the cerebral infection in the same way that it acts as a preventitive in cardiac infection, any presence of chorea after other signs of rheumatic infection have died down, being due to the previous active infection and its residual effects. I have always found arsenic in tonic doses to be of considerable service in this later stage.

5. Apart from my fatal case of rheumatism and chorea, Case VII is the only other example of the series exhibiting pericarditis. Osler(9) mentions the fact that pericarditis is an occasional complication of chorea, - usually /

usually in cases with well marked rheumatism. In 73 aut-:opsies which he collected, it was present in 19, in only 8 of these was arthritis present. The family history of rheumatism is strong in this case. The difficulty is to place this lad in some light employment, such as will not embarrass his heart.

D. The Antagonism between the Rheumatic and Tubercular Infections, and the Occurrence of Tuberculosis in the Family Histories of Cases of Chorea.

The antagonism between rheumatism and tuberculosis is scarcely mentioned in the literature. Miller, (10) in mention-:ing the occurrence of tuberculosis in the family histor-:ies of rheumatic children, points out that rheumatism and tuberculosis are very seldom found active at the same time in the same child; and that there is some evidence to show that the one active infection tends to protect against the other.

This antagonism has also been noticed by Duckworth. (11) In his view, the tubercle bacilli will not flourish in a rheumatic soil, and should they effect a lodgement in the body of a rheumatic person, their progress is arrested, and the lesion tends to indurate by fibrosis.

The subject is also discussed by Williams (12) in a paper on "Notes on Rheumatism in Children". With a

considerable experience in the examination of school children, and thousands of re cords to suuport her views, she arrives at the conclusion that the two diseases are antagonistic. In her opinion, predisposition to rheumatism is strongly hereditary, and further that rheumatism in the parent appears to protect the child in a definite degree from pulmonary tuberculosis.

My own experience also tells me that the two in-:fections are antagonistic. I cannot recollect having seen a tubercular subject developing rheumatism, either in its acute or subacute forms, nor have I ever seen a case of undoubted rheumatism develop tuberculosis, either pulmonary or other type. Certainly one gets an arthritis in tuberculosis, but surely one can assume that medical opinion of to-day would not ascribe that joint lesion to the micrococcus rheumaticus. Another interesting point is the occurrence of tuberculosis and rheumatism in mem-:bers of the same family That three members of a family, (a family which I have attended for many years), should develop pulmonary tuberculosis, and other three members of the same family develop sub-acute rheumatism shows the hereditary predisposition to both infections, and whereas the strumous cases take on the tubercle bacilli, the rheumatic individuals are antagonistic to the tubercular infection, but are easily invaded by the mirco-organism of /

of rheumatism.

Referring again to the family above-mentioned, a son died of pulmonary tuberculosis; a second son is in a sanatorium on account of a similar illness, and a third son has recently been discharged from the Army on account of "tubercular pleurisy and fibroid lung". Taking the rheumatic cases, a son has died of heart disease following rheumatism; a second son has been subject to subacute rheumatism, while a third son of the family has occasionally attacks of rheumatism. So far as my investigations go, the latter three cases had or have never complained of chest troubles.

Regarding the occurrence of tuberculosis in the family histories of cases of chorea. Middlemiss (13), in an analysis of 16 cases of chorea and motor tic, gets a definite history of tuberculosis in six members of his series. Im two of them, the patients were cousins, and the occurrence of tuberculosis, chorea, and amentia in different members of the family is strikingly illustrated, a sister of one of the chorea cases having pulmonary tuberculosis, and a mutual cousin being feeble-minded.

In my own series of 16 cases associated with rheumatism, three members of the series show a family history of tuberculosis, and in two of those there is also

a family history of rheumatism.

Taking the two series of 32 cases one gets a family history of tuberculosis in 28%, a figure which may be too high in view of the material dealt with. Accordingly one cannot be too dogmatic on the point.

Appended is a series of three cases of chorea showing a family history of tuberculosis:-

Case 1. Cathie McGregor. Aged 12½ years.
Had an attack of chorea six years ago.

Family History:-

Father:- Died of epithelioma of face following lupus.

Mother:- Is a highly strung, nervous woman, very industrious. Has suffered from sciatica and articular rheumatism. She also has a marked mitral murmur with cardiac irregularity, and requires a rest in bed occasionally.

Sister:- Had a very severe attack of articular rheumatism in 1909, her illness lasting for three months.

Uncle:- (On Mother's side) Died from pulmonary turberculosis.

Personal History:-

Convulsions during dentition. Pertussis at the age of twelve months. Never had scarlet fever. Before the attack of chorea she was subject to night terrors, and had been a nervous excitable child. I could not find an exciting cause which one would /

would associate with the onset of chorea; but at the age of three and a half years, before she came under my observation , she had been bitten by a little dog, and was much terrified in consequence. About this time she was afraid of chrysanthemums of the bronze and terra-cotta tints, and a piece of brown paper would also frighten her. The attack of chorea was ushered in with general pains, a cardiac bruit, systolic in time, appearing at the apex, and after two months illness she became all right again.

After History:-

Had measles and chicken-pox two years after the attack of chorea. She had been subject to sore throats and growing pains, and in 1915 had a severeattack of tonsillitis, when she com-:plained of pains all over, and severe headache. The tonsils were afterwards removed at a Hospital, but on examination one finds a fair amount of tonsil on both sides.

Type of Child:-

She is a shy backward girl, dark brown hair, and has a dry scaly skin. She has been stammering a great deal during the past two years.

Cardiac Condition:-

I examined this girl's heart at the beginning of this year. Cardiac bruit had disappeared. Pulse regular. First sound sharp at apex, and it takes on a blurring quality at the left edge of the sternum at a point lower than the pulmonary area. No distress on exercise.

Case 2. Josephine Gibson. Aged 18 years.

Had recurring attacks of chorea and articular rheu-
:matism.

Family History:-

Father:- Died of Pulmonary Tuberculosis in 1909.

Mother:- Subject to tonsillitis, and had an attack of pleurodynia some years ago.

Sisters:- One has recurring attacks of tonsillitis, and another is subject to bronchitis - tubercle bacilli absent in sputum.

Cousin:- (On the Mother's side) Had an attack of chorea.

Personal History:-

As a child she had pertussis, measles and bronshitis. She was a restless, fidgety girl, and was subject to attacks of tonsillitis.

Onset of Chorea:-

She was knocked down by a motor car in June, 1910, and developed chorea within a few weeks. Articular rheumatism of a sub-acute type set in two months later. Temperature remained above normal for fourteen days, and there was severe headache and general pains. There was also a loud systolic murmur at the apex. This attack was ascribed to a chill following a bathe in the sea.

After History:-

During 1911, she had another attack of rheumatism, the knee

and ankles being affected. Cardiac murmur was still evident, and at this period she was an in-patient of the Royal Infirmary, Edinburgh, for six weeks. Another attack followed in 1912, the mitral murmur being still present and patient was short of breath. She was troubled at this time with rheumatic iritis, and spent a few weeks in the Royal Infirmary.

During these years she had recurring attacks of chorea, and in 1915 scarlet fever followed without any joint involvement. There was no return of chorea when the patient left the Fever Hospital. A mild attack of rheumatism, associated with headache and pleurodynia, followed a year later.

Type of Child:-

She is a tall, good-looking girl, fair hair, slightly olive complexion, and shy in her manner.

Cardiac Condition:-

On examnining this girl's heart in January, 1917, I found a change in the quality of the murmur which was louder and sharper in tone. She complained of shortness of breath on exertion, and had a feeling of discomfort below the left breast. Twelve months later I again examined her, and she presented no symptoms pointing to her heart, no dyspnoea, no discomfort on exertion. The first cardiac sound inside the apex had a suspicions presystolic quality.

Case 3. John Readhead. Aged 14½ years.
Had recurring attacks of chorea followed by articular rheumatism.

Family History:-

Father:- Died of carbuncle.

Mother:- Has suffered from rheumatic(?) pains in shoulder and knees As she is very anaemic these pains are probably due to neuritis. She is subject to diarrhoea of a chronic type, which may be tubercular, or due to a grave form of anaemia.

Sisters:- One has suffered from tuberculosis of the bones of the right foot, and a rib of the right side; the other had her glands in the neck removed on account of tuberculosis.

Aunts. (On the Mother's side) Two have died of pulmonary tuberculosis.

Uncle:- (On Father's side). Died of pulmonary tuberculosis.

Personal History:-

Suffered from a "delicate stomach" when he was a child, measles at the age of two years, and chicken-pox at three years of age. Never had scarlet fever. He has negro and Spanish blood in his veins on the Father's side. His grandfather married a lady who was of Spanish and West Indian descent, - his great grandfather, who was a mulatto, marrying a native

West Indian woman. His Mother is a Scotch woman.

History of Chorea:-

When he was four years of age, he had his first attack, the exciting cause being ascribed to a dog attacking him. A second attack followed when he was about six years of age, being more severe in degree than the previous attack. He had a milder attack when he was about eight years of age, and I attended him for a similar attack three years ago.

History of Rheumatism:-

His first attack was towards the end of 1915, a second attack following in the Spring of 1916. These attacks were of a mild nature, the knee joints being principally affected accom-:panied by general aching in the muscles of the legs. Nat-:urally he has made very little progress at school, being very dull and giving no attention to his lessons. Of late he has been inclined to be impulsive, guilty of outbursts of temper, and is a source of great worry to his Mother.

Type of Child:-

He is of a dark, swarthy complexion, and in his younger days was an extremely nervous, fidgety boy, subject to night terrors and somnambulism. His tonsils are slightly enlarged, and he is a mouth breather.

Cardiac Condition:-

I have been unable to discover any lesion of the heart, unless the accentuated first cardiac sound at the apex, points to /

to simple dilatation. My own view is that this accentuation is nervous in origin. He has never complained of pain over the praecordial region, nor any sense of discomfort on exer-:tion.

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The following points are noteworthy in connection with these three cases:-

1. They all present tuberculosis in their family histories the tubercular strain being most definite in Case 111.

2. The rheumatic factor is evident in Cases 1 and 11, coming in each instance from the maternal side, but is absent in Case 111 unless one assumes that the indefinite pains in the Mother are due to rheumatism.

3. The neuropathic factor is present in Cases 1 and 11, expressing itself in the highly strung, nervous Mother in the former, and in the cousin who exhibited chorea in the latter. This factor is absent in Case 111.

4. The peculiar sensitiveness to colour is brought out in Case 1. She showed other signs of timidity and it is inter-:esting to note, latterly became a stammerer. Guthrie (14) in mentioning the case of a little girl who was very frightened for certain colours, expresses the view that in certain abnormal mental conditions, a primitive and instinctive/

instinctive dislike and fear of these colours is aroused.

5. The mental dullness in Case lll is marked as is also the change in the boy's disposition. Few cases of chorea of a severe type escape mental disturbances altogether, but in the majority it merely consists of mental dullness. Guthrie (15) points out that in rare cases, mental symptoms may become progressive, but that, as a rule, signs of feeble-mindedness have been previously existent. One has that suspicion in this case.

6. Again referring to Case lll, it is noteworthy that this boy is the only member of the family to escape the tubercular infection. As the maternal and paternal his-:tories are indefinite, it is difficult to say where the rheumatic predisposition arises - tuberculosis being evident on the Mother's and Father's side; but there can be no doubt of his resistance to the infection of tuber-:culosis, and my own view, as already mentioned, is that the two infections are antagonistic.

REFERENCES.

1. Batten: Lancet November 5th. 1898.

2. Langmead: British Medical Journal, June 14th, 1913. P.1262.

3. Poynton and Paine: Lancet. September 22nd, 1900. P. 861.

4. Branson: British Medical Journal. November 23rd, 1912. P. 1429.

5. Archibald: The Universal Medical Record. April 1915. P.355. (Quoted from St. Paul's Medical Journal. XVI. P. 610).

6. Galloway: Practitioner. January 1912. P.72.

7. Poynton and Paine: Researches on Rheumatism, 1913. P.406.

8. Poynton: Practitioner. March 1912. P.399.

9. Osler: Principles and Practice of Medicine, 8th Edition, 1916. P.760 and P.1071.

10. Miller: The Medical Diseases of Children, 1911, P. 145.

11. Duckworth: Practitioner. January, 1912. P.5.

12. Williams: Lancet. June 19th 1915. P.1286.

13. Middlemiss: Edinburgh Medical Journal, November 1915. P,341.

14. Guthrie: Functional Diseases of Children, 1909. P.31.

15. Guthrie: Functional Diseases of Children. 1909. P. 229.

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