salvarsan was given, and a fortnight subsequently the Wassermann test was negative. It has not since been tested. During the last few days gastric pain of the nature of gastric crises has been complained of.

While admitting that it is practically impossible to exclude with certainty the possibility of acquired syphilis in any given case, I feel that it is almost certainly excludable in this case. The presence of a full positive Wassermann test is of extreme interest. Very few patients who have suffered from congenital syphilis have had their blood subjected to this test in adult life, but as most infants born of syphilitic parents give a positive reaction in early life it is, I think, fully conceivable that congenital syphilis, mild, possibly latent, and certainly untreated, should give rise to a positive Wassermann test in adult life, and at the same time produce undoubted tabes dorsalis. Should, however, it be judged by others that the record of the case is in itself conclusive in favour of acquired syphilis, it is, I think, none the less of interest from its early development and from the sex of the patient.

ART. IX.—*Rheumatism in Children.** By J. H. CRANE, B.A., M.D., B.Ch., B.A.O. Univ. Dubl., Rossall School, Fleetwood, Lancashire.

SINCE starting practice I have had the care of several schools, consisting both of boys and girls, as well as hospital experience, and so have had ample opportunity of studying the various phases of rheumatism in children. There are few complaints more common and few more serious, and, in my opinion, it is the cause of a great majority of the heart troubles one meets with in adult life, owing to neglect in childhood. It is a disease about which we, as doctors, cannot be too careful and in relation to which our responsibility is very great, considering the serious harm that may be done to the heart, if overlooked

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or neglected. The ordinary conception of acute rheumatism as characterised by swollen, tender, and painful joints, profuse sour-smelling perspiration, and high pyrexia, is drawn from the observation of rheumatism as we see it in adults. In them arthritis is one of the most constant and prominent of the morbid phenomena. This description, however, does not represent it as seen in children; at this period of life it has a much wider pathological range, and its phenomena are more various and comprehensive. In the rheumatism of children arthritis is at its minimum, whilst pericarditis, endocarditis, chorea and subcutaneous nodules are at their maximum. In childhood also the tendency is for the various phases to arise independently and apart from each other, so that the series of rheumatic events is often spread over months, years, or even a whole childhood.

INCIDENCE OF SEX.

In adult life, rheumatism falls pretty equally on males and females, perhaps a little more heavily on the former, but in children, however, the case is just the reverse, girls suffering most.

HEREDITY.

There are, in my opinion, few diseases in which heredity plays a more definite part. One will constantly find on inquiry into the family history of children who are suffering from rheumatism, that other members of the same family have been similarly affected. Different authors point out certain typical facies to be made out in children predisposed to rheumatism, but those described by Hutcheson best suit the majority of cases that have come under my notice—viz., “dark complexion, dark hair, dark brown eyes, long dark eyelashes, a very clear delicate skin, very good complexion, and they have often well formed massive teeth and particularly large square upper incisors.”

PATHOLOGY.

I think it is now pretty generally accepted that rheumatism is an acute specific disease, caused by a specific micro-organism, usually spoken of as the "Micrococcus rheumaticus." This organism is Gram-staining, and is easily obtained from the substance of inflamed synovial membrane. A part where there is special congestion should be chosen. It can also be cultivated from the blood. By what route this organism enters the body is still *sub judice*, but the balance of opinion seems to lean towards the throat as the chief route, and in the majority of cases I have seen, the throat was in an unhealthy condition. Having gained access to the body, it tends to attack certain tissues in children more than others, and in particular fibrous tissues and membranes, such as the valves of the heart, tendons and sheaths of muscles, whereas the joints appear to escape altogether, or are only slightly affected. In this way the disease in children differs very widely from that in adults. Poynton, Pain, Hertz and others have quite recently inoculated rabbits with the Micrococcus rheumaticus obtained from human beings, and the following is a summary of the results they obtained :—In the rabbits thus inoculated it set up carditis, arthritis and other lesions, and histological examination revealed that these included all the phenomena found in the rheumatic lesions of human beings.

AGE INCIDENCE.

I think I may say that rheumatism is practically never seen in children under two or three years of age, and from nine to twelve seems to be the most susceptible time.

SYMPTOMS.

I shall group the different symptoms as follows, on the understanding that perhaps only one or more may be present at one time, and shall then discuss each symptom

separately :—(1) Pericarditis, endocarditis, myocarditis ; (2) muscular and fascial pains ; (3) rheumatic nodules ; (4) erythematous eruptions ; (5) tonsillitis ; (6) joint affections ; (7) chorea ; (8) pleurisy ; (9) abdominal pains ; (10) headache ; (11) nervous temperament ; (12) wasting ; (13) anæmia.

The heart symptoms are the most important, and it is these that make the disease in children such a serious one. Unfortunately, too, about 70 per cent. of rheumatic children manifest such symptoms in a greater or less degree. Of these endocarditis is the most common, and is often the first to make its appearance. In the majority of cases, however, we find the endocarditis associated with peri- or myocarditis, and often also we find the three present at the same time. This condition is spoken of as carditis. The mitral valve is the region most often attacked. The edges of the affected valves become swollen, thickened and much vascularised. Granulations form on it, which are soft and friable, and, for the most part, found a little way from the free edges of the valve curtain. From these, emboli may be swept off into the circulation. As a result of these inflammatory changes, we get valvular lesions produced, either stenotic or regurgitant, which are made evident to us by murmurs. I have seldom seen a case of rheumatic pericarditis in which there was not also endocarditis, and this has been impressed on me by the findings of *post-mortem* examinations. The onset of pericarditis is usually insidious, and is sometimes marked by vomiting. There is seldom much effusion, and this is not purulent. It is usually subacute in character and shows a great tendency to recur. The clinical picture of rheumatic pericarditis can be easily summed up. A child who has already had some other rheumatic complaint begins to vomit, has shortness of breath, with pain over the region of the heart. On examination we find three very typical symptoms—friction, dilatation, a rapid and rather tumultuous beat. In addition to these there are two other symptoms very

suggestive—viz., pallor of the face and great restlessness. Vomiting is an important and early symptom, and when one gets a rheumatic patient suddenly attacked by vomiting, one should always examine most carefully for pericarditis. I think very often too little attention is paid to the area of cardiac dulness, and percussion may give us some very useful information, as dilatation occurs very rapidly, and if careful note is taken from day to day the changes of cardiac dulness are often very striking. This rapid extension of cardiac dulness is very strongly in favour of pericarditis. With pericarditis, and also with endocarditis, there is always some degree of inflammation of the myocardium, or rather perhaps of the intermuscular connective tissue, extending to the muscle fibres themselves. Small-celled infiltration between the muscle fibres is found, the fibres themselves being swollen, blurred in outline, with numerous nuclei, and later on a development of fibrous patches. In mild affections these changes lead only to a slight temporary dilatation with increase of dulness to the left, some impurity of the first sound at the apex, and accentuation of the pulmonary second sound. If, however, the affection is more severe, serious and permanent dilatation results.

The muscular and fascial pains are worthy of special notice, not because they of themselves are important, but because they very often give timely warning of more serious symptoms that are usually associated with them—viz., heart troubles. A mother very often brings her child with the complaint that he is feeling “out of sorts” and has been troubled with “growing pains.” These “growing pains” are simply manifestations of muscular and fascial rheumatism, and many a diseased heart in adults is the outcome of these “growing pains” having been neglected in childhood. The presence of these pains makes it necessary for us to keep a strict watch on the heart, as they may be associated with, or followed by, very serious cardiac disease.

Subcutaneous nodules are another special feature of this

malady in children. Whilst extremely common in the young they are very rare in adults. They may appear in connection with any of the other symptoms, but are mostly associated with heart troubles, and so are of serious import. They tend to occur under the skin where bones come close to the surface—viz., over the spines of the vertebræ, along the shins, over the patella and olecranon, along the back of the forearm and under the scalp. They are also found along tendons of muscles. They vary in size from that of a hemp seed to that of a pea or small bean. They are usually more easily felt than seen. When examined microscopically they are found to consist of a nuclear growth of fibrin in all stages of transformation into fibrous tissue; a network of fine vessels can be seen passing on to the surface of the deposit, but it has no capsule. They are analogous to the deposits found on the valves of the heart, and their association almost always with endocarditis is strong evidence that they are due to the same cause—the rheumatic irritant—and so are of the greatest importance as “danger signals,” showing that there is progressive trouble going on in the heart.

Erythematous eruptions are very common in children's rheumatism; not so in adults. The most common are erythema circinatum, urticaria, peliosis rheumatica, and erythema nodosum. Erythema nodosum usually occurs over the shins. The lesions consist of purplish red, tender swellings, often of the size and shape of a split almond. They go through the same colour changes as an ordinary contusion. They appear in crops, each crop lasting a few weeks.

Tonsillitis and inflammation of the naso-pharynx occur so frequently just previous to, or during an attack of rheumatism, that it is very difficult to escape the conclusion that they bear some direct relation to it, and of late years great stress has been laid on the possibility of the naso-pharynx and tonsils being the chief sources of infection. In the majority of cases that have come under

my notice the throat has been in a bad condition, the tonsils being large, inflamed and full of pits, and the nasopharynx in a congested condition. These parts, in my opinion, form an excellent breeding ground for the *Micrococcus rheumaticus*.

I have already mentioned joint pains. They are often so slight as to be altogether overlooked. There is less swelling and tenderness, less pain and fever, than in adults. It is a very rare occurrence to see a child lying motionless in bed, bound hand and foot, and fearing to move on account of joint pains. There is usually merely a little pain, stiffness and tenderness, with little or no perceptible swelling. The most common complaint that I have seen is stiffness and tenderness at the back of the knee and in the hamstring tendons, the patients walking on their toes, with the knee slightly bent. This slight arthritis is misleading, and has often led to diagnosis of scurvy, infantile palsy or syphilitic disease, but the early recognition of the true cause is most essential, as an insidious endo- or pericarditis may be at work concurrently with it. Scurvy may be distinguished by the periosteal position of the swelling and also that it is invariably confined to the shafts of long bones. In addition, spongy gums, subcutaneous hæmorrhages, hæmaturia or albuminuria may also be present. One can always try the effect of anti-scorbutics. In infantile palsy there is extreme flaccidity of the muscles, the affected limbs are limp and hang down loosely, whilst the tenderness is more diffuse. At a later period the tendon reflex and faradic contractility disappear. In syphilitic disease there is swelling and tenderness from the periostitis present, and one will nearly always find other evidence of congenital syphilis and perhaps elicit a syphilitic history. The inflammation of joints then being so slight in children one does not get the profuse acid perspirations or the pyrexia seen in the case of adults.

I have always regarded chorea as a manifestation of rheumatism in a large proportion of cases, and some

writers go so far as to say that every case of chorea is rheumatic in origin. It is, indeed, well to regard every choreic patient as a probable rheumatic, and be ready to treat them as such, as chorea is often the first of the rheumatic symptoms.

Pleurisy is not so uncommon a symptom as some practitioners believe. It is most usually found on the left side, and seems to be of common occurrence where severe carditis is present, as *post-mortem* examinations on these cases show. It is usually of a dry nature, and if any effusion is present it is generally very slight. Goldschreder records having isolated a diplo-streptococcus from a pleural effusion.

A fairly common complaint in rheumatic children is pain in the stomach, and especially so in those who have complained of slight pain in joints or limbs. It is generally situated in the epigastrium around the umbilicus. What causes the pain I cannot say. It may be due to a catarrh of the stomach, dependent in some way on the rheumatic poison, or it may be in the abdominal muscles. I remember on two different occasions a case being sent into hospital as acute appendicitis for immediate operation. Operation was postponed and the patient put on large doses of salicylate of sodium. Within forty-eight hours all pain had ceased, the patient felt quite well, and some days afterwards left hospital without operation. Whether the symptoms were due to rheumatism which cleared up with the salicylates, or whether it really was appendicitis which disappeared on proper dieting, I cannot say, but in such cases it is well to have rheumatism in our minds. I am told that such cases as these are quite common amongst young soldiers when they first enlist.

Headache is another trouble in rheumatic children and also in the families of rheumatic parents. At present in this school I have several rheumatic boys, who constantly come to me with bad headaches. It may be due to the anæmia so common in these cases, or to nervous temperament which we also find, or it may be caused directly

by the rheumatic poison. It is a very common complaint in chorea.

Another symptom very noticeable in rheumatic children is the nervous temperament they exhibit, such children being subject to many minor nervous disorders, such as night terrors, habit spasm, over-sensitiveness, nervous diarrhœa, and in some cases enuresis. Wasting is another common symptom, and it is often the only complaint for which some children are brought to the doctor, but on questioning one will very often get a vague history of growing pains.

It is astonishing how susceptible rheumatic children are to secondary anæmia. The red blood corpuscles of children are more readily destroyed than those of adults, and are only very slowly replaced, the red marrow not being capable of meeting these special losses. The consequence is a fall in the hæmoglobin percentage and in the number of red corpuscles. These changes are frequently seen in rheumatic children, and are of serious import. I have made it a routine in practice to put my rheumatic children on a tonic containing iron during the convalescent stage.

PROGNOSIS.

This disease in children must always be looked upon as a very serious complaint on account of the great tendency to heart trouble. This danger is aggravated on account of the first heart symptoms being likely to be overlooked or neglected, and also by the fact that at this period recurrent attacks are the rule, so that the heart may be fatally damaged in spite of every care. In all cases we must be careful to impress on the parents the seriousness of the malady and the importance of prolonged rest in bed in order, if possible, to save the heart. The first attack does not generally damage the heart permanently, and in many cases where a murmur is present, by prolonged rest and good treatment, it may disappear and the heart become healthy again so far as we are able to judge.

TREATMENT.

Our first duty is to try to prevent the disease developing in those who are by heredity predisposed to it. Such children must be well and warmly clothed, and must not be allowed to have wet feet. Many people forbid bathing of any kind, but my experience here is that sea-water baths, which have been slightly heated, do not do any harm during the summer months. The throat and nose must be carefully examined, and if in an unhealthy condition, must be attended to at once. On the first appearance of the so-called "growing pains" the child must be put to bed for a prolonged rest, it may be weeks or months, so as to save the heart if possible, kept warm, and put on anti-rheumatic remedies. The only drugs that seem to have much effect are salicylate of sodium, aspirin, salicin and potassium iodide. There is a diversity of opinion as to the usefulness of salicylates, some people believing that they are of use only in arthritic cases, and are useless or perhaps harmful in cardiac cases on account of their depressing effect ; but, in my opinion salicylate of sodium is our most useful drug in all cases of rheumatism. I cannot see that aspirin and salicin have anything to recommend them in preference to it. It is well to combine the salicylate with double the quantity of bicarbonate of sodium to prevent any toxic symptoms. I generally give 10 grains of salicylate of sodium with 20 grains of bicarbonate of sodium every three or four hours to a child of ten, and gradually diminish the frequency and quantity of the doses as the symptoms abate, watching carefully, of course, its effect. They should not be stopped as soon as pains cease or when the temperature becomes normal, but should be continued for about a fortnight after the pains have subsided, but in smaller doses. Potassium iodide in 2 to 5 grain doses is also useful in joint affections. Some practitioners give quinine combined with an alkali, such as citrate of sodium or potassium. There is no need for local applications for the joint or limb pains, except to wrap

the part up in cotton wool, and if the bedclothes press on it, use a cradle. The child should be kept in bed for at least three weeks after all pain has ceased, the heart being examined carefully every day. If there are any signs of pericarditis, leeches, ice over the præcordium, small blisters or iodine, are the remedies usually resorted to. If there is slight dilatation, but no symptoms of failing compensation, give small doses of *nux vomica*, but in cases of severe dilatation, where the heart is becoming slightly irregular, give either *tr. strophanthus* or *digitalis* combined with *nux vomica*, watching the effect carefully. I think it is well to avoid, as far as possible, hypodermic medication in cases of children. If there is much pain or discomfort with sleeplessness, a little Dover's powder or *nepenthe* may be given, but it must always be used with extreme caution. During convalescence give iron, cod liver oil and other tonics. Great care must also be exercised after the attack is over, as recurrences are frequent. On the first sign of any muscular or joint pain, sore throat or rise of temperature, the patient must go to bed again at once. A change to a dry climate—inland in preference to the seaside—should be recommended.

LITERARY INTELLIGENCE.

MESSRS. J. & A. CHURCHILL are about to publish an important new book entitled "The Difficulties and Emergencies of Obstetric Practice," by Mr. Comyns Berkeley and Mr. Victor Bonney, Obstetric and Gynæcological Surgeons to the Middlesex Hospital. The illustrations are all original and very numerous. They are, moreover, the design of an expert artist, who is himself a medical man. The same publishers have just ready the sixth edition of "A Short Practice of Midwifery," by Dr. Jellet, Master of the Rotunda Hospital, Dublin. The new edition is to be issued with a larger page, and has been revised throughout, and contains many new illustrations. The popularity of the book is evident by the fact that 20,000 copies have been printed.