AN ADDRESS ON DISEASE OF THE HEART IN CHILDREN.

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AFTER briefly expressing his thanks to the Society for having honoured him with the invitation to address them, Dr. Bruce proceeded:

MR. PRESIDENT AND GENTLEMEN,—Disease of the heart as it occurs in the child possesses so many features of special interest that we feel justified in discussing it apart from—indeed as distinguished from—disease of the heart in the adult. The very anatomy and physiology of the circulation are peculiar in young subjects. The causes of disease incident on the puerile heart are also in many important respects different from those which lead to cardiac lesions in persons who have reached the middle and later periods of life, when we have to reckon with physical and mental strain, the various cardiac poisons—alcohol, tobacco, tea, lead, and uric acid especially, with Bright's disease, syphilis, and the several degenerations. The symptoms and physical signs of heart disease are equally modified in many important particulars by the patient's age. Lastly, it is only by a thorough knowledge of these many peculiarities of the circulation and its diseases in juveniles and adolescents, that we can accomplish a diagnosis with accuracy, or offer a prognosis or plan treatment with hope of success.

Now if I were preparing a systematic treatise on disease of the heart in children it would be proper for me to begin with an examination of these differences and peculiarities; but for my present purpose I have felt that it will be more profitable if the brief and necessarily imperfect sketch I offer you is drafted on what I may call natural lines. I propose to take up the history of a child with acquired disease of the heart from the moment when the endocardium and pericardium are first threatened with inflammation, and trace it onwards to that advanced stage when the child is in grave peril from cardiac dropsy.

The various periods of this eventful history which can be profitably recognised and discussed are as follows:

I. *Acute Inflammation of the Heart*, endo-, peri-, and myocarditis, when the disease arises, threatens life directly and through its complications, demands intelligent treatment, and progresses, we will suppose, to an immediately favourable termination, but leaves behind some chronic lesion.

II. *The Establishment and Maintenance of Compensation*, the period during which the child becomes and remains practically free from symptoms of organic disease.

III. *The Rupture of Compensation and Failure of the Heart*, when the patient suffers from cardiac symptoms, and is in a condition of distress or actual danger.

You will observe that this programme does not include either congenital malformation of the heart, ulcerative endocarditis, or functional disturbances of the circulation. Each of these subjects would of itself be sufficient to occupy the whole of the time at my disposal, and I am compelled to devote my remarks entirely to acquired disease of the heart which passes into a chronic form.

I. ACUTE INFLAMMATION OF THE HEART.

Let me begin, then, with acute inflammation of the heart in the child, and discuss with some appearance of systematic arrangement the etiology, symptoms, signs, progress, prognosis, and treatment of endo-, peri-, and myocarditis as far as they are peculiar to infancy and childhood.

First, as to the *causation* of these diseases. What are the diseases with which they are etiologically associated in the child? Or, conversely (which is far more important), What are the diseases in which acute cardiac inflammation is so much to be feared in the child that when we meet with these our attention must be specially directed to the heart?

Of these, acute rheumatism is, of course, by far the most com-

mon; but it by no means always makes its appearance in a well-declared form. This is the first point on which I desire to dwell to-day. There can be little doubt that the higher relative involvement of the heart in young subjects is due in some measure to the fact that rheumatism is frequently "latent" in the child, and that consequently the most important of all measures for the protection of the endocardium—namely, early treatment—is not always carried out. I would insist on the extreme importance of keeping our minds alive to the possible existence of acute inflammation of the heart not only in cases of well-developed articular rheumatism, but in every instance of pyrexia in young subjects with obscure pains in the limbs—"growing pains," as they are often called; of making careful search for tenderness in the joints—swelling and redness being often impossible to discover in the limbs of a chubby child; and of using the stethoscope repeatedly. And, further, I would insist on the necessity of never failing to think of rheumatism in certain pyrexial diseases in children when arthralgia is entirely absent, such as sore throat, pleurisy, pneumonia, and erythema. We have all seen instances of this kind, where we have discovered, perhaps when it was already too late to prevent endocarditis, that we had missed for days, or even weeks, the true nature of the complaint. In other instances pericarditis is the first event of all. Under these circumstances, we may have regarded the inflammation of the pericardium as "idiopathic" or due to "chill," or as a local extension of the pleurisy with which it is very likely associated; but in many of these instances of so-called simple or primary pericarditis the process is really rheumatic, and the sooner we discover this fact the better for all concerned. Four tests may be employed under these difficult circumstances to determine whether pericarditis be rheumatic or not. These are, first, the association with it of an endocardial murmur; secondly, the effect of anti-rheumatic treatment, especially of salicylates; thirdly, the discovery, after minute examination, of tenderness in the joints; and, fourthly, the family history.

Far behind rheumatism as causes of cardiac inflammation in children come chorea, scarlet fever, diphtheria, septicæmia, measles, tonsillitis, and peliosis rheumatica. The association of chorea with rheumatism and heart disease has recently been worked out both in England and America, and for our present purpose we may venture to conclude that acute inflammation of the heart arises in some cases of chorea where rheumatism cannot be traced.¹

With respect to acute pericarditis in children, its occasional connection with scarlet fever and with phthisis must not be forgotten. In children, also, I have been impressed by the insidious appearance of pericarditis after slight injuries to the periosteum. I have known acute suppurative pericarditis and pyæmic abscess of the heart follow a kick on the shin in an apparently healthy little girl of 6 years. I have also known fatal pericarditis associated with pleuro-pneumonia occur in a boy of 6, who had drunk a small quantity of water in which cut flowers had been standing for a day or two; the process appearing to be one of infection of quite a specific nature.

The practical lesson to be drawn from these observations is obvious. In rheumatism, however slight, in all acute illnesses in a child which may possibly be of rheumatic origin, even although unattended with pains in the limbs, such as pleurisy, pneumonia, and tonsillitis, and in every case of pain in the limbs of children, especially the children of rheumatic families, the suspicion of cardiac involvement should be entertained, and a careful examination repeatedly made of the chest, front and back. And the same rule applies to all cases of trifling-looking injuries of bones, chorea, and the acute specific diseases.

I now come to inquire whether there are any peculiarities in the *symptoms* of acute disease of the heart in children, which may readily escape, deceive, or mislead us if we are not prepared for them. The first striking clinical feature of acute cardiac disease in the child is the relative latency or mildness of the symptoms as compared with those in the adult, and the relative distinctness of the physical signs. There is nothing remarkable in these characters as far as regards endocarditis, which is seldom attended by proper symptoms in the adult. But even in the pericarditis of young subjects the symptoms may be absent which

¹ The present Address was delivered shortly before the publication of Dr. Cheadle's *Harveian Lectures on the Various Manifestations of the Rheumatic State as Exemplified in Childhood and Early Life*. In these invaluable lectures the reader will find a complete and remarkably lucid treatment of the mutual relations of the acute arthritis, chorea, cardiac disease, and other "phases" of rheumatism as they occur in the child.

usually direct our attention to the heart. Præcordial distress, pain, palpitation, and the characteristic cubitus may not be present at first, or they may not be so prominent as they usually are in the adult. We must never wait for complaints on the part of the patient, but watch attentively and examine for the development of characteristic signs. The expression of the face, the posture in bed, an increase of dyspnoea, and working of the *alæ nasi* are important indications of cardiac involvement, whilst physical examination of the præcordia will reveal the alteration in the impulse, the increase of vertical dullness, the friction or the muffled sounds—all with comparative facility in the child.

In the case of acute myocarditis, also, the symptoms are very obscure, being mainly lost in those of the associated inflammation of the endo- and pericardium. Even when they are well marked they may not belong specially to either a cardiac or a respiratory type, but assume a character strongly suggestive of cerebral disease. In addition to anxiety, pallor, or lividity of the face, failure or absence of the pulse, and urgent dyspnoea with clammy sweats, the most prominent feature of the case may be a dull, sleepy state, preceded by headache, convulsions, and delirium, and progressing towards complete coma. It can be readily understood how difficult under these circumstances would be a diagnosis of acute inflammation of the heart, as distinct from some involvement of the brain or its membranes; and, indeed, as a matter of fact, this type of myocarditis has very seldom been successfully diagnosed during life.

The second clinical feature connected with acute heart disease in children is the great susceptibility of young subjects to impressions. Children are very readily excited and upset, under these circumstances, by extraordinary events, whether of a pleasant or of an unpleasant kind. The visit of a friend, a change of nurse, the slightest alteration in diet, neglect of the bowels, or carelessness with respect to the warming of the room on a cold night, may raise the temperature of children with endo- and pericarditis when they are progressing favourably, aggravate the palpitation, or cause a relapse of the acute cardiac disease, the pleuritic effusion, or the rheumatism on which these depend.

This remarkable susceptibility of children to impressions, and, as I believe, the obstinacy of the rheumatic process in childhood, account for the peculiar course and duration of acute heart disease in young subjects. One of the most striking, and perhaps the most important, feature of infantile and puerile endo- and pericarditis is their tendency to repeatedly relapse, and thus run a protracted and indefinite course. In adults the rheumatic process, once controlled by correct treatment, can be subdued with proper care, and does not return if ordinary precautions be taken with respect to rest and food. In children, on the contrary, we have no confidence that when the temperature falls under ordinary treatment, it will not rise again the moment our measures are in the least relaxed. It does not require a change of medicinal treatment or a solid meal to bring back aches in the joints, to induce fresh præcordial pain and distress, and to set up a return of effusion in the pleura. The first attempt to leave bed for an hour, or even to sit up in bed, the anticipation of some promised pleasure in connection with convalescence, the simplest indulgence of the palate (and these children are so urgent in their cravings), the fatigue consequent on listening too long to an interesting story, the leave-taking of their nurse at what appears to be the successful end of the case—these or other exciting circumstances may readily be the cause of a serious relapse. And what most of all tries the patience of the medical attendant, and shakes the hopes of the parents and their confidence in his skill and treatment, is the persistent return of such relapses one after another. As I have just said, the natural irritability of children, their sensitiveness to impressions, is not entirely accountable for this peculiar course of the disease. The rheumatic element must also be reckoned with. As long as the rheumatic process lasts in the child, however slight, even to latency, its manifestations in the joints, the heart and pleura will continue to be worried by it and to suffer, not only in the way of subjective distress and attacks of palpitation, but of repeated pathological change. This is but another statement of the fact on which I have just insisted, that rheumatism is at once latent and dangerous in the child. The course which a case of rheumatic heart disease may thus run in a young subject is measured not by days, nor perhaps by weeks, but by months. It is a comfort to know that even in these cases perseverance is rewarded. The most scrupulous care on the part of the doctor, nurse, and relatives will finally wear out the rheu-

matic process, which, under half-hearted management, might persist for an indefinite time and lead to disastrous results.

With regard to special *complications*, my experience is that pulmonary disease is more common in children than in adults under treatment for rheumatic endocarditis. A very interesting series of cases illustrative of this connection was recently recorded by Dr. Cheadle,² three out of six patients being children. Dr. Cheadle dwelt on several peculiar features of these cases of "rheumatic pneumonia," including the remarkable partiality of the disease for the left lung and comparative immunity of the right lung, the association with pericarditis and with well-marked endocarditis or chronic valvular disease, and the absence of such symptoms as cough and expectoration. This is again but another way of stating the facts to which I have been drawing your attention to-day—the severity, the tendency to complications, the indefiniteness of course, and withal the latency of acute rheumatic disease of the heart in young subjects. It is also highly important for us to remember that, under these circumstances, tonsillitis, pleurisy, or pleuro-pneumonia may possibly be the first symptom of all, then inflammation of the heart, and that rheumatism may not make its appearance in the joints until after weeks of illness. I would add that, in my experience, these complications not only are obscure and serious, but shift and change very remarkably, effusion coming and going in the pleura within twenty-four hours, and that such changes may be exceedingly rapid, the child sometimes dying of increase of fluid in the chest before relief can be afforded.

Several important differences in the *physical signs* connected with the heart have to be borne in mind when we approach the examination of these cases in children. I will not detain you with a description of the special methods which have to be followed in the examination of infantile and puerile patients. All of us who have had much experience of the treatment of young subjects understand the great value of careful inspection, especially in infants: of a keen eye for the general appearance, expression, and complexion, the condition of the hands, the lips, and the neck, the attitude, the behaviour, and the symptoms or phenomena that occur during examination, especially the whole aspect of the patient before the circulation has been disturbed by fear and crying. But I may remind you of a few physiological differences in connection with the heart of the child, which must never be forgotten when we are anxiously examining it day by day for the earliest appearance of endocarditis or pericarditis.

The heart lies higher in the thorax of the child; the situation of the apex beat is usually in the fourth space, and more to the left than in the adult. The impulse, as a whole, is often widely visible and palpable. The sounds, too, are normally somewhat peculiar. They have a puerile character, just as the respiratory sounds have, being especially "divided" (both periods of silence marked), frequently "deliberate" or slow in their development, and more often definitely reduplicated than in the adult. When the heart is diseased in young subjects, the prominence of the præcordia is especially striking—for instance, in acute pericarditis. Palpable signs, such as friction fremitus, are peculiarly well marked in children, and audible friction is relatively loud and easily determined, except that it occasionally simulates somewhat closely the blowing murmurs of endocardial origin. I have also been struck by the extensive area in the back over which systolic murmurs are frequently conducted in children.

I now come to the all-important inquiries: What are the terminations and the immediate and remote prognosis of acute cardiac disease in children? Is death more likely or less likely than in the adult? Is there greater or less relative liability to permanent valvular disease and adherent pericardium?

Let us begin with the first question, that of the *immediate prognosis*. Some authorities would offer a favourable prognosis in acute heart disease as it occurs in children. For myself, I confess I regard it as unwise to forecast so favourably. It is no doubt true that acute rheumatic and choreic inflammation of the heart seldom proves directly fatal in young subjects, but it is equally true that its complications are frequently the cause of death, particularly pneumonia and pleurisy. I have come to look upon rheumatic pleuro-pneumonia in the child and adolescent, in association with endocarditis and pericarditis, as a condition full of peril to life. If other physicians have had better results, I can only repeat that, unhappily, this is not my experience.

The question of the *ultimate prognosis* of acute heart disease in

² *Lancet*, 1888, ii, p. 861.

children is rather a peculiar one. The comparative frequency of chronic valvular disease as a consequence of acute rheumatism in the earlier years of life probably depends to a considerable extent upon the social condition of the patient, being greater amongst the poor, who do not always enjoy the advantages of early, close, and continuous treatment. We may anticipate with confidence that the better knowledge of this subject which now prevails, and the improved results of the salicylate treatment of rheumatism, will considerably reduce the proportion of cases of endocarditis and of permanent damage to the heart. But quite irrespective of this consideration, experience justifies us in stating that the remote prognosis of endocarditis is actually better in the child than it is in the adult: that the probability of the development of permanent valvular disease from endocarditis is less, for we know that if proper care be taken, the evidence of valvular lesion, in the form of a murmur, sometimes completely disappears in young subjects—it may be weeks, months or even years afterwards. The proper rule then for us to follow, when we are asked for an opinion with respect to the future condition of the child's heart—as to whether it will be left organically damaged or not, is to be cautious in expressing an unfavourable prognosis, and to give the parents the assurance—to which they are entitled in their great anxiety—that in a certain number of cases the signs of valvular disease ultimately disappear.³

I come, lastly, in this connection to some general considerations with respect to the treatment of a case of acute cardiac disease in the child as distinguished from a similar case in the adult. I shall not be expected, in discussing this subject, to enter into the details of medicinal treatment.

You will have already gathered from what I have said under the heads of Etiology, Symptoms and Prognosis, the points which, in my opinion, the practitioner has to bear particularly in mind. It is our first duty to reduce the comparatively great liability of acute rheumatism or other primary disease to end in cardiac inflammation, that is, to prevent endocarditis and pericarditis. In the great majority of cases this is to be done by immediately and vigorously combating the rheumatic process with salicylates, insuring proper nursing, attending to the diet, the bowels, and the liver, and quieting the circulation and the nervous system. Excitement of every kind, even those very insignificant looking circumstances which I have already mentioned, must be rigidly countermanded. Unhappily we have less control over the other causes of acute cardiac inflammation, such as pyæmia, scarlet fever, and diphtheria; but even in these diseases the process and its local manifestations can sometimes be subdued. In the case of threatened carditis and pericarditis, consequent on acute osteomyelitis from injury, proper local surgical treatment will surely be of some avail. At least if we can do no good, let us carefully avoid doing harm. In diphtheria, where myocarditis may supervene, let us keep off depressing emetics and expectorants such as apomorphine and ipecacuanha, and every kind of meddlesome treatment. One of the most unfortunate circumstances connected with the treatment of diphtheria is the excitement with which the child often meets our attempts to apply local remedies. Nothing of its kind is more distressing to the practitioner than the use of the douche for the nose, or of the brush for the throat of a diphtheritic child whose pulse and general appearance indicate threatening cardiac failure.⁴ In scarlet fever the chief indication for preventive treatment as regards the heart is to control the blood-pressure and anticipate acute cardiac dilatation by means of diet, hydragogues, and nitrites. Pilocarpine must be used with great caution.

If endocarditis or pericarditis have made their appearance when the case comes under our care, the same strict measures must be carried out. Our endeavour will be to cut short the rheumatic attack, believing, as we do, that the continuance and, to some extent, the severity of the cardiac inflammation depend on the activity of the original process. Salicin and quinine sometimes succeed when the salicylates fail.⁵ As the symptoms are subdued, the very greatest caution must be exercised in relaxing the antirheumatic system of treatment. Relapses must be intelligently anticipated. The practitioner ought from the first to let the parents understand that the case is quite likely to run an irregular indefinite course, and that he is prepared to manage it on intelligent and consistent principles, whatever may be the ex-

tent and complexity of its duration. Absolute rest in bed, entire freedom from excitement, and proper nursing must be continued week after week. The diet must be rigidly fluid, and given in small quantities at short intervals. It is not enough that delicacies of a suspicious kind should be withheld; even the cravings and repeated request of the child for simple biscuit, or bread, or other plain solids must be denied, however trying for the mother, nurse, and doctor, as well as for the patient, this may be. Stimulants may have to be given, and that freely. The bowels must be evacuated daily; if not naturally, then by the exhibition of aloes in the evening or a mild saline in the morning, or by enema. The temperature of the room must be most carefully regulated. The patient is not to be permitted to use his hands excepting for the simplest requirements, especially in pericarditis; he must not hold a book nor be allowed to read. As I have already said, the greatest judgment is necessary on the part of the parents and nurse with respect to the mental occupation of the patient as the more urgent symptoms pass off.

I can understand that much of this counsel may seem unnecessary to some of my audience, whilst others may regard the system of treatment as excessively strict from first to last. But those of you who have had experience of such cases as I have just sketched, dragging on from week to month, will not quarrel with my advice, knowing as you do that even if carefully followed for the first week or two, the plan of rigid treatment is apt to be allowed to degenerate when weeks have grown into months, and still the rheumatic pains and the palpitation and the dyspnoea persist or continue to return.

Cases of this kind have to be managed rather than "treated." You will occasionally find it necessary, as one of the wisest of my professional friends has remarked to me, to direct your attention more to the parents than to the patient, and to order blue pill and bromide for the mother, not for the child. I am confident that it is the want of firmness, patience, and consistency in the management of the original endocarditis that has to account for the severity—possibly indeed for the very existence—of some cases of chronic valvular disease of the heart. This brings me to say that there is of course another reason for insisting on continued and prolonged care in the treatment of acute inflammation of the heart. Even when the morbid process has actually come to an end, the diseased valves demand the most careful treatment. The mitral, and perhaps the aortic, cusps are left in a state of diminished resistance, hyperæmia, and vegetative growth. The danger is great that these conditions will pass into a chronic lesion with obstruction or incompetence of the valves. The urgent and obvious indication is for cardiac rest, such as can be secured only by diminished force and frequency of the heart's movements. This circumstance clearly demands a lengthened period of convalescence and a most gradual and cautious return to ordinary occupation.

I must not forget to add that in some instances paracentesis of the chest is necessary when the effusion rises high, or when it is double, or the opposite lung becomes congested. In a few instances, as I have already said in passing, the operation may be suddenly and urgently called for.

II. THE ESTABLISHMENT AND MAINTENANCE OF COMPENSATION.

Let us now suppose that the child has been safely conducted through the perils of acute endo- and pericarditis, has convalesced completely, and has been left with chronic valvular disease—say mitral regurgitation, or with adherent pericardium, or with both. If compensation can now be established, we know by experience that the child will not only live, but may grow, develop, and enter on a happy, active, useful, and possibly long life. The management of a child in whom physiological compensation is being established calls for the exercise of great judgment. The decisions that have to be arrived at, and the success of the plans that have to be carried out, depend on an intimate knowledge, not merely of the condition of the child's heart and other organs, but of the constitution and mental disposition of himself and of his parents—precisely the kind of knowledge that the family practitioner possesses more fully than the consultant.

There can be no doubt that compensation occurs with exceptional completeness and rapidity in the child. In patients coming before us with chronic valvular disease traceable to endocarditis in infancy or childhood, whether their present complaints are of the heart, or whether (as is so often the case) of some other disease or disorder entirely unconnected with it, we are constantly finding evidence of recovery—good cardiac action, the signs of hyper-

³ Cf. Dr. M. A. Boyd, of Dublin, On the Disappearance of Cardiac Murmurs, *Medical Press and Circular*, March 13th, 1889.

⁴ Compare Jacobi, *Archives of Pediatrics*, March, 1889.

⁵ Dr. Cheadle, *loc. cit.*

trophy, and ability of the circulatory apparatus to discharge their functions within reasonable limits. *A priori* this is only what we should expect—that compensation would be easily and successfully effected in the child, in whom increase in vigour and growth in size are comparatively active natural processes, and vascular and cardiac elasticity still unimpaired. Let us review the circumstances that determine and favour compensation, so that we may understand this matter a little more fully.

The first circumstance that determines compensation is moderately increased pressure within some part or area of the circulatory system, leading to a demand for increased activity and accommodation on the part of the heart and blood vessels. For instance, in mitral disease there is increased pressure between the mitral opening and the pulmonary valves, calling for increased activity of the right ventricle, and demanding room for an increased volume of blood within the lesser circulation. The second circumstance is a sufficient reserve of force in the cardiac muscle and of elasticity in the cardiac and vascular walls to respond to and satisfy these demands. In mitral disease this is provided for abundantly in the right ventricle, and in the walls of the left auricle and the pulmonary veins, capillaries, and arteries. The third condition of compensation is the property or power of hypertrophy or growth of muscular tissue in connection with a continuation of increased activity. And the fourth and last condition is sufficient nutrition—a proper supply of blood through the coronary arteries, and a healthy state of the nervous influences that reach it. If these considerations appear somewhat too theoretical for daily application, let us discuss the subject from the other point of view—as it is presented to us in practice. Our experience is that compensation has to be established in spite of certain circumstances which militate against it, and which we have to remove when they seriously stand in the way. A large and perhaps the most important part of our duty as family advisers in cases of chronic disease of the heart in children is the timely anticipation and prevention of evil.

The first cause of interference with compensation is impoverished blood supply, consequent on general nutritive failure—anæmia, starvation, dyspepsia, and disturbed action of the liver. This cause is evident enough in the children of the poor, but it is often overlooked in the badly managed, pampered, overfed, and coddled children of the well-to-do. Although, on the whole, this source of imperfect compensation is less common in children than in adults, it must never be overlooked. The child's diet must receive our most careful attention. A frequent appeal to the bowels and liver by means of aperient powders is equally necessary. At this period, too, hæmatinics carefully used ought to prove invaluable—iron in one or other of its many forms, and arsenic.

The second set of causes of interference with compensation arise in connection with muscular exertion. An excessive demand for cardiac activity, which is one of the common causes of broken compensation in the adult subject of heart disease, at any rate amongst the poor, is, or ought to be, comparatively rare in the child. Boys will occasionally strain a weakened valve or a hypertrophied heart in play, but this is an uncommon event compared with the occurrence of damage to the heart of the hard-working man, who will not be restrained from resuming work after acute rheumatism—it may be weeks before he is in a fit condition to do so.

Much the same remark applies to nervous causes. We have seen the effect of nervous disturbances in determining relapses during the acute stage of these cardiac diseases in the child. In the same way excitement may disturb the nutrition of the compensating heart, for example, the premature or otherwise indiscreet return of the child to his lessons. But, on the whole, nervous influences are by no means so fruitful of evil in the child as the many that encompass the adult man and woman. Children can be spared many nervous shocks which adults must suffer. This brings us naturally to consider that most important part of the management of the child with heart disease which we are expected to settle, namely, his education. It often taxes our judgment severely to give sound advice on this subject. With the girl of the better classes there is indeed but little difficulty on this score: she remains at home, of course. But with the boy comes the critical question—Is he to be sent to school? How different the significance of this inquiry with each individual lad! Let us recall for a moment what "going to school" meant to each of us and our schoolfellows, according to our several dispositions and abilities. No doubt it is wise to let a boy have lessons at home for a time; then to extend the range of his mental and

bodily exercise by sending him to a school in the neighbourhood for a few hours a day; and finally, if all goes well, to put him to a boarding school specially selected for the healthiness of its situation and the amount of individual attention that can be bestowed upon its pupils. Whether there or at home, the youthful subject of heart disease is to be faithfully watched. On the one hand we must be on the outlook for symptoms of mental strain—headaches, night-talking, or sleep-walking, irritability of temper, and the occurrence of choreic twitches. On the other hand we have to see that muscular exercise is neither abused nor neglected. We are always expected to speak definitely as to games. My own plan is to allow simple quiet cricket to any lad with heart disease who is otherwise able to be at school with his fellows, but to forbid matches of every kind and set games at tennis, where his courage might not allow him to give in until too late. Football and paper-chases are to be unhesitatingly forbidden. Tricycling ought to do no harm if reasonably enjoyed; but, as a matter of fact, it is dangerous, for I have recently had to treat at least four cases of strain of the healthy heart from over-riding tricycles or bicycles.

Having settled this point definitely as to the manner in which the "cardiac" child is to be reared and educated, our duty is not completed until we have given the parents another caution—with respect to the incidence of acute disease. The subject of chronic valvular disease of the heart must be specially protected from rheumatism. His parents and teachers must never be allowed to forget that this is the greatest of all dangers, lest the boy get a return of rheumatism and an increase of his cardiac lesion. They must be cautioned not to disregard the most insignificant looking symptoms that may suggest rheumatism, such as sore throat, a stiff neck, or a trifling ache in the legs. Just as it is difficult to throw off the original rheumatism in the young subject, so we find it is difficult to prevent its return; and we must always be prepared for it. From 10 or 12 till puberty is probably the most unfavourable age in this respect. Some children are rheumatic throughout all these years, continuously or discontinuously. And whilst they are rheumatic, however slight may be the joint symptoms, even to the degree of latency, the heart is never free from a kind of worrying influence of the primary disease and the danger of further organic involvement in the form of pericarditis, extension of the endocardial lesion, and acute pulmonary complications. If the hygienic measures which I have already suggested have been faithfully attended to, including a proper use of baths and clothing and the regulation of the digestion and bowels, rheumatism will be, as a rule, successfully averted. If it do make its appearance, active measures must be immediately instituted.

During the most trying seasons of the year, the liability to acute pulmonary disease must also be kept before the mind, and, if bronchitis or congestion of the lungs arise, the condition of the child's heart will call for careful consideration.

In connection with the subject of the management of compensation in the child, let me refer to the advisability of examining the heart periodically, however free from symptoms it may be. We ought to be intimately acquainted with the size of the heart and the state of the valves and pericardium in anticipation of illness, and, indeed, in order to offer sound advice whilst the child is well.

Lastly, a remark which I have just made with regard to the management of these children in the better classes of society brings me to mention the effects of incorrect treatment of every kind. I do not refer simply to unsuccessful treatment, but to the mistaken application or abuse of good remedies. Not only may there be an abuse of rest and feeding, but we may be guilty of a routine employment of such drugs as digitalis and its allies when they are more than unnecessary—positively harmful. If we clearly understand the significance of compensation, we cannot fail to comprehend the weakness, the uselessness, the worse than uselessness, of these or any other methods of routine treatment.

III. RUPTURE OF COMPENSATION AND FAILURE OF THE HEART.

Whilst compensation is maintained, we have seen that a child with heart disease is practically free from symptoms. It is, I confess, incorrect to say that the child is free from a degree of anæmia, dyspnoea, and occasional distress when his heart is taxed by exertion or excitement, and it is also true that he is peculiarly thin. Still, he is often so well that no one suspects the cardiac lesion. Unhappily this favourable condition does not last indefinitely. Sooner or later in most cases there occur symptoms indicative of

cardiac inadequacy—temporary, it is true, if care be taken, but very apt to return. In these illnesses, which are characterised by palpitation, dyspnoea, precordial distress, disorder of digestion and liver, and nocturnal suffering, it is said that the child has "heart disease;" indeed, it may be that the heart disease is now discovered only for the first time. We know that it would be more correct to say that the child is suffering from failure of compensation, or failure of the heart in compensation: that the symptoms are not strictly those of valvular disease of the heart, but of failure of the hypertrophied walls.

The severity of the symptoms of failure varies greatly in different instances, from passing shortness of breath or an attack of nocturnal palpitation after a careless supper to a pronounced condition of dilatation of the heart, with engorged lungs and liver, urgent dyspnoea, cough and hæmoptysis, ascites, albuminuria, and it may be dropsy, of which the patient ultimately perishes. In several important respects the phenomena of broken compensation are peculiar in the child. In the first place, cardiac dropsy and albuminuria are comparatively infrequent. Pain and other subjective symptoms are also less prominent, or at any rate are less complained of than in the adult. On the contrary, dyspnoea is a complaint most commonly mentioned by the mother, and continues to be a striking feature. Epistaxis (with premature menstruation in girls) may attract our attention for the first time to the state of the child's heart. When the condition of the patient is urgent, we find with comparative frequency that some acute pericardial, pulmonary, or pleuritic complication is also present.

All these symptoms are familiar to you, and I need not dwell upon them now. Indeed, so familiar are they, that when we meet with them we are very apt to accept them as a matter of course for symptoms of "disease of the heart," and to make no further inquiry into their origin. A little consideration ought to teach us that we are wrong here. They are never a matter of course. Failure of compensation never arises without a cause. These symptoms would not be present unless something had occurred to undo compensation. As we sit by the bedside of our patient suffering from dyspnoea and palpitation, it is our duty to ask ourselves, "What has happened that this child, who has been comparatively well ever since his attack of rheumatism with endocarditis a year ago, and of whom I have been so careful in the interval with respect to his entire management, should now be suffering from urgent cardiac failure?" On our proper estimate of the importance of asking ourselves this question, and on the correctness of the answer that we give to it, will depend in a great measure the success of our prognosis and of our treatment.

As regards prognosis, the immediate prospect mainly depends upon the circumstance whether, on the one hand, muscular exertion, nervous strain, impoverishment of the blood, or injudicious treatment have been the cause of the undoing of the natural cure, or whether, on the other hand, rheumatism or other intercurrent disease or a fresh lesion is at work. If one or other of the first set of causes be present, a short period of rest in bed and general correct treatment will soon restore the heart; but if an intercurrent disease be at the bottom of cardiac failure, the danger is great both directly and indirectly.

On the whole, the prognosis of cardiac failure in the child is better than in the adult. As compensation tends to be established and to be maintained with comparative readiness in the young, so it is as a rule more easily restored. But here we must be cautious. I have said that such marked symptoms as cardiac dropsy are rare in the child, and the proper complement of this statement is that when these marked symptoms do occur they are of more serious import.

When we proceed to apply treatment in the case of a child suffering from urgent cardiac failure, if we will but be guided by the considerations which I have just reviewed, with respect to the cause which is at work, including the conditions in which the child is living, we shall never allow ourselves to be guilty of routine practice, especially in the direction of the administration of drugs. If we find the cause to have been nothing more than some indiscretion in the way of feeding, medicinal treatment, or general management, we may, in a large proportion of cases, especially amongst the poor, bring the case to a successful issue by contenting ourselves with the employment of proper rest, food, nursing, and the simplest remedies, followed by the administration of tonics and hæmatinics. Confinement to bed for a few days, and abstinence for a longer period from exercise, will in the same way relieve those cases which can be traced to moderate over-

exertion. When rheumatism is discovered to be present, the measures which are familiar to you must be immediately instituted, in order to combat the morbid process and sustain the heart. In the case of other intercurrent diseases of an acute kind, such as the specific fevers and pulmonary congestion, the precautions which I mentioned at an earlier part of the lecture must never be neglected; I mean with respect to the avoidance of debilitating remedies, including the abuse of antimony, ipecacuanha, and emetics. In a word, routine must be avoided: each case must be treated on its own merits according to the cause that is at work.

But whilst this is a rational and successful method of treatment in a large number of instances, we must never forget that at times the cause of the cardiac failure may not be discoverable, and that at other times the condition of the child is far too urgent to justify us in dealing simply with the cause. Urgent dyspnoea, palpitation, and failure of the pulse will demand instant attention; and it is our duty under these circumstances to procure if possible immediate relief and to avert urgent danger. Time does not permit me to dwell on the details of the management of these cardiac symptoms to-day, and I can only refer to the general principles which, in my opinion, ought to guide us in our attempt to avert death and to restore compensation.

The first indication in this class of cases is to increase the cardiac force, so that the circulation may be restored and maintained. If the condition of the patient is not exceedingly urgent, this indication can be successfully fulfilled by the employment of digitalis, strophanthus, caffeine, senega, squill, and their allies. Sometimes one and sometimes another of these remedies answers best; but, on the whole, there can be no question that digitalis, if rationally employed, is still the most valuable. Combinations of these drugs with each other, and with other remedies, such as the nitrites, strychnine, and—after a time—iron, are often peculiarly valuable.

When matters are more pressing we have happily a series of cardiac stimulants which act with promptness and success in the child. Ether, ammonia, and alcohol are familiar to us all; but perhaps some of you may not be so well acquainted with the subcutaneous use of strychnine in the form of the 1 per cent. pharmacopœial solution of the hydrochlorate, which in some instances has an effect little short of marvellous in restoring the action of the ventricles. If the urgency be connected mainly with engorgement of the lungs and failure of the right side of the heart, the greatest possible benefit may be derived from venesection, cupping, and leeching; and, under certain circumstances, the judicious use of hydragogue purgatives, mercurial cholagogues, and stimulant expectorants will be attended with the very best results.

Lastly, it is unnecessary for me to insist upon the essential importance in these patients of attention to the diet, which must be highly nutritious, perfectly digestible, and given at short intervals; and under this head I of course include the administration of stimulants in proper form and in proper amount. Occasionally it is necessary in the child to perform paracentesis, and my experience is that this, if carefully practised, may in some cases give not only immediate but permanent relief.

INSANITY IN ITALY.—Insanity appears to be on the increase in Italy as in some other countries. In a publication embodying the results of the last (fifth) census of lunatics in Italy, Professor Verga says that whereas in 1883 there was 1 lunatic in every 1,476 of the population, the proportion now is nearly 1 in 1,000. The ratio varies largely in different provinces. Thus in Sardinia it is 1 in 5,062 inhabitants; in the Neapolitan province 1 in 3,257; in Sicily in 3,167; in Piedmont 1 in 1,366; in Umbria 1 in 1,278; in Venetia 1 in 1,025; in Lombardy 1 in 983; in Tuscany 1 in 913; in the Marche 1 in 893; in Emilia 1 in 760; and in Liguria 1 in 758. These figures, however, as pointed out by Dr. Verga, are misleading, the difference in the number depending much more on local variations in the mode of certifying, admitting, and discharging lunatics than on any special tendency to the development of insanity in particular regions. One very remarkable fact brought out by Dr. Verga's statistics is the relatively enormous proportion of lunatics among criminals. Thus while taking the general population, among 1,000 persons above 15 years of age, the average number of lunatics is 1.24, among convicts the proportion is 12.25 per 1,000. In the female sex the corresponding numbers are 1.09 and 3.08 per 1,000.