A Clinical Lecture

ON

THE PREVENTION OF HEART DISEASE.

DELIVERED AT THE HOSPITAL FOR SICK CHILDREN, GREAT ORMOND STREET,

BY

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IN this lecture I will consider a question which I believe to be at present the most practical in the whole range of the study of heart disease—the possibility of preventive measures. Curative treatment for the moment is almost at a standstill. Cardiac tonics have been studied with the greatest industry; we are not likely to learn more of the value of the salicylates in heart disease than we do now, and serums and vaccines are not yet effective.

There is, however, another line of attack, opened up by recognition of the fact that, excluding congenital affections, the major part of the heart disease we meet with in the young is infective in its origin. These infections may attack the whole heart, or predominantly the valves, pericardium, or myocardium. Their relative frequency in the young is very different. Some are rare—for example, the tuberculous. Others vary in relation with epidemic waves—the diphtherial, the influenzal, and that associated with scarlet fever. Pneumococcal and staphylococcal cases are unusual in this hospital, as also the syphilitic, but rheumatic heart disease is very frequent and very constant in its occurrence. This is particularly the case in London, and it is with London I shall be dealing. At this hospital we only see children up to 12 years of age, and many cases, it is known, occur between that age and 15, so that not even here do we get a complete picture of the frequency of rheumatic heart disease in the young.

The Gravity of Rheumatic Heart Disease.

It is possible to give a clear idea of the havoc acute rheumatism causes in childhood, because in 1919-20 we had a bad outbreak, and with Dr. J. C. Spence and Dr. D. Paterson I made an analysis of the cases.

We have 100 medical beds, and these are for practical purposes almost always fully occupied. The average stay of a medical case is twenty-eight days, and the cost of each child £2 9s. a week. The number of cases of rheumatism admitted in the year 1919-20 was 172, and if they are imagined as one long case it would have occupied a bed in the hospital for twenty-nine years; or putting it in another way, all our medical beds (100) would have been filled for fifteen weeks. The average stay of each case instead of twenty-eight days was sixty, and in maintenance the outbreak cost the hospital £4,589. This expenditure is, after all, the least serious result. What arrests attention is that 66 per cent. of these children had signs of organic disease of the heart, 22 cases died, and 38 became complete invalids. Undoubtedly this was an outbreak of unusual severity, but each year we have many cases, and in every London hospital where children are admitted in any numbers there is the same story.

If we study the age incidence we are struck by the early commencement of the heart disease. In this attack the limits were 2 years and 12 years, which is our age limit; thirty examples of first attacks occurred at the age of 7. As soon as the school age is reached we find a steady increase in the frequency of incidence.

On the other hand, acute rheumatism is infrequent among children, of school age, of parents who are in better circumstances than the hospital class.

Cardinal Pathological Facts.

There are some points on the pathological side of infective heart disease which are simple but yet outstanding. If the poisons attack the noble tissues—the muscles and nerves of the heart—these cannot be replaced if destroyed, and if they are partially damaged can only recover completely if that damage be slight. When the fibrous tissues of the heart's framework, the valves and the pericardium, are attacked

and destroyed they are replaced by scar tissue, and if they are the seat of prolonged irritation short of destruction they thicken and contract, sometimes shutting in small areas of necrotic tissue. There are two problems before us at the bedside; one, What evidence is there of active infection? the other, To what extent are the symptoms the result of scars due to healed lesions? With these two problems in mind we rapidly come to the conclusion that in the young some degree of active infection is almost constant. It is an axiom that the chief cause for a cardiac breakdown in a child is active—I do not say fresh—infection.

Diphtheria when virulent kills the noble tissues but does not produce scarring. Contrast with this a chronic relapsing rheumatic pericarditis, where as a result a grossly thickened pericardium is densely adherent to the heart and possibly to the surrounding tissues; a still more striking example of this type of change is seen in chronic tuberculous pericarditis, which may literally strangle the heart in its grip.

Here, then, we have two extreme examples: on the one hand the destruction of the noble tissues, and on the other scarring of the fibrous tissues; but in rheumatism we frequently see a certain grade of damage produced in both—there is myocardial weakness and scarring of the valves. I do not think we can ever get a real grasp of the problem of prevention unless we keep these two classes of injury before our mind, for it is injury to the muscle of the heart which particularly calls for prolonged supervision in convalescence, and the scarred valves disturb the work of the heart as a mechanical pump.

Diphtheria under Control.

When we consider diphtheria—dangerous though the cardiac infection is—we recognize that it is a contagious and notifiable disease due to an accepted microbic infection. It is a disease on the whole as well under control and supervision as we can expect in a great community. Methods for detection and for treatment may no doubt advance, but already there is general recognition of the importance of careful supervision of the heart. It is, for example, well known that dangerous symptoms are particularly likely to develop in the third to the fifth weeks, with exceptions at either limit, and we recognize that most of the tragedies occur in cases in which the nature of the infection has not been recognized and the child for that reason has escaped from supervision. These missed cases must always occur in human endeavour, and in no way alter the fact that heart disease due to diphtheria is well supervised. Tuberculous heart disease is so uncommon in this country that though we recognize it in children's hospitals it bears no relation in frequency to other tuberculous lesions, and great efforts are, we know, made to keep tuberculosis under supervision.

Scarlet fever stands in the same category as diphtheria, for it is notifiable, and every effort is made to get the cases under supervision, but much of the heart disease connected with scarlet fever has, in my experience, arisen after the child has left the fever hospital, and it must be considered in the main under the same heading as rheumatic heart disease, to which I now come.

Rheumatic Heart Disease.

We are now confronted with some obvious difficulties. Acute rheumatism is not notifiable, and I am not prepared to advocate that it should be at the present juncture. The cause of acute rheumatism is still under dispute. Many consider the problem unsolved and the infection unknown; some look upon rheumatism as non-infective, though likely to be complicated by infections which determine the manifestation, and some believe with me that it is a definite infection and a definite disease. Whatever view we may take we shall do well, in my opinion, to look upon rheumatic heart disease as infective, for it behaves in every way like an infective lesion. It is not necessary for the purpose of prevention to commit ourselves to a specific infection, for the moment that rheumatism is admitted to be an infective process the importance of prevention is manifest.

Prevention Often Can be Only Partial.

Unfortunately the prevention of rheumatic heart disease can be attained only in a modified degree, for frequently the patient has already been damaged, and the most we can do

then is to stave off further attacks. This limitation it is essential to recognize, for at present we are unable to control rheumatic heart disease with any certainty. Some may demur at this and point to the specific action of the salicylates, but the present history of rheumatic heart disease in childhood does not bring to me any conviction upon this point.

My views are humbler, and they rest upon the belief that there are some obviously weak points in our general management of rheumatic children which can be much improved. If this improvement is a practical undertaking we shall, I hold, prevent much severe heart disease and many deaths from that cause, and further make many lives more useful to the State and much happier for the individuals. I believe also that with improvement we shall incidentally learn more of the life history of infective heart disease, and very probably in the future discover as a result valuable data which may lead to further advances. It must be remembered that year by year ceaseless investigation is in progress throughout the world of medicine, which may at any moment lead to some new discovery in therapeutics.

DEFECTS IN MANAGEMENT OF HEART DISEASE IN CHILDHOOD.

I shall now attempt to justify the main theme of the lecture by referring to what appear to me the weak points in our present management of heart disease in childhood.

1. Imperfection in Medical Education.

The first point concerns our own profession. There seems to me some difficulty in the pathways of students who desire to gain a real clinical insight into the rheumatism of childhood, and I am speaking as a clinical teacher both at a general and at a special hospital.

Except in the largest general hospital there is no great opportunity for a student during his time in the wards to see many cases of acute rheumatic carditis, and yet there is no doubt that at this age rheumatic heart disease requires unusually careful observation. In the adult the later and closing chapters of heart disease are seen with their alarming and striking symptoms; in the child the detection of dilatation, of early endocarditis and pericarditis—that is, the dawn of heart disease—requires close attention and some special teaching. I believe it to be correct if I say that no one in this audience who has worked in a London children's hospital will deny that he left the hospital with a very much clearer idea of cardiac rheumatism.

Yet no one can appreciate the gravity and difficulties of the problems involved in the dawn of infective heart disease who has not a good clinical knowledge of rheumatism—not only cardiac rheumatism—in childhood. Recently this weak point has been strengthened by the greater attention paid to children's disorders in the final examination, and it will doubtless lead to general progress.

2. Public Ignorance.

A second and very important point is the lack of appreciation by the public of the gravity of heart disease in childhood. This, I think, can only be combated by simple propaganda and instruction. The medical profession would be much assisted by a better instructed public, as one example will show. We all recognize that early heart disease is often most insidious, occurring without pain or any striking symptom. So remarkable is this that we recognize a group of cases of primary cardiac rheumatism which may come first under our observation with very definite organic disease and yet with no data to guide us as to its exact commencement or duration. Even now, although I am well acquainted with these facts I get cases in the wards which astonish me by the severity of the lesions and the absence of striking symptoms. If we recognize that this is a difficulty, how much more doubtful must be the feelings of parents, who see their children lying in bed without pain or distress and are told that convalescence must be slow and carefully supervised! If, however, they recognize that the disease is caused by poisoning due to a microbe and that the poison softens the heart muscle, they are more likely to appreciate the necessary care when emphasis is also laid upon the fact that the entire future of the child depends upon the heart muscle becoming once more firm and strong.

The instructions I picture should be simple and terse, in the form of a printed leaflet, such as has been used in this hospital with success for many other purposes. It would be most effectual if they were issued from some official bureau, but even issued by hospitals, provided they were uniform in character, these leaflets would be very useful. At first they would probably only reach the parents of rheumatic children, but in due course they would doubtless find their way into the hands of many parents with children.

These are some of the instructions that appeal to me:

Specimen of Instructions.

1. Rheumatism is caused by infection by a microbe and is a frequent disease in large cities.
2. In children rheumatism often attacks the heart, and is the most frequent cause of organic heart disease.
3. Pains in the muscles and joints in children should receive attention as possible warnings of rheumatism.
4. Sore throats are often associated with acute rheumatism.
5. Rheumatic heart disease is often painless and requires a doctor's examination for its detection. Shortness of breath and pain over the heart require immediate attention.
6. The heart when injured by rheumatism recovers slowly from the poisoning, and one of the greatest dangers to a child's future is for it to resume an ordinary life before the heart is firm.
7. Chorea or St. Vitus's dance is rheumatism attacking the brain, and its chief danger is the tendency for the heart to be injured by the rheumatism at the same time.
8. Great nervousness, dreaming of school work, alteration in disposition, and slight twitchings are often seen before the chorea has become definite, and are warnings.
9. Rheumatism often recurs, especially in the spring and autumn.
10. An occupation in life for a child with heart disease requires careful choice.

Needless to say, if propaganda is employed the exact degree of information and the wording would be of the utmost importance. These headings are only some of my own ideas upon the subject. Able minds in this country would soon hit upon the best mode of instruction for the public if they once decided that it was the correct step to take.

3. Chorea and School Teachers.

A group of the public whom I think should be particularly approached by propaganda and simple lectures are the school teachers in the London County Council schools. It is possible that such steps are taken already and have escaped my notice. The reason for this action is the great amount of chorea in London during the school age. Chorea being cerebral rheumatism, it seems very probable that this frequency is in part due to overstrain and lowering of the resistance of the nervous system to infection. Now if in private practice we find a boy or girl at a private or public school flagging in health and becoming irritable and unequal to school life, still more if we find warnings of chorea, we advise a term from school and mental and physical rest. Chorea certainly is very rare among such children.

Fortunately for the children in the Council schools, Sir George Newman has taken up their cause with a large body of skilled assistants, but the enormous machinery required for the education of these masses of children and the frequent ignorance in the homes from which they come must result in many children attending in indifferent health, and even until they have definite chorea.

Possible Steps for the Prevention of Chorea.

I see very clearly the extreme difficulties of coping with such a problem, in the face too of the continual tendency of parents and children to take advantage of any relaxation of discipline. Yet I believe three steps would help:

1. The education of parents as already indicated.
2. Simple lectures on rheumatism and chorea in children to the school teachers.
3. I venture to think that an investigation on a large scale by the school doctors into the frequency of chorea in London school children, and into their histories immediately before their actual breakdowns, would give the medical profession most useful assistance. We should get a definite idea of the magnitude of the evil, and all of us would learn facts which would stimulate us to warn parents to call attention to ill health more promptly.

I cannot say whether or not some of the actual methods of education at present may not be at fault, but it is quite possible that a careful inquiry into the approved routine and character of the teaching may also lead to some useful suggestions. Rheumatic children are very sensitive, and may feel the strain of some particular kind or way of instruction to an extent which is not realized. If, then, as I believe, it will be found that the incidence of chorea is

much too high in London, it is possible that educational experts confronted by the facts will be able to modify some methods without any serious upset to the general machinery. The subject of chorea is well worth most serious investigation.

The school medical officers carry out valuable work for the cardiac children, and we see many cases caught up by them and sent to us for treatment. In that direction there has been a distinct advance in preventive treatment which has already proved encouraging.

4. A Weak Point in Hospital Treatment.

There is great need for the establishment of an auxiliary hospital near London to which we can send rheumatic children for their convalescence. Our hospital, for example, is needed for acute cases, but we know too well how wrong it is to nurse a child through an acute carditis and then to send it out with a heart still enfeebled by half-healed lesions to a poor home; in consequence we often keep these children for many weeks, and even then not long enough. Yet in private practice we should not dream of choosing a hospital ward in this part of London for a slow convalescence. We need auxiliary hospitals, because skilful supervision is required, and rheumatism is notoriously treacherous. It is not only fresh air and sun that I look for in these hospitals. Rest is a necessary part of the treatment of rheumatic heart disease; but blind unreasoning rest is bad—for there is no better tonic for the young heart than exercise, and convalescence from rheumatic carditis should be a history of graded exertion and not aimless rest. The auxiliary hospital can supervise these graded exercises with every hope of success. The ultimate goal is plain—it is to send the child back to its home with a heart strengthened to the level of carrying on ordinary life; and if that is unattainable to ascertain the limitations and advise the parents. In this country hospital it would be easily arranged in the grounds to have level paths and gradients of different degrees. There would be massage provided, and arrangements would be made for education. Such an institution must be linked with the parent hospitals, and it is essential that the medical officer should be enthusiastic in the cause and realize the essentially practical aim of such a hospital.

5. Suitable Employments for Cardiac Cases.

In America the care of cardiac patients, which since 1911 has been organized on a large scale, embraces adults as well as the young. I am here only dealing with the young children, but it is clear that any undertaking of this kind should not end abruptly at the age of 12 or 14 years, and there is one connecting link with the adult which is obvious. It is evident that though many cases of simple dilatation completely recover, and many slight mitral lesions also leave the heart practically as strong as before, in general terms rheumatic affections tend to lessen the reserve power. There are necessarily all grades of weakness to complete invalidism, and I have already indicated that our endeavour, while cases are under medical care, should be to ascertain these limitations as far as possible. Much of this labour will, however, be wasted if no organized attempt is made to study the various adult occupations in relation to physical exertion, and to make a practical schedule which can be within reach of parents who are placing their children with damaged hearts in the world. I am not discussing an abstract problem as to whether overexertion can strain a healthy heart, but content myself with the obvious fact that a damaged heart may easily be brought to rack and ruin by an unsuitable occupation. We want to prevent as far as possible a boy with a damaged heart becoming a coal-heaver or furniture-mover, and to give the child every chance of being placed in an occupation which will be suitable to his or her cardiac powers. So far as I am aware, in London there has been no organized attempt made to prevent by some accessible information the loss of the skill, time, and money spent on children with acute rheumatism that must follow the undertaking of unsuitable occupations. The suffering, the loss of life, and loss to the State from such mistakes must be very considerable. Parents no doubt do in many cases realize the dangers. I admit, too, that "needs must when the devil drives" is an ever-present obstacle; but there still remain, I believe, many who would be greatly assisted if the impor-

tance of occupation was included in instructions to parents, and better opportunities given to these damaged but active workers to select suitable occupations. In America this has been carefully investigated, and suitable lists provided.

6. A Central Office.

It would be necessary to have a special central office, in touch with hospitals and country hospitals, schools, and parents, where this information would be obtainable, together with propaganda and syllabuses of popular lectures. Looking far forward, it is my hope that eventually the study of rheumatism in its broadest sense will have a centre in London, in which research upon this great subject would be continuous. Divorced from the great hospitals such an institution would be a dead thing; but I can imagine this condition of affairs. A young investigator has decided to take up this subject, and goes with suitable testimonials to this headquarters for the necessary training in technique and knowledge of the literature. This accomplished, he receives an official introduction to the authorities at one or more of the great hospitals, by which he will be enabled to study the special cases upon which he is intent. Whether or not he worked in this or that hospital laboratory or at headquarters would be a matter of detail. The headquarters would be the centre for the arrangement of propaganda, lectures, etc., and would be in possession of the literature on the subject and be itself equipped with suitable laboratories. This control institute would eliminate one of the greatest obstacles to research in this country—the rivalry of the great hospitals. Search for the truth and the best requires no rivalries and no schools where one line of thought is obnoxious and another idolized. Research wants freedom. If I could live again and had a request to be granted, I would ask to be educated on sound lines in technique and literature and then be given opportunities to think my own thoughts and make my own mistakes. Then also a centre for continuous study is far less wasteful than sporadic efforts, which are often lost with the death of the investigator.

7. Local Foci.

Among the factors in the prevention of rheumatic heart disease removal of suspected local foci has not yet been mentioned. Up to a certain point I am a believer in local foci of infection, but I am sure that we still want to know more about the behaviour of infections in the human body before we can be dogmatic upon their exact value. The most important local focus in rheumatic heart disease is most probably the tonsils, and for nearly one hundred and fifty years the clinical importance of tonsillitis in relation to acute rheumatism has been recognized by physicians who have paid much attention to the disease. The following is a short account of the first complete observation that showed this suspicion to be correct.

A man, aged 28, came to hospital in June, 1900, suffering from acute tonsillitis, pains in the limbs, and mitral and aortic disease with dilatation and an excited action of the heart. There was a history of previous attacks of rheumatism.

Dr. A. Paine made a culture from the inflamed tonsils in the acid milk medium we used, and twenty-four hours later a minute strepto-diplococcus in association with other micrococci had grown in the tube. These were plated out on fresh blood agar and the diplococcus isolated. This, injected intravenously into a rabbit, produced acute carditis with endocarditis of the aortic and mitral valves, and the same diplococcus was isolated from these lesions in pure culture.

Even if the conclusions from this investigation are not pushed thoroughly home, it is apparent that from a case of acute rheumatism with heart disease a strepto-diplococcus, isolated by plating from the inflamed tonsils, determined an acute carditis, even to the point of reproducing similar valvular lesions. This result, coupled with later ones from chronic tonsillitis in children and supported by the researches of Fritz Meyer in 1901, when added to the long history of clinical observations laid the foundation of the view of the infective focus which has now such far-reaching application in rheumatic affections.

Nevertheless, caution is required in pressing this point too far, for removal of the tonsils, as is now well known, does not prevent further attacks, though I have no doubt in my mind that unhealthy tonsils should be removed in rheumatic children. It would be, in my opinion, a mistake to suggest the wholesale removal of tonsils in rheumatic children and

those suspected of rheumatism when there is no evidence that they are diseased. Further, we do not know all the avenues of infection. The wholesale removal of tonsils must mean occasional disaster to a healthy child, and the ground for such a step as this must be absolutely sure. The medical profession has to accept the factor of some infective focus in acute rheumatism, and in course of time we must learn how far steps should be taken along these lines for the prevention of the infection. Our experience as yet is not sufficient.

SUMMARY OF ARGUMENT.

I have now finished my comments upon the weak points in the present management of rheumatic heart disease in the young, and the steps that appeal to me as likely to be of service. Briefly summarizing these now, they are:

1. Improvement in medical instruction.
2. Education of the public, particularly parents and school teachers, by propaganda and lectures.
3. Further investigations into the incidence of chorea in London.
4. Auxiliary country hospitals with a special department for cardiac children.
5. A schedule of suitable occupations for cardiac children.
6. A central bureau for purposes of organization. In the far future an institution for research into and the study of rheumatism.
7. Discrete treatment of local foci.

Expectations from Prevention.

It may now be fairly asked what we may hope to gain by measures which mean expenditure of money and a great deal of skilled organization. It may be objected that we are not going to cure rheumatic heart disease by these methods, and that our active therapy is very imperfect. Will these children then benefit much by these measures, and will the State gain any advantage? It seems to me that much is to be hoped. In the first place, these measures introduce a new atmosphere into the study of heart disease. Heretofore we have treated the acute illness and we have patched up the chronic heart conditions, but often enough, I think, without attempting to distinguish between the active infective process and the passive results from scars. In other words, we have treated these patients as cases of heart disease rather than as cases in which a cardiac lesion is the prominent symptom of an infective process. Now with prevention we are irresistibly led to think ahead, and to treat such cases with a view to the future, asking ourselves, How did this occur? Where was the weak point? Have we got the active element of the disease under our control? and Have we got the best possible result in the circumstances? This line of thought invariably makes for progress and for thoroughness. Those who have watched cases of rheumatic heart disease in private practice with every advantage in treatment and care must have been astonished to see how wonderfully they may recover. It is to anyone who has not had this experience a revelation. I believe that we should, with prolonged and skilfully managed convalescence, see a great improvement in our results with the most important group of all our cases—the first attacks of rheumatic carditis. With proper organization, I believe, we should get hold of the cases with recurrent attacks more easily and give them also a much better chance of recovery. I feel convinced we should learn to prevent much chorea, and believe that in a few years we should learn much more about the life history of the rheumatic child, and thus prevent many breakdowns during school life. All this would be the more valuable because the incidence of cardiac rheumatism is greater in the first fourteen years of life than at any other period. Care as to occupation in after-life must produce good results. Lastly, I believe that along these lines we shall throw light upon the malignant or progressive forms of endocarditis, because we are more likely to discover the early departures from health which precede the established disease, as year by year we get the cardiac cases more carefully organized and under more complete supervision.

I hope that very careful consideration will be given to this question of prevention. The ravages of rheumatic heart disease deserve our close attention in London, and wherever

there seems to be any ray of light that direction is worth exploring. I am no advocate of wild schemes. When I see an old country garden with some dead trees and damaged shrubs I do not advocate its total upheaval and conversion into a modern one. We can work by degrees and test each step. Do not suppose that I advocate, for example, building a number of auxiliary heart hospitals; on the contrary, these cases could be well managed in an auxiliary hospital of a general type, if the special needs of these children were considered.

It is high time that the whole subject should be considered seriously by our profession, and if after careful consideration prevention does not appeal as a practical undertaking, at least we shall know the reasons for such a decision, and whether we agree or not shall not feel, as I do now, that in London we are content with the policy of drift.

THE ECONOMIC ASPECT OF HEART DISEASE.

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THE vast economic loss to the community caused by disease must be obvious to anyone who has ever reflected on the subject; more particularly patent did this become during the great war, when perhaps for the first time the labours of the Royal Army Medical Corps with regard to hygiene and preventive medicine began to be fully appreciated. The conception of disease held by the laity is largely based upon their experience of acute diseases, such as scarlet fever, measles, and diphtheria. In such cases the patient as a rule either dies or gets well again in a reasonable length of time. This, too, was the idea of the ancients, in whose writings far more space was devoted to the consideration of fever and other cognate acute diseases than to chronic disease, for, like the artisan of Plato, "they had not leisure to be ill." Yet, of course, the medical profession is well aware that in the modern world the sum total of human distress and inefficiency caused by chronic disease far exceeds that produced by acute disease—at all events in Western Europe and America—so greatly have acute diseases been reduced by the energy and science of modern hygiene. But from chronic disease the economic loss is enormous, and in the case of cardiac disease, with which this paper is concerned, it is particularly great. Thus in the United States it is said to be the cause of the greatest number of deaths and disabilities.

No doubt the abolition of all forms of rheumatism and of syphilis would reduce cardio-vascular disease by nearly two-thirds, but apart from the immediate onset of any such medical millennium it seems well to consider by what mechanism we can ameliorate the condition of cardiac patients and render their lives more economically effective.

The ancients were under the impression that the heart was invulnerable so that no disease could befall it, and in some ways it seems unfortunate that the word "disease" has to be applied to the heart, for it so often creates an erroneous impression in the mind of the laity in general and employers in particular, associating it as they do with the idea of sudden death. Cardiac disability or a "laming" of the heart would almost seem to be a more appropriate expression, for in truth when the heart has been damaged by rheumatic fever so that there is a valvular lesion, it is in many cases in a condition analogous to that of a limb after anterior poliomyelitis: it is definitely and permanently handicapped, but the condition is not necessarily progressive. But just as a man who has suffered from infantile paralysis may not have his activity very seriously impaired for his life's work, so too a patient with a compensated valvular lesion may frequently not be greatly inconvenienced. One must never forget that cardiac disability varies from complete invalidism to a state of fairly high efficiency, the majority of cases being correctly classified as "moderately handicapped." Hitherto attention has been rather too much directed to the serious cases of heart disease and away from the merely handi-