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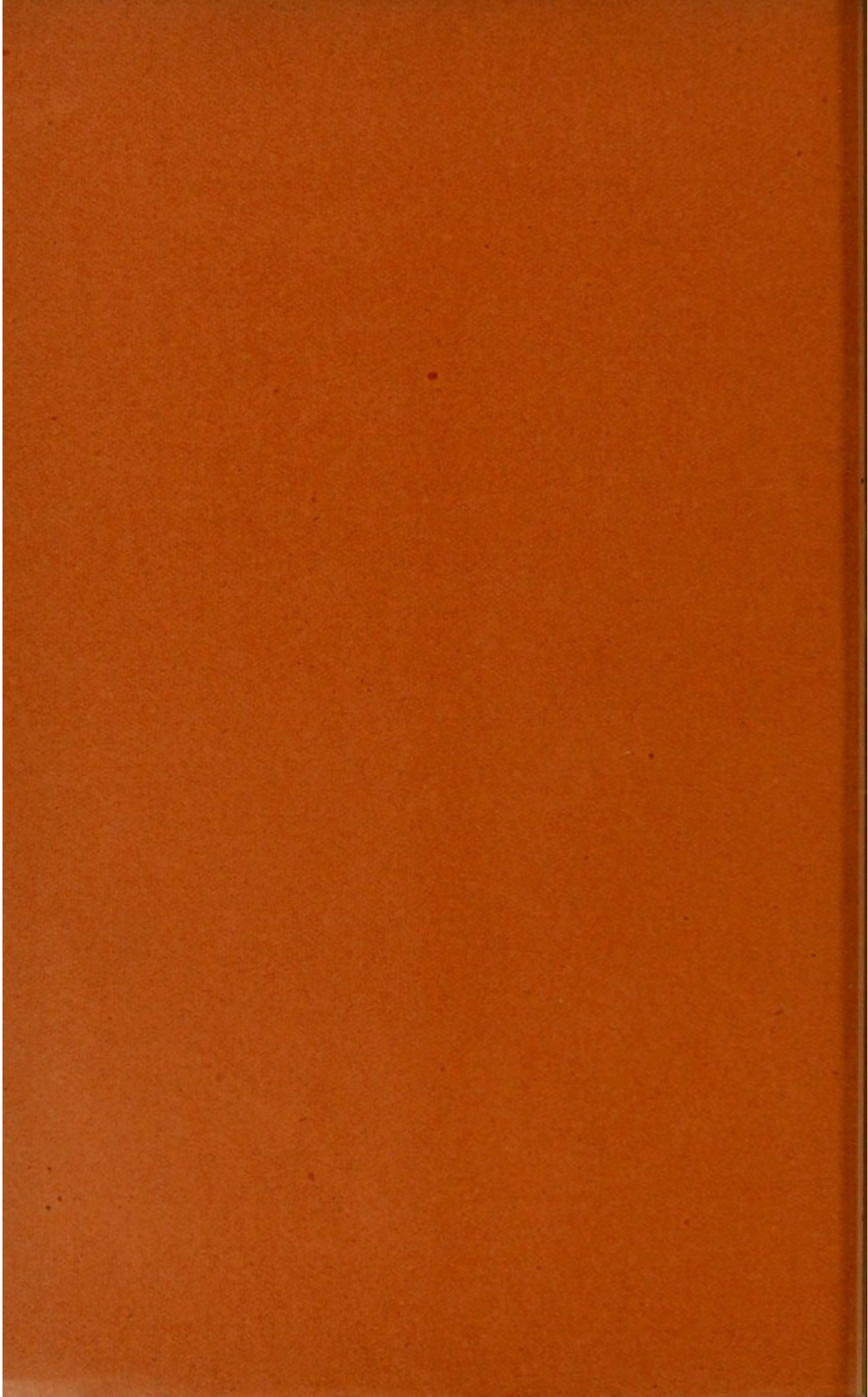
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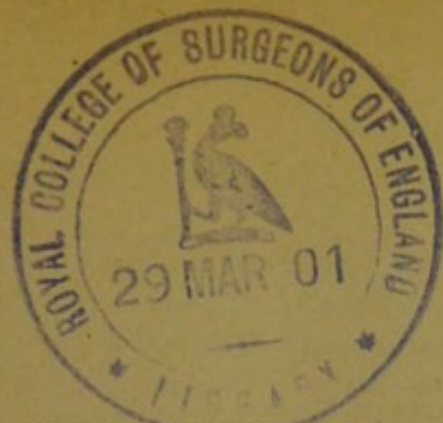
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The Relative Importance of
Valvular and Muscular Lesions
in Diseases of the Heart ❁ ❁



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THE RELATIVE IMPORTANCE OF VALVULAR
AND MUSCULAR LESIONS IN DISEASES
OF THE HEART.*

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PHILADELPHIA.

It would be incorrect to say that the importance of affections of the myocardium has been but recently recognized; yet it is probably true that the attention of teachers and authors has been much more actively given to these affections during the last four or five years, and that among physicians not engaged in teaching or writing, the subject, while not ignored, has not even yet received the attention it deserves.

One reason for this is that until recently, at least, in the didactic lectures, in the clinical lectures, in the ward classes, and in the quiz room, so much stress has been laid on the diagnosis of valvular lesions and the recognition of cardiac murmurs that the average student leaves college with the conception of valvular murmurs and heart disease as synonymous. In post-graduate teaching I have frequently had experienced men, as well as recent graduates, report that a patient's heart was normal because they had failed to find any valvular murmur. Furthermore, in considering the treatment

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of patients presenting valvular murmurs, what has seemed to have most weight with the majority of physicians, as observed in post-graduate teaching or in consultation practice, has been the name of the valvular condition—mitral regurgitation, aortic regurgitation, mitral stenosis—while comparatively little attention has been paid to the condition of the cardiac musculature or to the blood-vessels. Concerning the great importance of the vascular system in diagnosis, prognosis and treatment, I have frequently written, and in this communication shall merely allude to the matter. Attention is now directed to the importance of the condition of the musculature of the heart, which experience shows, even if *a priori* considerations did not so indicate, means more for the patient's life and comfort than does the condition of the cardiac valves. To this statement there is but one important exception, namely, the case of mitral stenosis with great narrowing; of which more hereafter.

VALVULAR LESIONS.

In many cases of valvular lesions, even of long standing, compensation is so good that under all ordinary conditions of life the function of the heart is performed almost perfectly; and it is only when extraordinary exertion, mental or physical, or extraordinary emotional strain throws an additional burden on the circulation or calls for more quick adjustment of circulatory relations, that the impairment is seriously felt. To drug such a patient because auscultation reveals an organic murmur at base or apex would be to increase his difficulties, not to lessen them. Treatment by regulation of diet and of physical and mental activities may often be judicious and tend to prolong the period of maintained compensation. For many years I used to show to my ward-classes a man past three score and ten, who had a clear history of mitral incompetence for more than thirty years, and who needed no medicine. I have watched a number of children, whose heart-valves were damaged by endocarditis of scarlet fever, grow into adolescence and manhood, even into womanhood with its duties of maternity, and still need no drugging. Sometimes the hypertrophy exceeds the needs of circulatory compensation, in which case temporary diminu-

tion of the patient's activity, purging and the judicious use of bromids and aconite will usually subserve the therapeutic indications. But whether or not the treatment outlined suffices, the point to which attention needs to be chiefly directed is distinctly the muscular condition and action, not the valve-lesion. On the other hand, when compensation has not been good, or having been good has begun to fail, the valvular lesion is, in most cases, but a secondary element in prognosis and treatment. As in all engineering problems, all the conditions need to be studied, and the measures appropriate in mitral regurgitation are often ill adapted for aortic stenosis. But it is pre-eminently the failing muscle that needs to be nourished, strengthened, stimulated or regulated. It is the failing muscle from which the burden needs to be lifted by reduction of physical, mental and emotional activities and by therapeutic devices. Unconsciously, however, the therapeutic lesson has become somewhat organized in the automatic motor apparatus of the profession, and physicians who follow the rules laid down in the text-books or by their teachers for the treatment of various valvular lesions, usually adopt measures which are, in the main, directed toward the indications furnished by those signs and symptoms consequent upon the good or bad condition of the cardiac muscle.

MITRAL NARROWING.

I shall, therefore, not dwell on this phase of the subject, save to direct attention toward the problem presented by cases of mitral narrowing. That this lesion is more common than the older text-books would indicate seems to be becoming the general opinion. Compensation is never fully established, for the obstacle is so placed that neither increased force of cardiac contraction nor increase in the containing capacity of the chamber behind the obstruction can succeed in forcing the due quantity of blood into the left ventricle and thence into the arteries with each systole. Perhaps nothing in cardiac semeiology is more significant than the disproportion between the great systolic energy and the weakness and smallness of the radial pulse, in cases of marked mitral obstruction. In order to permit the muscle to act as effectively as possible under the circum-

stances, it is necessary not only to dilate the peripheral vessels by nitroglycerin or baths or appropriate exercises, but also to diminish its own wasted and wasting exertions. For this purpose strontium bromid, and even small doses of aconite, carefully watched and regulated, have proved useful; and the apparently paradoxical, but really useful, combination of aconite and digitalis has also been of great service.

HEART DISEASE WITHOUT MURMURS.

It is, however, not in valvular lesions, but in those cases in which rational symptoms of cardiac impairment exist, without murmurs or with inconstant murmurs, that the diagnostic problem becomes most difficult and that routine treatment not only fails to do good but frequently does harm.

ACUTE DILATATION.

I can remember with what diffidence I first made the diagnosis of acute dilatation of the heart, and with how much relief I welcomed the confirmation of this diagnosis by my distinguished teacher called in consultation. Yet acute dilatation, not necessarily fatal, has seemed by later experience not common, it is true, and yet not so rare as to call for the report of isolated cases. In certain subjects it occurs more readily than in others, and the attack may be repeated more than once. I do not refer now to the cardiomyopathies of acute infectious fevers, but to the idiopathic acute dilatation, that is to say, dilatation occurring suddenly or in a comparatively short evolution, from direct strain on the heart.

The readiness with which changes in the size of cardiac chambers may occur is not generally recognized. I recall the case of a boy of 12 years in my dispensary service at the Philadelphia Polyclinic, whom, however, I saw only once, in whose case slight changes of position altered not only the position of the apex but also the transverse area of dulness, as demonstrated by the independent observation of two component diagnosticians. The phenomena of cardiac changes in the warm bath have been made familiar by the publication and multiplication of the observations of the Nauheim school. Fright, and sometimes less severe emotion, es-

pecially in the anemic and poorly nourished, will cause acute dilatation of the heart; and this condition may often persist for some time after the cause of disturbance has been removed.

Other causes leading to acute dilatation are the effect of rarefied air at altitudes and sudden, violent, or relatively excessive exertion, as in climbing, bicycling, swimming, or in athletic contests; the general or temporary physical condition of the subject and the physical and psychic environment having much to do in the determination of a relative excess; while the quantitative effort of the skeletal muscles may be less important than its character in determining heart strain. When pericardial adhesions or valvular disease, or innutrition or even latent disease of the myocardium exists, acute dilatation is much more likely to occur.

ACUTE MYOCARDITIS.

Acute myocarditis is common in all the infectious fevers even when endocarditis and pericarditis do not occur. Perhaps rheumatism, diphtheria, typhoid fever, pneumonia and influenza give the most striking examples of this class of cardiac affections, and most physicians recognize this during the persistence of the exciting disease. It is often overlooked, however, after convalescence has begun; and many patients recovering from influenza in particular are allowed to return to active work long before the condition of the heart warrants it. A condition of myopathy is thus set up, and one frequently meets with cases presenting such symptoms of impaired circulation as dyspnea, vertigo, inability to walk rapidly or to climb, sometimes with edema of the extremities, intermittence of the pulse, and precordial distress, in which the origin of the symptoms can apparently be traced to a recent or remote attack of influenza.

CHRONIC MYOPATHIES.

Still more difficult of recognition and more frequently overlooked are the chronic myopathies which have not had distinct origin in some frank infection and which have not followed valvular disease or nephritis.

Recent works upon pathology describe many varieties of myocardial lesion, with various forms of degen-

eration in the muscular fibers and with varying quantities and distribution of interstitial or substitutional fibrous tissue. Huchard, among the French observers, has made a number of refinements in the nomenclature of these conditions and has described special symptoms observed during life as associated with special forms of myocardial degeneration and interstitial alteration discovered post-mortem. Much of this, however, seems to be premature. It is well that histological studies of the dead heart should be made as systematically as possible, and the utmost information concerning the character of the structural changes gathered; but it is only after a large number of cases shall have been carefully traced in their clinical histories over several years, and the intimate nature of the lesions found after death in such cases carefully collated and compared, that we shall be enabled to analyze the data and establish the signs and symptoms which, observed during life, shall warrant a diagnosis of some special affection of the myocardium. Even the term "myocarditis" as a generic designation seems to be going too far, unless we are prepared to assert that every alteration of the cardiac muscle and every form of increase of connective tissue indicates an inflammation. The French observer's term, "myopathy," or, if we prefer to Anglicize it, "muscle disease," is better, and represents the full extent of present accurate knowledge applicable during life, to the diagnosis of the vast majority of the chronic cases which have not followed acute infectious diseases.

CAUSATION.

Among the principal causes of disease of the cardiac muscle in American men is the long-continued, even moderate, use of alcohol, and especially when this has been associated with the use of tobacco. I have not observed the same degree of impairment in those who have used alcohol alone or those who have used tobacco alone as in those, and these, of course, form the majority, who have used both. What constitutes temperate use of alcohol or tobacco varies very much with the individual. In some patients disturbance of the cardiac rhythm and irritable and weak over-action of the heart begin soon after the smoking habit has been established. In others it occurs only toward the involution period

of the organism; that is, after middle life. It is probable that the changes induced by tobacco are but slight at first, so slight that we are warranted in considering them neuro-functional; but that the long and constant repetition of these disturbances finally, by exhaustion of certain qualities in the cardiac cells, brings about degenerative structural change. The same may be true of alcohol, though the well-known tendency of this drug to produce sclerotic changes in general warrants the belief that in the alcoholic myopathies structural changes are present from the first. Alcohol and tobacco usually give rise to other sclerotic changes also, in the vessels especially, which secondarily lead to impairment of cardiac nutrition by ischemia and to increase of the work placed on the heart to carry on the circulation, owing to the heightening of peripheral resistance. Thus, further changes occur in the cardiac muscle in addition to the direct effect on it of the poisons, and to exhaustion through their influence on the nerves. Gout or lithemia, grouping under this head those general conditions of toxemia associated with the overproduction of uric acid, but in which xanthin and hypoxanthin and other alloxuric products may be equally potent, is often, too, associated with the alcoholic habit; but in cases in which alcohol is used not at all or but moderately, and in which there exist hereditary tendencies to this perversion of metabolism, myopathy is not infrequent. So, too, syphilis, in association with or independent of alcohol, may give rise to changes in the heart, not necessarily gummatous, which in turn give rise to vague clinical symptoms often difficult of interpretation. Sexual excesses, mental strain, especially if worrisome, physical overwork, whether in the serious pursuits of life or in games and athletic exercises, malnutrition, lead poisoning, the abuse of tea and coffee, and, in exceptional cases, emotion, are to be added to the list of causes.

RATIONAL SYMPTOMS.

The symptoms, at first, at least, are usually vague. They are inconstant, not only as regards different cases, but as regards the same case at different times. At first, and sometimes throughout, they may be comprised under the general head of rational rather than physical

signs. Death, indeed, may occur suddenly without any known history of either rational or physical signs. It is probable that in most cases, if not all, with the exception of cases of fatty infiltration and fatty degeneration, the earliest stage is one of hypertrophy—a pathologic, not a physiologic or compensatory, hypertrophy—this being followed by exhaustion of the undifferentiated cellular elements out of which new fibers are furnished for growth and repair, and this, in consequence, by degeneration of muscle tissue and proliferation of connective tissue. Overaction, spasmodic and irritable in character, is, therefore, followed by defective and irregular action, and the progress of lesions is marked by a corresponding change in the associated semeiology. Dyspnea, constant or occurring especially on slight exertion, tinnitus aurium, headache, dilatation of the pupil, vertigo, vague sensations of cerebral and precordial distress, sometimes actual pain, not rarely angina pectoris, cervical and occipital pain, slight blueness of the lips, injection and later dulness of the conjunctiva, increased force and tension, later irregularity and intermittence of the pulse, sometimes transient edema, often digestive disturbance, unaccountable languor, drowsiness, undue readiness to fatigue, irritability of temper, sudden cardiac palpitation and occasional and increasing periods of very slow and feeble action of the heart are noted, but not all at the same time or in the same patient. Besides this, it is evident that many of these symptoms are common to a variety of affections. Many of them may result from indigestion, most may occur from anemia, many are associated with nephritis, and they are nearly all to be found in neurasthenia. Especially difficult is it at times to differentiate between the unbalanced action of the neurasthenic heart and the irritability of impaired power of the myopathic heart. One needs to be specially guarded in such a diagnosis, for the statement to a neurasthenic that he has heart disease may so frighten him as to produce it. Murmurs are perhaps more common in neurasthenia than in pure myopathies, the arrhythmia is more changeable in its type, and the general characteristics of the patient are to be taken into consideration. In gouty neurasthenics and in other gouty subjects it is easy to refer to the heart the pain

of intercostal neuralgia, and in both gouty and syphilitic subjects it is easy to mistake the pain of costal periostitis for cardiac pain. Sometimes, however, genuine cardiac pain of myopathy or vascular sclerosis, intercostal neuritis and gouty or syphilitic periostitis are all present. Mistakes are only to be avoided by careful observation and weighing all the phenomena of the case.

THE COSTAL FRINGE.

Verging on the definition of physical signs, and I believe quite significant of cardiovascular alteration, are ectases of superficial veins, most marked on the face and thorax; in the latter situation sometimes forming what I have denominated the costal fringe, that is to say, a network of very fine red, pink or blue vessels following the borders of the costal arch like a fringe of embroidery. This, however, is sometimes found in patients presenting no rational or physical symptom of cardiac disease, and is not infallible. Usually the cardiopathic patients who present it show slight permanent enlargement of the liver, and are subject to attacks of engorgement of that viscus.

PHYSICAL SIGNS.

As regards percussion and auscultation, these are, in the late stages of myopathies, quite definite, but not so in the earlier stages. An increase in the precordial dullness in both directions laterally, with displacement of the apex-beat downward and to the left, gradually takes place. Sometimes the increase is irregular in outline, and one suspects localized dilatation of the heart, or cardiac aneurysm. With this at last goes feebleness, perhaps disappearance of apex impact or weakness and diffusion of the wave. An impurity rather than a definite murmur of the systolic sound is among the early signs, as is also, and I think this is quite significant, an approximation in quality between the first and second sounds. The first sound is shortened in duration and its tone becomes more valvular. Sometimes the second sound is relatively or actually accented. Later the sounds become rather empty, resembling in rhythm and in character the muffled drum of the fetal heart. This embryocardia is easily recog-

nized, and is significant in diagnosis. Duplication of the first or second sound may be developed. Gallop rhythm is never an early sign, but its evidence of muscle-weakness is always clear, whether in uncomplicated myopathy or in failure of compensation in cases of valvular lesion. Intermittence, even to asystole, is also significant, yet one may watch and wait for three or four minutes before he notes the dropping of a single beat, either with the finger at the wrist or with the ear over the apex, and then several beats may be dropped in a minute, sometimes as many as one beat in every four or five. Sometimes the patient himself has a sensation of stoppage of the heart, and this may or may not be accompanied with an actual intermission. It may take place frequently or but rarely. In one of my cases it was said to occur but once a day. With the patient quiet, whether recumbent or seated, or even standing, there may be neither intermittence nor irregularity; yet slight exertion, or even change of position, induce both. Among the symptoms on which I am accustomed to lay stress in the diagnosis of myopathy is undue readiness to change in the frequency or character of the pulse on slight change in the position, activity, or emotion of the patient. The volume, tension and strength of the pulse vary greatly in different cases or in the same case from day to day, and are, of course, affected by the presence or absence of concomitant disease of the arteries, the latter being usually present. They vary much, also, under medication, more, perhaps, than in uncomplicated valvular disease. Murmurs are sometimes present, constantly or inconstantly, due not so much to sclerotic changes in the valves—although these doubtless occur at times in connection with the sclerotic changes in the parenchyma of the heart—as to relative insufficiency.

For complete closure of the cardiac orifices the valves alone do not suffice. The musculature, not only of the auricular and ventricular walls, but also the papillary muscles, must act perfectly, in order to secure complete occlusion of an orifice in systole. Failure to accomplish this gives rise to adventitious sounds. Sometimes these are so marked that the incorrect diagnosis of valvular lesion is difficult to avoid.

TREATMENT.

In the treatment of these conditions, endeavor should be made to remove or mitigate the exciting causes which are usually in continuous influence. In the cases of coffee, tea, alcohol and tobacco this is extremely difficult, sometimes impossible. The reduction of the mental and physical activities of the patient is usually desirable, though this should not be pushed to excess in early cases, in the absence of such symptoms as edema, or evidence of pulmonary or visceral congestion, because the nervous worry induced may be so harmful as to overbalance the gain. It is always well, however, unless there is some counterindication, to reduce the work placed on the heart by the use of nitroglycerin in small doses; sometimes so little as $1/400$ of a grain twice a day answers the purpose. The diet is, of course, to be carefully regulated, the skin and the eliminative functions generally are to be kept in good condition, and all excesses are to be avoided. All this "goes without saying." Warm carbonated, saline baths, with massage and gently resisted movements, after the method of Schott, of Nauheim, but modified to suit the individual patient, have been of great benefit in many of my cases—so much so that the patients have often wished to continue the treatment when I have thought it best to intermit. These measures should never be kept up for too long a period consecutively, though they may be renewed from time to time. The question of exercise in some of these cases is very difficult; for with the gouty and in the early stages of their cardiopathy it is often desirable to prescribe moderate exercise. The tendency of the patient is to do nothing, or to indulge in exercise, as in other things, immoderately and spasmodically. This, therefore, becomes a question of good judgment in the individual case, not only as to the requirements of the case, but as to the trustworthiness of the patient. When severe symptoms are present, absolute rest becomes necessary.

Among drugs to strengthen the heart, improve its nutrition and regulate its action, strychnin is the most generally useful. One may also employ from time to time digitalis, of whose preparations (following Beates) I prefer Merck's German digitalin; adonis, of which a

good extract or the glucosid adonidin may be used; spartein sulphate, caffein, cactus, of which last the fluid extract or a solid extract may be used, or strophanthus in the form of tincture or solid extract. Much might be said concerning their choice in different cases, but such is not the main object of this paper, nor does time permit. Whatever drugs are used, none should be used continuously, but judicious alternation should be resorted to, and sometimes combinations will in individual cases act better than single drugs. Arsenic is of service as a general nutrient, as are also iron, gold and sodium chlorid, and sometimes, in syphilitic cases, courses of mercurial inunction, with sweating by means of hot baths, followed by potassium iodid in full doses. In some cases, both of syphilitic and non-syphilitic patients with tobacco heart, potassium iodid in small doses is of service. In gouty cases the strontium salts, both iodid and bromid, have seemed of service, not only as addressed to the underlying condition, but also as soothing the cardiac action. For combination with these, when needed, strontium lactate is an excellent diuretic. In acute conditions of cardiac incompetence, whether in the course of chronic valve and muscle disease or suddenly arising without previous disease, venesection is usually indicated. The heart can not empty itself, the patient is in great danger, and blood should be drawn promptly, fearlessly, and in sufficient quantity to afford relief.

SUMMARY.

1. In the great majority of cases of chronic disease of the heart, the exact site and nature of the valvular lesion, while always to be taken into consideration in treatment, are of less importance therapeutically and prognostically than the state of the cardiac muscles.

2. The most important exception to this general rule is in the case of mitral stenosis with great narrowing. Aconite is often of use in this condition to reduce the excessive muscular effort, even when compensatory hypertrophy has not become sufficient.

3. In many cases in which no evidence of valvular lesion can be detected during life, and in some of which slight valvular alterations, in others normal valves, are demonstrable after death, there exist rational signs of

cardiac incompetence which are due to diseases of the cardiac muscle.

4. The symptoms and physical signs of cardiac myopathy are inconstant, and in the early history of the case may be slight. In the absence of valvular lesions, intermittence or irregularities of the pulse or apex-beat, disturbance of rate or rhythm by slight causes, and recurrent pain referred to the precordium, in non-hysterical and non-neurasthenic subjects, are the principal local symptoms calling attention to the disease of the cardiac muscle. Tinnitus, vertigo, dyspnea, venous ectases, visceral congestion, edema, and other evidences of circulatory disturbance may be slight and escape attention until sought for. There is usually impurity or weakness of the first sound of the heart, with approximation of the two sounds in quality or relative accentuation of the second sound; later embryocardia and gallop rhythm may develop.

5. Gout, syphilis, alcohol and tobacco, tea and coffee, sexual excesses, mental strain and physical overwork, either in serious pursuits or sports, are among the chief provocations of disease of the myocardium, apart from those lesions secondary to the acute infections or consecutive to nephritis or valvular disease. Among the acute infections, influenza is a frequent cause of cardiac muscle disease.

6. Other than the general diagnosis of disease of the myocardium, there is not yet sufficient knowledge of clinical signs to permit accurate recognition antemortem of the pathological nature of the lesion.

7. The diagnosis between neurasthenia of the heart and disease of the myocardium may be difficult.

8. The chief importance of the subject lies in the avoidance of error; *a*, in the prognosis and treatment of valvular disease which may be overtreated or undertreated through failure to estimate properly the condition of the muscle; *b*, in the recognition of serious lesion of the muscular structure of the heart in cases that have been supposed to be normal because of the absence of valvular murmurs; *c*, in the distinction between organic muscular lesions and functional disturbance, and in the realization of the fact that the latter may lead to the former.

9. In treatment, judicious regulation of diet, rest and exercise; avoidance of exciting causes and excesses of any kind; the good functional condition of the skin and eliminative organs, are of the first importance. Warm, saline, carbonated baths and, in some cases, gentle massage and resistance exercises carefully adapted to the individual case, are of great benefit. Nitroglycerin is the most useful single agent of the *materia medica*. Strychnin, digitalis, adonis, cactus, strophanthus and spartein have usefulness in individual cases. Arsenic, gold and sodium chlorid and iron are useful tonics. Potassium iodid and mercurials sometimes have special indication. Venesection should be made promptly and sufficiently in the case of sudden and urgent symptoms of cardiac failure.

