AN ADDRESS DELIVERED AT THE OPENING OF THE SECTION OF MEDICINE AND THERAPEUTICS.

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INTRODUCTION TO A DISCUSSION ON FUNCTIONAL DISORDERS OF THE HEART.

GENTLEMEN,—The subject which I now venture to submit to you for discussion to-day is one on which, as it appears to me, this Section may very profitably engage. It may fairly be affirmed that our knowledge at the present time respecting it is still far from complete, and if we can bring fresh light to bear on it, our time will have been usefully spent.

Cases illustrating what we commonly term functional disorder of the heart are frequently met with in practice. Sometimes they present little difficulty either for diagnosis or successful treatment, at others, very nice discrimination is called for, and both diagnosis and treatment may exercise our highest skill.

The whole subject has certainly become better defined for us since knowledge of cardiac physiology, and the due recognition of physical signs relating to the heart, have become part of the common knowledge of the profession. On this account we can hardly go back with profit to the teaching of our forefathers respecting these conditions, and I say this with all veneration for those who preceded us, since I am not one of those who consider that the dawn of true knowledge only fell upon those of us who first saw the light some forty or fifty years since. I learn every day to respect more and more the calm judgment and intuition of those who lived in an age of less fuss and feverish strife, of more calmness and reflection than is easily procurable for us of to-day.

The remarks I propose to make shall refer to conditions of cardiac disturbance and of vascular disturbance which can fairly be held distinct from all such as are plainly associated with, if not dependent on, organic diseases of the heart or the great vessels. We apply the term "functional" here, and I maintain the use of the term as necessitated for clinical practice, *pace* the purists and the physiologists, whom indeed we often have to part company with to meet the claims of the bedside. We leave the physiologist at the door of his laboratory, and we are to heal our patients in our wards. The work of each is different. The physician is not commonly skilful in the laboratory, the physiologist, if he be a physician, is not necessarily the best practitioner, and I do not expect that time will effect much change in these relationships. For me, medicine is an art founded on many sciences, and a great physician is a great artist. I take it the physiologist would refuse to be dubbed an artist. Of course I say this with the highest respect for the latter, but it is necessary in these days to claim the rightful sphere for the bedside man whose work is with the ever changeable problems presented by humanity in its sicknesses. Our aim as hospital teachers is to make good practitioners, men who can treat and heal the sick. That, I say, is our whole business.

Our subject to-day relates to irregular and inordinate action of the heart and blood vessels, whether that action be unduly slow, irregular, intermittent, or unduly frequent.

We are here face to face with symptoms which though in many cases appearing practically alike, yet own varied causation, and in each case our duty is to trace out the cause. Symptoms of diseases at the bedside are thus like the products of diseases in the deadhouse. A morbid change may be the result of very different causes, and the clinical history alone can sometimes supply us with the exact cause which led up to the particular morbid product. Hence morbid anatomy often reveals but a part of the whole story of the case under examination.

I shall clear the way for this discussion by treating the subject

of functional cardio-vascular and rhythmical disturbance in the following order:

a. Infrequency	} Arrhythmia.
b. Intermittency	
c. Irregularity	
d. Inordinate frequency (tachycardia).	
e. Inordinate vascular pulsation.	

a. INFREQUENCY.—*Infrequent Pulse (Pulsus rarus)*.—This condition is not often met with. Sometimes it appears as a constitutional peculiarity, not more than thirty or forty beats occurring in the minute. Such infrequency may accompany convalescence from acute diseases. Where physical signs of cardiac disease are detectable, aortic stenosis or fatty condition of the walls may be indicated. The most marked instances within my own knowledge of the class of cases I now refer to arose apparently as a result of the influence of malarial poison, which sometimes leaves an impress for life on the heart's rhythmical action in respect of infrequency. Jaundice is well known to cause infrequency of pulse. Increased arterial tension has this effect, but in much less degree. The nervous condition upon which this alteration of rhythm depends is either of temporary or of permanent character. The results of injuries to the head causing infrequent pulse may be recalled in this connection—the so-called *pulsus cephalicus*, also met with in encephalitis, meningitis, cerebral abscess, and hæmorrhage. Whether the condition is due to inhibitory sympathetic influence, or to intensified action of the vagi fibres is not certainly known. In the acute cerebral disorders, infrequency may suddenly give way to extreme frequency or to irregularity, the morbid process either being of a wandering nature, or acting at one time in a paralyzing, and at another in an irritating, fashion. In the instances due to malarial influence, we must suppose that some abiding change has occurred in the cardiac centres in the medulla oblongata, whereby a complete alteration of rhythmic impulse is established. In any case of infrequency, there are no facts, so far as I know, to justify anxiety or a grave prognosis in respect of longevity.

b. INTERMITTENCY.—I take, next, intermittent action of the heart, that condition of pulse known as arrhythmia. The pulse here is regular, but from time to time a beat is dropped. The next beat is more forcible. This has, as is well known, sometimes no important significance, at others it may portend grave cardiac disease. Under the influence of emotion or excitement, irregular action is apt to supervene in some persons, but this may only occur when there is from some cause a lowered standard of general health. It is not peculiar to either sex. It may be affirmed that irregularity is commonly of graver import than mere intermittency. In any case the gravity is to be determined by careful physical examination of the heart and radial pulses. As emotion or excitement passes off, the heart's action becomes regular in most of the simple cases. Amongst the less serious causes of intermittent action may be noted the action of excess of tea-drinking or indulgence in tobacco-smoking. Prolonged overwork, night-work, curtailment of sleep, anxiety and worry, violent shock or grief, are all recognised factors in inducing intermittent cardiac action. If the sufferer is not advanced in life, and mends his bad habits, with time, all such effects may pass off, a proper trophic equilibrium being attained. Habitual intermittency may, however, be compatible with a full term of life and a heart practically sound. Intermittency may pass off temporarily under the stress of an acute illness with pyrexia, and return with the re-establishment of health.

The cause of temporary intermittency is not uncommonly irritation set up by dyspepsia. Recumbent posture may aggravate it, and the assumption of the erect position remove it. Hence, retiring to rest after a full meal may prove an exciting cause. An over-acid state of the primary digestive process in the stomach and duodenum may be thus provocative. The line of irritation here is not far to seek, the gastric branches of the vagus conveying morbid impulses to the circulatory centres in the medulla oblongata.

For purposes both of diagnosis and prognosis in any given case care must be taken to ascertain the degree of arterial tension present. Speaking generally, it may be affirmed that high tension pulses with intermittency are of more serious moment than the reverse, such conditions probably being significant of progressive damage to the valves and coats of the aorta. Again, the super-vention of intermission in the pulse after sudden exertion is of graver import than an abiding condition of intermittency under ordinary conditions. The weak heart fails under stress, the

sound heart rallies under this exertion. We may speak of two forms of intermittent pulse: (a) where the condition is constant, and (b) where it is only occasionally induced.

a. Constant Intermittency.—The patient is generally in middle or advancing life. He may be quite unaware of any cardiac irregularity, or may subjectively realise the thump of the organ as a more vigorous beat succeeds to the intermission. This condition is not of serious import in the absence of any marked signs of heart failure or arterial decay, and is compatible with advanced longevity. Chloroform commonly removes the intermissions, and a meal with some stimulant may often act similarly. Intermittency of the pulse is often associated with the gouty habit of body; it may be an abiding condition or only temporary. I am inclined to believe that the gouty habit induces irregularity rather than intermission of cardiac action, and I shall reserve what I have to say on this point till I come presently to discuss irregularity of rhythm.

b. The intermissions may be only occasionally present as the result of some dietetic error or dyspeptic condition; excess of tea, coffee, or tobacco may induce this, and what is not an excess in any of these agents for some persons may prove highly provocative in others, who are readily affected by them.

c. IRREGULARITY.—*Irregular Cardiac Action.*—By this is signified irregularity of rhythm and inequality of tension. The pulse is irregular in force and volume. This is sometimes a temporary condition, due to dyspepsia more often than to any other cause, especially flatulent dyspepsia. Emotion may likewise induce this. Abuse of tea, coffee, and tobacco may also be provocative. It is perhaps less common to meet with persistent cardiac irregularity than persistent intermittency apart from manifest organic change in the walls or valves of the heart, and when it occurs is probably of graver import. Prognosis in any case will depend altogether on the textural soundness of the heart. Though occasionally met with in fatty degeneration of the cardiac muscle, it is more often absent than present. The disturbances of the heart's action which depend on a gouty habit of body are very noteworthy. Irregularity of the pulse is apt to supervene after middle life. There may have been occasional intermittent action of the heart previously. The irregularity is very pronounced sometimes, and may persist for many years without the supervention of any detectible organic lesions save weakness. Attacks of overt gout and of gouty ailments, such as phlebitis, may occur from time to time. In such persons, suffering from chronic eczema, there is sometimes observed a return to regular action of the heart if the skin affection becomes active and itchy. This may happen again and again in the same patient.

d. INORDINATE FREQUENCY.—*Palpitation.*—The special significance of palpitation apart from organic disease varies greatly. The patient may or may not be conscious of undue or violent cardiac action. It is either temporary or persistent. Dyspeptic disturbances is often to blame for the temporary form. In the abiding varieties there is commonly profound nervous disorder. In accentuated form, the malady known as Graves's disease presents this as one of its three cardinal symptoms.

Paroxysmal varieties have been noted in connection with chronic rheumatic arthritis, of which I have noted several instances. Dr. Eales has lately directed attention to a form of the disorder associated with displaced and floating kidney of which I have not any experience.

Dr. Samuel West has noted examples of paroxysmal heart hurry not dependent on any permanent recognisable disease of the heart, though temporarily accompanied by dilatation and murmur. Dr. Bristowe first called attention to cases of this nature, styling them instances of "recurrent palpitation of extreme rapidity in persons otherwise apparently healthy." It is probable that under the name palpitation several varieties of cardiac disturbance may have to be differentiated. Dr. Bristowe is of opinion that there is no essential distinction to be drawn between cases of palpitation characterised by simple rapid cardiac action, and those in which rapidity and irregularity are combined, and that the paroxysmal state may eventuate into a persistent one. In some of these cases the cardiac pulsations do not always reveal themselves at the radial artery. In several of those recorded by Dr. Bristowe there was organic disease, and in one there was hypertrophy and dilatation, although there was neither disease of the valves nor degeneration of the cardiac muscle. Such changes as occur in uncomplicated cases Dr. Bristowe believes to be the consequence of the disordered rhythm, and not the cause of it. Many of them persist for years, some as long as fourteen years, but they usually

end fatally, and sometimes suddenly, by syncope. Rapid pulsations may alternate with great infrequency in some of these cases, two hundred beats giving place to thirty-four in a few days in one recorded by Dr. Bristowe. The paroxysms are apt to come on without warning or any recognisable provocation, and may last a few minutes or hours, or even for months before an ordinary pulse rate is restored.

It is noteworthy that cases of this kind occur in middle life, and about equally in both sexes. Dr. West is of opinion that the symptoms are due to myocarditis, and, though nervous, depend on structural, though presumably temporary, changes in the muscular tissue, and he thus differs from Dr. Bristowe in his interpretation of their true nature. Certainly, a gradual failure of the heart is apt to supervene in these cases, and the prognosis in any given instance must be considered grave both in respect of renewed paroxysms and of the ultimate issue. As antecedents of several of the recorded cases, it is to be noted that rheumatism and syphilis figure, and that undue strain is often the exciting cause of paroxysms. These facts appear to me to justify Dr. West's views in respect of their pathogeny rather than those of Dr. Bristowe.

e. INORDINATE VASCULAR PULSATION.—This condition is well recognised as a functional disorder. It is found in the abdominal aorta in conditions of anemia, and after hemorrhage due to gastric ulcer. In persons during middle life, of both sexes, I have witnessed many examples, sometimes with dyspepsia in an atonic form, with hypochondriasis, and a tendency to oxaluria.

Again and again I have had cases submitted for an opinion as to the likelihood of aneurysm. In leukæmia and pernicious anemia I have not met with inordinate pulsation in the large arteries.

I have followed some of these cases—when death has supervened from other causes—to the *post-mortem* room, and have never found any gross morbid anatomy for them. The conclusion is therefore clear that they are dependent on disordered nervous conditions. No mere temporary state of diminished arterial tension will account for the symptoms. There must be some loss of vasomotor control. The associated nervous symptoms and antecedent neurotic conditions must not be ignored in most of the cases. I have never seen or read of a fatal issue as a consequence. The drugs which prove of any avail are such as act specially through the nervous system, and this fact also sheds light on the nature of the ailment.

Hysterical palpitation is a well-marked variety. Emotion, fits of bad temper, and fright are provocative in persons already disposed. The gouty habit of body is certainly a cause.

The palpitation may be entirely subjective, the cardiac rhythm not being really increased, but the beats forcible, and giving rise to loud sounds. Sometimes the beat appears to the patient to stop, and resume its action with a violent thump or sensation as of "turning over."

Examples of what is termed irritable heart come into this large category. These occur most frequently in young men who take violent exercise, and live hard in all ways. Both in the navy and army such cases occur, especially in the first years of service, and heavy drill and violent muscular exertion are to blame. No valvular lesion is found in these cases, but the action of the heart is violent, and indicates some degree of hypertrophy. Unless rest is secured for a long time in such instances some permanent lesion is certain to accrue, and many of the patients are dismissed from the services before recovery takes place. The young military recruit suffers more than the young seaman. The former is often younger than he avows, and has perhaps been poorly nourished; while the latter is more carefully selected and gradually trained to his duties. His dress, also, allows of less restraint to the circulation.

Graves's disease is an exquisite example of a cardio-vascular disorder dependent directly on neurotic influence. The latter is either inherited in some form, or acquired as the result of exhaustion by spanæmia, poor nutrition, or prolonged diarrhoea. The disorder is, however, not to be considered in the class now before us, for there is certainly more than functional disorder here. There are several grades of it, some cases being temporary, others being very severe and fatal. Whether the primary nerve disorder lies in the sympathetic cervical ganglia or in the medulla oblongata is not yet determined.

Balfour, of Edinburgh, teaches that nervous origin of any case of palpitation may be ascertained by making the patient exert himself. Extra exertion has the effect of subduing the rapid

action. With organic lesion (such as fatty change) present the contrary effect will ensue.

In the earlier stages of rapidly advancing chronic rheumatic arthritis, persistent tachycardia has been especially noted. The pulse may be as frequent as 120, or reach 200 in the minute, without any cardiac or vascular murmurs, and in the absence of pyrexia. Dr. Kent Spender, of Bath, has called attention to these remarkable symptoms, and my experience is confirmatory of his observations. Women appear to furnish most examples of this disorder. It is to be noted that this form of tachycardia is persistent, and not paroxysmal, and is hardly, if at all, amenable to ordinary cardiac sedatives.

In the condition of the respiration known as "Cheyne-Stokes breathing," the pulse may become diminished in force and frequency towards the end of the respiratory pause, but irregularity is not usually noted; it is commonly of high tension.

In the superficial sketch which I have now presented to you, I have endeavoured to consider only such conditions of cardio-vascular disorder as are, for want of a better term, called functional. There is as yet no morbid anatomy for them, yet for many of them the line is apt to be transgressed, and in time there are found changes in the direction of decay by atheroma, fatty degeneration with fatal issue. Have we not here the earlier manifestations of organic disease, changes indeed, but such as may often be recoverable if early detected and wisely treated? To my mind the line of breakdown—for such it is—appears to be in the central nervous system, involving the parts more especially which minister to the regulation of cardio-vascular trophic equilibrium; and here we have to do, so far as we know at present, with the centres in the medulla oblongata, and more especially with the vagi and sympathetic nerves. The inhibitory action of the vagi appears to be suspended. The peculiar association of tachycardia with the earlier symptoms of riotous chronic rheumatic arthritis appear to me to throw some light on many cases of disturbed cardio-vascular rhythm. I am convinced of the neurotic element in most cases of arthritic disorder, and as rheumatic disease is prone to fall on the motorial elements throughout the body, I feel sure that this morbid direction is determined mainly through the nervous system. I regard these failures in rhythm as expressions of decay, more or less, in the centres regulating these functions, and these may be temporary or limited, at times so little grave as to constitute recoverable conditions, at others so severe as to preclude hope of permanent relief. In some of these cases there is manifest inheritance of some neurotic condition which underlies and dominates the whole process.

There must never be a note of despair in any of our therapeutic efforts; and by attention to early symptoms, to restoration of healthy function throughout the body, we may hope to rescue many of the sufferers from these particular ailments. Naturally in this connection we resort to various cardiac and vascular sedatives of which digitalis and aconite serve us in good stead. Nutrient tonics such as iron, cod-liver oil, and arsenic, are distinctly of avail. The digestive system, being often in fault, demands especial attention, while the various bromide salts are often distinctly useful in combating the more overt nervous symptoms present in many of these patients.

Amongst my hearers must be many who can illustrate from their full experience many of the conditions I have here tried to depict, and I call on them to do so, and to help forward our knowledge on this confessedly difficult and very important subject.

Lastly, I would urge that, as practical bedside physicians, we pay good heed to what is for us of the last consequence—the treatment of cases such as I have described. We meet here not merely as *doctrinaires* or schoolmen, but as servants of the public and healers of the sick.

II.—EDWIN RICKARDS, M.A., M.B.Oxon., F.R.C.P.,

Honorary Physician, General Hospital, Birmingham.

It seems to me that ever since it became known that cardiac murmur was evidence of valvular defect of the heart, the consideration of valvular disease has overshadowed that of functional disorders. We have been making our way to a perfect knowledge of valvular disease, and now we are fast approaching the end of that journey.

Our knowledge of functional disorders is in its infancy. Speaking generally, I consider that every form of functional disorder of the heart of any duration, or of repeated occurrence, is a sign

of a weak heart—an indication that the reserve power of that heart is abnormally small. The potential energy of hearts free from organic disease varies within a wide range. Weak hearts may, however, work efficiently even up to old age, and only break down under avoidable strain. They are very amenable to treatment, but a disregard of existing weakness may lead to organic changes or sudden failure.

I purpose making a few remarks touching slow pulse, or, as it has been termed, bradycardia, which I define as an affection in which the number of heart beats are fewer than 40 per minute and the condition is a chronic one.

The most generally recognised causes of slow pulse are congenital defect, injuries to the neck implicating the medulla and cervical cord, mental strain, and organic disease of the heart. Is it a congenital condition? I know of no case which conclusively proves that it is. It may occur early in life. Chomel found it in a boy aged 15, suffering from valvular disease of the heart. In one of Mayo's cases¹—a man aged 35—it had existed for fourteen years. M. Lause, of Lyons,² found it in a man aged 26, whose heart was otherwise normal. And it is a condition which may persist for a long time. Dr. Southey³ mentions the case of a gentleman who had a pulse of 20 for thirty years. Fifteen years ago I saw a gentleman whose heart's action was regular and the beats were 30 per minute, whether he was standing, sitting, or walking. He was at that time 65 years of age, and vigorous in mind and body. I could detect no organic disease of the heart. His surgeon then told me that his pulse had been known to be slow for forty years; that he had always been a very thin man, but that he had had no fits or faintness, nor serious accident or illness; that alcohol and tobacco did not suit him. He is still alive. But, until a case can be found where the pulse has been observed to be slow from infancy to childhood, or even to puberty, I do not think we shall be in a position to say that the condition is ever a congenital one.

The view that slow pulse may be the result of injuries and diseases of the medulla and cervical portion of the cord is supported by a case recorded by Holberton⁴ where, two years after an injury to the neck, the pulse became slow and where the medulla was subsequently found atrophied, and by a case of Dr. Fletcher, referred to by Dr. Russell⁵, where slow pulse followed an injury to the neck many years previously and where the cervical portion of the cord was atrophied. But a study of these cases has led me to think that they afford but thin evidence that the slow pulse in them was the result of changes in the medulla and cord. In a case under my own observation, where the atlas and axis were carious, the pressure on the medulla and spinal cord sufficed to cause complete paralysis, even of the diaphragm, and yet the pulse rate was accelerated not slackened.

Charcot, in his lectures on diseases of the nervous system, states that he has met with three cases in aged persons where the pulse was permanently slow and where *post-mortem* examination revealed no organic disease of the heart, and he urges that in these cases the medulla was at fault.

Mental strain has been followed by slow pulse in several recorded cases. Hewan⁶ cites himself as an instance of slow pulse. In him the condition followed a period of great anxiety.

But before concluding that in such cases the slow pulse was due to an affection of the central nervous system more exact information as to the state of the heart than is at present forthcoming would seem to be necessary. But I think we may safely assume that in most cases of slow pulse organic disease of the heart is detectable. The phenomenon is not connected exclusively with any one cardiac lesion. The organic disease may be valvular, mural degeneration, or chamber enlargement.

Dr. Russell⁷ collected the records of 38 cases of slow pulse which were associated with evident disease of the body, in 30 there was organic disease of the heart. My limited experience is opposed to the doctrine that slow pulse is a common symptom of fatty heart. Besides the one already alluded to I have seen three cases of slow pulse, where the pulse has persistently ranged between 26 and 38. In all these latter cases there was evidence of organic disease of the heart, in all the heart was enlarged, in all there was an apical systolic murmur, in all an occasional abortive beat, all had fits and

¹ *Lond. Med. Gaz.*, vol. xxii.

² *Med. Times and Gaz.*, 1881.

³ *Clin. Soc. Trans.*, 1875.

⁴ *Med. Soc. Trans.*, vol. xxiv.

⁵ *Med. Times and Gaz.*, 1877.

⁶ *Lancet*, 1875.

⁷ *Med. Times and Gaz.*, 1877.

suffered from giddiness and dyspepsia, all were middle-aged men, in no case could the phenomenon be traced to any cause outside the heart.

What is the prognostic significance of slow pulse? Here, as in valvular, much depends on the symptoms to which it gives rise; in the absence of symptoms, and in the absence of irregularity of the pulse it is compatible with vigour of mind and body and with longevity. The organ which first suffers is the brain. Fits of a mixed character—syncopal and epileptiform—due to cerebral anæmia, are of frequent occurrence; they were present in twenty-nine of Dr. Russell's thirty-eight collected cases. The repeated occurrence of these fits, to my mind, necessitates a bad prognosis as far as longevity is concerned, but even these cases with care may last for years. In the Croonian Lectures, 1887, Dr. Broadbent cites cases of temporary slow pulse, with dropped beat and bigeminal pulse, which by rest got well. As regards treatment, my patients derived no benefit from digitalis, strophanthus, iron, arsenic, quinine, or atropine. They got to think that stimulants afforded them no real help; that an albuminous diet, and a diet free from much fluid, suited them well, and that their well-being depended largely upon the avoidance of severe physical exertion. I think that slow pulse and intermittent action of the heart may be bracketed together, and attributed to defective muscular irritability or defective energy of the ganglia of the heart.

III.—J. E. EDDISON, M.D., Senior Physician Leeds Infirmary.

DR. EDDISON thought that the use of the term "functional disease" was liable to mislead us, and make us assume that we were dealing with disease when we were only describing a symptom. We were too apt, when we did not know the cause of a particular disorder, to attribute it to the nervous system. If we really meant that certain cardiac disorder was due to disease, say, of the medulla, we should describe it, and, indeed, treat it, as a disease of that region. So with cardiac disorders, palpitation, dilatation, and so on; if they were due to want of adequate excretion, or an abnormal condition of the blood, such as anæmia, they ought to be described as such, and treated accordingly. He referred to the frequency of cases of weak heart in which the alternate beats were not felt at the radial pulse. True slow pulse and true quick pulse going on during life were—like extreme shortness or extreme tallness—only unusual deviations from the normal, and in no way to be classed as disorders. They were, however, very interesting in many ways, particularly as showing the range of physiological variation.

IV.—W. R. THOMAS, M.D., Bournemouth.

WE are aware that cases of functional disease of the heart require the greatest care on our part when forming a diagnosis. It is very difficult, often after the most careful examination by stethoscope and otherwise, to come to a proper conclusion, especially when the pulse is intermittent, and certain murmurs are heard; but having once decided that it is a functional disorder, then we have to find out the cause.

I think that the several causes of this disease may conveniently be divided into five, namely:—

1. Mechanical: those dependent upon mechanical causes, generally found below the diaphragm.
2. Nervous: those dependent upon the effects of certain medicines upon the nervous system.
3. Hæmic: those dependent upon the condition of the blood.
4. Reflex: those dependent upon reflex causes.
5. Central.

1st Class. Dyspepsia, owing to any gastric disease, will tend, mechanically, to produce cardiac symptoms, as the presence of indigestible food or a flatulent condition will, by pressing upwards, interfere with the action of the heart; especially is this noticed when the horizontal position is assumed. Indeed, anything which tends to produce a distended state of abdomen will act in a similar way; for instance, constipation of bowels, pregnancy, tumour, and so on.

2nd Class. Tea is perhaps one of the principal causes. When I was physician to the Sheffield Public Hospital, I always had a number of old ladies under my care who practically lived on tea—tea for breakfast, dinner, tea, and supper. Tea acts through the nervous system upon the heart; it acts upon the mucous membrane of the stomach, producing a dyspeptic condition, and

its consequences pressure upwards and, ultimately, owing to mal-assimilation brought on in this way, a general state of debility.

Tobacco acts as a sedative upon the heart, and often gives rise to symptoms which seem to be, and indeed are, sometimes very serious; an intermittent, irregular, weak pulse; a tendency to faint (sometimes actual syncope occurs), a tottering gait, and other serious symptoms. By its action upon the salivary secretion, and indirectly upon the gastric secretion, it produces dyspepsia and its results—mechanical interference with the heart's action and debility.

Alcohol acts not only upon the heart, but upon the nervous system generally. It acts at first as a stimulant, and afterwards as a depressant, and ultimately by its presence in the blood it produces a disease of vessels, heart, and other organs. By inducing a state of chronic gastritis it gives rise to indigestion and its consequence, namely, pressure upwards against the heart.

3rd Class. An impoverished condition of blood, whether it be called anæmia, chlorosis, or by any other name, ultimately gives rise to want of tone in the nervous system generally, general want of nutrition in the muscular system, including the heart itself, and functional symptoms necessarily result. Other organs suffer as well as the heart.

4th Class. Reflex causes often produce such symptoms, the most common being uterine derangements, and often, indeed, the fear of frequent examinations and local applications or interference. The uterus and heart seem to be intimately connected by the nervous system. I have seen constipated bowels and the presence of worms produce heart symptoms; so also have frequent catheterism and stone in the bladder.

Of course, excessive excitement of sexual organs, in any way induced, is a frequent factor. I have seen such produce not only serious functional symptoms, but also a miserable state of mind bordering on insanity.

5th, Central. Certain diseases of nerve centres do, no doubt, rise to some of these symptoms, but generally there are other signs pointing to central mischief also. I am sure that I have seen the heart mischief of exophthalmic goitre without the exophthalmia and without the goitre.

By considering these several causes, and others which time does not permit me to name, by exclusion we can generally come to a conclusion, and can form a very good idea of the curability of the cardiac mischief, as it will depend upon our ability to remove or not the cause.

I am not surprised at our President, in the excellent address which we have had the pleasure of listening to, not including angina pectoris. I look upon angina pectoris as a disease which depends upon organic mischief—structural disease of arteries generally; but there are symptoms simulating those of angina which are purely functional.

V.—E. MARKHAM SKERRITT, M.D., F.R.C.P., Senior Physician Bristol General Hospital.

DR. SKERRITT considered that it was important in cases of unusually fast or slow pulse to recognise clear that there was no absolute standard of normal pulse rate, and that variations in rate of the heart's action might be physiological even within wide limits. It was interesting to note that in a certain number of such instances the peculiarity was hereditary. It was necessary to look not only to the actual rate of heart beat, but also to the associated phenomena; and, when it was found in any given case that the apparent abnormality was not accompanied by any physical signs of disease in the heart or elsewhere, and that there was in addition a total absence of symptoms of weakness of heart or disturbance of its function, and especially if the condition were known to have existed unaltered for a long period, in such a case it might fairly be regarded as physiological rather than pathological. Surely nothing more could be asked of an absolutely normal heart than that it should do its work well for over eighty years, as in the instance of slow pulse already referred to.

Passing from this subject, there was a group of cases of functional disturbance of heart which it was important to recognise on account of their close simulation of serious organic disease. It was not uncommon to meet with patients who had reached the age at which degeneration of heart fibre tended to occur, and who presented the symptoms usually associated with fatty heart, weak and perhaps irregular pulse, giddiness, tendency to syncope, and the like; and yet, under appropriate treatment, all the adverse symptoms disappeared. The condition was frequently

associated with overwork or worry. The recognition of this variety of functional disturbance of the heart was of importance from the point of view of prognosis, as it had repeatedly come to the knowledge of the speaker that a diagnosis of fatty heart had been made which the subsequent history of the case proved to be erroneous. It was usually impossible at first to be certain that no such organic change existed, but it was most important to give the patient the benefit of the doubt, and not condemn his heart before time had been given for its possible recovery.

VI.—SIR WALTER FOSTER, M.D., F.R.C.P.LOND., M.P.

Senior Professor of Medicine, Queen's College, Birmingham.

SIR WALTER FOSTER said that as the President of the Section had called upon him to speak he would obey, although he had unfortunately made no preparation by consulting some of the records of his past experience. The material he could lay before them would therefore consist very much of the impressions left on his mind by a research which he had made some years back on cases of frequent pulse. Several cases were studied, most of them in young women who had marked cardiac disturbance without the signs of any organic disease. In these cases the pulse rate was seldom less than 120, and in most cases commonly about 150 beats per minute. The cases were studied for the purpose of testing the efficacy of remedies in reducing the pulse rate. The patients were in the first place kept in a recumbent position for some days without drugs, and the recumbent position was not found to lower the pulse rate to any decided extent. At the same time, the observation was made that the body temperature of these patients was in nearly all instances slightly above normal, being from 99° to 100° F., the lower temperature being observed as often at night as in the morning.

With a view to reduce the frequency of the pulse the following methods were tried:—Ice applied to the præcordial region was found to lower the pulse rate, reducing a pulse in one case of 150 to 104, but the reduction only lasted a few hours after the cessation of the application. Bromide of potassium in 20-grain doses three times a day produced no effect. Caffeine to the extent of 12 grains a day was found to reduce the pulse in one case from 140 to 95 in the course of three days; but the full effect was temporary, for, under the continued use of the drug, the pulse rose again to 120, though it never reached the previous standard. The use of digitalis was not more satisfactory. Aconite in 5-minim doses three times a day reduced the pulse some 20 beats on the daily average, while the temperature remained practically unaffected. Tincture of veratrum viride was tried at first in 5-minim doses, and afterwards in 10-minim doses thrice a day. In the larger doses it reduced the pulse rate considerably, in one case bringing the pulse rate down from 130 to 60, but it had to be discontinued in consequence of the nausea and headache which supervened, and the pulse rose again.

Hydrocyanic acid was found useful in some cases probably dependent on gastric irritation; but the drug from which most benefit, especially long-continued benefit, was derived was quinine. It was tried in quantities of 10, 15, and 21 grains daily, and reduced the pulse rate and the temperature. In two cases in which it was tried over some weeks, the pulse rate was reduced after other remedies had failed. In one case it fell from 156—the previous average—to an average of 90, at which it remained for some weeks after the cessation of the remedy, and in another case it was lessened from 130 to 84, the temperature in both cases returning to the normal standard. These cases of rapid pulse were essentially neurotic cases, dependent on strictly emotional or sexual causes, and in other cases on some reflex irritation. These cases shaded off gradually into Graves's disease, and he was confident that a class of cases of rapid pulse occurred which, under the persistence of their causes, would gradually develop into this formidable malady. For the treatment of such cases he strongly advised quinine in largish doses, continued over a long period. He had seen cases of this kind, in which rapid pulse had been succeeded after a time by fulness of the thyroid and exophthalmos, gradually restored to health under such treatment. One of the worst cases of fully marked Graves's disease which he had ever seen, had, under his observation, been cured by the occurrence of pregnancy. In some such cases he had found electrical treatment by the application of galvanism to the neck reduce the pulse frequency during the application, and in the course of time to be followed by a permanent reduction of the frequency of the pulse.

VII.—C. R. DRYSDALE, M.D.,

Senior Physician Metropolitan Hospital.

DR. DRYSDALE thought that the best division of the subject discussed by the Section was the one proposed by Dr. W. R. Thomas. He thought there was no doubt that in speaking of functional derangements of the heart, it was only meant that no lesion could be discovered either before or after death to account for the symptoms. The cause of slow pulse was usually to be found in some previous acute disease; but he had seen one case where it seemed to have lasted at 28 per minute almost the whole of the life since it was recognised at the age of 19 in a young lady. The best way, in his opinion, to consider functional disturbances of the heart was to take them in connection with the causation. Dyspepsia, constipation, and fulness of the stomach might cause the affection. Onanism was a very frequent cause of rapid pulse and palpitation, and often was a valuable indication of this frequent cause of nervous disease. Excesses in marital relations were not so frequent a cause as onanism. Then excesses in alcohol, tobacco, tea, and coffee were extremely frequent causes of palpitation and rapid pulse. In such cases it was to be supposed that some poisoning of the nerve centres took place, due to alcohol, nicotine, theine, or caffeine. The theory of the retention of uric acid might account for many of the effects of such poisons. Hysteria and mental disease were causes. He thought that, as a rule, the best treatment of such cases consisted in removing the cause and very little in drug medication.

VIII.—DAVID DRUMMOND, M.A., M.D.,

Lecturer on Pathology, University of Durham; Physician and Pathologist, Newcastle-on-Tyne Infirmary.

DR. DRUMMOND referred to some of the cerebral symptoms attending markedly slow or feeble action of the heart, and called attention to the fact that some epileptiform seizures might depend upon anæmia, the result of slow action, and arising out of what appeared to be ordinary syncopal attacks. He adduced the case of an old gentleman, aged 80, who died recently. The patient was the subject of chronic albuminuria—probably granular kidney, aortic and mitral disease (a systolic murmur was audible at each orifice), with considerable cardiac hypertrophy. These conditions were recognised two years before his death, and during the whole period the heart was at the rate of 30 in the minute on the average, sometimes 25, and at times up to 40. This patient, as the result of an attack of influenza with pleurisy developed during the early part of the present year, grew extremely feeble and ill, his heart became still more feeble and slow, and now epileptiform convulsions ensued. These convulsions were invariably preceded by a great reduction of pulse rate; in fact, it gradually came down until only 2 beats occurred in the minute. By degrees the rate increased and the fit passed off.

IX.—SIR DYCE DUCKWORTH'S REPLY.

THE PRESIDENT, in replying, said he considered that the manner in which the subject had been debated fully justified the selection of it for consideration in the Section, and he thought several important contributions had been made. In the first place, he had purposely excluded from his address the subject of angina pectoris. He quite agreed with Dr. Eddison that organic cardiovascular disease was always present in that disease, and he could not, therefore, regard it as a functional condition. With regard to Dr. Rickards's view that the potential energy of the heart varied, and might be expected to vary, in different individuals, he fully agreed, and would always have regard in every case of disease to what he would call the personal factor or equation of it. Not much had been suggested from a therapeutic point of view. Sir Walter Foster had urged the use of quinine in large doses as a remedy for some forms of cardiac irregularity, and it might be well to remember this for future employment.

At the Birmingham police court last week, Alfred Hooper, surgeon's assistant, was summoned, at the instance of the Superintendent Registrar, for giving a false certificate of death to Sarah Ann Potter on July 4th, in reference to the death of William Thomas Potter. The defendant was acting as *locum tenens* for Mr. Vokes, a duly qualified medical practitioner, who, on June 23rd, before he left home, filled up and left with the defendant a medical certificate to the effect that Potter had died of cancer, whereas the man was then alive. The magistrate said the practice was a most reprehensible one, and fined the defendant £5 and costs.