THE LUMLEIAN LECTURES ON THE PRINCIPLES WHICH GOVERN TREATMENT IN DISEASES AND DISORDERS OF THE HEART.

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By SIR R. DOUGLAS POWELL, BART., M.D., F.R.C.P.,
Physician Extraordinary to Her Majesty the Queen; Physician to the
Middlesex Hospital.

LECTURE I.

CLASSIFICATION.

THERE is, perhaps, no branch of medicine in which, notwithstanding much knowledge, the confidence of the practitioner is so easily shaken, and in which he is so apt to relinquish the courage of his opinions as in heart diseases; and there is none in which the public, who treat their hearts with too much respect and their nervous system with too little, require such firm and steadfast guidance at the hands of our profession.

In my endeavour to lay down the lines of treatment of heart disorders and diseases, I will first speak of such modifications of the cardiac functions as are the result of disturbed or even organically changed innervation of the heart and vessels, the heart itself being sound. Secondly, I must glance at similar disturbances of extrinsic sources as they affect an unsound heart. Thirdly, I will endeavour to group from a therapeutic point of view the intrinsic disablaments and diseases of the heart mainly under the headings:

1. Of heart failure in acute disease.
2. Of cardiac overstrain.
3. Of chronic heart failure.
4. Of acute inflammatory cardiac affections.
5. Of chronic valvular affections of the heart.
6. Of ulcerative diseases of the endocardium.

In order to understand so far as it is at present possible functional diseases of the heart and to arrive at a point from which we may safely take further steps in their apprehension, we must have clearly traced in our minds the paths of direct and indirect cardiac innervation and the vasomotor nerve mechanism. It is impossible to isolate the heart from the vessels when thinking of its functional disturbance; we must look upon the cardio-vascular system as a whole. With considerable accuracy the blood may be said to be held in the grasp of the cardio-vascular tubes; that the blood current is maintained and directed by the rhythmic pumping action of the two ventricles and by the position of the valves. The tendency is for the muscular arterial system to evacuate all the blood into the lax and capacious venous system, but the due proportion of blood distributed to the arteries and veins is secured by the controlling action of the small vessels which regulate the flow through the capillaries.

NEUROSIS.

There are unquestionably a large number, perhaps an increasing number of people, who are morbidly conscious of their heart's action, indeed of the function of their cardio-vascular system generally or in particular parts. They feel disturbances, flutterings at the heart, throbbings, flushings, pallors of the surface or parts of the surface, or of particular organs, noises in the vessels about the head, and apart from, and in the intervals of these more definite sensations, they have a sense of their heart beating and appreciate sometimes a disorder, an intermission, or a faintness in its action. This condition, or group of conditions, and the thousand and one variations to which it is subject, is the result of purely nervous disorder. It occurs in people of both sexes, mostly young people between puberty and thirty, of nervous inheritance, or who have exhausted their nervous system in various ways by dissipation, excess of tobacco, alcohol, venery or over-pressure of brain work.

It is amongst the class of so-called "neurotics" that functional disorders of the heart so largely abound. A neurosis is a functional, as distinguished from an organic, disturbance in a nerve centre, and the disturbance is generally manifested as a hyperæsthesia.

A neurotic person is a person whose whole nervous system, and especially that portion of it known as the organic nervous system, is hypersensitive and abnormally within his cognisance. "Neurotic" is sometimes used as a term of reproach; it is often confounded with hysteria, which is indeed one of its lesser manifestations. It is a condition of nervous system sometimes acquired but more often hereditary, very widely prevalent even in our cold-blooded race, and which is perhaps a national characteristic in some brighter climates.

Although the attentive observer could at sight pick out from a crowd of persons the two or three neurotics present, he would be much puzzled to give his reason for so doing. Perhaps an indefinable alertness of the facial muscles, a quickly-changing expression, a mobile and slightly-contracted pupil, with increased sclerotic exposure, are the characteristic features. These persons have a quick circulation, a somewhat raised and variable arterial tension, their thermic centres are unstable, and temperature charts with them have to be discounted. Neuralgic affections are common, and amongst them and in their families will be found the other functional nervous complaints—migraine, epilepsy, asthma, hysteria, and the visceral neuroses so well described in this place by Professor Clifford Allbutt. From the social side they are delightfully portrayed in some of the stories of a Member of our College, under the pseudonym "Philip Lafargue."

FUNCTIONAL DISORDERS.

Functional disorders of the heart are sometimes due to a defect in the organ itself; more commonly they are caused by stimuli reflected from distant organs or parts, generally dependent upon morbid states of the blood, circulating through the heart or disturbing the centres of its nervous mechanism, an acquired or hereditary instability of the nervous system being often recognisable.

In endeavouring to lay down the lines of treatment of functional disturbances of the heart, we must hold in comprehensive review the vast tangle of circumstances which thus influence directly or indirectly the now sufficiently well-defined cardiac innervation.

In the following table I have endeavoured to summarise the causes of that want of stability which marks the function of the neurotic heart:

TABLE I.

Cardio-vascular neurosis. Definition: An increased sensibility and a disordered action of the heart and vessels, not dependent upon structural change.

Want of stability may be located in the cardio-vascular muscle caused by:

1. Malnutrition Anæmia.
2. Defective metabolism... ... Fatty infiltration
Retention of effete materials,
Gout.
3. Morbid blood stream Renal or liver inadequacy or sur-
charge.
Anæmia.
4. Functional overstrain Fatigue.

Want of stability may be located in the nervous system, and due to

1. Toxic influence Specific pyrexias.
Nicotine.
Alcohol.
Digitalis.
Uric acid and its allies.
Excessive absorption from duct-
less glands.
Deficient absorption from duct-
less glands.
2. Reflex excitation or depres-
sion Abdominal { Gastric.
Renal.
Intestinal.
Hepatic
Pelvic
Dental
Emotional { Anxiety.
Fear.
Anger.
3. Direct excitation or depres-
sion Brain Dis- { Concussion.
ease or { Compression.
injury { Meningitis.
Cerebritis, etc.

CARDIO-VASCULAR HYPERÆSTHESIA.

The first degree of this condition, consisting of undue appreciation of the heart's action and the blood circulating through the vessels, is extremely common in nervous introspective people. The heart's action may be quite normal, but it is liable from slight causes to become paroxysmally excited and accelerated. The pulse tension is variable. I

have described instances of this degree of cardiac disturbances in a brother and sister whose father died insane, their mother of spinal paralysis, their grandmother was on the verge of insanity, and the brother highly neurotic; but alcoholic, social, tobacco excesses, and mental overwork will produce the same effect.

The next degree is that in which the heart's action is really oppressed to a point varying from a mere vague anxiety to a positive discomfort and onwards to the third degree, the acute suffering of angina. These persons may not be introspective, their attention is not concentrated upon their circulation, but is compelled thereto by actual discomfort or pain. The vague and ill-defined anxiety concentrated about the heart, of which so many of these patients complain, is closely allied in character, and probably in mechanism, but in very mitigated degree, with that cardiac terror so characteristic of angina pectoris. The usual symptoms of increased arterial tension are present, and are to be traced to the usual causes of that affection—namely, mental shock, anxiety, hurry in work, sedentary lives, numerous and overlapping social functions, constipation, the threatening of a gouty storm, etc. There is no cardiac lesion necessarily present, although, as we well know, chronic high arterial pressure will in time lead to, and is often attended by, gradual cardiac changes of a degenerative kind.

It is from amongst the first two classes of cases, not distinct but merging into one another, here referred to that the cases of vasomotor angina come. It is not difficult to see how shock, chill, emotion, dyspeptic distension of nerve endings, and other causes, referred to in Table 1, may so increase arterial resistance as to cause cardiac embarrassment and anginal pains. Paroxysmal attacks of palpitation or tumultuous action of the heart are not uncommon incidents in connection with especially the second degree of cardio-vascular neurosis described, the attacks being attributable to sudden vasomotor relaxation or to vagus irritation from dyspeptic or gouty causes.

The first degree of cardiac hyperæsthesia is most common in young adult life in both sexes, but more common amongst males than females; cases are not infrequently met with in females later on about the menopause and even in later life. Those in the second category are far more common amongst males and prevail most from about 35 to 50.

The perverted physiology of neurotic disturbances of the heart and vessels is well understood, the paths of transmission are anatomically marked out, the causes of disturbances of central origin, those originating in irritation of visceral or peripheral nerve endings, the toxic effects of undue absorption from glands, thyroid, adrenal, ovarian, testicular, as well as those of retained excretory products, from defective elimination or over-production are all recognised as more or less potent factors in cardio-vascular disturbances; and finally the effects, immediate or remote of drugs: digitalis, atropine, tobacco, the whole range of hypnotics and analgesics, cocaine, antipyrin, phenacetin sometimes prescribed by the medical attendant, but sometimes taken without his sanction. It is very difficult precisely to formulate the harm done by amateur drug taking for pain, sleeplessness, and spasmodic suffering. It seems to me that it may be clinically summarised by saying that the controlling centres of the nervous system suffer chiefly, emotional disturbances are more easily excited, reflex agitation is less controlled, the cardio-vascular and thermic centres are diminished in tone. No doubt those innocent and attractive little bottles of tabloids which are so freely scattered on the toilet tables of society have much to do with the increase of the neurotic disturbances of the heart and vessels, which unquestionably is a medical feature of the present generation. A neuralgia which in former days necessitated the called-for nerve rest is now promptly subdued by a dose and the patient is enabled thus to take a further step in nervous fatigue without direct suffering.

Neurotic persons as a class take too little food, are always hurried over the meals and in the details of life; they eat too fast, and have a tendency to exceed in nerve stimulants—tea, tobacco, alcohol, and certain drugs—or they find their excitement in social entertainments.

It is in all cases essential to make a thorough examination of the heart, and to come to an absolute diagnosis, for the treatment rests largely on moral grounds, and must be sup-

ported if possible by an assurance of physical soundness. If on careful examination the position and dimensions of the heart be found normal, and the character of the impulse and sounds be such as are not incompatible with textural soundness of the valves, an absolute opinion can be expressed. There is undoubtedly room for anxious consideration and hesitation in regard to the character of the impulse and sounds of the heart in many of these cases, for the impulse is often violently increased and apparently extended by undue locomotion of the organ, and the sounds are perhaps disorderedly, reduplicated, and not infrequently attended with murmurs. Still, a careful investigation, selecting a time when the action is more tranquil, will in most cases suffice to convince the experienced observer as to whether such sounds are significant of organic disease or compatible with mere disorder. Functional murmurs do not strictly accord in position and conduction with those due to valve defects. Any such murmurs present are always systolic or post-systolic, often somewhat frictional in character; never, in my experience, diastolic or presystolic, and most generally are heard with undue loudness over the neck vessels or sometimes are very apparent over the lung, even remote from the heart, and especially so during inspiration. There is no history of rheumatic fever or of previous heart disease.

If the patient who suffers from any disturbance of the heart's action, whether it be mere abnormal consciousness of its action or the most severe palpitation or anginoid attacks can be truthfully assured that there is no organic lesion, that his troubles, however painful or distressing, are not mortal, a most important step is taken in the treatment. On the other hand, we have most of us seen patients whose lives have been rendered miserable with the ever present fear of death owing to a hasty and ill considered diagnosis of a weak or a dilated heart, a diagnosis that should never be made without the gravest sense of responsibility, and requiring in some cases more than one careful examination.

Having come to a diagnosis, and reassured the patient with regard to prognosis, the next point is to investigate the patient's mode of life. A sample day's doings, noted down and corrected here and there as the case may demand, is an elementary measure of treatment. The removal of the morning cup of strong tea, or its replacement by a small cup of warm milk diluted with Vichy or other water, the arrangement by rising a little earlier for a leisurely breakfast and time for a proper relief of the bowels before entering upon the day's work, the avoidance of rush at the luncheon hour, and the securing of a quiet hour before dinner will, with a few sensible directions with regard to the dietary, do much to render digestion more complete and quiet the nervous system. Many of these people have really but little to do, but they are always in a hurry about it. Another considerable portion who earn their daily bread and support their families by hard and exacting toil are yet impelled by their nervous energies to occupy all their leisure evenings, off afternoons, and Sundays with honorary secretarial duties, or teaching, or amateur philanthropy, all duties which with a heavy heart but a determined mind the physician in these particular cases has to prune down in order that they may continue to do that which is essential for themselves and their families.

But there is yet another class of men, chiefly in the forties and fifties, who in earlier years have been physically active, even athletic, but of late with quadrupled professional business, domestic and social affairs on hand, have lost leisure for exercise yet preserve their powers of eating and drinking as regards quantity but of enriched quality. All such tend to venous plethora, retarded circulation in their great organs, heightened blood pressure, fat-laden and infiltrated heart, and from them a large contingent of functional heart disorders are furnished. These are the cases in which a yearly course of the waters of Harrogate, Homburg, Carlsbad, Marienbad, etc., are so valuable, and in which the *terrain cur* of Oertel is to be advocated; but a little wise overhauling of the dietary by the physician, the resolute acceptance of such by the patient, and the adoption of steady daily exercise dovetailed in with the work, will do much to perpetuate cures thus initiated. Their hearts are lazy and hampered, not weak; they require sensible guidance not to have cardiac introspection as an administered neurosis.

Having (1) given an absolute diagnosis, and (2) having in

investigated and corrected the habits of life in whatever respect they may be faulty, we have (3) to ascertain and remove, or at least to treat, the exciting causes of cardiac disturbance. These are for the most part reflex, gastric, intestinal, rectal, renal. I have seen very striking instances of floating kidney attended with great functional disturbance of the heart, and sometimes also pulsation of the abdominal aorta. Exostosis, bad teeth, and other sources of distal irritability, are frequent causes of disturbed cardiac innervation. Dr. Clifford Allbutt, in his Goulstonian Lectures, alludes to many cases of cardiac attacks of a functional kind, with very slow, quick, or intermittent action, and in some with distinct anginal symptoms, which he has observed to occur in connection with, often in succession to, or alternately with, some form of visceral neuralgia, especially gastralgia or some uterine disturbance, such as menorrhagia. No doubt in many of these cases the neurosis is really central. Dr. Allbutt points out that pulmonary gastric and cardiac neuroses are often concurrent in families, and I have seen a striking instance in which they have each been present at different times in the same individual. Here it is clear that we have to do with a central neurosis manifesting itself in different viscera at different times. Dr. Allbutt is, moreover, careful to point out that in his cases of cardiac disturbance following gastralgia there was no dyspepsia proper.

The causes of high tension other than those mentioned must be looked for, and if possible treated. The gouty disposition has to be reckoned with. In this department of inquiry and rectification will come the causes of those conditions of the heart muscle which, rendering the organ especially irritable and inadequate in function, are accountable for breathlessness, palpitations, and spurious anginal seizures. Fatty infiltration of the intermuscular texture and incomplete removal of waste materials from the cardiac muscle briefly constitute the pathology of these cases, and their etiology chiefly consists in indolent, self-indulgent living, including rich and too plentiful food, often alcoholic excess and too little exercise, the other chief cause being the cessation of hæmorrhagic or other fluxes which attend the climacteric period of life. Venous plethora is the marked feature in all these cases, and graduated exercises, restrictions in diet, and hepatic depletory medication are the principal measures of treatment. The diet should in these latter cases be carefully looked to. It should be spare, slowly eaten, taken at regular meal times only, and may consist of a good breakfast, a moderate amount of fresh-cooked meat, without fat, for luncheon, and poultry or game for dinner, with fish and a little soup. Starchy and root vegetables and bread should be removed, or only very sparingly allowed with the lunch and dinner meals, crisp toast or biscuits being substituted for bread. The amount of fluid taken with the meals should be restricted in decided cases to a claret glass with luncheon, and two glasses with dinner. This may consist of one or other of the light wines, or diluted spirit in measured quantity. About an hour to two hours after, or half an hour before meals a glass of plain hot water should be slowly sipped to supplement the fluids taken.

In the more pronounced cases the passive exercise and soothing monotony of a well-planned sea voyage is sometimes very advantageous, only, however, for those who are able to eat and sleep well on board ship. The restful régime of a spa suits others, the particular spa being selected for its chalybeate or its eliminative effects as the case may require. The more formulated treatment by surface stimulation from aerated saline baths combined with rest and passive resistance exercises prove very beneficial in some cases, more particularly those in which there is a gouty element, the arterial tension ranging high and nervous introspection not being too marked a feature. A definite course of spa treatment is often useful, indeed sometimes essential, in serving the purpose of inculcating the habit of self-discipline.

Drugs are, of course, often required in the treatment of functional disturbances of the heart, purgatives or laxatives, and particularly an occasional mercurial to lower arterial tension and to remove irritating materials. Sometimes nerve sedatives of the bromide order, often hæmatinics, especially arsenic and iron, as tonics to the nervous system and blood restorers. Strychnine is often very badly borne by patients of the neurotic class, except perhaps for short periods, and

where a cardiac tonic is required caffeine is more appropriate. In cases of venous plethora a course of salines is sometimes necessary, and in gouty cases suitable remedies.

Functional disturbance, similar in kind to those we have been considering, is as frequently observed in association with diseased as in healthy hearts, and many of the troubles and some of the catastrophes of cardiac disease are attributable to functional derangement. Numberless people die of functional disturbance of a diseased heart; few, or none, die of functional disturbance of a sound heart. Hence the importance of a definite diagnosis in every case as to which category it belongs.

TREATMENT OF ANGINA PECTORIS.

The etiology and morbid mechanism of angina pectoris are difficult enough to formulate with regard to prophylactic and remedial treatment. The difficulties diminish when we recognise that there is a continuity in the phenomena presented to us for treatment from the slighter degrees of introspective recognition of the cardio-vascular mechanism, through the more distinct evidence of cardiac anxiety and distress in connection with the higher and more persistent grades of arterial tension to the paroxysmal attacks of acute breast pang associated with a veritable asthma of the blood vessels which may supervene in any cases of the series; and this continuity is to be observed between so-called false and true angina, although some authors will not admit the term angina except as applicable to the fatal cases of coronary origin.

In a large proportion of cases angina pectoris is an entirely functional disorder, the main feature of which is sudden increase of blood pressure and a correspondingly sudden call upon cardiac effort; it may be on the systemic, it may be on the pulmonary, side of the circulation that the strain arises. The causes of this arterial spasm are almost all within our scope of remedial treatment, and the neurosis that favours its occurrence is subject to considerable modification and control. In all these cases whilst it is the heart that suffers the angina, the conditions which originate that suffering are outside the heart. There is no essential difference save in degree, and not always in degree, between cases of angina in which the heart is sound and those in which it is unsound, but there is every difference in the gravity of prognosis and the urgency for treatment. The cause of distress is contraction of the peripheral or general visceral or pulmonary vessels, giving rise to muscular strain of one or both cardiac ventricles suddenly induced and of a cramp-like character.

The cardiac pain in vasomotor angina is difficult to explain satisfactorily; it is distinctly a result of intraventricular pressure, and from its character and radiation it must be primarily an affection of the sensory nerves of the heart caused by stretching of its tissues, so that the contraction of the tissues is attended with pain. The endocardial surface is more sensitive than the pericardial surface, but comparatively insensitive tissues when stretched become very painful. Dr. Allen Sturge observes that reflected pain is only an ordinary sensation conveyed to a nerve centre in commotion, by which it is intensified to a painful sensation. Thus may the reflected pains be accounted for as emanating from the centres disturbed through the cardiac nerves. On the other hand, we have only to conceive a slight degree of hyperæsthesia of the organic nerve centres to account for that undue perception of the cardio-vascular mechanism which is the first grade of neurotic disturbance, and which can readily become a painful perception of increased pressure within the heart.

The pain, which is to a certain extent the measure of the strain upon the heart, is to be attacked by remedies which relax arterial spasm. Amyl nitrite, nitro-glycerine, and the nitrites generally, but especially nitro-glycerine (1 min. of the 1 per cent. solution), may be given at intervals of five minutes for 2, 3, 5 or more doses, and at the same time that the antispasmodic is given an appropriate cardiac stimulant is required. In the more purely neurotic cases it is most desirable to avoid alcohol. There is no better stimulant than slowly sipped hot water. Dr. Brunton has pointed out that sipping is a physiological stimulant to the heart, and hot drinks tend to relax arterial spasm. A prescription for a carminative draught, including

ammonia, chloric ether, and valerian or cardamoms, is valuable to be taken in several sips. Warmth to the surface, and especially to the extremities, are the further requisites.

The second stage of these cardio-vascular attacks is one of reaction and excitement, to be followed by fatigue. Often by the time the medical observer arrives the cardiac pressure has already been relieved through the depressor nerve of the heart excited by intraventricular pressure bringing about relaxation of arterial spasm, the first violent throbbing or the threatened standstill of the heart has already yielded to quick, perhaps somewhat irregular, beats, the tension of the pulse is no longer apparent, and this fact has no doubt led many observers to question the alleged mechanism of this form of angina. With a few hours' rest in bed the patient may again be fit for the duties of life, although usually a sense of lassitude and fatigue remains for a few days. It is now that the cause of the attacks must be sought out, the conditions of the heart carefully ascertained, and the daily life, diet, and surroundings and functions of the patient must be investigated and corrected where in error.

If there be no heart disease present, the patient must be thoroughly reassured on that point; but if heart lesion be present, much more attention must be given to the after-treatment, and the prognosis depends upon the nature of the lesion present. I would briefly say that the gravest cases are those in which there is enlargement of the heart without, or not accounted for by, valvular defect. I would mention the fibro-fatty heart, the syphilitic heart, the renal heart in this category. Aortic stenosis and aortic regurgitation come next, the regurgitant defect being by far the most common. Mitral stenosis is not infrequently attended with anginal seizures, sometimes of a fatal kind, and the attacks would probably be more frequent were it not for the readiness with which pulmonary hæmorrhages occur. Mitral regurgitation as the primary disease is rarely accompanied with angina, and when it supervenes on cases due to degenerative hypertrophy and dilatation it tends to preserve the patient from future attacks. On all these cardiac conditions anginal attacks may supervene, having precisely the same mechanism as the attack unattended with cardiac disease. It is most important to bear this in mind, for the treatment is precisely on the same lines, only it must be more urgently pursued.

The initial treatment may be started with nitrite of amyl inhalation, and the patient should always have the drug at hand. But the attack is commonly attended with such acute heart failure that the clinical features of high pressure pulse and labouring heart may be immediately lost. Undoubtedly, the subcutaneous injection of pure ether, to which a minim of nitro-glycerine solution may be added, if not already otherwise taken is the best treatment in severe cases if caught at the right moment. The sense of prostration is greater and more defined in these cases. Alcoholic stimulants, so much to be avoided in pure vasomotor cases, are in these imperative. A full dose of brandy should be given in some hot drink. In those cases, and they are many, in which flatulent distension forms a marked feature of the attack, if it be not concerned in producing it, a draught of ether, ammonia, soda, cardamoms, and spirits of chloroform is of much service at the earliest stage.

The heart is left in an exhausted or fatigued condition after the attack, and there is a decided tendency to a series of several attacks. For this a mixture of strychnine or caffeine may be prescribed with digitalis, so that 15 or 20 minims of liquor strychnine and 20, or 30, or 40 of tincture of digitalis are given in 24 hours, and the strychnine may be given subcutaneously in, of course, equivalent doses, or the caffeine in the form of salicylate. It is probable that digitalis and strychnine influence the heart muscles before that of the vessels, but if the pulse become tightened, as it may be in exceptional cases, the digitalis must be lessened or its effect on the vessels moderated by the addition of $\frac{1}{2}$ -minim or 1-minim doses of nitro-glycerine to the prescription. There is another remedy which is a powerful restorative to the fatigued heart, and that is oxygen inhalation, which may be given for five or ten minutes every hour or two or three hours as may be required.

These cases often come to us with a history of a recent attack, and we have to consider what form of angina it has

been, how to avert fresh seizures and how to repair, if it may be, the failing heart which renders each attack so dangerous. The presence or absence of heart disease must be rigorously ascertained:

1. The soundness or otherwise of valve function.
2. The presence or absence of enlargement, dilatation, or hypertrophy of the organ.

It is important not to form too hasty a judgment, and it is often impossible to come to a final diagnosis at or immediately after a seizure. In tumultuous action, whether from excitement or violent work, the locomotion of the heart is greatly increased, and an inexperienced observer is apt to find great enlargement, displaced apex beat, etc., when none exists. On the other hand one hears it sometimes maintained at inquests and the like that considerable organic disease of the heart may exist without any recognisable signs. I would venture to say that a careful investigation of the sounds and dimensions of the heart will always establish in such cases a displaced apex beat, an increase in the dimensions, or a recognisable alteration in the sounds of the heart. The converse is, however, frequently true, namely, that much alteration in the heart is conceived to be present when none exists. It requires great precision and diagnostic courage to prove a negative, and in the presence of functional disturbance and discomfort and anæmic *bruits*, mistakes in diagnosis are very frequent and easily made.

With mitral regurgitation of rheumatic origin, high tension pulses do not often supervene, but mitral insufficiency is frequently a sequel to the dilatation of the heart consequent upon chronic high tension and secondary cardio-vascular changes, and under these circumstances it is undoubtedly a safeguard against over-distension of the ventricle. I have seen cases in which the establishment of mitral incompetence has produced a cessation of anginal attacks which had previously occurred from time to time. In senile hearts mitral regurgitation is common, and is not to be looked upon seriously, but rather as a favourable element in prognosis, a condition normal to the senile heart.

TACHYCARDIA, BRADYCARDIA, EXOPHTHALMIC GOITRE, ETC.

Neither reading nor a considerable experience of cases has brought me to an exact appreciation of the mechanism of that persistent hurry of the heart's action which is known under the term—a term which responds well to our ignorance—tachycardia. The chief features of the cases may be briefly enumerated:

1. A persistent hurry of pulse lasting for periods varying from hours to many weeks, during which the pulse is rapid, from 120 to 200 or more, regular, small, of sustained, I should say, rather than of high tension.
2. Intervals of severe palpitation, attended with precordial pain, notable distress, and more tumultuous irregular action of the heart.
3. Although murmurs may be heard and the cardiac dullness may be broadened during attack, in the intervals the dimensions and sounds of the heart may in the earlier stages be perfectly normal.
4. In the earlier stages and in the most typical cases the heart hurry has been observed to begin and to finish quite abruptly. This was so in Dr. Cotton's case and in Sir T. Watson's, in the latter the pulse suddenly changing from 216 to 72, with subsidence of all symptoms whilst that physician was still in the room.
5. So far as any exciting cause can be stated, it has been for the most part mental shock, mental or physical overstrain.

The above characteristics are sufficient to show, were demonstration needed, that the condition is a pure neurosis, and that the neurosis must be either of the vagus or sympathetic cardiac centre seems fairly certain. It is inconceivable that a paralytic affection of the pneumogastric centre should be so persistent, should be attended with a regularity of rhythm so generally notable, and should be capable of such abrupt termination as is observed in some cases. The view of sympathetic excitement is perhaps better supported by other phenomena of sympathetic irritation, such as sweatings and flushings of the face. No antitoxicant can be recognised in most cases. It is worthy of remark, on the one hand, that many people, especially women, suffer from persistent hurry of heart, coming quite within the range of the lower degree of tachycardia, and, on the other, that there is nothing to distinguish simple tachycardia from that which is the constant symptom of exophthalmic goitre, the rhythm and quality of pulse being precisely the same. It is also to be remarked that there are cases which might be regarded as of a transitional kind, in which, with no enlargement of the thyroid, and with no more than a slight beadiness of the

eyes, there are present the characteristic hurry of circulation, cardiac murmurs, etc., and in other cases again these circulatory phenomena precede the thyroid enlargement.

For the present the exact meaning of tachycardia must remain unsolved, and we may associate it with some other clinical facts, such as persistent elevation of temperature and unexplained continued elevation of arterial tension, the morbid physiology of which is not yet apparent.

The theory of exophthalmic goitre maintained by Moebius, Johnston, Greenfield, Murray, and others, that it is due to an excessive formation and absorption of thyroid secretion and its action on the nerve centres in the medulla, is useful if only as a working hypothesis. This hypothesis has been suggestive of certain measures of treatment that have been devised for exophthalmic goitre, and more successfully for its opposite myxedema. It would appear to be at least approximately true, although probably some central medullary change precedes the thyroid phenomena, and is responsible for them. Some regard the thyroid secretion as modified and having toxic effects. It is based upon certain very definite observations, namely:

1. That no definite lesion of nerve centres has been found.
2. That the thyroid is the organ more obviously affected than any other.
3. That its structure is altered in the direction of hypertrophy and over-activity of function, and possibly there may be some alteration in the quality of the secretion (Moebius, Murray, Jeffrey).
4. The symptoms tachycardia, nervous irritability, insomnia, and vibratile contraction of voluntary muscles, are the reverse of the bradycardia, torpidity and impaired reflexes characteristic of myxedema, consequent upon atrophy or excision of the thyroid.
5. Whilst moderate doses of thyroid extract will cure or keep in abeyance the phenomena of myxedema, an overdose of the extract will produce symptoms resembling those of exophthalmic goitre.

There has as yet been found no direct means of treating simple tachycardia successfully. The digitalis class of drugs are useless in this, as in almost all cardiac neuroses, except, and the exception is important, in the treatment of the heart fatigue which sooner or later ensues as a consequence of the functional strain upon the organ. Tachycardia in its various grades is, however, often but a symptom, a prominent expression, of a neuropathic state which requires to be approached for treatment from many sides.

In exophthalmic goitre again, having made the diagnosis, the physician has to deliver himself of the somewhat magisterial sentence "imprisonment for six months and under surveillance for from two to five years." The rest for the first six months should be absolute on bed sofa, or on a couch in the open air, with the utmost avoidance of all excitement and mental fatigue. The patient can then be promoted to bath chair exercise, quiet walking and driving, or more scientifically graduated exercises, and in the course of time recovers. The general well-being of the patient can be maintained, and the more distressing local and general symptoms relieved or removed by cold applications to the throat, sedatives of the bromide and valerian order, arsenical and sometimes iron tonics; digitalis and the like drugs may be given on the appearance of heart fatigue, indicated by the signs of dilatation and a pulse irregular in time and force. In the treatment of the tachycardia, apart from heart strain, digitalis is of little value. The use of thymus extract is, in my experience, of some value in diminishing the rapidity of the pulse; the galvanic current has been found useful in some cases. Theoretically, the Nauheim brine baths should be useful, but practically I have seen no good from them, at least in the more acute stages. The treatment of constipation and proper dietetic support are all matters of great importance under the enforced quietude of the patient.

Operative treatment, by partial extirpation of the thyroid gland has been rather extensively tried, as has also section or partial resection of the sympathetic nerve in the neck. Mr. Treves has recently given some instructive illustrations of the fact that any surgical operation will in a certain proportion of instances, in some manner unknown, modify, perhaps even cure, a pure neurosis. The partial removal of the thyroid gland in the acute stage of the disease is attended with very considerable danger and only very inadequate success.

The best cases were those of Paul of Liverpool, but of his six cases recorded in the *BRITISH MEDICAL JOURNAL* for 1897, all except one were of more than two years' standing. Abadie and Faure (*Prog. Medical*, 1897) have had successes from section or ablation of the cervical sympathetic, but, of Faure's three cases, one was of twelve years' standing,

and in the others the duration is not stated. Doubtless the section of the sympathetic will slow the heart, but it has not yet been satisfactorily shown to influence the disease, and one would regard with some misgivings the future of a heart deprived of due sympathetic innervation, whilst it is clinically remarkable how well the heart comes out of the long struggle, but little damaged when the patient has been carefully steered through by judicious handling. It sometimes happens that a disfiguring enlargement or a more serious distortion of the thyroid remains after the tachycardiac symptoms have subsided, and in one instance I have seen this condition dealt with very successfully by removal.

BRADYCARDIA.

One form of bradycardia is that which sometimes follows upon the rapid heart of exophthalmic goitre. It is very commonly associated with well-marked myxedema, and may continue notwithstanding that the disease has been cured or held in check by thyroid treatment. I have seen it in epileptics, in which case the rhythm is not only slow, but generally irregular. As a temporary condition bradycardia is not infrequently met with as a sequel to influenza, and also in association with the stage of depressed temperature that frequently follows upon other fevers. In the influenzal cases that I have seen it has been associated with a very high density of urine with great surcharge of urea, as though there had been some previous accumulation, the urine becoming solid with crystals on the addition of cold nitric acid. Spurious anginal seizures are sometimes observed under these circumstances, but I have never known them to prove fatal, although of course in the presence of any previous heart disease they might readily prove so.

Chronic high arterial tension is generally associated with a slow, sometimes a very slow, pulse, whereas in acutely raised tension the heart's action is, as I have pointed out, generally quickened.

In chronic bradycardia, a condition that tends to remain permanent, and does not necessarily shorten life, an occasional twenty-four hours' rest in bed should be enjoined, and for mental work the recumbent posture should be preferred. In cases of a more temporary kind the combination of strychnine with an alkali or iodide of potassium (the two drugs being kept in separate bottles, and only mixed at the time of taking) is a very useful one. Caffeine is also very useful, especially where the urine is scanty. A five minutes' whiff of oxygen three or four times in the twenty-four hours is a valuable cardiac stimulant. In cases of myxedema thyroid extract will be given, but it is not wise to push it to the production of any excitement of circulation.

THE HUNTERIAN LECTURES

ON THE

SURGERY OF THE KIDNEY.

Delivered at the Royal College of Surgeons of England,

By HENRY MORRIS, F.R.C.S.,

Surgeon to the Middlesex Hospital.

LECTURE I.

ON THE ORIGIN AND PROGRESS OF RENAL SURGERY AND THE CONSERVATIVE TENDENCY OF ITS RECENT DEVELOPMENT.

MR. PRESIDENT AND GENTLEMEN,—In selecting the subject for the lectures, which by the grace of the Council I am about to deliver, I was influenced by the fact that "renal surgery," though it has attracted a good deal of attention amongst surgeons during the last twenty years, has not yet received the general recognition by the profession at large to which it is entitled, nor has it hitherto been the theme of any Hunterian professor.

I propose in this lecture to describe briefly the origin, and then to trace the progress, of this quite modern branch of surgery.

HISTORY.

In the sixteenth, seventeenth, and eighteenth centuries the practicability of nephrotomy was repeatedly discussed by Camerarius and François Rousset in 1581; by Shenck in 1584; by Jean Duclédat and Cousinot in 1622; by Riolan also in the early part of the seventeenth century; by Von Hilden in 1646; then a century later by de Lafitte in 1753, Borden in