primary revival of words takes place in that portion of the brain in which (in a child) speech first develops. In the child, words are first learnt by hearing certain sounds associated with certain objects, and simple thoughts connected therewith are acquired before the child has the power of articulating them. He sees an object before he can name it; he must revive those auditory impressions which he had previously heard associated with it, otherwise how can we explain the fact that a child in full possession of speech even as late as the fifth, sixth, or seventh year, if he becomes deaf will certainly become dumb, unless he is trained by lip reading, that is, unless the primary incitation to articulate speech be transferred from the auditory to the visual word centres? The facts related in this case do not accord with the statement of Bernard that the motor centre of speech may become independent of the sensorial centre which had presided over its education.

There are, however, certain exceptional persons (visualists) who, as it were, read rather than hear their thoughts and in whom (as Ballet says) the visual images of words acquire such an importance that they alone constitute the medium of their internal speech.

The general rule, however, is that auditory images constitute the most potent representations of words (even in the common class of indifferents), whilst visual images form the most potent representations of ordinary external objects.

In exceptional cases it seems that the ordinary functional coupling of the auditory with the glosso-kinaesthetic centre, and of the visual with the cheiro-kinaesthetic centre, is not adhered to. Thus the deaf-mute has to rely upon signs and gestures, or lip-language, and he thinks in the main with revived visual symbols; and it is from the organic seats of these that incitations pass to related parts of the glosso-kinaesthetic centre.

Again, in children who have been born blind, but have nevertheless ultimately learned to write, a direct association must have become established between the auditory and cheiro-kinaesthetic word centres. In the simplest process of thought we have no limitation of activity to any one area, but there are widespread processes of primary activity in all these speech centres and their associated tracts in both hemispheres—an activity which is not limited to concept or percept centres, but spreads to all parts of the cortex of both hemispheres. It is generally accepted that lesions of the glosso-kinaesthetic and cheiro-kinaesthetic centres (even when both are affected) do not produce failure to comprehend the meaning of words written or spoken, although the patients themselves are unable to speak or write (Bastian loc. cit.).

The degree of derangement from such lesions varies in different individuals, as one would expect, from relative potency inherited or acquired of the various centres. A more important and probable explanation is the variability of vascular supply and possibility of collateral circulation being established, and still more the escape or involvement of perforating arteries supplying subcortical structures.

The right facial paresis suggests the possibility of a subcortical lesion and the possibility of a small lesion in the anterior portion of the posterior half of the capsule, and although sections through the brain in the region of Broca's convolution and the zone of the lenticular nucleus showed no lesion, yet it is open to Marie to argue on this account that the aphasia was explicable by a condition of anarthria. I would submit, however, that the few times she uttered "is that" her utterance was normal. This suggests a lack of sensory initiation.

PROFESSOR BUDIN'S SUCCESSOR.—Dr. Paul Bar was appointed on July 4th to succeed the late Professor Budin in the Chair of Obstetrics in the Medical Faculty of Paris. Born in Paris in 1853, he was *externe* of the hospitals in 1875, and gained the coveted post of *interne* in the following year. For a year he was under Tarnier at the Maternité. In 1881 he took his degree, and was awarded a silver medal for his thesis on the pathology of hydramnios. In 1883 he was appointed *accoucheur* to the hospitals, and in 1887 he won the rank of *professeur agrégé*. He took an active part in the foundation of the Société d'Obstétrique, of which he is now President. Professor Bar collaborated with Tarnier in his treatise on midwifery, and has written much on eclampsia and other obstetrical subjects. He has already established his reputation as a teacher.

THE PREVENTION OF VALVULAR DISEASE.

By RICHARD CATON, M.D., F.R.C.P., J.P.,

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As medicine becomes more scientific in methods of inquiry and less vague in theories of treatment, it naturally follows that definite and practical measures, such as the arrest of a pathological process in its early stage, are recognized as of great value. Much more may be done for the welfare of the patient by checking a disease of structure in its incipient stage than by any curative measures when the morbid change has become fully developed.

Though we have yet something to learn in regard to the diagnosis of valvular disease, the clinician can in the majority of cases not only detect a fully-developed regurgitation or stenosis, but he can also follow the advancing stages of such a valvular defect in the making. I fully admit that experience and close observation are needed for a diagnosis of the latter order, but it is quite within the powers of any well-trained physician.

In the case of the development of that too common ailment mitral regurgitation, the normal first sound at the apex is compounded of two elements, first of the less important muscle-sound, and secondly of the "crack" of the stretched valve cusps made "taut" by the sudden high pressure of the blood stream under the powerful squeeze of the ventricle. This "crack" is much like the sound produced by a sail which has been hanging slack when the wind suddenly fills and tightens it; this second factor, due to sudden valve tension, is much the more important of the twin causes which in conjunction make up the first of the two sounds, the "lubb-dupp" at the apex, with which we are all so familiar. Those of us who have watched with care the progressive changes of sound which lead up to the bruit of valvular disease know that the sharp clear "lubb" is gradually changed into a longer and duller sound, often somewhat muffled in quality. This change is due to a thickening and stiffening of the valve membrane from inflammatory change with effusion under the endothelia, and later to the formation of vegetations on the free surface of the membrane. Necessarily the cusp becomes less pliable and adapts itself less quickly to the movements of the blood-wave. In like manner, if we were to thicken and stiffen the mainsail of a yacht so as to render it less pliable, the sharp clear tone at the instant when a sudden wind-wave rendered it "taut" would not be produced. Then as we watch such a valve we note that its sound becomes more prolonged and assumes what may be termed a "whiffing" character, a sort of tuneless impure whistle, due I imagine to less perfect closure of valve cusps and partial escape of fluid between them.

Next this whiffing sound develops into a genuine regurgitant bruit as the amount of reflux increases. The thrombi and projecting vegetations which form on the edge of the cusp almost inevitably prevent exact closure, and the intraventricular pressure being great the reflux soon raises tension in the auricle and the pulmonary network, and causes augmented pressure in the pulmonary artery and sharper closure of the pulmonary valve.

Long years of experience in hospital and private practice have taught me the vast importance of watching these early stages and directing one's scheme of treatment in accordance with the indications they give.

In acute rheumatism the inflammatory changes which take place (a) in the joint tissues and (b) in the endocardium are like in kind. But the two structures are differently situated as regards functional activity. The joint tissues have secured for them the great advantage of physiological rest—a condition of the greatest aid to natural and artificial means of cure. The sensory nerves, whose function under normal conditions is dormant, wake up during the presence of inflammation to a phase of acute irritability, and absolutely forbid all movement. As it seems to be a law that functional activity and the repair of lesion cannot proceed in any living structure at the same time, the pain thus caused by movement has a great therapeutic function in the rheumatic joint in thus ensuring rest.

The heart is very differently circumstanced. For its complete rest is not possible, and doubtless the necessary

continuance of its activity is a chief reason for the fact that while joint structures recover in so large a proportion the disastrous results of valvulitis have been commonly of life-long duration.

It is to be remembered, however, that the work of the heart varies greatly at different times and under different circumstances, and that within limits its amount can be regulated. Posture, the measure of activity, the character of the food, the presence or absence of pain, the degree of mental tranquillity, the volume of blood to be moved, and the degree of contraction of the arterioles, all influence the tension in the vessels and in the cavities of the heart, and influence the force and speed with which the heart contracts, or, in other words, the sum of the mechanical work which the heart has to do.

If we want to place the great force-pump of the body in a position to recover from its inflammatory trouble without permanent crippling of that essential part of the mechanism, the valves, we must, in the first place, cut down the work demanded of this pump to a minimum. Sometimes we cannot do this. If extreme nervous irritability exists; if asthma or any lung disease involves the right side of the heart in extra labour; if the amount of the blood to be moved is very great; if the ventricle, to begin with, is feeble and dilated, our chance of giving the heart the needed rest is small.

Fortunately in a large proportion of cases these obstacles do not exist; in acute rheumatism and most of the pathological states in which valvulitis occurs we can secure a large measure of rest and of the conditions favourable to heart repair *if we take sufficient trouble*.

We lessen pain and fever by the use of adequate doses of some salicyl compound, if acute rheumatism be the cause, or if it be not, by other appropriate measures; we insist on the most absolute quiet and rest, alike of body and mind; a light diet is given; if there is not enough sleep, we give some gentle sedative. Fullish doses of sodium or potassium iodide are given three or four times daily, with two objects: (1) To aid absorption, and (2)—of much more importance—to lessen the volume of the blood and diminish blood pressure within the circulatory system, just as we give it in aneurysm.

Secondly, there are certain nerve channels through which, in all probability, we can directly influence and stimulate the trophic and vasomotor nerves of the heart without exciting the muscle fibres—namely, the first four dorsal nerves in their distribution between the clavicle and the nipple. It is well known from the researches of Head, Sherrington, and Gaskell that these nerves are closely associated with the heart; the phenomena of angina give further proof. Small discs of canthos, which blister almost painlessly in three or four hours, are applied here one by one.

The effect of the first group of measures is to slow the heart and diminish its amount of work as far as it can be done; we give the organ the greatest amount of rest that is practicable, and thus offer it the opportunity of self-cure. The second measure stimulates the curative activity of the part, just as in a rheumatic joint a small blister removes with great rapidity both pain and inflammation, or as in a case of a callous ulcer a blister applied to the margin of the ulcer leads to renewed activity of the healing process and promotes cicatrization. Of the two measures of treatment above named, the prolonged period of rest is by far the most important; without that the other is of small avail. The rest must continue for six or eight weeks, or even for a more extended period. This seems a long time, but when the alternatives are a crippled heart or a sound and vigorous one for the remainder of life, few people will hesitate to purchase the latter by even a more protracted time of rest than I have named. By degrees the bruit lessens, becomes intermittent, and at length vanishes. My own somewhat prolonged experience has been that if, after the rheumatism has disappeared, the patient with a mitral bruit is allowed to get up and to throw the full ordinary strain upon his weakened endocardium, in the vast majority of cases chronic mitral regurgitation or stenosis results, while if the above-named measures are taken, in the majority of instances the patient at length rises from his bed without any bruit, and has the immense blessing of a normal heart usually for the rest of his life. I have watched numbers of these cases for many years, and have witnessed the working man whose incipient heart lesion has

been thus treated fulfilling year after year his full measure of hard work without dyspnoea and without discomfort.

The rest treatment must be commenced fairly early; if too great an amount of structural change has taken place it may not be recovered from, and though at first the patient may seem all right and the sounds present little or no bruit, slow contraction of the mitral orifice may ensue, leading to trouble in after years.

This method of treatment is so reasonable in theory and so satisfactory in its results that I cannot doubt that it will eventually be accepted generally by the profession, of whom a large number already are converts.

The great difficulty lies in the tax which the long rest imposes upon the patience alike of practitioner and patient. The convalescent from acute rheumatism with a recent cardiac bruit, if feeling well and comfortable, naturally does not appreciate the much heavier peril which may linger behind; and unless he be told the full truth, nothing will induce him to submit to a further weary period of quiescence and restriction from the indulgences of diet and activity to which he is tempted. The hospital patient also commonly chafes somewhat, as likewise the governing body of the hospital may, under this long rest period.

I can only say that personally I have almost always found such difficulties disappear when the problem has been clearly stated to the patient or to the hospital authority, while in the few cases in which the patient has refused to comply, he alone is responsible for the evil consequences, and one's own conscience is clear.

THEORY AND TECHNIQUE OF ORTHODIAGRAPHY:

A DEMONSTRATION.*

By PAUL C. FRANZE, M.D.,

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I HAVE much pleasure in showing to you a method of clinical examination which is called orthodiagraphy, and which serves to determine with accuracy the outlines of the heart by x rays. The theory of this method is as follows: If a source of light casts a shadow of an object upon a plain surface which we may call the plane of projection, then we must distinguish two principally different kinds of projection.

In the first the rays are parallel; this, therefore, is the parallel projection; and such is only the case with sun rays.

In the parallel projection the size of the shadow is equal to that of the object.

The second is the central projection; here the rays are divergent, emanating from a centre of emission which is either a true mathematical point, as in the case of the true central projection, or at least a limited luminous body or plane, as in the case of the spurious central projection.

In the central projection the shadow is magnified, and the more so the nearer the body be situated to the centre of projection, and the less the further away it be from the latter and the nearer to the plane of projection.

Now, all terrestrial projections are either true or spurious central ones, and therefore the projection with x rays is a central one too, and approximately a true central projection, as the rays emanate approximately from the centre of the anticathode of the tube from whence they diverge into space exactly like the radii of a sphere. Therefore in ordinary radiographs the picture is magnified.

Now in the case of ordinary radiographs the magnification is practically unimportant, for they usually deal with parts of the skeleton, or with foreign bodies or calculi, in which a slight magnification does not interfere with the diagnostic value of the picture, and, moreover, these parts can generally be brought so near to the photographic plate, which is the plane of projection in this case, that the enlargement is very slight.

With the heart, however, the case is different, for radiological examinations of the heart are undertaken mainly in order to ascertain its exact outlines, and as its greatest circumference lies about 7 to 10 cm. away from the surface

* Given at a meeting of the Bath and Bristol Branch of the British Medical Association.