for the means by which health may be preserved and restored.

The last remarks have been suggested by the renal excretion, which is more readily used as a means of testing an individual's condition than other secretions and excretions; but it is evident that neither our physiology nor our pathology will be perfectly reliable, so long as we have not obtained the means of accurately estimating all the changes taking place in the body at the same time. It is scarcely conceivable, that human capacity will ever achieve so vast and glorious a result. For the present, we must be content with a distant view of our goal, and with a careful inquiry whether we have discovered and are pursuing the right path that leads to it, though our strength may be insufficient for the race.

[*To be continued.*]

Original Communications.

NOTES AND OBSERVATIONS ON DISEASES OF THE HEART AND LUNGS.

By T. SHAPTER, M.D., F.R.C.P., Senior Physician to the Devon and Exeter Hospital, etc.

THE medical observer, who has had an extended practical acquaintance with diseases of the heart, must often have been struck with the fact that certain analogous departures from the normal action of this organ are, in some cases, associated with fatal tendencies, in others are proved to be consistent with a good average state of health; while others, again, yielding to the most careful physical examination but few, or even no, indications of disease, may prove to be unexpectedly fatal.

It may be assumed that those more obvious physical phenomena which the heart reveals, whether to the touch, to careful percussion, or to the attentive ear, as differing from what is usual in health, are due to departures, perchance temporary only, from the normal condition of this organ; and it may also be concluded, where these phenomena are found to be persistent, that they are due to alteration, as the case may be, in its structure or bulk, or to disarrangements of its valvular completeness.

These latter generally entail, sooner or later, by their disturbance of the animal economy, a fatal termination. Nevertheless, conspicuous and very remarkable exceptions occasionally present themselves, and the issue of life or death does not appear to be influenced by the inferred condition of the heart; while, on the other hand, the former may present themselves as very dangerous, and perhaps immediately fatal affections, as may also those cases occasionally met with, and which appear to be due to no structural alterations appreciable by careful examination, or, at any rate, to such as neither alter the size of the heart nor impede its blood-flow.

It is proposed, by reference to the notes of a considerable number of cases, to review some of the affections belonging to these several categories, and chiefly with the view of considering and determining their relative fatal tendencies. But, before doing this, I should wish to say some few words respecting the action of the heart in its relations to the circulation of the blood, and of the sources of the normal and abnormal sounds emitted thereby.

As regards the heart, it has appeared to me that the view of its action has been unnecessarily—I would even say erroneously—complicated by the general statement that the function of the auricle is that of a "propeller" of the blood into the ventricle. The simpler view that I would hazard is, that the ventricle is essentially the organ that, on the one hand, by expansion sucks in the blood, and, on the other, by contraction expels it; that the proper function of the auricle is, on the one hand, to contain a ready supply of blood for the expanding ventricle, and, on the other, a safety-pouch to counteract or equalise the backward strain caused by the contraction of the auriculo-ventricular valves.

I have elsewhere (*Medical Gazette*, Dec. 5th, 1857) ventured to state that, as regards the heart, the circulation of the blood is more simply effected than is usually considered to be the case; that, in fact, the heart proper is ventricular, and ventricular only; and that the circulation of the blood through the heart mainly depends upon, firstly, its ventricular exhaustion or suction power, and then, secondly, on its ventricular contraction, whereby it is indued with the function of propulsion.

The auricle, on the other hand, is rather to be considered as an appendage proper to the venous system, and not as appertaining or necessary to the ventricular heart; and therefore (without ignoring the influence, as a propeller of the blood, of the capillaries and of the veins generally, feeble though this influence may be, as also of the auricle, as portion of the venous system), auricular contraction is not an active agent in the movement of the blood.

The above conclusions are grounded on the fact, that the distension or greatest size of the auricle is not induced by a sudden influx of blood from the cavæ, but on the contraction of the ventricle, when there arises a retrograde pressure against the onward flow of the blood, caused immediately by the closure of the flaps of the mitral (or tricuspid) valve as these are propelled into the auriculo-ventricular axis; hence the blood then contained within the auricle is ponded or regurgitated back, and the greater distension of the auricle is effected. The relaxing of the valve, on the expansion of the ventricle, whereby the exhausting or suction power of the heart is exercised, immediately relieves the auricle of this, its fuller amount of tension. Its normal condition of a full, but not distended, vessel is then restored. In this state it continues during its period of rest to receive blood from the cavæ, and to deliver it into the expanding ventricle, till this latter, being again filled, again contracts upon its contents.

In the above we see exemplified, as regards the auricle, the phenomena of elasticity, rather than those of active muscular contractility; while the ventricle distinctly exemplifies the latter.

The normal state of the auricle is that of an elastic tube or vessel, capable, within certain limits, of expanding or contracting on the fluid it is called on to contain. Ordinarily full, it partially collapses as the blood is first drawn from it into the ventricle, on the expanding of this latter, immediately after its period of contraction has been concluded. The ordinary and, so to say, passive condition of the auricle is again disturbed at the moment of the closure of the auriculo-ventricular valves, when it becomes obviously distended, from containing, relatively, an increased amount of fluid. The adaptation of the auricle to these series of changes may fairly be assumed to be due mainly, if not entirely, to its elasticity, and not through the agency of any active inherent contractile power.

The very careful and valuable experiments of

Dr. Halford, and, previously, of Pechlin and others, fully confirm the above conclusions; for the heart was seen to expand as well as to contract, though no blood was furnished to it. Expansion, and hence a suction-power, is, therefore, a function as normal to it as the recognised one of contraction, by which it is universally allowed to be endowed with the power of propulsion.

Supposing the above view of the function of the auricle to be correct, it is then probable that the musculi pectinati act firstly in preventing undue distension, and secondly, after distension has been effected, in aiding towards restoring the auricle to its normal dimensions.

The above, doubtless, is not in accordance with the ordinary explanation of the function of the auricles, which is, that the auricles contract on the blood contained within them, and thus propel it into the ventricle. There are three cogent arguments against this conclusion. Firstly, it would assume that the auricle contained an amount of blood which should be somewhat more than equal to the capacity and the requirement of the ventricle on its expansion, and this, as must be admitted, it does not; secondly, the absence of a normal and regularly recurring pulsation in the jugular and larger veins; and, thirdly, the absence of any sufficient valvular apparatus at the venous entrance to the auricle, or where the venæ cavæ deliver themselves into the sinus. This latter alone would militate against the assumption of its being an active contractile organ; for not only is the absence of any such structural arrangement to such an end contrary to the whole principle of the circulation and the mechanism of its organs, but, in fact, the contraction of the auricles would as equally force the contained blood into the cavæ as into the ventricle.

The phenomena observed in those cases where there occurs, independently of valvular disease, an obvious pulsation in the jugular vein, indirectly confirms the whole of the above position. An undulatory motion is seen to be succeeded by the more distinct pulsation; and this pulsation is synchronous with the pulsation in the carotid artery.

Again: the ordinary explanation—that the dilatation of the ventricles is passive only, and solely caused by the forcible discharge, by the auricle, of blood into them, and thus forcibly effecting their distension—is not only inconsistent with the above view, but the structure of the auricle does not warrant such a conclusion: it has neither the general strength nor the character of fibre for the exercise of so large a power.

Without discussing what may be the motive power exercised upon the blood in its course through the veins—how much may be due to capillary force, and how much to an elastic or even to a contractile power proper to the veins themselves—I here hazard the opinion that the auricle fulfils two evident conditions; the one, in connexion with the venæ cavæ and sinus, of being the ready vessel of supply, whence the ventricle, or heart proper, receives that blood which, on its expansion, it requires; the other, that of being an elastic expanding vessel, and representing one of those enlargements which invariably accompany the valves of the veins, by which the blow of the suddenly contracting ventricle, and the consequent sudden closing of the valves on the incoming stream of blood, are compensated for. And I would further hazard the opinion, that any muscular power which the auricle may exert on the propulsion of the blood is only secondary.

Assuming this simpler view of the heart's action to be correct—viz., that the ventricles first act by a process of exhaustion, so as to suck in the blood, and then by contraction propel it onwards—we will pass on to a consideration of the sounds, normal and diseased, thereby emitted.

[*To be continued.*]

REMINISCENCES OF A FOUR MONTHS' STAY WITH PROFESSOR A. VON GRAEFE IN BERLIN.

By A. SAMELSON, M.D., Manchester.

[*Continued from p. 357.*]

THE concluding chapter of our recollections shall be a rapid survey of the *morbid occurrences* of interest, which we have noticed, and the measures of treatment preferred at the Clinique in various diseases of the eye and of its appendages. To this end we shall proceed in the order as the organs topographically succeed each other from before backwards, briefly relating at their proper places those few cases in point, which our scanty notes supply.

Starting, then, from the affections of the lids and their vicinity, we find that *Trichiasis* and *Distichiasis* are met either by the removal of the tarsal edge; or, as the case may require, the excision of separate hair-bulbs only; or, more generally, by the operative plan of Arlt and Jäsche, further modified by Von Graefe himself. The modification consists in the addition of a vertical incision, about two lines long, near each angle of the tarsus; mostly both, sometimes, however, only one of them, performed prior to the splitting of the ciliary margin. The union of these lateral incisions by sutures is the last act of the operation. The dissection of the triangular piece of skin from above the tarsal bridge, after it has been circumscribed by the knife, is effected with scissors. Sometimes a strip of integument, if still retaining the roots of some lashes, is yet separately removed from the tarsal border.

The customary operation for *Entropium* is by removal of a quadrangular piece of skin from below the inverted tarsal edge, and subsequent suture. The ligature plan does not appear to be practised.

Ectropium is more generally discussed by the operative transplantation of the integument, the triangular gap resulting from which is as much as possible lessened by the employment of sutures. The canthoplastic operation, or the excision of a wedge near the outer corner, are steps often collaterally adopted. In the case of a boy affected with organic ectropium of the right lower lid, which, though slight, extended over the entire length of the tarsus, and had arisen from long bygone bone-disease (a little fleshy growth in a depression at the outer angle still betraying the former fistulous opening), an incision an inch long was made, in direct continuation of the outer commissure; the lower lid was, by a tedious process, subcutaneously detached from its extensive adhesions far down the cheek, and so far as the ala nasi, until it was thoroughly moveable, when a small wedge near the outer commissure was removed from the lower lid, and the tarsal edges of both lids were pared with scissors a good way towards the middle of the palpebral aperture. The trial of adaptation giving a most satisfactory result, the gap caused by the excision of the wedge was first united by a thread at the tarsal margin, and five or six more sutures were added to close the transverse incision. The success was perfect. In some cases, more complicated blepharoplastic operations had to be resorted to.

Blepharoptosis is, in operable cases, combated by Von Graefe's own method, consisting in the removal of part of the orbicularis muscle, as well as of the in-