LECTURES

ON

THE FORMATION AND EARLY GROWTH
OF THE BRAIN OF MAN.*Delivered at the Royal College of Surgeons of England.*

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LECTURE III.

THE right mantle on its inner surface has a broad ridge, external to the optic thalamus (Fig. xv, s), raised toward the middle line—the corpus striatum—thicker and more distinct anteriorly, and gradually fining down towards the hinder portion of the mantle. A deep groove separates it from the corresponding thalamus; and between the two, and partially concealed in the groove, a band of tissue curves round the outer surface of the thalamus, the fornix of the adult brain. Above the first ridge is a second, narrow and irregularly waved, traced in front to the olfactory lobe, and behind gradually shelving to the general surface of the mantle. In front of this, and on a more external plane, a ridge ascends, nearly vertically, and from it (Fig. xv, a) there branches off a narrow ridge, which curves backwards and upwards, and a second ridge, which is marginal, cresting the mantle above as a thick lip, and ending behind in a junction with the other branch.

The left mantle outside the thalamus is marked with a broad plateau (Fig. xvi, s), the lower portion of which represents the corpus striatum; and on this side also the fornix is visible, as a band between this and the thalamus. Posteriorly the plateau ends in four tapering ridges, gradually shelving until lost in the level mantle-tissue (Fig. xvi, s to a). In front of the thalamus a thick ridge rises and ends in a club-shaped mass, connected in front with the ridge ascending from the olfactory lobe, and

Fig. 15.

Fig. 16.

Fig. 17.

through this by a curved band with the ridge in front of the olfactory lobe. The original bands then follow the margin of the mantle (Fig. xvi, b) to the terminal point of the highest of the four ridges passing back from the plateau; but on this side the marginal bands overhang corniculate-like, and, thus bending inwards, curve towards the upper border of the thickened tissue forming the plateau.

From these dissections it may be gathered that the mantles are thus early marked by distinct fissures on the outer surface, the direction of the groove which indicates the future Sylvian fissure being vertical. On the inner surface, the folding over of the mantle, with its club-shaped masses separated by fissures, to form the shell of the hemisphere, and the consolidating of the anterior convolutions, are distinctly indicated. The fornix and the optic thalamus of either side are well marked structures.

In a foetus 1.8 inches long, the optic thalami, when widely separated, have between them the tissue of the tracks diverging into the hemispheres, but united along the entire middle line (except at the infundibulum), and each one marked in front by a nearly vertical groove (Fig. xvii, f). In front of this, again, a thick ridge of tissue ascends, curving round the anterior border of the thalamus (the portion marked at h in Fig. xvii); whilst in front of this the olfactory lobe tapers forward and inwards, and is continued by its base into the first ascending ridge, and joins with the other anterior convolutions. Above the optic thalami the crura of the pineal centre are well marked, and at this point of junction a slight elevation indicates the centre from which the membranes have been detached by dissection (Fig. xvii, p). Below and somewhat posterior to the basal vertical groove is the site of the pituitary centre. In Fig. xvii, the tissue uniting the diverging tracks has been torn through, completely so in front of the vertical groove, and nearly so behind that structure, to show the relations of the anterior

ridges which grow up from them. At this period the great bulk of the tissue here accumulated, as contrasted with the size of the optic thalami and mantles, is remarkably at variance with the delicate grey commissure, the tuber cinereum and lamina cinerea, which represents these basal structures in the adult brain.

In the foetus four inches long, the mantles have grown so as to cover the corpora quadrigemina and the cerebellum, the latter having made but little progress in development. The right hemisphere (and the appearances presented by the left now closely correspond) has greatly altered its relations. The Sylvian fissure (Fig. xviii, sf) is no longer vertical, but approaches the horizontal direction, although its vertical limb is well marked. In front and below, the olfactory lobes are no longer conspicuous, being hidden by the great growth of the anterior lobes. The anterior portion of either mantle is marked by five single gyri, separated by fissures; then a double gyrus, marked off by two long fissures; then a single gyrus, followed by another, the eighth in order from the front, which branches in three chief divisions. Beyond this, which completes the structures above and in front of a deep notch—internal parieto-occipital fissure (Fig. xviii, p o)—a number of convolutions, separated by fissures, seem crowded together, and tucked in, as it were, under the root of the Sylvian fissure. The change in the arrangement of these gyri and fissures has been brought about by the gradual unfolding of the mantle backwards, and by the gathering in of the hinder folds as the anterior and middle portions expand outwards. We have to examine these structures at a much earlier period of their development to understand the provision which is made to determine this arrangement of the folds of the mantle.

A vertical section from before backwards through the middle line (Fig. xix) shows the plan of development by which the mantle or shell becomes converted into the solid hemisphere. In Fig. xix, the optic thalamus and the peduncles, with part of the corpus striatum, have been removed. That portion of the track which grows out behind and mesially to the olfactory lobe, is fixed to the pituitary centre, and is united with its fellow, forming the anterior portion of the corpus callosum. Above this, and marked off from it by a groove, is the part of the anterior lobe formed by union with the preceding, and with the tissue in connection with the olfactory lobes. It has grown rapidly backwards (Figs xix, xx, a l), consolidating with the ridge of the plateau above the corpus striatum (extraventricular portion), and ends in a thick rounded mass at l'. This represents the gyrus fornicatus of anatomists. As at c, Fig. xix, in the first named track, fibres turn inwards to form a transverse commissure, so beneath this prolongation backwards of the second track fibres grow out and pass inwards to join from before backwards in the middle line, and thus eventually complete the union of tissue which constitutes the corpus callosum. Whilst these changes are going on in the anterior and mesial structures, the corniculate fold of the margin (third track) has so grown as to join in its entire length with the great ridge with which, in a foetus 1.6 inches long, it was only in connection at its posterior extremity; and along the entire lower border the fold (Figs. xix, xx, m l) is now uniting (for the union is not yet complete) with the second track, forming the gyrus fornicatus. This fold incloses a great cavity, by some observers said to represent the lateral ventricle: it is formed by the folding over of the convolutions, and is bounded below

Fig. 18.

Fig. 19.

by the prolongation backwards of the second track, by the consolidation of which with the third track it is shut off eventually from the parts under the corpus callosum. At its lower margin a shelf of white tissue is seen to pass into the second track, and no doubt extends under the gyrus fornicatus to assist in forming the corpus callosum. This structure is also joined by the fold of brain referred to as seventh in order, and behind this again by the unfolded portions of the larger branched gyrus (eighth fold), over which, except in the fissures at its posterior and lower margin, not a mark is to be seen. The fissure behind this is the internal parieto-occipital (Fig. xix, p o), and below this is a long, nearly horizontal, and eventually deep fissure, the calcarine (Fig. xix, c l). This is not one of the primary fissures, but is caused by the folding in of the lower and hinder portion of the brain on the inner aspect as the mantle

expands in an outward direction (Fig. XX, C L). This folding has been carried to such an extent that the lowest primitive gyrus is bent over on itself, being closely applied to the thalamus and peduncle, the gyrus hippocampi in the adult brain. It follows that to recognise its relations with the order of development of the convolutions, it must, in the adult brain, be turned over towards the inner side, when it resumes the position it originally had.

By the folding over of the lower and posterior gyri, a fissure is thus formed which originally includes the posterior horn of the lateral ventricle (so-called), but the white tissue which forms the corpus callosum grows back into this fissure above, and eventually ends by forming the base of a deep gyrus in the calcarine fissure about which the opposed gyri become adherent, and thus solidify the hinder part of the brain. As with the unfolding of the mantle, so also for the explanation of the bending over of the convolutions we have to look to a much earlier period of development.

Each hemisphere is formed, it thus appears, by a series of processes or gyri, which, under the name of the mantle, grow out from the lower part of the optic thalamus, unfold fan-like from before backwards, and also bend over towards the middle from above downwards. Further, as they increase in width, the lower and hinder folds, as they have now become, being fixed, as will be presently shown, at the base and to the middle line, become twisted inwards as the other parts grow outwards. This thickening and increase in breadth depends upon the consolidating of the mantles by the growing together of the anterior lobes, and by their growth backwards with great thickening of their tissue, and by the subsequent filling up by the same tissue of the cavity, which, for a time, exists enclosed by the superior folds. If one may venture to follow these folds, it may be said that those of the first track or first set end in front of the anterior bend of the corpus callosum by blending with the second set, which, in their turn, terminate by curving round the posterior extremity of the corpus callosum (Fig. XX, A L). A third set, separated from the others by the fissure which defines the gyrus fornicatus above, curve towards the back of the corpus callosum (Fig. XX, M L) behind the second set, and are limited behind by the internal parieto-occipital fissure. The fourth set come out below at the Sylvian fissure and curve round, the highest of them to the back of the corpus callosum, the remainder to the back of the thalamus and peduncle of the brain, ending by the side of the optic track and the infundibulum. It is these last named tracks which bend over to form, with the thalamus, the posterior horn, and also the calcarine fissure (Fig. XX, C L).

Fig. 20.

Fig. 21.

When, however, these tracks are referred to as ending, it will be seen, when some of the earlier stages of development are described, that each track consists of a bud, or loop if it consist of fibres, from the peduncular tissue; and thus the fibres, after passing to the apparent end of each track, revert to the peduncle. These buds are covered by a tissue, whiter than their own, and thus easily recognised, which forms the bulk of that which fills up the space left by the arching of the mantles, and forms also the corpus callosum.

I shall now consider the manner in which this growth of the hemispheres is provided for; and, although I hope to give the general plan with some exactness, yet it should be understood that no one can approach the examination of these details without being struck by the beauty and marvellous complexity of the structures which are unfolded, and then again close in, before a final unfolding, to form the brain of man, or without recognising the fact that, at the most, one can only offer an imperfect exposition of the minute relations of their various parts.

The following dissections have been made on the foetus from 1.1 inches to 1.6 inches in length; and as the statement is to be made throughout that the convolutions are visible from a very early stage, and as this is at variance with the usual statements, I take the opportunity of showing these specimens—one of a foetus 1.3 inches long, and a second of a foetus 1.6 inches long—in which the outgrowths or convolutions are distinctly marked in all their details. The commonly received statement that these gyri begin to make their appearance about the fourth month, has arisen from the examination of the foetus at a more advanced period than that to which I refer, for it is quite obvious

that, by superficial growth, the convolutions are for a time obscured; and thus, for example, in this specimen of the foetus six inches long, they seem to be only beginning to show themselves, but this is, in point of fact, their reappearance after a temporary veiling.

On dissecting the brain of a foetus 1.3 inches long, the tracks of tissue forming, in addition to the passage through their upper third (Sylvian fissure), the future corpora quadrigemina consist of two parts—one superior, the other inferior (Fig. XXI, S I). The superior is of a white colour, whilst the inferior has a greyish tint (I speak merely of comparative shades); and in this way the two are distinguished, for the same difference of colour is observable throughout their course, more or less distinctly.

At the hinder part of the corpora quadrigemina (Fig. XXI, Q), the superior track forms a single layer with marks of a serrated suture on its upper surface; it surrounds the Sylvian fissure, and, further back, just above the upper border of the cerebellum, has received some of the crossed fibres, if the term fibres may for convenience be employed, of the inferior track. The main portion of the superior track is, however, continuous with that in which the cerebellum is formed, and ascends from the lateral and posterior portions of the spinal cord. In front of the corpora quadrigemina, this track is divided by a median fissure (the third ventricle) into two portions, which pass forwards, and these again into two other portions, marked off by a fissure, which pass to the upper and inner surfaces of the inferior tracks, and are distributed with them. The two portions which pass forward bend downwards and then forwards, as shown in Fig. XXI, S, O, F, to reach the pituitary centre. The further changes which occur to these tracks consist in the flexing of the upper portion upon itself so as to constitute the optic thalamus (Figs. XXI and XXII), which long retains the mark on its inner surface of this bend, and in the adapting of the lower part of the track (Figs. XXI and XXII, F) to the thick mass of the mantle which forms the

Fig. 22.

corpus striatum, over which it is continued, curving round the posterior margin of the corpus striatum, but still retaining its connection with the pituitary centre. This is the fornix. On the inner surface of the section of the brain of a foetus 1.6 inches long, carried from before backwards through the middle line, the flexures of the superior tracks are well marked (Fig. XXII), the fornix can be traced from the posterior flexure (the future corpus albicans) (Fig. XXII, Fa) to pass forward over the corpus striatum, whilst its terminal portion indents the inferior track in crossing over its upper and inner surfaces to reach the pituitary centre (Fig. XXII, Fa, Fig. XVII, F). It is my opinion that the tissue of opposite sides in the superior tracks is here continuous above the pituitary centre, and forms the anterior white commissure. A similar decussation of fibres exists below the pineal centre (posterior white commissure), at the superior limit of the anterior central vesicle.

It thus appears that between the two fixed points, the pineal and the pituitary, the portion of the superior tracks we are now considering develops, on either side, a long and tortuous course, in which they form the optic thalami and the fornix. The inferior track is directly continuous with the columns representing the lateral and anterior portions of the spinal cord which have decussated, it seems probable, in the medulla oblongata. They are joined by a portion, on either side, of the superior track, and then the four united pass forward below and to the front of the curves of the superior track, already described, and end at the pituitary centre in relation with the superior tracks (Fig. XXI, Pt). They thus represent a growth from the superior (or anterior) extremity of the front columns of the cord, just as the superior represents a similar growth of the hind columns. But, like the superior, the inferior track of either side develops in a tortuous course, passing forward, then inwards and upwards, and lastly backwards and downwards, to the pituitary centre. In all this course the white layer of tissue from the superior tracks is on the mesial surface of the curves. From these the mantle of either side is developed; and, in a foetus 1.1 inches long, it is of some size. Below, its tip is the part fixed to the pituitary centre (Fig. XXI, Pt); in front are two projecting portions (between Pt and I'), the anterior being the olfactory lobe, then a deep notch and a rounded mass, which ascends and is fixed at P by the membrane at the pineal centre (in the diagram it has been drawn a little forward from this connection), then a deep

notch and a series of minute prominences, and so to the first-named point at Pt (following the line between I' and Pt in Fig. XX1).

Let us here consider the influence exercised upon the further growth of this mantle (Fig. XXIII, M) by its having the two fixed points which have been referred to. As it increases in bulk, and as the vault of the skull is raised to receive it, the attachment of its upper portion to the pineal centre (which centre is fixed by strong membrane-tissue to the base) causes it to bend over towards this point; and thus the tissue prolonged from this track forms an arch having the shape of the external superior and internal parts of the future hemisphere. Beneath the arch, there is at first a cavity (Fig. XXIII, V), the filling up of which takes place rather later; and all the tissue developed from the projections of this track thus forms a sort of shell (or mantle); and, supposing the inferior track to consist of fibres, these fibres would be traced through the shell to its furthest limit, and then back again to the track, as already mentioned; and this seems to be the plan of the fibre-arrangement, at all events of the continuity of parts in the more superficial portions of the hemispheres. By the attachment to the pituitary centre, the point of the mantle at Pt, Fig. XXIII, is held fast whilst the infolding of the mantle and its development by increase of bulk laterally is in progress; and this portion consequently becomes tucked in under the increasing parts above it. Hence, as seen in Fig. XX, and again in Fig. XIX, the lobed gyri, which lie at first on the surface, become covered over and closely applied to the root of the mantle, where they form the hippocampus major, with its pes and the adjacent convolutions; still in the adult retaining their close relations, as in the foetus, with the fornix. The tucking in of these gyri forms the deep calcarine and other fissures on the inner aspect of the posterior portion of the adult hemispheres. Thus the one centre (pineal) determines chiefly the folding over of the anterior and middle portions; and the second centre (pituitary) provides for the folding in of the posterior part of either mantle.

Whilst the development of the inferior tracks forms the shell of the mantles, their consolidation, and the consequent formation of the hemispheres, seem chiefly due to the great development of that portion of the track derived from the divergence to it of the part of the superior track (Fig. XXI, below s), and which forms the comparatively distinguishable white layer on the upper and inner surface of the mantle. From this the corpus striatum seems to rise; and from it, too, appears to come that thickening of the front portions of the mantle which results in their sending back tracks of tissue which unite first the two anterior portions, then join these with the middle, and finally with the posterior folds, extending also within the shell in all its parts to close up its cavity. As these portions are prolonged backwards, they unite in the middle line, first anteriorly, as may be seen in a foetus five inches long, to form the corpus callosum, which can thus be scarcely spoken of as growing from before backwards, but simply as uniting in that direction—just, for example, as the opposite plates of the palate join to complete that structure by uniting in a direction from the intermaxillary bones backwards to the uvula. In Fig. XXII, it is easy to see how the back growth of tissue (c) overlies the fornix (F).

In a foetus 1.9 inches long, the great size of the inferior tracks, in comparison with other portions of the brain, can be seen; also their union in the middle line so far forward as the terminal bend of the superior tracks. Beyond this, they are separated for some distance, except at the base in front of the pituitary centre, then curve forward and upward, making way for the mass of the corpus callosum. This intermediate portion occupies a large space in the foetal brain at this stage of its development (Fig. XXII, at s L), but forms in the adult the comparatively insignificant cavity of the septum lucidum.

The Third Ventricle.—In the progress of the development of the hemispheres, the optic thalami, separated by a fissure, and the adjacent portions of either corpus striatum, are roofed over by the corpus callosum, including under this name not merely the transverse commissural tissue, but also the extension of the tissue which lines the convolutions of the anterior and posterior arches of the mantle. The space included between these structures consists of the third and lateral ventricles, as commonly described. These form, however, one continuous cavity, which is crossed by the fornix on either side. The anterior and posterior horns are due to the mode of folding of the mantle; whilst the middle horn is merely the fissure between the optic thalamus and one of the posterior, eventually inferior, of the convolutions. To examine this ventricle, the corpus callosum should be divided along the middle line from before backwards, and the hemispheres should be separated posteriorly from each other. The relations of the ventricle will then be seen, with the exception of its central and deeper portion, from over which the membranous covering (velum interpositum) must be removed before it can be examined. In fact, although the space between the optic thalami is continuous with a fissure which is traced back to the

cord, and is probably due, as usually considered, to the original formation of these structures from equal side-pieces, it is simply the fissure between the internal surfaces of the superior tracks, and its prolongations lie between parts which belong to the surface of the cerebrum, just as much as the convolutions do, which seem to enclose them. The ordinary method of examining these surfaces, added to the use of the terms lateral and third ventricles, tends to mislead the observer, first by suggesting that the hemispheres enclose a cavity or cavities within the cerebrum, whereas the apparent cavities are simply spaces between portions of the external surface of the brain; and secondly, by leading to the inference that the lateral ventricles, with their cornua, are distinct from the third ventricle, whereas they form but one space between continuous surfaces. Figs. XXIV, XXV, show how the folding of the mantles gives their direction to the anterior (XXIV) and posterior (XXV) horns.

The tения semicircularis simply marks the line of union between the thalamus and the corpus striatum.

The Convolutions.—There is a certain order in the mode of development of the primary buds or gyri, which may assist in explaining the relations of the convolutions in the adult brain. If the mantles be examined in the foetus 1.6 inches long (Fig. XXVI), there will be seen on the left outer surface, for example, a series of eight gyri. Of these, the first four unite together and form a band, which is continued backwards to the pineal centre; and it seems as if their extension is limited by the resistance offered at this point by the fixed membranes. The sixth gyrus is bifurcated, and the fissure corresponds with that of Rolando in the adult. The fifth, the sixth, and the seventh, fixed to the pineal centre, bend over as the brain expands within the cranium, and join along the greater portion of the upper border (the seventh forming a fold beyond it) of the track from the anterior gyri. The eighth gyrus consists of at least three primary divisions, and this likewise bends over as the brain heightens; and, as it develops backward, the gyrus forms fresh folds, always converging towards the pineal centre, passing deeply under cover of the parieto-occipital fissure. Beyond this is a well marked fissure (parieto-occipital, in the adult brain, Fig. XXVI, P O). Then succeed the divisions marked in the figure, and the lowest of which is notched; these are fixed to the pituitary centre, and, as development progresses, are folded over, and are applied to the back of the thalamus and peduncle, and constitute the uncinat process and the hippocampus major, bounding the fissure which leads to the surface of the thalamus (middle cornu of lateral ventricle). The gyri between this and the fissure are rolled over to form the lower portions of the cerebrum (temporo-sphenoidal lobe). The fissure itself is in a line with the horizontal Sylvian fissure, which at this date is nearly vertical in its direction, and then bends over to the mesial side.

The accompanying diagrams* are copied from Professor Turner with some slight modifications, and represent, I consider, very closely the ordinary markings seen at the surfaces of the adult hemispheres; and it is very interesting to trace by their help the resemblance to the arrangement observed during an early period of development, as compared

Fig. 23.

Fig. 24.

Fig. 25.

Fig. 26.

with that of the adult brain. The better to distinguish them, the several regions have been coloured. On the outer surface, in front, are the portions which correspond with the first five gyri; next are the ascending frontal and ascending parietal gyri, with the fissure of Rolando between them; and we are at once reminded of the bifurcated gyrus in the foetal brain (Fig. XXVI). Then a large district is occupied by a single convolution, as in the foetal order; and with this, and spreading out to form the great portion of brain around the horizontal fissure of Sylvius, are the convolutions which may be presumed to coincide with the eighth gyrus, with its three branches; and, if the inner face of the hemisphere be examined, the deep internal parieto-occipital occupies, in relation to these convolutions, the position of the deep cleft behind the eighth gyrus.

But on the inner face of the hemisphere is recognised the plan on which the gyri have been brought together. Here is the prolongation backwards of the anterior masses, and below them the commissural fibres. Above is the sulcus (calloso-marginal, Fig. XX, between M and A L) which indicates the line of junction between these and the succeed-

* Coloured diagrams. Figs. XXVII to XX and Fig. XXVI, may be referred to in illustration of the relations of the convolutions.

ing arches, which further bend in to end at the pineal centre. If the parieto-occipital fissure be examined, we find in its depths the mesial fold of the eighth gyrus. Then follow the folds of the hinder part of the brain; the ninth arch lying behind the sulcus (parieto-occipital), and turning over to the pineal centre; and the remaining gyri arching to a line between this point and the pituitary centre—the calcarine fissure reminding us of the manner in which the mantle has folded over in the posterior portion of the cerebrum.

This is the general plan of disposition of the chief parts of the cerebrum. Any one who has endeavoured to trace the complex outlines of the secondary or subsequent folds of the chief gyri, will shrink from the endeavour to follow out the course of these convolutions in the adult brain, or to endeavour to distinguish these structures by distinctive names. There are in all thirteen or fourteen primary gyri; and it seems sufficient to indicate their connections in a numerical order from before backwards, as in Fig. XXVI, and to retain this numbering for the adult brain, grouping the gyri as has been mentioned; for it is not possible with the anterior and posterior gyri to point to the position of each one separately.

During the early stages to which my dissections extend, there is nothing to notice respecting the medulla oblongata after that period at which it exhibits the decussation of fibres to which reference has been made. It has acquired its ordinary characters in a foetus five inches long; but the changes which it undergoes are not of a character to bear upon the general question of the mode of formation of the brain.

In a foetus four inches long, the cerebellum, covered by the mantle, although increased in size, differs little in appearance from that of the tissue which formed it at a much earlier period; but, after this date, it increases rapidly by budding from its side-pieces, so as to form lobes and folia. Its peduncles, which have been visible from an early period (ninth week), are the fibres of the superior tracks continued through on their way to the hemispheres and optic thalami. The cross fibres which form the middle peduncle are not distinguishable before the fourth month as any considerable mass; but, about the third month, tissue passes across between the tracks; and it is worth noticing that here, in connection with the hind-brain, in the mid-brain, and in the fore-brain, these primary commissural fibres unite portions of the superior tracks.

I would suggest that the best method for examining an adult brain, so as to obtain a view of the relations of its various parts, is by making an antero-posterior vertical section through the middle line. The several structures can then be readily inspected in their natural relations; and, although I do not now desire to advocate any new nomenclature, it is evident that the study of the brain would be much simplified if the names of its various parts were reconsidered, so as to enable us to give a more orderly description of them. Our present nomenclature has come to us pretty much by hazard; and nothing can be more unreal or perplexing than the dissection of a brain by sections of its tissues as usually practised.

I have to thank you, in conclusion, for the kindness with which you have listened to these details, and which, like most descriptions of complicated dissections, must, I feel, be difficult to follow as they are narrated. My excuse for bringing them before you is my wish to make clear, as I hope to some extent I have succeeded in doing, the relations to each other of the more important parts of the cerebrum during the early stages of their formation, so as to provide a basis for more exact clinical observations as to the functions of its several parts.

DEACONESSES' INSTITUTION AND TRAINING HOSPITAL.—The annual meeting of the Evangelical Protestant Deaconesses' Institution and Training Hospital was held on Saturday, at Tottenham, under the presidency of the Earl of Shaftesbury. The report stated that the hospital was now too small for its requirements. The number of in-patients last year was 305. Since the erection of the hospital in 1868, 1,796 had been admitted. The institution, it was regretted, was £1000 in debt. Mr. S. Morley, M.P., said that this institution had been of great service as a local hospital to Tottenham, and also to other parts of the country, for the training of deaconesses or nurses, whose services were in great requisition. The Hon. A. Kinnaird, M.P., thought that, in the matter of providing nurses for the public, this hospital could favourably compare with any other. Dr. Laserson stated that he had conceived a plan for the enlargement of the hospital, which would combine economy with simplicity, and give to the poor inmates every comfort, the estimated cost being from £18,000 to £20,000. Alluding to the work of the hospital, Lord Shaftesbury maintained that nurses should be as carefully and accurately trained as surgeons and physicians. In a great many instances, nurses were superior to the physicians in the treatment of the sick. Subscriptions to the amount of £1,200 were announced at the meeting.

THE HASTINGS PRIZE ESSAY, 1873.

ON THE PATHOLOGY AND TREATMENT OF OVARIAN DISEASES.

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IV.

MR. SPENCER WELLS has characterised the condition of the medical treatment of ovarian tumours as one of hopeless impotence; and, if we except the general treatment by chalybeates, tonics, hygiene, by which we guard against too rapid exhaustion, and at the same time prepare our patients against the great trial by which alone they can be cured, we may at once accept his statement. Sometimes we are the victims of singular coincidences, which seem to militate against the general experience in such matters, and, only within a few days, I have met with such an instance. More than a year ago, I was consulted by a woman with an enormous unilocular tumour, whose husband declined all operative proposals. Lately, she received from the hands of a physician some inert *placebo* in the shape of an ointment, and soon afterwards the cyst burst and its contents were absorbed. Possibly, she may be permanently cured, but more probably she is not; but, meantime, nature has apparently secured for medicine a triumph which it is only to be regretted is not more common.

The surgical treatment of ovarian tumours has now been simplified into two operations: the minor operation of tapping, which is palliative and, on some rare occasions, curative, and the major operation of ovariectomy, which is either curative or fatal. In the process of development through which the surgical treatment of ovarian tumours has passed, many various and injudiciously strong opinions have been expressed on one or other, or both, of these operations; but, during the last fourteen years, there has grown up an experience in the hands of one man, incomparable with anything else in the annals of surgery, and that experience has been so conscientiously detailed and so critically examined, and its conclusions have been so irresistibly drawn, that there is from it at present no appeal. In my own practice, I have found that, when I have differed from Mr. Spencer Wells, I have only exhibited my inexperience; for case after case has opened out for me the fact, that he had encountered everything before me; that he had previously tried what I have tried, and that there seems but little hope that anyone can surpass his magnificent results.

The operation of simple tapping was formerly regarded as much more serious than we now consider it, for no operation is at present more common in the hands of the ovariotomist. Generally, it is adopted either to gain time, in order that the patient's health may improve, or, paradoxical though it may seem, that the patient's robust condition may somewhat deteriorate; or it may be employed for diagnostic purposes. Sometimes it is curative—a fortunate result that I have met with twice in cases where I have tapped pelvic unilocular cysts through the vagina. It has sometimes happened, as noticed by Mr. Wells, that the tapping of large cysts through the abdominal walls has been followed by cure. It is more than probable that cases which have had a fortunate ending have been cysts of the broad ligament; for a truly unilocular tumour of the ovary—that is, a tumour of one cyst, with nothing else that would be likely to subsequently develop into another cyst, even if the first were cured—I have not yet met with.

Tapping by the vagina is not usually attended with good results in ovarian tumours. I have seen death result three times after it in the practice of others. Mr. Wells has found it better to keep the opening patent, and to encourage suppuration and discharge, than to allow the puncture to close. In the two cases to which I have referred, I fully exhausted the cyst by the aspirator, and to this, perhaps, may be attributed the fortunate result. In tapping through the abdominal walls, whether for the purpose of diagnosis or treatment, the point of puncture should be in the linea alba.

If the cyst be small, the ordinary aspirator will be found a most efficient instrument; but, if the cyst be large, the tapping will be best performed by Mr. Wells's small-sized syphon trocar.

Sometimes I have punctured above the umbilicus, but generally it is better to keep between the umbilicus and the pubes, going above the former spot only when there is some solid matter below, or some suspicious circumstances that may warrant the exception. I have always adopted Mr. Wells's plan of first puncturing the integuments with a