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THE

HEAD OF THE INFANT AT BIRTH.

PART II.

BY

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Part II.

In a former communication to this Society upon the subject of the Head of the Infant at Birth, in February of this year, the size and shape of the cranium and the characters of the osseous framework of the head were described, and special attention was paid to the results which were obtained from the frozen sectional method of investigation. In the present paper it is my wish to complete the consideration of this subject by the study, by the same method, of the soft parts of the head of the new-born child. The material from which the following conclusions were drawn consisted of five full-time infants, one eight months' and one seven months' fœtus, and the frozen sectional method of research, which is now too well known to require description, was that employed. The brain and its membranes, the ear, the orbits and their contents, the nasal cavities, and the buccal cavity and sucking pads may now, without further preface, be described.

The Membranes of the Brain and the Cranial Sinuses.—In the infant at birth the arrangement and relations of the membranes of the brain do not differ in any marked way from those found in the adult; but there is a peculiarity as regards the relation of the cranial sinuses to the cranial vault which it is of importance to consider. The superior longitudinal venous sinus lies immediately beneath, and is in relation to the frontal suture, the anterior fontanelle, and the sagittal suture; and, as there is during parturition a varying amount of displacement of the borders of the parietal bones which form the boundaries of the sagittal suture, it follows that a considerable strain is put upon this venous sinus, with the result that occasionally rupture of the walls of the bloodvessel occurs, followed by extravasation of blood into the membranes. In two of the still-born full-time infants extravasations of blood, in one case into the falx cerebri, in the other into both the falx cerebri and tentorium cerebelli, were found; and I believe that this form of intra-cranial cephalhæmatoma is not nearly so rare as an examination of the literature of the subject would lead us to believe. M'Kee, in a paper on "Intra-cranial Cephalhæmatomata" (*Medical Record*, 26th

September 1885), lays special stress upon the great rarity of this variety as compared with the extra-cranial; but it is probable that the rarity is more apparent than real, for whilst all cases of the external blood extravasations are easy to diagnose during life, the intra-cranial effusions give rise to symptoms which may be, and no doubt often are, ascribed to other conditions; and, further, post-mortem examinations of the brain of infants are neither easily obtained nor often carried out. Charpentier also (*Traité des Accouchements*, vol. i. p. 294) comments on the rarity of these cases, and points out their frequent association with placental disease, especially hæmorrhagic, and with the coiling of the umbilical cord round the child. In both the cases in which I found intra-cranial meningeal hæmorrhage in the new-born there was placental disease; and in one case, at any rate, the head was subjected to great and continued pressure, for the position was a persistent right occipito-posterior, and forceps were ultimately used to deliver the child. There was also coiling of the cord round the neck of the infant. In both cases the hæmorrhage was meningeal, and could be traced from the tentorium cerebelli to the falx cerebri, and from the falx to the superior longitudinal sinus. In one of the cases there was also a large extra-cranial cephalhæmatoma of the sub-aponeurotic variety; but in the other case there was no blood extravasation outside the cranium, although there was an unusually large caput succedaneum. All authorities are agreed that the cerebral form of hæmorrhage is extremely rare in the new-born, and I have seen no example of it. In early life the meningeal form of hæmorrhage is more common than the cerebral, whilst in old age the cerebral variety is much more often met with than the meningeal, and this difference is due to the absence of disease of the arteries in early life and the comparative frequency of atheromatous changes in the senile vascular system. It is very probable that many cases of meningeal hæmorrhage in the new-born, beyond causing some difficulty in the resuscitation of the infants affected, and some transient paralytic or convulsive symptoms which are often unobserved, result in complete recovery.

The Brain.—In the new-born infant the brain, on account of its fluid condition, is a difficult organ to study topographically, yet a great deal has been accomplished in late years to clear up the relations of the cerebral fissures and convolutions to the cranial sutures and fontanelles. Various methods of research have been employed in the study of cerebral topography, but none of them have been found quite satisfactory. In the infants examined by the frozen sectional method I endeavoured, before the sections were quite thawed, to trace the relation of the fissures to the cranial sutures, with the following results:—

The Sylvian fissure, which, according to most authorities, is in the adult on a level with the spheno-parietal and squamous sutures anteriorly, is in the infant at a higher level *quâ* the

cranium. In a child of one year and ten months, Symington found that the Sylvian fissure lay under cover of the parietal bone about half an inch above the level of the squamous suture, and my sections of the infant at birth fully bear out this observation. Thus in one case the fissure lay 1·5 ctms. above the suture, and in another case 1·7 ctms. above the level of the squamous suture. It is believed that the change in the relative position of the fissure and the suture to be found in the adult is due both to the ascent of the squamous suture and to the descent of the Sylvian fissure from widening of the base of the brain. It was also noted—and the fact may be of some value in the cranial surgery of the infant—that the fissure lay at a level about 2 ctms. above the helix of the ear. The *great transverse* fissure of the cerebrum, which passes into the descending horn of the lateral ventricles, was seen to be as closely as possible on a level with the squamous suture, and a little above the tip of the ear externally. The *great longitudinal fissure* of the cerebrum, which contains the falx cerebri, followed, in the infants examined, the middle line of the head with considerable exactness, and lay immediately beneath the frontal and sagittal sutures and the upper branch of the linea cruciata on the inner surface of the occiput. It lay also under the anterior fontanelle in its antero-posterior diameter. Knott found that in the great majority of cases it had similar relations to the cranial vault in the adult (" On the Cerebral Sinuses," J. F. Knott, *Journal of Anatomy and Physiology*, vol. xvi. p. 27). The *parieto-occipital fissure* was located in several of my specimens. It marked the division between the parietal and occipital lobes, and corresponded in level with the tip of the occipital bone at the posterior fontanelle, lying rather behind than in front of the lambdoidal suture. According to Broca and Bischoff this is also its position in the adult; but Sir William Turner places it ·7 or ·8 of an inch in front of the lambdoidal suture—a statement with which Professors Ecker and Hare concur. Hamy (*Revue d'Anthropologie*, 1872) agrees with Broca as to its position in the adult, but finds that in the new-born infant it lies a few millimetres in front of the lambdoidal suture. The *fissure of Rolando*, which divides the frontal from the parietal lobe, lies in the adult under cover of the parietal bone and behind the plane of the coronal suture; but in the infant, according to Hamy, the frontal lobes being less developed, it lies relatively further forwards, the upper end of the fissure being behind the coronal suture, whilst the lower end lies under cover of the frontal bone. In one of my cases exact measurements were made which showed that the upper end of the Rolandic fissure lay 4·2 ctms. behind the coronal suture, whilst the lower end reached almost to that suture. In this case also the fissure appeared to be less vertical than in the adult. The *calcarine fissure* seen on the internal surface of the cerebral hemisphere which separates the cuneate lobe from the uncinate convolution, and which, with the parieto-occipital fissure, serves to

mark off the cuneate lobe, was traced in two of the infants examined, and was found to lie about 1·5 ctm. below the parieto-occipital suture, and approximately opposite to the occipital protuberance. No special facts of interest with regard to the remaining lobes, convolutions, and fissures of the brain in infants were brought out in these researches, but in connexion with the vexed question of the degree to which the cerebrum overlaps the cerebellum in the new-born infant a word or two may be said. D. J. Cunningham (*Topographical Anatomy of the Chimpanzee, Orang, and Gibbon*, 1886) states that the overlapping is not so great in the infant as in the adult condition, and finds that in the case of mesial sagittal sections the cerebrum overlaps the cerebellum to the extent of 9 mms. in the male infant and 7 mms. in the female infant, whilst in the adult male the overlapping is to the extent of of 25·5 mms., and in the adult female brain to that of 27 mms. Symington, however, found that in two male infants the projection in the middle line was 20 mms. and 19 mms. respectively, a projection relatively greater than that in the adult. In one of my cases the cerebrum measured 11 ctms. in length, and overlapped the cerebellum to the extent of 20 mms. In a second case the cerebrum was 8·5 ctms. in length, and the projection beyond the cerebellum was 15 mms. These measurements, therefore, support Symington in his conclusion that relatively the cerebrum overlaps the cerebellum as much or more at birth than in adult life; at the same time we must, as this observer points out, remember the fact that in the infant the cerebellum is relatively small.

It will be seen from much that has been said that cerebral topography in the adult, but also more markedly in the infant, is still a very inexact science; but with the discovery of more satisfactory methods of rapidly hardening the brain *in situ*, it is certain that the subject will soon be put on a more exact basis, and that the relation of the cerebrum to the bones of the skull will be as well known as those of the heart and lungs to the thoracic parietes.

The *Pituitary Body or Hypophysis Cerebri* is of great importance, as marking the line of demarcation at the cephalic end of the fœtus between stomodœum and encephalic vesicles and canal of the spinal cord, exactly in the way that the coccygeal body at the caudal extremity of the fœtus marks the spot where the hind-gut and the lower end of the central canal in the spinal cord meet. Bland Sutton suggests what he even terms the somewhat startling conclusion, that the tube which primarily represents the central nervous system in the vertebrate embryo must be regarded as a disused segment of the primitive alimentary canal, connected with the gut anteriorly by the cranio-pharyngeal canal, and posteriorly by the neurenteric canal or passage (post-anal gut). The meeting place of the narrow tubular portion of the anterior primary encephalic vesicle, known as the infundibulum, with the buccal epiblast

is marked by the pituitary body. Bland Sutton goes on to state that, even at the mid-period of intra-uterine life, a narrow cavity may be detected passing from the pharynx through the basi-sphenoid so as to come into close relation with the infundibulum. This cavity is afterwards represented by a band of fibrous tissue, which disappears in the macerated sphenoid, leaving what is known as the canalis cranio-pharyngeus of Landzert. In one of my cases, a dropsical infant, in the mesial section of the head the pituitary body was seen resting on the sella turcica of the sphenoid, and in the cartilage joining the basi-occiput and basi-sphenoid was seen a narrow cavity closed both at its pharyngeal and cranial end. This cavity, I have no doubt, represented the canalis cranio-pharyngeus, and its presence in this infant supports Bland Sutton's statement that the alimentary and central spinal canals are continuous in the vertebrate embryo. Another piece of evidence in support of this view is to be derived from the well-known fact that in monsters with a deformed nervous system (as the anencephalic fœtus) there is frequently also deformity of the alimentary canal, *e.g.*, constriction of the stomach or intestine, an example of which I found recently in the dissection of a monster of this variety.

In a coronal section of the head in one of the infants examined the *vidian canal and nerve* were well shown. The vidian nerve, which passes from the spheno-palatine ganglion backwards through the vidian or pterygoid canal at the base of the pterygoid process of the sphenoid, is relatively large in the infant at birth. The vidian canal also is large at birth, so large that it was only on subsequent dissection that I was led to a correct conclusion with regard to its character.

The Ear.—The ear of the infant at birth presents two peculiarities,—one is the very complete development of the internal ear, the tympanic cavity and ossicles, and the mastoid antrum; the other is the rudimentary state of the external auditory meatus, the mastoid portion of the temporal, and the Eustachian tube. The most important characters which distinguish the infantile from the adult ear are, therefore, to be found in connexion with the last-named parts. The imperfect ossification of the temporal bone, and more especially of its tympanic ring at the time of birth, explains the condition of the external auditory meatus. In the infant also the skull in the region of the ear is in a transition stage: there is anteriorly the antero-lateral fontanelle, which becomes the region *pterion;* whilst behind the ear is the postero-lateral fontanelle, the future region *asterion.* At and between these two fontanelles is found a medley of small bones and cartilage islands, which have no small importance from the point of view of the pathologist. It is not, however, within the scope of this paper to consider the development of the temporal bone, a subject upon which there is as yet no general agreement among embryologists. Suffice it to state, that it is chiefly through the imperfectly developed condition of the tym-

panic and squamoso-zygomatic portions of the temporal bone at the time of birth that the outstanding characteristics of the infant's ear are produced.

The External Auditory Meatus.—In several of the coronal sections of the heads that were made I was fortunate enough to open into the meatus in the greater part of its extent (Fig. 2). The osseous part of the meatus is insignificant in the infant, being represented by the annulus tympanicus. This ring of bone afterwards grows out to form the floor and the anterior and part of the posterior wall of the adult meatus. The roof of the osseous meatus is formed by the squamosal element of the temporal bone, which in the infant slopes gradually inwards towards the membrana tympani. In the adult the squamous part of the temporal forms at this point a much sharper angle than it does in the infant. From the annulus tympanicus a fibrous membrane is seen passing outwards to two or three pieces of cartilage, and the membrane and the cartilages together form the floor of that part of the meatus which is not ossified. It is in this membrane that ossification occurs, leading to the formation of the tympanic plate; and Symington therefore suggests for this membrane the name "membranous or fibrous tympanic plate." The spaces between the cartilages at the outer end of the external auditory meatus are known as the fissures of Santorini. Whilst the floor of the meatus is thus membranous at birth, the roof is osseous, for the pars squamosa turns inwards, as already described, to constitute this part of the canal. It is correct, then, in the infant, as in the adult, to speak of an inner osseous part of the meatus and an outer cartilaginous portion; but in doing so it must be remembered that in the infant the inner part is osseous only in the roof, the floor being entirely membranous, or nearly so, for the tympanic ring forms only a slight projection. It is wrong to state that the external auditory meatus is entirely cartilaginous in the new-born; it is partly osseous, partly membranous, and only to a very small extent cartilaginous. In the adult it is customary to look upon the osseous part of the canal as constituting two-thirds, and the cartilaginous part one-third of the total length of the meatus; but in the child at birth a very different proportion exists, for then the inner third alone is osseous, and that only in the roof, the floor being made up of the fibrous tympanic plate.

Varying statements have been made with regard to the length of the external auditory meatus in the infant. It has been stated to be short and rudimentary, and so it does appear if the skull only be considered, but if the soft parts are in position the canal is seen to be of considerable length. In two cases (one an infant at birth, the other an infant that died on the sixth day of life) I found that the upper wall of the meatus measured 19 mms. in length, and the floor 21 mms., the difference in the length of roof and floor being due to the oblique position of the membrana tympani. Symington comes to the conclusion, from the study of coronal

sections of infants and young children, that the external auditory meatus is relatively as long or longer in the infant and child as in the adult, and the measurements in my cases fully support this statement; in fact, the figures in the two cases above alluded to are even greater than those found by Symington in full-time infants.

In infants the external auditory meatus has a general inclination downwards as it passes in towards the tympanum; but it has, as a rule, no anterior or posterior curve, for coronal sections of the head in this plane usually expose the meatus in its entire extent, although sometimes a small portion of the external ear has to be removed to show the outer end of the meatus. The inner (tympanic) end of the canal is a little larger than the rest of the meatus, and is called the sinus of the meatus; should a foreign body, therefore, get lodged in this part of the meatus, its extraction is a matter of considerable difficulty.

The *membrana tympani* forms the boundary between the tympanic cavity and the external auditory meatus. It is directed obliquely in the infant as it is in the adult, but some authors state that it is much more oblique, nearly horizontal, in fact, in the infant. I have been able to convince myself, from the study of several frozen sections, that the membrane is not horizontal, although the fact that the external auditory meatus has a downward trend gives to the tympanic membrane an appearance as if it lay almost transversely. In one case I found that the membrane formed an angle of 12° with the floor of the meatus and of 33° with the horizon. In the adult it is stated to form an angle of 45° with the floor of the meatus.

The Tympanic Cavity.—One of the coronal sections (Fig. 2) showed very clearly the division of the tympanic cavity into two parts, the narrow *atrium* internal to the membrana tympani, and the broader *attic* above the level of that membrane. The cavity was seen also to have an irregularly triangular shape, the base being formed by the roof of the tympanum, and the apex by the narrow floor immediately internal to the tympanic membrane. The tympanic ossicles, malleus, incus, and stapes, were seen dividing the attic into an inner and an outer compartment, and their relations are the same as in the adult middle ear. In all the above-mentioned characters the tympanic cavity in the infant does not differ from that in the adult, but there is one point of difference of some clinical importance which has yet to be noticed, and that is the presence in the roof of the attic of an unossified suture. The roof of the tympanic cavity is formed by an outgrowth from the pars petrosa, which joins the squamosal part of the temporal bone; and at the point of junction there is, in the new-born infant, a suture, the *petro-squamous*, which, as Symington points out, increases the risk of inflammation in the tympanic cavity spreading to and involving the membranes of the brain. Clinical evidence shows

that this complication of ear disease is very common in the infant, and that therefore the prognosis in otitis media occurring in early life is graver, but at the same time it must be remembered that the thinness of the mastoid portion of the bone will render the operation of trephining comparatively easy at this age and at this spot. If pus form here, and if the diagnosis be made with any degree of certainty, trephining the mastoid is indicated.

The Mastoid Antrum.—The mastoid cells are not developed till after puberty; but, as Symington has shown, there exists in that part of the periotic bone which is named the pars mastoidea a large space, the antrum, which communicates with the tympanic cavity. In all the infants that were examined I found this mastoid antrum, and noted that it had, like the tympanic cavity, a very thin roof, which formed the only separation between it and the cerebral membranes. As the infant grows older, the walls, and especially the roof of the antrum, get thicker, and about the time of puberty become hollowed out into air-cells, which communicate with each other and with the cavity of the antrum. No reference is made to the presence of the mastoid antrum in the ear of infants in the ordinary anatomical text-books.

The Eustachian Tube.—The Eustachian tube is short in the infant. In one of my case it measured 18 mms. in length, and Symington in two nine months' fœtuses found that its length was 17 and 18 mms. respectively. In the adult it measures from 35 to 36 mms., or twice its infantile length. Its direction is different in the infant from what it is in adult life, for in the infant it runs almost horizontally. In one case it was traced throughout its whole course, and was found to run backwards with a slight inclination outwards and downwards, forming an angle of about 10° with the horizon. The osseous part of the Eustachian tube can scarcely be said to be present at all in the infant, although in the adult it forms one-third of the tube. The cartilage of the tube is peculiar in form, being deficient inferiorly and externally. The pharyngeal end of the tube is small in infants, and lies in the same plane as the inferior meatus of the nose. Its aperture is peculiar, there being a prominent margin above and internally, which is wanting below and externally; and this peculiarity makes the passage of the Eustachian catheter less difficult than it would otherwise be. At its tympanic end it is difficult to say where tube ends and tympanic cavity begins, for the roof and walls of the tympanic cavity gradually approximate to form the tympanic end of the tube.

The Face.—The relatively small size of the face as compared with the cranium in infants is rendered very evident by frozen sections, especially those in the vertical sagittal or transverse planes. In a sagittal mesial section the greatest vertical diameter of the face is less than 5 ctms., whilst the greatest vertical diameter of the cranium is more than 10 ctms., and the difference is even

more striking when antero-posterior measurements of the two regions are compared together. The face of the infant is nevertheless an important part, for physiognomy is a useful guide to the diagnosis of infantile maladies; and, further, the obstetrician requires to be able to recognise this region of the infant's body when it presents, as it occasionally does, at the os uteri. In making the diagnosis of a face presentation, one is usually instructed to feel the mouth, nose, eyes, supra-orbital ridges, malar prominences, and chin; and at first sight the presence of so many important landmarks would lead one to believe that the diagnosis must be an easy one. I have, however, been struck with the frequency with which students of the tutorial midwifery class in our University fail to recognise the face of the infant, or mistake it for some other part of the body, as the breech. The difficulty is, I believe, due to the fact that the child's face differs in several details from that region in the adult; thus the mouth does not contain teeth, and therefore is sometimes mistaken for the anus, a mistake which should not, however, arise, were the gums carefully felt for. The nose also at birth does not form the prominent feature that it does in adult life, and is liable to be mistaken for the tip of the sacrum and coccyx. Another diagnostic landmark is the eye, and some authorities advise that this organ should be felt for in making the per vaginal examination; but I must say that I think the less the obstetrician palpates the eye the better, for cases are on record where the enthusiastic tyro has done damage to this organ in his efforts to diagnose a face case. The supra-orbital ridges are useful landmarks, and so is the chin; but in the infant the chin is, on account of the rudimentary state of the inferior maxilla, a less prominent feature than in the adult. There need never be much difficulty in the diagnosis of a face case if the mouth and gums be recognised.

The Superior Maxilla.—The relatively small size of the superior maxilla is one cause of the small dimensions of the infant's face. In the child at the time of birth the antrum of Highmore is a small cavity, and therefore the body of the upper jawbone is also small; and further, the alveolar process of the superior maxillæ is also in a rudimentary condition, from the imperfect development of the teeth. From an increase in the size of the antrum of Highmore, from an enlargement of the alveolar processes, and from the development of the teeth, the growth of the superior maxillæ and of the corresponding part of the face is brought about. The inferior maxilla also is small at birth, its symphysis is not fully ossified, and its angle is an obtuse one; but the development of the teeth during childhood brings it to its adult form and size.

The skin of the face is not so loosely attached to the subjacent bones as is that of the scalp, and hence in face presentations a marked caput succedaneum is rarely developed.

The Orbits and their Contents (Fig. 1).—The orbits and eyeballs do not differ in the infant from the same parts in the adult. In several of the frozen sections made the relations of the parts within the orbit were very clearly brought out. The eyeball measures a little more in its antero-posterior diameter in the middle line than in either its vertical or transverse diameters, the measurements being about 1·7 ctm. antero-posteriorly, and 1·5 ctm. vertically and horizontally. In one of my cases the pupillary membrane was still present. In a plane immediately posterior to the eyeball the muscles have the following relations: the levator palpebræ superioris and the superior rectus lie in close apposition to the roof of the orbit, and are related externally to the lachrymal gland; near the inner wall is the internal rectus, and immediately above it is the superior oblique; close to the outer wall is the external rectus, and near to the floor is the inferior rectus, with the inferior oblique lying internal to it. The optic nerve does not lie in the axis of the orbit, but is nearer to its inner than to its outer wall, and its excentric position is more marked as it nears the eyeball; thus in one of my cases it lay 1·1 ctm. from the outer wall and 7 mms. from the inner wall (Fig. 1). As a result of this disposition of the nerve, the external rectus is the muscle which lies furthest from the optic nerve in its course through the orbit. The large amount of fat lying behind the eyeball is well demonstrated in frozen sections of the head.

The Nasal Cavities (Fig. 1).—The nasal cavities in the new-born infant are relatively small, but in childhood they grow quickly as the surrounding bones and air-cells increase in size and the posterior nares broaden out. The superior meatus has an average length of 1·5 ctm., and passes between the superior and inferior turbinated parts of the ethmoid. The middle meatus measures about 1·8 ctm. in antero-posterior extent, and lies between the inferior turbinated part of the ethmoid and the inferior spongy bone. The inferior meatus, which is the longest, measuring about 2 ctms., lies between the inferior spongy bone and the floor of the nasal fossa. In one of the infants examined the fourth meatus of the nose was present. It is called by Meyer the recessus sphenoethmoidalis, and divides the superior turbinated part of the ethmoid into two portions, to the upper of which the name of concha suprema is given. Into the infundibulum the antrum of Highmore opens by a narrow chink. The septal cartilage of the nose showed in the cases examined no sign of any lateral deviation. The mucous membrane lining the nasal cavities is very vascular, and the specimens I have seen lead me to believe that it is more vascular in the new-born infant than in the adult. It may be, therefore, that at birth, when the first inspiration of air into the delicate lungs is taken, a special arrangement is made to warm the air passing in. In two of my cases the soft palate was seen to be tilted up at its posterior end towards the nasal fossæ, a

circumstance which may have been due to attempts to expel mucus from the respiratory passages.

The Buccal Cavity.—In all the sections of the heads of infants which I have made, the mouth was seen as a potential cavity, the dorsum linguæ came into contact with the vault of the palate above, and the tongue was in apposition to the inside of the cheeks and gums laterally. In all the specimens, also, the tip of the tongue lay upon the upper surface of the lower gums. It is a fact worthy of note, that even when the mouth is tightly closed the gums do not come into contact. This fact, which is revealed by frozen sections, Symington specially dwells upon as showing that provision exists at birth for a considerable development of the alveolar arches and teeth before the gums of the two jaws can really meet. I have not, however, been able in my cases to show that the distance between the jaws is so great as Symington found it, namely 6 mms., for in the specimens examined it measured from 2 to 4 mms., and in one case the jaws were in contact. Another peculiarity about the buccal cavity in the new-born infant is the fact that the lower jaw lies in a plane posterior to that of the upper jaw. In a sagittal vertical section of the head, the anterior surface of the lower jaw is seen to lie in the same vertical plane as the posterior surface of the upper jaw. As life advances the jaws come into line with each other, and with the development of the teeth the space between the gums disappears.

If the tip of the tongue be raised in the case of the new-born infant, two folds of the mucous membrane are seen, one of which, the larger and outer, has a dentated margin, and is called the plica fimbriata; the other, which is smaller and is situated nearer to the middle line and the frenum, is known as the plica sublingualis. In one of my cases there was found under the tongue on the right side a congenital ranula which contained a small quantity of clear limpid fluid (Fig. 1).

The Sucking Pads (Fig. 1).—H. Ranke has in a recent paper (Ein Saugpolster in der menschlichen Backe, *Virch. Arch.* Bd. xcvii. pp. 527–547) drawn special attention to pads of adipose tissue which exist in the cheeks of new-born infants, and which are, as Symington shows, present also in the child. Ranke was led to the study of these bodies by the fact that in a child one year old, in a state of great emaciation from continued diarrhœa, the cheeks presented a swollen appearance. This swelling he found to be due to the presence of a distinctly encapsulated mass of adipose tissue, the so-called sucking pad (Saugpolster). He made sections of the face, coronal and horizontal, in the new-born infant, and also dissections from the skin surface inwards, and found that these pads were distinct structures which were not continuous with the subcutaneous adipose tissue. In several of my sections the relations of these pads could be seen, and they were always easily differentiated from the surrounding fat from the fact that on putting the

sections into spirit the pads changed their colour slightly, and shrank from the adjacent tissues in one case to the extent of being easily removable. Each pad lies in the neighbourhood of the duct of the parotid gland, upon the buccinator, and partly upon the masseter muscle, and has superficial to it the musculus risorius of Santorini. An offshoot from the pad passes into the spheno-palatine and zygomatic fossæ. Each has a vertical diameter of about 2 ctms., a transverse of about 1·5 ctm., and an antero-posterior of a little over 1 ctm. They are found not only in the infant but also in the child and adult, and are present even when the adipose tissue in other parts of the body is extremely small in amount. They are no doubt connected physiologically with the act of sucking, hence the name of sucking cushion given to them, and probably act by distributing equally the atmospheric pressure, and preventing the drawing inwards of the buccinator muscle between the gums during the efforts of suction when a vacuum is created in the buccal cavity.

Description of Plate.

Fig. 1.—Coronal section of head in plane posterior to the eyeballs (viewed from behind), $\frac{5}{6}$ nat. size. *a*, frontal suture; *b*, longitudinal sinus; *c*, longitudinal fissure with falx cerebri; *d*, beginning of Sylvian fissure; *e*, left optic nerve; *f*, left sucking-pad; *g*, cystic tumour below tongue; *h*, tongue cut transversely; *k*, right nasal fossa, showing superior, middle, and inferior meatuses; *l*, orbital plate of frontal bone; *m*, zygoma near its root; *n*, tooth germ in upper maxilla.

Fig. 2.—Coronal section of head in plane of the middle ear viewed from behind, right side slightly posterior to left, $\frac{5}{6}$ nat. size. *a*, external auditory meatus (left); *b*, membrana tympani; *c*, lobule of left ear; *d*, helix of ear; *e*, odontoid process of axis vertebra; *f*, basi-sphenoid; *g*, incus, with stapes in fenestra ovalis; *h*, petro-squamous suture in roof of tympanic cavity; *j*, Sylvian fissure; *k*, squamous suture; *l*, sagittal suture; *m*, superior longitudinal sinus; *n*, lateral ventricle; *o*, third cerebral ventricle.

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Fig 1

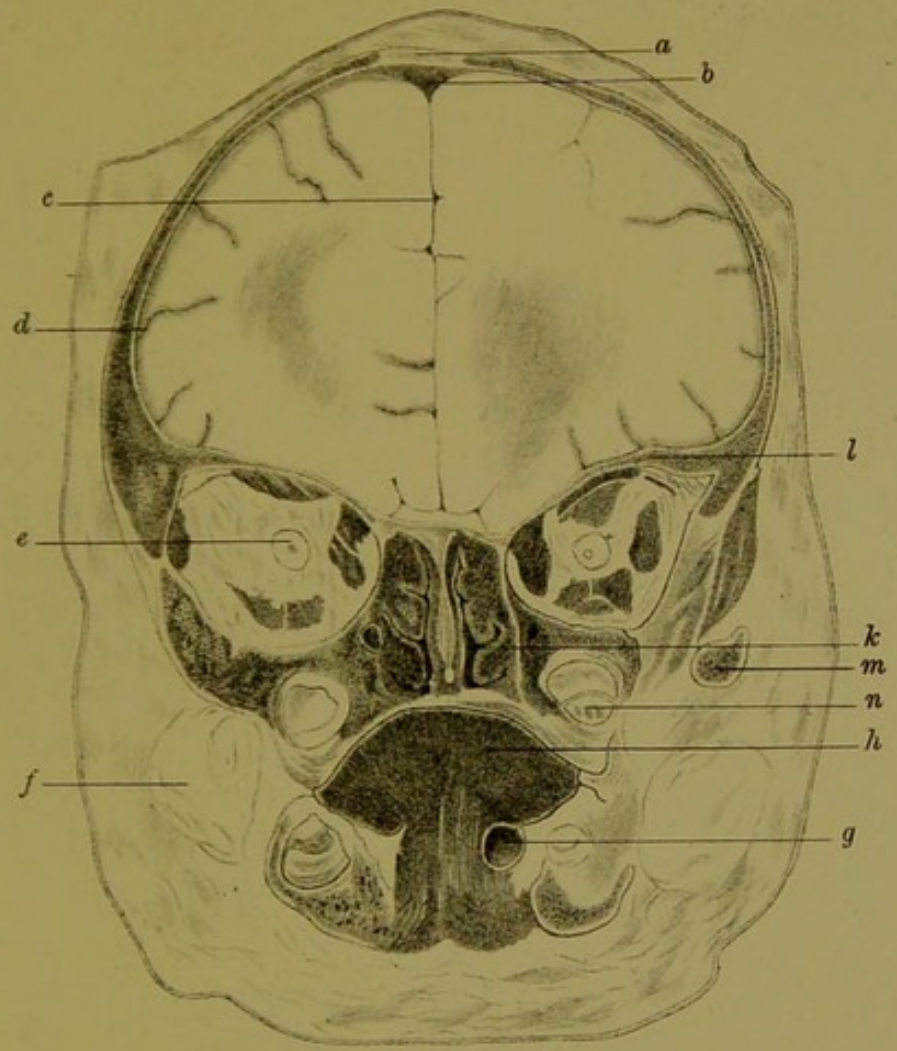

Fig 2