Richards, H. — Anatomy of the elephant's ear. (1890.)

A FURTHER REPORT

ON THE

ANATOMY OF THE ELEPHANT'S EAR,

BY

HUNTINGTON RICHARDS, M. D.,

Aural Surgeon at the New York Eye and Ear Infirmary, and Chief of Clinic in the Ear Department of the Vanderbilt Clinic, College of Physicians and Surgeons.

[Reprinted from the TRANSACTIONS OF THE AMERICAN OTOLOGICAL SOCIETY, 1890.]

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A FURTHER REPORT ON THE ANATOMY OF THE ELEPHANT'S EAR.

By Huntington Richards, M. D., *New York, N. Y.*

When Doctor Buck committed to me a continuance of the dissection and description of the larger one of the two anatomical specimens discussed in his papers entitled "A Contribution to the Anatomy of the Elephant's Ear" and "A Revised Description of the Anatomy of the Elephant's Ear," he had obtained from Prof. Wilder his consent to the removal of certain restrictions in regard to destruction of the specimen as a museum preparation, which had greatly hampered him in his work. These restrictions had handicapped him. Through his kind stipulation I was freed from this handicap at the very beginning of my further investigations, and, in consequence, very soon made a discovery leading to the necessary revision of the doctor's first paper in the second just presented to the Society for publication in this year's annual Report. The outer surface of the specimen up to the moment of this discovery had been believed by Dr. Buck and myself to be also its lower surface and a part of the lateral aspect of the elephant's head, — a belief confirmed by the assumed direction of the Eustachian tube, and unshaken by any information provided (for none was given) regarding the direction of the planes of section made at Cornell University. This surface was covered by a layer of very dense, tough, leather-like tissue (muscle-stumps, fibrous tissue, fat, etc.), hardened by prolonged immersion in alcohol, which layer effectually masked all inequalities of surface existing in the underlying bone. Its

removal from the bone was the work of no inconsiderable difficulty. When effected the very marked inequalities of bone surface shown in my first illustration were revealed. The relation borne by these inequalities to the meatus of the auditory canal, and a comparison of the specimen, thus fully stripped of all so-called soft parts, with the elephant skulls at the Central Park Museum, proved clearly that this surface was a part of the posterior aspect of the skull, that the direction of its plane was nearly vertical, and that consequently the directions and relations described in Dr. Buck's first paper required the revision he has given them in his second paper now issued to supersede the former.

This illustration (Fig. 1) shows the back of the specimen, a part of the front section of which is shown in Fig. 1

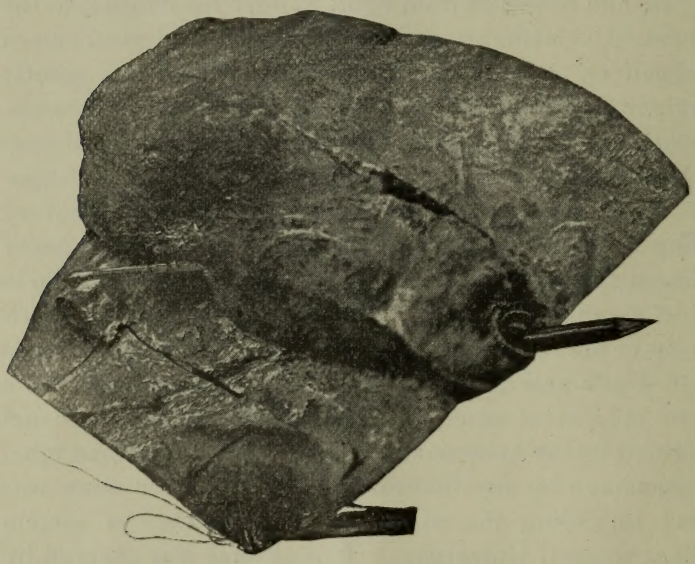

FIG. 1.

upper

of Dr. Buck's paper, and the ~~left-hand~~ border of the latter corresponds to the upper border of my picture. In this picture a lead pencil is seen protruding from the meatus of

the auditory canal, into which it had been inserted in order to show the direction pursued by that canal. The points shown by Dr. Buck's illustration are described in his paper. In my own illustration the following points call for especial attention. At the right hand lower corner is seen a part of the articular surface for the condyle of the lower jaw. The left hand portion of the illustration shows an unmistakable mastoid prominence; immediately below this the stump of a cartilaginous process, clearly the analogue of the styloid process in man; and, to the right of, *i. e.*, external to, this process, the entrance of a canal into which and through which a probe has been passed. The opposite extremity of this probe (which was, by the way, a stout kitchen skewer $2\frac{1}{2}$ millimeters in diameter) can not of course be seen in the illustration. It emerged from an opening on the anterior aspect of the specimen lying immediately above that part of the tympanum containing the ossicles and immediately external to the cavity of the vestibule (which had been opened by Dr. Buck). Into this anterior opening passed a thick bundle of nerve fibres which traversed the canal and had to be forcibly crowded aside to admit the passage of the probe. This bundle of fibres was, at a deeper part of its course, in close relation to the auditory nerve; it was manifestly the facial nerve, and the canal traversed by it and by the probe (or skewer) was clearly the Fallopian canal. The illustration (in which the specimen is seen tipped considerably to the right and also somewhat away from the spectator) shows the parts as about one-third of their natural size. The mastoid process or protuberance, measured from the top of the specimen to its tip, is $10\frac{1}{2}$ centimeters long; but it is probably only throughout the lower half of this distance, viz., for about 5 centimeters upwards from its tip, that this protuberance on the back of the skull can be rightly regarded as a mastoid or teat-like projection. The cartilaginous stump

already spoken of as the analogue of the styloid process in man (an ankylosed union of the tympanohyal with two others — the periotic and stylohyal) measures 3 centimeters in length, not quite 2 centimeters (19 millimeters) in width, and 9 millimeters in thickness. As shown in the picture, its cross section is elliptical in outline. Flower, in his "Introduction to the Osteology of the Mammalia" (p. 181), says of the tympanohyal bone of the elephant, that it is "distinctly seen at the bottom of a deep fossa between the squamosal exoccipital and tympanic with the stylo-mastoid foramen to its outer side." Such is the situation of the cartilage stump now under discussion, which must therefore be either the unossified tympanohyal, or else a cartilaginous ~~bunch~~ uniting the lower end of this bone with the upper end of the stylohyal, the next lower bone of the anterior hyoidean arch (see under description of the dog's skull, op. cit., p. 123). To one who has superficially examined the specimen, or who has merely looked at the illustration I am now describing, the statement of Flower that the mastoid portion of the periotic bone in the elephant "is very small and does not appear on the surface of the cranium" will seem very singular. A careful examination of the specimen, and especially of such a cross section of it as is partly shown in Fig. 2, demonstrates, however, the correctness of this statement. A line of suture separates the periotic bone from the exoccipital and it is to the latter bone that properly belongs the great mastoid process seen in Fig. 1. The very large pneumatic cells of this mastoid process appear to have no communication across this suture with the smaller pneumatic cells found in the posterior and lower part of the generally very dense periotic, and it is this posterior part which probably is, strictly speaking, the mastoid portion of that bone. Hence I have been careful to call the marked and distinctly teat-like prominence upon the skull

surface the mastoid *process* rather than the mastoid *portion*. It appears to be a sort of false mastoid portion as compared with that of man. In man the mastoid process is identical with the mastoid portion of the periotic bone, the periotic by this mastoid portion taking a part in forming the outer surface of the skull. In the elephant the periotic does not come to the surface as a mastoid process, and the mastoid process is an integral part of the exoccipital bone. From its position in relation to neighboring structures as well as from its shape I cannot but believe this mastoid process to be identical with the "paroccipital (or paramastoid) process" of the exoccipital described by Flower and by him said to be the analogue of the jugular eminence in man (op. cit., pp. 98, 112, and 132); and yet this author states distinctly that in the elephant there are no paroccipital processes (p. 181). In describing the skull of the dog, which he takes as a type for that of all mammalia, he speaks of the "paroccipital (or paramastoid) process" as a prominent process of the exoccipital serving for muscular attachment lying external to the occipital condyle and separated from it "by a deep depression," and also as "projecting backwards and downwards." The stylo-mastoid foramen he also locates as external to this process (p. 119). Not only do the large pneumatic cells of the mastoid prominence fail to communicate across the suture with the far smaller cells of the deep-lying mastoid portion of the periotic, but they are also by the bony walls lying upon both sides of this same suture shut off from communication with the exceedingly large pneumatic cells surrounding the tubular auditory canal. These latter cells belong to the squamosal bone. The external auditory canal of the elephant is formed according to Hyrtl only by the squamous portion of the temporal bone. Flower describes it as formed almost exclusively by this bone (the squamosal) and says that the tympanic contributes very

little to its formation. As regards the periotic bone, I have spoken above of the relatively small pneumatic cells found in its posterior portion and have said that this was probably the true mastoid portion mentioned by Flower. Köstlin however denies the existence of any mastoid portion (pars mastoidea) in the elephant; and without a violent disruption of the specimen now under discussion I can not determine whether these pneumatic cells belong strictly speaking to the periotic bone or to the tympanic, with which latter the periotic is even in the young elephant completely united (see Flower, op. cit., p. 181). I can detect no line of separating suture between the cell-containing lower posterior part of what certainly seems an integral portion of the dense periotic and the higher-lying and more forward-lying part of the periotic, containing the vestibule, cochlea, and semi-circular canals but otherwise quite lacking in cellular structure.[1] As to these pneumatic cells which we may pretty safely assume to be within the periotic bone, it would perhaps be more correct to speak of them as a single cell with freely communicating and wide-mouthed side crypts than to regard each of these crypts as a separate cell; this single cell with irregular side crypts or alcoves is as yet the only pneumatic space I have been able to detect within the per-

[1] I have said that the cells within the mastoid process of the exoccipital bone do not communicate with any cells within the periotic. I may add that in the line of this suture and between these two bones is found a small portion of a third bone independent of both the others and having within it small cellular spaces communicating with neither of these two. To what bone this portion belongs I do not know; clearly not to the exoccipital; seemingly also not to the periotic: for the upper part of the periotic is separated from it by a line of suture. It may be a portion of the tympanic (although the latter bone is firmly joined to the periotic below); or it may belong to the squamosal. I am disposed to regard it as a portion of or process from the latter. This process, to whichever of these two bones it may belong, takes part in the formation of the outer wall of the upper part of the secondary tympanic cavity described by Dr. Buck.

iotic bone. This very irregularly shaped cavity measures 2 centimeters wide in its greatest diameter and $1\frac{1}{2}$ centimeters long in its least diameter (the antero-posterior). The section of the bone shown in Fig. 2 bisected it in the plane of the latter. It communicates by an irregularly heart-shaped opening 8 millimeters wide with the secondary tympanic cavity described by Dr. Buck. This opening is very distinctly shown in Fig. 2, and through it the observer looks directly inwards into the secondary tympanic cavity.

There is no communication whatever between this cell and any of those comprised in the pneumatic system of the squamosal bone. Its larger part is not shown in Fig. 2, being continued within the outer portion of the specimen that was removed in making the section. A branch from this outer and larger part sweeps half way round the Fallopian canal, and the blind extremity of this branch, 6 millimeters in height and 3 millimeters in width, closely approaches the upper wall of the auditory canal at a point but a few millimeters external to the margin of the drum-membrane; from the auditory canal at this point it is separated by a bony septum only 2 millimeters in thickness; from the Fallopian canal on the upper and outer aspects of the latter it is separated by a mere shell of bone not more than $\frac{1}{2}$ millimeter thick. The section of the bony septum between the auditory canal and Fallopian canal, as seen in Fig. 2, passes across this septum almost precisely on a level with the blind end of the branch just spoken of as sweeping half way round the latter canal, so that the very shallow cup-shaped depression formed by the end of this branch upon the cut surface of the septum between the two canals, while plainly distinguishable in the specimen and indistinctly so in the photograph, is not, by reason of the imperfections of the art of engraving, to be made out in the illustration. Its position on the cut surface of the septum is directly below the lower corner of the irregularly

heart-shaped opening into the secondary tympanic cavity, which opening is seen as a black hole somewhat above and to the left of the central point of the picture. The large intra-petrous cell I am now describing does communicate therefore with the lower part of the tympanum *through the medium of the secondary tympanic cavity*, but it does not communicate with the chamber containing the ossicles; yet it is probably the analogue of the mastoid antrum in man.

Fig. 2.

The three cells whose anterior extremities are seen in the upper left hand corner of Fig. 2 belong to the system comprised within the mastoid prominence of the exoccipital bone. The curved line of suture separating this bone from the squamosal (or it may be the tympanic at this pre-

cise point) has its extremities, so far as shown in the illustration, at the points marked *a* and *b* on the margins. From *c* on the upper margin the suture separating the squamosal (or the tympanic?) from the periotic runs diagonally downwards and to the left until it meets the former.

The chief object that I desired to attain by the presentation of Fig. 2 was a demonstration of the course, calibre, and direction of the Fallopian canal. This demonstration the picture gives fairly well. All the structures represented are shown somewhat larger than their natural size, being magnified about 20 per cent.; the view is taken looking directly toward the median line, *i. e.*, from without inwards; the top and bottom of the picture show respectively the top and bottom of the specimen; and the frontal aspect of the specimen is that seen toward the right of the observer. In preparing the specimen for this demonstration of the Fallopian canal two planes of section were followed, the upper one vertical and antero-posterior, the lower one also antero-posterior but meeting the upper plane at an angle of about 150 degrees, and passing obliquely downwards and somewhat outwards, *i. e.*, towards the spectator, in the illustration; the upper section was begun from the canal and was made by inserting the fine saw blade through the canal and cutting thence toward the surface of the bone. The lower section, if I recollect aright, was made from the surface towards the canal.[1] It was this lower section which obliquely cut

[1] If any reader of this article desires to know the direction pursued by these two planes of section with relation to the outer surface of the skull let him again refer to Fig. 1, representing this surface. When these sections were made there had already been removed from the specimen one large upper fragment and three smaller lower fragments, all four of which are shown, held in their original positions by wires, in this figure. The central portion alone of the specimen, the one containing the auditory canal, the tympanohyal, the Fallopian canal, and most of the mastoid prominence, together with the important structures of the middle and internal ear not shown in this view, was the portion operated

across the auditory canal so as fully to expose to view (and to the photographer's camera) the outer surface of membrana tympani shown in the illustration and to divide the bony septum between the Fallopian and auditory canals. In making the section the extreme tip end of the short process of the anvil was cut across close to its point of articular insertion, and in this and other manipulations of the bone a fragment of this septum, about 1 centimeter long, 4 or 5 millimeters broad, and $1\frac{1}{2}$ millimeters thick, and constituting a portion of the party wall between the Fallopian canal above and the chamber containing the ossicles below, became separated and rode upwards and forwards from its normal position. This fragment is seen in the picture lying directly above the body of the incus. Of an accident which was the chief cause for the breaking away of this fragment I shall have occasion to speak when I come to the description of Fig. 3 and Fig. 4.

Returning now to the description of Fig. 2. — The direction pursued by that portion of the Fallopian canal which is shown in this picture was found to be nearly horizontal, declining but little in a downward direction as it proceeded backwards to its termination at the stylo-mastoid foramen. Its average diameter throughout this part of its course is about 5 millimeters; its length is 55 millimeters. The total length of the canal I am unable to state, for in the dissection that exposed the cavity of the vestibule the anterior and upper wall of that part of the nerve channel (not shown in the illustration) which curves downwards and towards the median line in front of and above the tegmen tympani had been removed. This direction of downward and forward curvature in the canal begins at a

upon. The upper section ran along a line parallel with the left (mesial) border of the specimen and leading directly upwards from the stylo-mastoid foramen; the lower section ran along a line extending upon the surface obliquely downwards and outwards from this foramen to the lower border of the bone.

point about corresponding to that extremity of its lower bony wall from which the left hand or posterior extremity of the semi-detached fragment seen in the illustration has broken away. An elongated hiatus in the inner and lower wall of the canal (nearly 15 millimeters long and from 2 to 4 millimeters wide) shows that the facial nerve in its passage above the roof of the upper tympanum is not entirely separated from the latter cavity by a bony partition. The elongated hiatus seems to be at its posterior extremity continued into a line of suture, which exists on the inner or mesial aspect of the canal, runs throughout the entire length of the canal, and appears to be a line of apposition or suture between the periotic and tympanic bones. Whether, however, this may not be a suture line between these two bones united together on the one hand and the squamosal on the other, I can not determine from the specimen before me, at least in its present condition and without further and very destructive, not to say violently disruptive, dissection, the lines of suture in the deeper parts of the specimen being very narrow, their course very tortuous and complicated, and the union between the component bones of the specimen being one of veritably rocky firmness. Neither can I discover an elucidation of this point in the few books on anatomy readily at my command.

As shown in the illustration, the Fallopian canal near its external mouth at the stylo-mastoid foramen becomes greatly dilated. The diameter of this outer dilated portion —and consequently that of the aforesaid foramen —is 14 millimeters; its length, or depth, from the posterior surface of the skull is about two centimeters. At the inner (and forward) extremity of this dilated portion the facial canal is joined by another canal having a diameter of 3 or 4 millimeters, which, running upwards, forwards, and inwards from this point of junction with the facial,

opens on the inner surface of the specimen (seen in Fig. 3) at a point directly behind the back wall of the secondary tympanic cavity and opposite the junction between the narrower and wider portions of the latter. Embedded in the tough mass or chord of tissue which was extracted from this channel was an artery of considerable size,— a branch, no doubt, of the stylo-mastoid artery. At a point on the lower and anterior wall of the facial canal, on a line with the opening of this large arterial channel, a small branch of the facial nerve enters the bone in a direction leading toward the upper tympanum. This I take to be the chorda tympani nerve. Its ragged end is indistinctly seen in the illustration projecting into the facial canal just at the beginning of its narrower portion. Immediately below this nerve tag on the cut surface of the septum between Fallopian and auditory canals is seen an opening some three or four millimeters wide. This is a cross section, close to its outer extremity, of the first of the two channels leading from the second "stall" described by Dr. Buck, — a channel by him ascertained to have a length of 33 millimeters. What looks like a large cell near the lower left hand corner of the illustration is a cross section of the "single passage without any bifurcations" and measuring nearly 70 millimeters in length, which Dr. Buck found leading outwards from the third of the four "stalls." The tympanic mouths of these stalls are shown indistinctly in Fig. 3 of Dr. Buck's paper and somewhat more distinctly in Fig. 3 of this paper. In my illustration the septa dividing them are on careful inspection to be made out at the bottom of a dark elongated vertical hole lying immediately to the right of, *i. e.*, behind, the border of the membrana tympani.

Again returning to Fig. 2. — I beg to call the reader's attention to the tolerably clear view given of the cavity of the upper tympanum containing the ossicles. The heads of the hammer and anvil and their now partly

separated articulation show quite well, as do also the short and long processes of the anvil, the cup-shaped head of the stirrup (from which the latter process has become disarticulated), and the tendon of the stapedius running from the stirrup head in a direction upwards and backwards. Part of the exposed neck of the hammer is also well shown, while the pushing outwards of the membrana tympani near its upper border by the short process of the hammer, and the shallow cup-shaped, or, rather, saucer-like, dragging inwards of the membrane by the tip of the hammer handle, can also indistinctly be made out. What in man would be the posterior crus of the stapes is in the elephant the superior crus. It can be dimly seen in the picture as it runs upwards and inwards (*i. e.*, away from the spectator) from the head of the bone, its direction, as shown in the picture, forming an angle of about thirty degrees with that followed by the stapedius tendon. Some account of the ossicles and of the closed chamber in which they lie has been given already by Dr. Buck. Except as regards the stapes and the stapedius tendon, I have been able to add but little to this account besides the presentation of this illustration in the present paper. A separation of the outer wall and of the hammer and anvil from the inner wall of the tympanum and from the now detached head of the stirrup will doubtless give a clearer view of the form, relations, and connections of the ossicles; but the result of such an examination, and also of further investigation of the labyrinthine structures in the petrous part of the periotic, must be deferred until the issue of still another paper.

Before turning to a consideration of the next illustration, Fig. 3, I desire to say a word regarding the large cells existing within the mastoid prominence. Three of the largest of these cells are seen in that part of the specimen shown in this picture, but they appear only by their inner or

forward extremities in the engraving: — one of them, the middle one of the three, about an inch below its upper left hand corner; another, the lowest of the three, just a little above *b* on the margin. The septa dividing these cells run at right angles to the skull surface. The length of the upper and middle cells, measured in an antero-posterior direction, is 45 millimeters, that of the lower one is 30 millimeters. The vertical height of all three is about 2 centimeters; the extent of the middle one in a horizontal direction — at right angles with the mesial plane of the skull — is about the same, viz., 2 centimeters; that of lower one is fully 45 millimeters. It is with the system of cells contained within this mastoid prominence of the exoccipital bone that communication from the secondary tympanic cavity is established through the medium of the "two triangular openings with smoothly rounded edges" mentioned by Dr. Buck as existing at the inner upper and back corner of this cavity; and my further dissection has therefore shown that neither of these openings leads into the system of cells (belonging to the squamosal) "which surround the external auditory canal." What appears in the illustration to be a fourth cell lying immediately to the right of, *i. e.*, anterior to, the extremity of the middle one of the three just described is in reality a corner — the upper outer and back corner — of the secondary tympanic cavity cut across and opened by the section of the bone. It is precisely at this point that the meeting takes place between the two suture lines already mentioned, — the occipito-squamoso-periotic (or occipito-tympanic?) and the periotico-squamosal (or periotico-tympanic?).

I turn now to a brief discussion of my third illustration (Fig. 3). The point of view in this picture is diametrically opposite to that of Fig. 2; the observer has before him the inner and vertically cut surface of the entire specimen and is looking directly outwards, in a direction parallel with the

auditory canal, towards the lateral aspect of the skull; in other words, the surface here shown is that of the plane of antero-posterior vertical section, the posterior border of which is the left hand border of the bone, as looked at from behind, in Fig. 1. The principal things shown by

FIG. 3.

this picture are such as have been already described by Dr. Buck, and some of which, seen from a slightly different point of view, are shown also in his illustrations numbered 2, 3, and 4. The reduction in this illustration of mine is one-half. I ~~print~~ present it for several reasons, viz., as

supplementary to those of Dr. Buck, as being — thanks to the photographer—a clearer view, and, finally, as especially illustrative of points particularly touched upon in this paper. Among the latter I wish to call especial attention to the great mass of leathery "soft parts" here seen on section as detached from the upper, and still closely and intimately adherent to the lower half of the posterior external aspect of the skull. The reader will please observe how this tissue dips into the deep fossa below the mastoid tip and how far (even as thus seen only along the line of section) it serves to mask the existence of the mastoid eminence. I can again assure him that the removal of this tissue, comprising the periosteum, from the fossa in question, from around the cartilaginous stump corresponding to the human styloid process, and from the mouth of the stylo-mastoid foramen, was a work calling for the expenditure of much time and occasionally of considerable physical force. Cross sections of four (and at the top of the specimen of part of a fifth) mastoid cells are seen in the picture close to the posterior surface of the skull. The fibrous mass of tissue seen running almost vertically upwards from the upper part of the secondary tympanic cavity occupies a groove which marks the position and course at this point of the suture intervening between the mastoid prominence of the ex-occipital and the bony process interposed between this prominence and the pars petrosa of the periotic, viz., the occipito-squamosal part of the occipito-squamoso-periotic suture. On the anterior surface of the pars petrosa at a point about half-way down the front (left hand) border of the specimen is seen the bundle of fibres comprising the facial and auditory nerves. On a horizontal line drawn backwards between this bundle of fibres and the lowest of the five visible mastoid cells we see the narrowest portion, or isthmus, of the secondary tympanic cavity,

and, as already stated, it is close to the back border of this isthmus that the canal containing what I have assumed to be a branch of the stylo-mastoid artery emerges. As shown in Fig. 3, the mouth of this canal looks very small. This was because it still contained the artery and other traversing tissues. On their removal the diameter of this inner opening of the canal was found to be about 4 millimeters. The accident alluded to under the discussion of Fig. 2 can better be described in connection with this Fig. 3, as this illustration shows the specimen in its entirety. While making the second of the two sections intended to expose the Fallopian canal the bone was held firmly braced by pressure against its upper border and lower anterior corner. An increase of this pressure suddenly produced a crack which traversed the back part of the periotic and the tegmen tympani in a vertical direction, partly dislocating the ossicles and anteriorly tearing the membrana tympani loose from its attachment to the annulus. To remedy the effect of this tear I braced the membrane by the fine wire shown near the lower right hand corner of Fig. 2. This tear and the partial dislocation of the ossicles I regret, though less than I do another effect of this fracture shown but too distinctly in Fig. 4, viz., the tearing through, along the line of the promontory, of the thick membranous partition which up to that moment had quite separated the tympanum proper below from the upper chamber containing the ossicles above. In making further dissections, however, this same accidental fracture is likely to prove decidedly helpful.

Fig. 4, though on a larger scale, is in other respects nearly identical with Fig. 2 of Dr. Buck's paper. In both the observer is supposed to be looking almost directly upwards towards what I may venture to term the membranous tegmen of the lower tympanum in contra-distinction to the bony tegmen of the upper tympanum or ossicle

chamber. This view shows very clearly the course of the chorda tympani nerve forwards and outwards around the

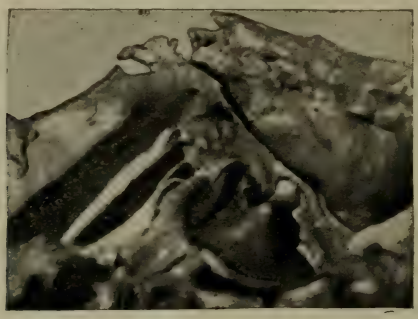

Fig. 4.

neck of the hammer, and also shows, alas, but too distinctly, the line of accidental fracture through the membranous tegmen just mentioned. The rounded surface of the promontory is also well shown.

Before closing this paper I desire to express my sincere thanks to Dr. B. Alexander Randall, of Philadelphia, who, while recently on a visit to this city, most kindly volunteered to take for me a number of photographs of the specimen. Two of these photographs were selected by me for use in this paper, and engravings from them are given in Fig. 2 and Fig. 4. These two views were exceptionally difficult subjects for the camera, and, as usual, the process of engraving does imperfect justice to the excellence of the photographic work. Fig. 1 is from a photograph made by Thomas of 717 Sixth avenue, and Fig. 3 from one made under my supervision by the photographer at the College of Physicians and Surgeons. I desire also to express my thanks to Prof. Allen of the Central Park Museum, and to other gentlemen connected with that institution, for kind attention and courteous assistance offered on the occasion of my visits there.