

traveled from the torcular herophili, in the lateral sinus, until the sinus becomes known as the sigmoid, on account of its supposed resemblance to the letter S. From here the blood passes downward to the jugular bulb, and from there out of the head by way of the internal jugular vein. It must be remembered that the venous sinuses of the cranium are merely spaces between the separated layers of the dura mater, and that when the osseous side of the sigmoid sinus is removed it is the external layer of the dura mater which is seen to constitute the outer wall of the soft sinus, the inner surface of the sinus being lined by endothelium. At about the middle of the sigmoid sinus the mastoid vein is given off, which passes through the mastoid bone in the mastoid foramen (Fig. 12.7) to join the occipital cutaneous vein on the outside of the head. The sigmoid sinus bends sharply forward in the inner plate of the mastoid bone, so that its most marked convexity, or knee, as it is called, lies just above and on a horizontal line with the most dependent portion of the mastoid antrum. In other words, the most prominent portion of the sinus lies very close to the field of active work in all mastoid operations.

The exact relative position of the sinus is, therefore, of great importance to mastoid operators and should be carefully studied. Ballance places the bend of the sinus as one inch posterior to, and a quarter of an inch above, the center of the meatus, and this estimate is probably nearly correct for a large majority of cases. It is seldom further back than this, but is often found further forward. Hessler finds twelve cases in the aural reports of the world where the sinus lay even in front of the mastoid antrum. Fortunately, such extreme malpositions are very rare, as seen by Hessler's report, but as annoying anterior malpositions of the sinus may be frequently seen, the operator should be always on the alert to detect them and should always chisel slowly and carefully, brushing away the debris as progress is made, that careful inspection of the operative field may be obtained. The thickness of the osseous wall separating the mastoid cells from the sigmoid sinus is only a few millimeters in extent, under normal conditions, and when necrosis and exuberant granulations are present the intervening wall may be extremely thin, or even absent altogether, and the sinus will be reached with little or no effort, beyond a cleansing curettement, and be seen as a whitish-blue channel as the venous blood shows through the gray dural covering. The closer the proximity of the sinus to the meatus the more perplexing becomes the operative procedure, and as the bend of the sinus sometimes lies close to the posterior meatal wall, and therefore exactly in the area of the ordinary mastoid operations, extreme care must always be taken until a malposition of the sinus can be excluded.

In case, however, a malposition is present the operator should, in chiseling, keep close to the meatal wall and endeavor to chisel around the prominence of the sinus, dissecting it out, as it were, or it may even be necessary in reaching the antrum to pursue the method of Stacke and arrive at the antrum by first breaking down the posterior superior wall of the meatus and then working backward and upward until the antrum is reached, which may be at a point directly underneath the sigmoid sinus. The ordinary depth of the sinus, from the outer surface of the mastoid cortex, varies very much, as may be imagined, but it may be said that about ten millimeters is a fair average, and Koerner's investigations show that the right sinus usually lies deeper from the surface than the left, a fact which should not be forgotten in operative work.

Besides those features already enumerated, the petrous portion of the temporal bone presents other points of interest to the mastoid operator, such, for instance, as the osseous Eustachian canal, opening on the jagged anterior surface of the bone, which is divided into two passages, the upper for the tensor tympani muscle (Fig. 6.6), and the other and larger for the Eustachian tube, lined with ciliated epithelium, whose wavy motions away from the tympanum tend to aid in the drainage of the tympanum and prevent the entrance of pathogenic organisms to the middle ear. The large opening for the carotid artery having one aperture in the under surface of the petrous, as the artery enters the bone, and another in the anterior surface, as it leaves it, after having made an abrupt curve, is also of interest, and as necrosis of the tympanum may in rare cases erode so deeply as to open the carotid and produce most alarming hemorrhage, uncheckable save by the prompt ligation of the carotid artery, these important anatomic points should be kept well in mind.

On the posterior surface of the petrous bone will be found the internal auditory canal leading into the interior of the bone and giving passage to the auditory and facial nerves, and as this channel sometimes is the avenue for migration for pathogenic organisms from the labyrinth and tympanum to the brain and the means, therefore, of producing brain abscesses, etc., it is of importance to the surgeon.

Running along the superior border of the petrous bone is a well-marked groove for the passage of the superior petrosal sinus (Fig. 12.8) emptying into the sigmoid sinus, having proceeded from the cavernous sinus. On the under surface of the bone is another groove lodging the inferior petrosal sinus, carrying blood from the cavernous sinus to the jugular bulb.

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REPORT OF A CASE OF BRAIN TUMOR.*

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The following case is considered of sufficient interest to report: 1. Because of the extreme rarity of this form of growth. 2. Because of the extreme size to which it grew. 3. Because it offers a typical illustration of nearly all, if not all of the effects of a slowly developing intracranial growth. 4. Because of the clinical manifestations shown.

CLINICAL REPORT BY DR. MACDONALD.

Patient.—H. B., aged 36, was admitted to the Central Indiana Hospital for the Insane, October, 1898, was discharged September, 1902, as improved. Re-admitted Dec. 30, 1904.

Family History.—Parents living and in fair health. One maternal uncle epileptic, one cousin insane.

Personal History.—There was no report of severe illness or injury in childhood. At the age of 16 he developed major epilepsy, which was attributed to a sun stroke. Ten years later his left eyeball became abnormally prominent, but observation is faulty as to its first appearance. Four years later a right hemiplegia developed. On admission his mental state was found to be one of arrested development. He was amiable during the interval, but became very irritable before the convulsions, and often had outbreaks of fury following them.

* Read before the Marion County Medical Society, Indianapolis.

Physical Examination.—Patient is of medium height, and of powerful muscular development. The cranium is apparently symmetrical, except that just behind the left external orbital process an abnormal prominence, smooth, not abrupt in outline, rises 1 cm. above the general surface, and is about 10 cm. antero-posteriorly and 5 cm. vertically. The percussion note over the prominence is flat and the finger receives the impression of greatly increased resistance, and apparently is not sensitive to pressure. The eyes are prominent, the left excessively so. The pupils are unequally dilated, the left being the larger, and both react slowly to light. There is an extreme degree of optic atrophy. The mouth is drawn slightly to the left. Speech is confined to some half-dozen words. There is a partially-recovered right hemiplegia with some contracture of the hand and foot. Both knee-jerks are exaggerated, the right more marked. There is right ankle-clonus and Babinski's sign on the right side. The mental condition made other examinations futile. On Dec. 19, 1905, the patient fell during a convulsion and fractured the right inferior maxilla. The shock was rather extreme and three days later he developed serial convulsions, then pneumonia supervened and caused death.

Autopsy.—Head enlarged and brachycephalic in type. Bulging of the left frontal area, of both eyeballs, the left excessively so. Thickness of the skull is very unequal and irregular, varying from that of an egg shell to 1 cm, thinning being par-

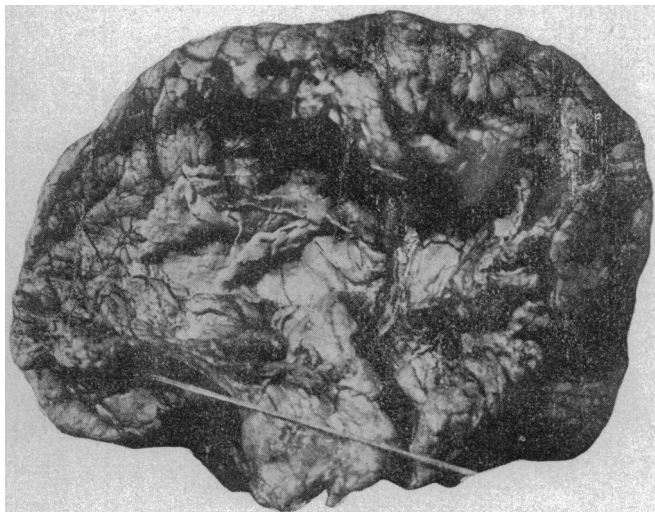


Fig. 1.—Antero-lateral view of left hemisphere. (a) Tip of temp. sphen., lobe turned down.

ticularly marked in the floor of the left anterior and middle fossæ and of the left frontal, squamous, and parietal bones. There is also atrophy of the petrous portion of the temporal, of the body of the sphenoid, and of the sphenoidal ridge on the left side, enlarging the anterior and middle fossæ, and making them practically continuous with each other. At the lower and anterior part of the left squamous just above the floor of the middle fossæ, are two cone-shaped projections, projecting inward about 1 cm., their bases gradually spreading, becoming continuous with each other at their adjoining surfaces.

There are moderate dural adhesions, most marked on the left side, with thinning of it over the anterior part. There is no subdural or arachnoid fluid.

Attached by a base 6 to 3 cm. to the inner surface of the vertical portion of the left frontal bone at its outer part is a hard, whitish, nodular growth, of cartilaginous consistency, with small areas of slight calcareous infiltration. Its weight is 575 gm., its size 16x12x9 cm., and extends backward and inward, taking the place of the greater part of the outer portion of the left frontal, left parietal and left temporo-sphenoidal lobes. On its outer surface are two depressions corresponding to the cone-shaped projections from the skull above described.

There is a second smaller growth, 3x2x5.5 cm. in size, springing from the inner surface of the left squamous just above and anterior to the base of the petrous portion, attached by a small

pedicle-like base, and of the same structure as the large tumor.

There is an oblique fracture of the right inferior maxilla at the point of junction of the horizontal and vertical portions extending back, in and upward. A moderate amount of callos, easily broken down, surrounds the seat of fracture.

The brain weighs 1,680 gms. There is complete displacement by atrophy of the left frontal lobe, except a layer averaging about 2 cm. in thickness on its mesial and internal-inferior surface, also of the outer portion of the left parietal lobe, and of the central three-fifths of the left temporo-sphenoidal lobe. The corpus striatum and optic thalamus with the intervening internal capsule are very much decreased in size and displaced

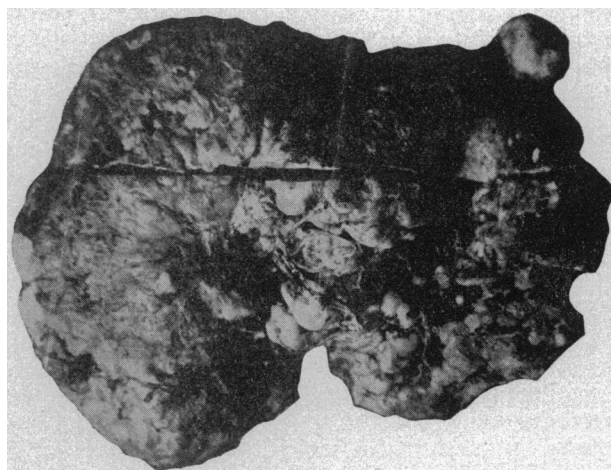


Fig. 2.—External surface view of part lying next to bone. (a) Anterio-external and point of attachment.

inward and downward. The left lateral ventricle is almost closed, the right lateral and the third are much dilated. The first, third, fourth, fifth, sixth, seventh and eighth cranial nerves on the left side are smaller than on the right side and somewhat gray in color. The optic nerves, commissure and tracts are similarly affected, the left more so than the right. The spinal cord is apparently normal.

Thorax.—There is slight, fatty infiltration of the right ventricle of the heart, slight arteriosclerosis of the aorta, most marked about the coronary orifices and involving the coronary vessels. There are extensive, diffuse, fibrous, band-like adhes-

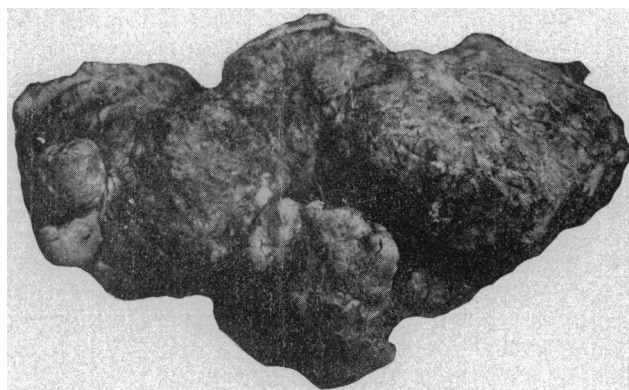


Fig. 3.—Marginal view, inner surface.

ions in both pleural cavities plus an acute fibrinous exudate over the base of the right lower lobe. The lower lobe and base of the upper lobe of the right lung are in a condition of mixed red and grey hepatization. There is also slight hypostasis of posterior and lower portion of the lower left lobe. The thyroid gland is moderately enlarged, tending to cystic formation. There is some hyperplasia of the bronchial glands and congestion of the bronchial mucosa. The remaining cervical and thoracic structures are apparently normal.

Abdomen.—Apart from the kidneys, the abdominal organs do not show any gross pathologic changes. The kidneys are in a condition of chronic parenchymatous-nephritis. The

right renal pelvis is dilated and pouch-like, the mucosa thickened and covered with a somewhat yellowish exudate, and the cavity contains a mulberry-like calculus 15 mm. in diameter. The right ureter is slightly dilated.

Microscopic Examination.—The brain tumor consists of practically normal hyaline cartilage throughout. The renal calculus is somewhat stratified and chemically consists mainly of phosphates, some oxalates, traces of xanthin and some organic material.

Osseous deposits in the dura, or small osseous projections from the inner surface of the skull are not infrequent, but the development of a definite tumor, benign in character, is a rare condition, especially chondroma. Gowers does not mention them. Mills refers to them as usually springing from the base of the skull in the form of flattened masses arising either from the bones, or from the dura, and lying like plates on the brain. Starr also refers to their extreme infrequency. No report has been discovered of any intracranial growth of the size of this one. Various authors refer to some the size of oranges, a closed fist, etc., so that this evidently is of an extraordinary size.

The effects produced by a slowly growing intracranial tumor are well shown in this case, involving, as it does, all the structures entering into the formation of the cranial cavity, as well as the contents thereof.

The case is illustrative of a group whose clinical manifestations are similar to and not always differentiable from those constituting the symptom-complex of true, idiopathic epilepsy. Judging from the clinical report one may safely assume that the growth was present at the time of the first so-called epileptic seizure. To what extent it had developed at that time, or to what degree it had involved the brain substance is impossible to say. It is possible, of course, that the epileptic seizures were primary, and the development of the tumor a secondary phenomenon, which may have been the result, directly or indirectly, of those seizures or the conditions producing them, or it may have had no connection with them at first.

The probabilities are, however, that the growth was the direct and exciting cause of the epileptiform seizures, and it does seem that there should be some means rendering possible a diagnosis between the two conditions at a time when operative procedures would be beneficial. But, as yet, we must confess to an inability to do so, since, on the one hand, one often meets with cases which, during life, are looked on as true idiopathic epilepsy, and the autopsy reveals the presence of some organic lesion, while, on the other hand, cases are also met with regarded as epileptoid, due to some organic lesion, but operation and autopsy fail to discover existence of any such trouble.

CALCIFICATION OF THE VAS DEFERENS AND THE SEMINAL VESICLES.*

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During my stay in the Pathologic Institute of the German University in Prague, I had the opportunity of examining some cases of pathologic changes in the ampulla of the vas deferens and the seminal vesicles. Two of these seemed to be more than ordinarily interesting and, as little is to be found in the literature concerning calcification, particularly in this region, they appear to justify publication.

CASE 1.—From Professor Pribram's clinic.

Patient.—Man, aged 63, died at 5 a. m., Feb. 4, 1906. The body was brought to the pathologic institute with the clinical diagnosis of *endarteritis obliterans, gangraena digiti I. et II. pedis sin., tetanus traumaticus*.

AUTOPSY.

Anatomic Diagnosis.—This was briefly as follows: Traumatic tetanus. Old endocarditis involving the bicuspid valve, with stenosis of the opening of the left vein and thrombosis of the valves. Embolism of left popliteal artery, with consequent necrosis and obliteration of first and second toes of the left foot and ulceration of the skin of the left heel. Cicatrices of the kidney due to infarcts. Hemorrhage into the left rectus abdominis muscle. Suppurative bronchitis.

Macroscopic Findings.—The genital organs were without pathologic changes, except that in the wall of the mesial part of the inferior third of the right seminal vesicle near the right vas deferens a mass of bone-like consistency was found, egg-shaped of the size of 0.25 c.cm. (Fig. 1). This condition of the seminal gland could be caused by only two pathologic processes: (a), a partial calcification of the seminal gland, not unlike a case described by Chiari in 1903; or, (b), by a phlebolith. When strong sulphuric acid is applied to a small piece of calcified mass characteristic crystals of calcium sulphate are produced. This chemical test was not applied here.

Microscopic Findings.—A microscopic examination of the

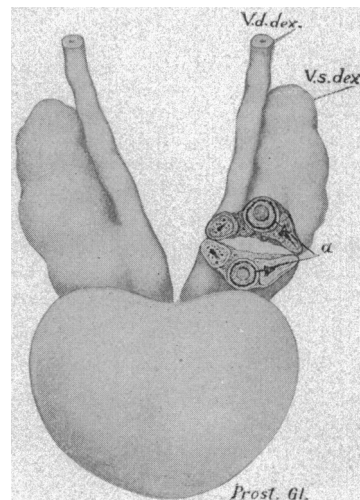


Fig. 1.—Calcification of the right seminal vesicle. a, Section of the calcified mass in the seminal vesicle. V. d. dex., Vas deferens right side. Normal. V. s. dex., The right seminal vesicle showing the calcified mass. Prost. Gl., Prostate gland. Normal.

seminal gland was undertaken in order to decide the true nature of the pathologic findings. A horizontal lamella was taken from the place of the seminal vesicle, which apparently seemed to be bone-like in consistency; it was put in Perényi's solution (10 per cent. nitric acid, 40 c.cm.; absolute alcohol, 30 c.cm.; 0.5 per cent. watery solution of chromic acid, 30 c.cm., and washed in 70 per cent. alcohol). After this process the bone-like consistency disappeared, and one could now conclude that this appearance was undoubtedly due to lime-salts. It was then embedded in celloidin, and the microscopic sections were stained with hematoxylin-eosin and Van Gieson's stain.

The epithelium was everywhere well preserved, and presented one layer only. The mucosa was without any pathologic changes, but, in the intercellular substance of the two outer layers of the tunica muscularis, a network-like mass, deeply stained by hematoxylin. It was homogeneous, and in places fine globular granules, with some concentric bodies here and there within the network, could be seen. The mass was circular in outline, following the circular and the outer muscular layers especially. (Fig. 2.) There was no tendency of the mass to enter in proper union with the tissue; it seemed to be undoubtedly only a lime-salt infiltration in the intercellular substance. The adjacent connective tissue in some places was found to be sclerotic.

* From Professor Chiari's Pathologic Institute in Prague.