oblique direction of the axis of the pocket-shaped recessus, I may say that the angle formed by the axis of the femur neck and the axis of the pocket-shaped recessus is in the new primary position in no case larger than 45 degrees (in average cases, however, mostly from 15 to 30 degrees), thus guaranteeing a more than sufficient stability. In this position the head of the femur is therefore fully emerged into the pocket-shaped recessus and the axes of the neck of the femur and the pocket-shaped recessus correspond to each other as near as possible. This position is maintained by means of a cast, which reaches as far as the ankle joint or the toes. After the first days the cast around the knee joint is cut away and a pair of hinges are inserted which allow the joint all motions.

RESULTS.

The results which I obtained with this new primary position are most satisfactory. One case, for instance, which was operated on twice before, one time by Dr. A. Lorenz, both times, however, with the result of a superior posterior redislocation, gave a complete anatomic result after the third operation, at which I applied my new primary position. The *x*-ray picture (Fig. 3) shows this beautiful result now two and a half years after the operation. Many other cases in which there was not the slightest stability at the time of the operation furnished the same wished-for results with normal gait of the patients. In consideration of these facts I believe that the methodic application of my new primary position will furnish fully 100 per cent. of anatomic cures after the hips have been reduced.

A very important advantage of my modification is that it does away with the brutal widening of the capsule after the operation; also the after-treatment is very much simplified, and the ectrorotation of the thigh and leg, which remains after the correction of the Lorenz primary position for good, is entirely avoided. The efficiency of the new primary position has been further proven by my attempts to transform subspinal positions into anatomic ones by re-operation.

The results gained were surprising, as all the cases thus treated showed a central reposition after the second operation. If one considers that in the United States alone there must be at least about 1,000 cases of congenital hip joint dislocations in which the original Lorenz method could furnish but a partial cure, and if one stops to consider that all these patients have now the possibility of getting an anatomic result, one can conceive the importance of this improvement of the method.

However large the number of cases may be in which the original Lorenz operation furnished only an anterior superior redislocation and which may derive the benefit of a complete cure from the new primary position now, yet its importance lies in the future where a general application of it should make the reposition of the congenital hip joint dislocation a method giving always ideal results without any restrictions by any conditions.

FOR THE DISCUSSION, SEE PAGE 357.

Subcutaneous Injections of Cocain in Vomiting of Pregnancy.—Sokolsky reports that after the failure of all the usual measures, in a case of incoercible vomiting of pregnancy, he injected 1 c.c. of a 1 per cent. solution of cocain in the epigastric region. Benefit was apparent at once, and a complete cure was realized in the course of 8 injections. Cited by the *Semaine Médicale*, October 3.

SOME VARIATIONS IN THE FRONTAL SINUSES.*

M. H. CRYER, M.D.
PHILADELPHIA.

In 1897, and at various other meetings of this Section, I have had the pleasure of demonstrating some variations in the shape and position of the frontal sinuses. In 1902, Dr. A. Logan Turner published a work containing a most valuable and comprehensive description of these sinuses, with many of their variations. He also read an excellent paper[1] before this Section at Atlantic City in 1904, in which he stated that "the frontal sinus is not a

Figure 1.

simple chamber." He also spoke of "the existence in many instances of incomplete bony septa and partitions in its interior gives rise to one or more diverticula or recesses," and claimed that failures in operations have been caused by non-recognition of such recesses. With these and work of members of this Section, Drs. Freudenthal, Richards, Holmes, Myles and others, one would suppose the subject to have been exhausted. But seeing cases of diseased frontal sinuses which would not yield to treatment through the natural outlet, ostium frontalis, I undertook a closer study of the variations in the anatomy of the parts, finding, as a result, skulls with greater

Figure 2.

variations of recesses, pockets and diffusions than had been previously seen by myself or described. The result of some of these dissections I now present.

The typical frontal sinus as described in the text-books on anatomy is familiar to all, but those who make of this region a special study know that this description does not begin to cover the ground. The frontal sinus as it

* Read in the Section on Laryngology and Otology of the American Medical Association, at the Fifty-seventh Annual Session, June, 1906.

1. "Operative Treatment of Chronic Suppuration of the Frontal Sinus," THE JOURNAL A. M. A., 1905, XLIV, p. 346.

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actually exists is of infinite variety. It not only varies in different individuals, but in the same person one side will differ entirely from the other. There are skulls in which frontal sinuses do not exist; there are other skulls in which there is but one sinus. In the latter event, the sinus may be very small, or it may extend from one of the external angular processes to far beyond the median line of the frontal bone and upward to a point above the level of the frontal eminences or backward over the orbit to near the optic foramen. In other cases the sinus

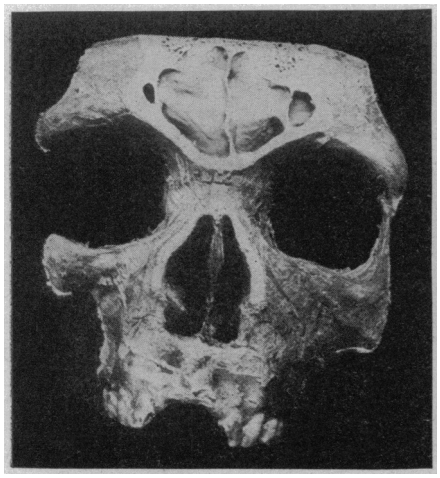

Figure 3.

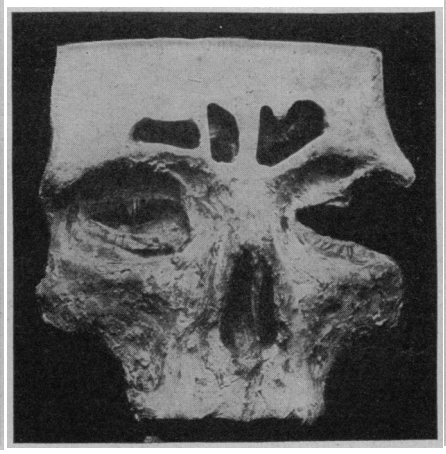

Figure 4.

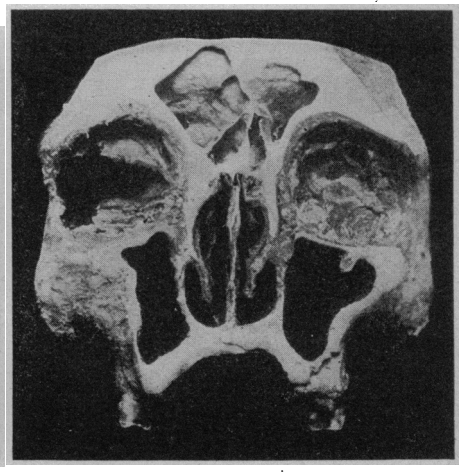

Figure 5.

may spread outward and backward and terminate in the great wing of the sphenoid bone; it may not only extend into the ascending portion of the bone, but also downward and backward until it becomes one common cavity with the anterior ethmoid cells and the maxillary sinus.

Text-books give two as the usual number of frontal sinuses, each having an independent outlet into the nasal chamber, but there are specimens which show no sinus whatever, there are others with one, two, three,

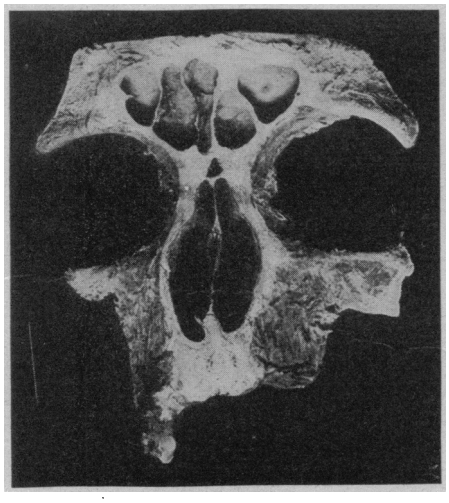

Figure 6.

four, and even five, all of the ascending portion of the bone and each having its independent outlet. These portions which pass over the orbit might be called supraorbital sinuses, especially if they have a complete separation and an independent outlet from the one which occupies the ascending portion of the bone. Some of our writers are inclined to treat these sinuses as ethmoid cells which have invaded this region; but, following the same reasoning, frontal sinuses found in the ascending portion could be called ethmoid cells invading the frontal bone, for they, like many other pneumatic spaces, are invasions into their different regions from the ethmoid labyrinth.

The anterior ethmoid cells are those which invade the frontal region and form the frontal or supraorbital sinuses and have their outlet near the anterior portion of the hiatus semilunaris. Some of the supraorbital sinuses are formed from the middle ethmoids and have their outlet into the hiatus semilunaris somewhat posterior to those from the anterior cells. Occasionally supraorbital sinuses will be found arising from the posterior ethmoid cells, and in such cases their outlets would be into the third or fourth meatus. When two frontal sinuses exist, the septum between them is complete except in

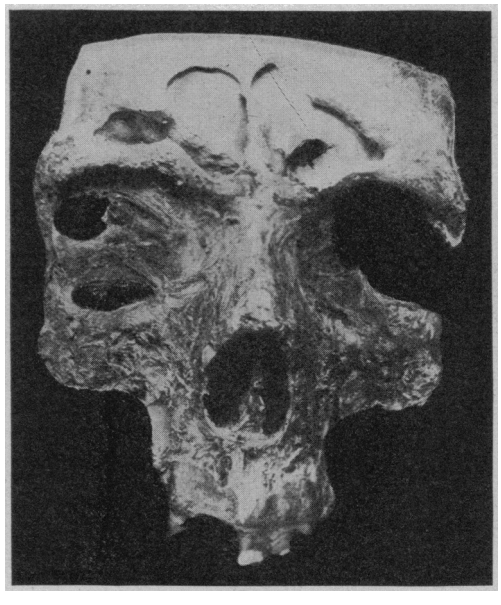

Figure 7.

very rare cases; in the great number of examinations made, only a few of these exceptions have been found, and they were apparently of pathologic origin. Two are among the specimens shown.

I have found two cases in which the internal plate or wall of the sinus has been incomplete. Dr. Makuen, Chairman of the Section, in his annual address at Saratoga in 1902, reported one of these cases in which I had found that the inner plate was lacking and the frontal

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sinus had become filled with brain tissue, or, in other words, the brain had developed forward into the sinus. The other case is that of a negro in whom the bone forming the inner wall had apparently been resorbed, leaving nothing but membranous tissue for the division between the brain area and the sinus. There are also cases in which the frontal sinuses have formed and then

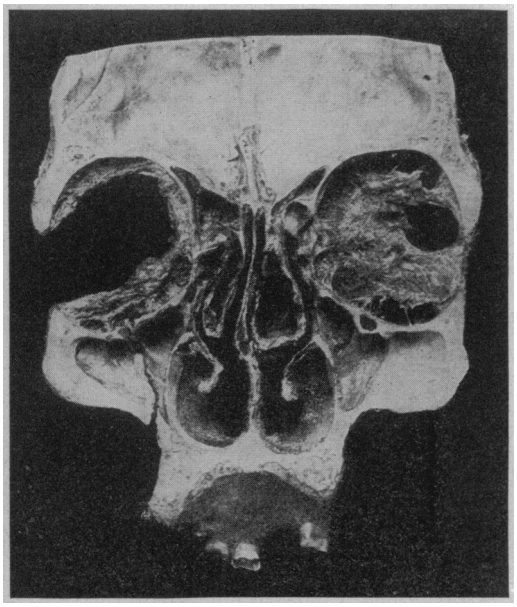

Figure 8.

so-called ethmoid cells have apparently pushed upward into them. A number of illustrations will further demonstrate these variations.

Figure 1 is made from two sections taken from the supraorbital region of the skull. The upper figure shows that the anterior portion of the frontal bone has been removed from the region of the superciliary ridges, exhibiting no indication of the sinus in the ascending portion of the frontal bone. The lower picture shows no evidence of the sinuses passing into the horizontal portion or over the orbits.

Figure 2 is made from a specimen having only a right

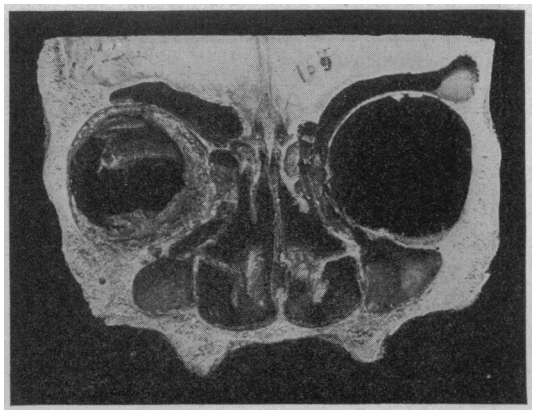

Figure 9.

frontal sinus, which extends unbroken far over to the left. This sinus extends partly over the orbit and has but one outlet.

Figure 3 shows two rather typical frontal sinuses with two outlets and a complete septum near the median line. There is also one partial septum in each sinus forming two pockets near the external angular processes. The right sinus measures horizontally 35 mm., the left 30 mm.; the depth of the right sinus is 42 mm. and the left 35 mm.

Figure 4 shows three complete frontal sinuses with three individual outlets and two complete septa. The two lateral sinuses pass backward well over the orbits.

Figure 5 is made from a skull that has four frontal

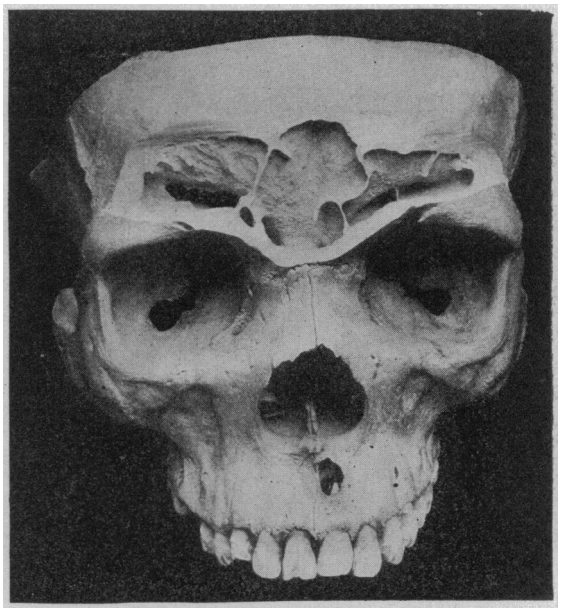

Figure 10.

sinuses, with four independent outlets and three complete septa. Some writers would class the two middle sinuses as anterior ethmoid cells which had invaded the frontal bone. If these cells should exist without the

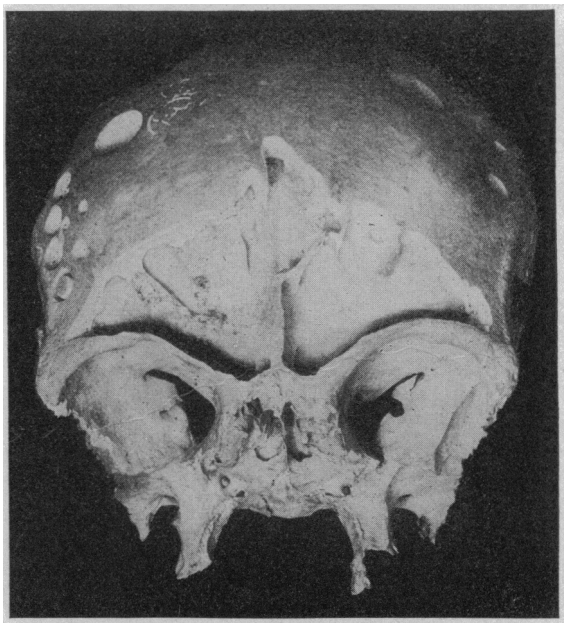

Figure 11.

two larger sinuses they would then be called frontal sinuses by the same person.

Figure 6 is made from a specimen containing five sinuses and having four complete septa. Four of the sinuses extend well upward to about an equal height.

Figures 7 and 8 are anterior and posterior views, respectively, of a specimen with two frontal sinuses of un-

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equal shape and size, with the septum nearly in the median line but somewhat curved in its formation. On the right side there is apparently an enlarged ethmoid cell pushed or "blown up" into the frontal sinus. This cell or pocket has its independent outlet into the hiatus semilunaris. In the left frontal sinus there is a larger balloon-shaped cell partly divided by an incomplete septum; it has two outlets into the region of the anterior ethmoid cells. If the middle turbinates of this specimen be examined, they will be found to contain two large

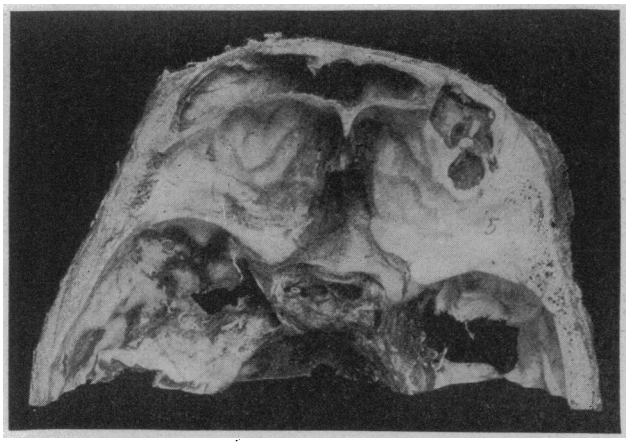

Figure 12.

cells, that on the right being especially large. At the upper and inner corners of each maxillary sinus there is a deep pocket, the infraorbital sinus.

Figure 9 is a posterior view made from a specimen having two large frontal sinuses with a complete septum. The right sinus extends back over the orbit and down through the region of the anterior ethmoid cell, continuing into the maxillary sinus and making one com-

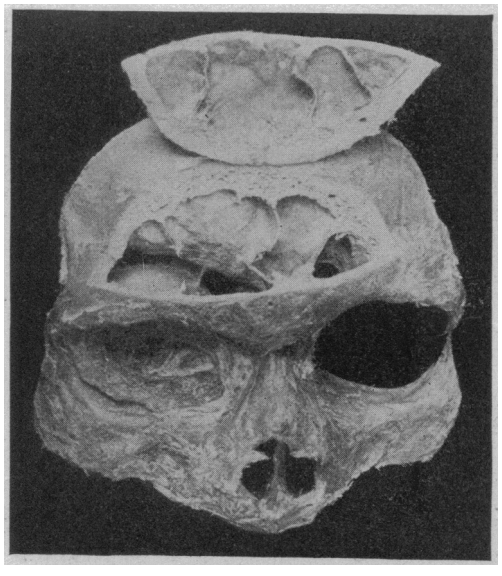

Figure 13.

mon cavity of the frontal sinus, the anterior ethmoid cells and the maxillary sinus.

Figure 10 is from a skull having two large frontal sinuses. From the appearance of the picture there are three sinuses, but the septum on the right is incomplete, making but one sinus on that side. Consequently the right sinus is very large and extends from the right external angular process transversely well over to the left side, measuring 65 mm. Its depth from the top to its outlet is 45 mm. and it extends well back over the orbit 40 mm. The left sinus extends outward to the external angular process and backward to about one-half the distance of that on the right side.

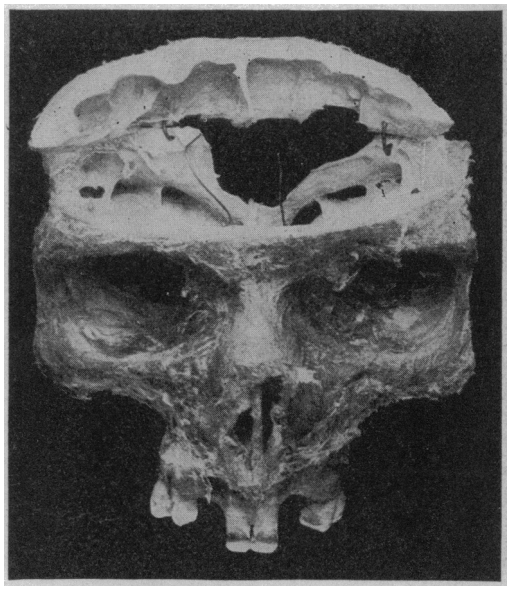

Figure 14.

Figure 11 is made from a section showing two very large frontal sinuses, the septum having a deflection toward the left side. The central portion extends higher than the frontal eminences, reaching upward 44 mm. (1¾ inches) above a line drawn across from the arch of the orbits. Such a conformation would be an important factor in performing craniotomy in the endeavor to reach the anterior portion of the anterior lobe of the cerebrum, as the frontal sinus should be avoided in all brain sur-

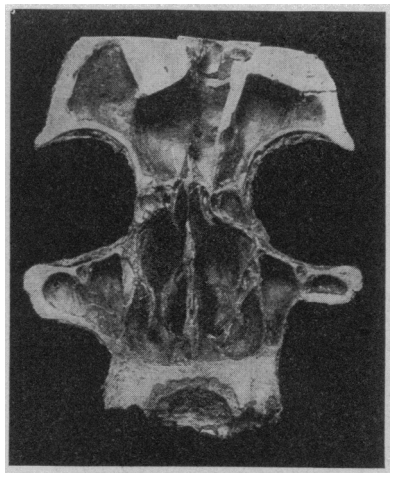

Figure 15.

gery on account of danger of infection to the brain from the sinus. There is marked depression of the sinus over the longitudinal venous sinus.

Figure 12, from a horizontal section above the orbitis, shows a transverse section of a large left frontal sinus, measuring 67 mm. from the left external angular process to a position over the center of the right infraorbital foramen without a septum. The right frontal sinus, measuring 40 mm., has small, several incomplete, nearly horizontal septa, making a number of horizontal pockets.

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Figure 13 is made from a transverse section of the face with a portion of the bone removed to expose the frontal sinuses. That on the right is extremely large, extending from the right external angular process over toward the left and measuring 67 mm., leaving but a slight space for the left frontal sinus, which measures

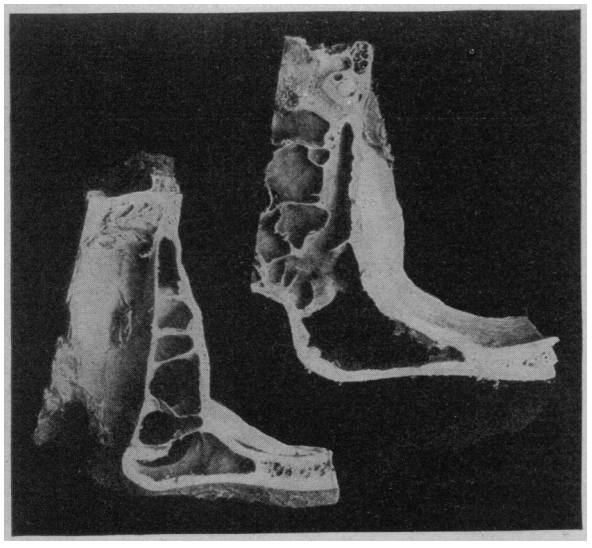

Figure 16.

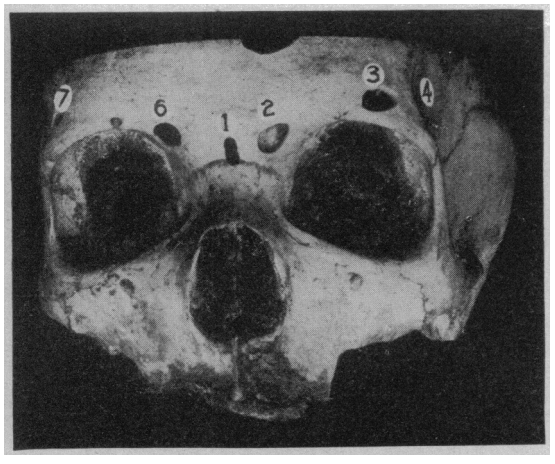

Figure 17.

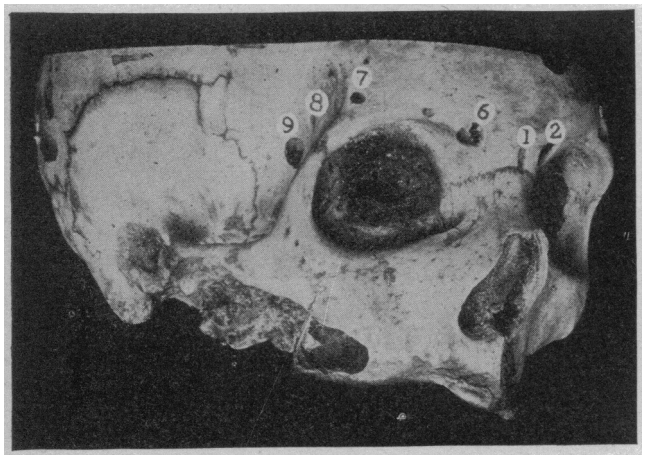

Figure 18.

15 mm. The septum between these sinuses has an inclination of about 45°. The right sinus also extends well back over the orbit and into the crista galli.

Figure 14 is made from a transverse section of the face with a portion of the bone removed, showing two very large frontal sinuses which extend backward over the orbits, where they are divided by several incomplete septa. They also extend downward and communicate directly with the maxillary sinuses. The right and left sinuses measure horizontally 50 mm. and their depth is 40 mm.

Figure 15 is a posterior view of the frontal sinuses showing two incomplete septa. The incompleteness of

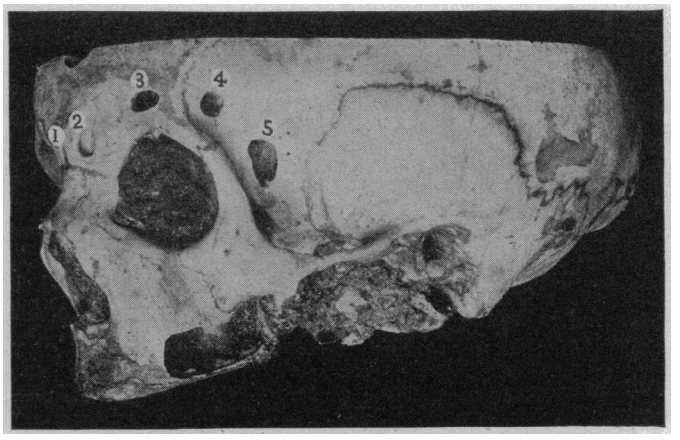

Figure 19.

the septa is more than likely due to pathologic conditions.

Figure 16 is made from two specimens showing lateral views of the frontal sinuses. The lower picture is a sagittal section cut near the center of the orbit, showing in the anterior portion a lateral view of the frontal sinus

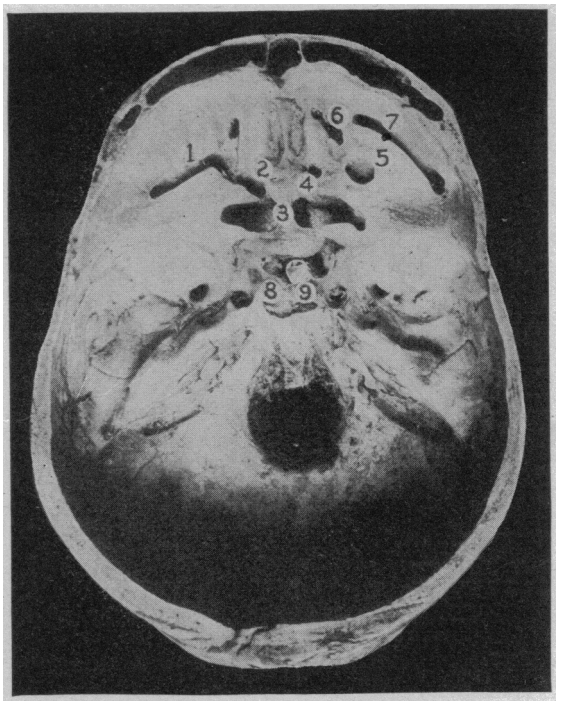

Figure 20.

divided into five pockets, all of which have one common outlet. The sixth or posterior cell communicates with the upper meatus of the nose. The upper picture is also a sagittal section cut to the median line of the os planum of the ethmoid bone. It shows a frontal sinus extending backward nearly to the optic nerve which is seen in position in the optic foramen. The frontal sinus

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of the specimen passes over the orbit and is also divided into several pockets.

The skull pictured in Figures 17, 18, 19 and 20 has the largest pneumatic spaces of any skull I have dissected, not only of the frontal sinus, but of the supraorbital, ethmoidal and maxillary sinuses. The frontal sinuses may be described as commencing in the right temporal fossæ at a point near the articulation of the frontal bone with the great wing of the sphenoid (see point marked 8, Fig. 18). It extends forward and across the skull to the opposite side, then a little backward, terminating near the left great wing of the sphenoid (see point marked 4, Fig. 19). The frontal portion of this great space is divided into four compartments, three of which have a separate outlet, while the fourth is connected to one of the others by a small foramen which is placed low down in the sinus.

As already stated, the right frontal sinus commences at a point marked 8, in Figure 18, in the temporal fossæ and extends upward, forward and inward to near the nasion, measuring 55 mm. The right supraorbital sinus commences in the zygomatic fossa (see point marked 9, Fig. 18) or in the right wing of the sphenoid bone; it passes upward, forward and inward over the orbits (see point marked 7, Fig. 20). Its outlet is in the anterior and lower portion of the right frontal sinus. It measures in length 55 mm. There are also several other sinuses or cells over the anterior portion of the orbits with independent outlets (see points marked Nos. 2, 4, 5, 6, Fig. 20).

The left frontal sinus commences in the temporal fossa at a point marked 4, in Figure 19. It then passes upward, forward and to the right to the wall forming an intermediate frontal sinus. It measures 48 mm. The sinus is divided into two compartments by a septum lying at an angle of 35 degrees from the horizontal. At the lower and median end of this septum there is a small foramen which allows the two compartments to communicate with one common outlet into the nasal chamber. The left supraorbital sinus commences in the great wing of the sphenoid bone and passes slightly upward, inward and forward over the orbits. The outlet empties into the anterior portion of the nasal chamber. Immediately back of the nasion and glabella there is an intermediate sinus with an independent outlet. It is cuboidal in shape, its lateral and anteroposterior measurements are 10 mm.

The sphenoidal sinuses are large, extending well forward and laterally over and under the optic nerve, leaving but a thin portion of bone separating the nerve canal from them. The sinus extends backward and downward to the basilar process of the occipital bone (see points marked 3, 8, 9 and 10, Fig. 20). The two sinuses measure laterally 44 mm., anteroposteriorly 33 mm., depth 44 mm. The maxillary sinuses are extraordinarily large. In one there is a large, incomplete, membranous septum. The right sinus measures in its greatest depth 44 mm. and diagonally from before upward and backward 55 mm. The left sinus is 55 mm. in its greatest height and diagonally backward, upward and forward 65 mm.

It will be claimed by some that the specimens here illustrated are freaks or great exceptions. I can not so classify them. They are all from my own dissections within the past 15 years. I regret that I have no means of knowing how many skulls have been sectionized during that time, but I believe that if a thousand of the skulls which come to our dissecting rooms were examined by sectioning, a collection showing equal variations with those here described would be made; and if a thousand skulls of persons affected with diseased pneumatic sinuses were examined the variations would be found much greater and more common. If surgeons who treat this region had some way of determining the character of these sinuses in the patient their treatment could be given on a more scientific basis.

External "landmarks" to indicate the true character of these sinuses are commonly lacking, and examination through the nasal fossa will give but a slight idea. Transillumination has been used with some success, but it is not sufficiently accurate for complicated cases.

RADIOGRAPHY.

Radiograms of this region have been made for several years with much improvement. Dr. Coakley, of New York, showed some very fine ones in Philadelphia last year. Several radiographers in Philadelphia are doing good work along this line.

It has been demonstrated by all who have investigated the pneumatic spaces intimately that they exist in an infinite variety of sizes, shapes and positions, so that even clinical experience counts for little, as no two cases present like conditions. It is evident that a good radiogram, if stereoscopic so much the better, is one of the most reliable witnesses for the surgeon's dependence in diagnosing the character and the disease of the frontal sinus region.

1623 Walnut Street.

FOR THE DISCUSSION, SEE PAGE 358.

TUMOR OF THE RIGHT VERSUS TUMOR OF THE LEFT FRONTAL LOBE OF THE BRAIN.

A COMPARISON OF THE SYMPTOMS OF THE PREFRONTAL AREAS.*

WILLIAM C. KRAUSS, B.S., M.D.
BUFFALO, N. Y.

At the meeting of the American Neurological Association, Washington, D. C., May 4 to 6, 1897, I presented a paper[1] and specimen showing a glioma situated at the base of the second frontal convolution on the right side of the brain; to-day I present a glioma occupying the same relative position on the left side of the brain. The specimen exhibited to-day, however, is a recurrence of the growth, the original tumor having been removed by operation Nov. 10, 1905, by Dr. Roswell Park of Buffalo, N. Y.

In comparing these two tumors or lesions of the frontal lobes of the right and left hemispheres respectively, I wish to call attention to the fact that while the right frontal tumor called forth no localizing symptoms, the left frontal tumor was characterized by pronounced mental disturbance and loss of the capability of writing and printing.

CASE REPORTS.

AUTOPSY.

CASE 1.—Glioma of the Right Frontal Lobe of the Brain. Autopsy. (Abstract.)

Patient.—A carpenter, aged 31, suffered with pain in the

* Read in the Section on Nervous and Mental Diseases of the American Medical Association, at the Fifty-seventh Annual Session, June, 1906.

1. "Glioma of the Right Frontal Lobe of the Brain." Trans. Am. Neurol. Assn., 1897; also, Jour. of Nervous and Mental Disease, February, 1898.

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