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**FURTHER OBSERVATION ON SOME ANATOMIC
AND CLINICAL RELATIONS OF THE SPHENOID
SINUS TO THE CAVERNOUS SINUS AND
THE THIRD, FOURTH, FIFTH, SIXTH
AND VIDIAN NERVES.***

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Last May it was my privilege to present this subject to this association in the shape of a preliminary report. Now I should like to add a note to it. The subject is a large one and clinically deals with a most difficult class of cases. It may be recalled that the question of the etiology and treatment of migraine was raised in that report; and the statement made that I believed many (but not all) of the recurrent headaches that bear the name migraine are sphenoidal empyemata that had lost most if not all local signs; or were started as such empyemata; and that the nerve trunks had become involved either by extension of the inflammation (or its toxin) through the thin wall separating the sphenoid sinus from the adjacent

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nerve trunks. The results (case reports) that I might now submit, although a goodly number, are too recent to permit of conclusions. I feel that these results should stand five years before conclusions are drawn. As far as they go, however, they strengthen my belief in the correctness of the deductions detailed in that report.

I desire now specially to record an anatomic observation and to mention a conclusion drawn from clinical observation as far as it has gone.

Last May I cited that the treatises on anatomy usually gave the impression that the trunks of the third, fourth, fifth, sixth and Vidian nerves were well (far) separated from the sphenoid sinus. During the year an additional number of volumes have been consulted, but no exception to this rule has been found. The observation that the third, fourth and the three divisions of the fifth, sixth and Vidian frequently lie in close association to the sphenoid sinus was a deduction from specimens which I had studied by cross sections. Two months later (July 18, 1912), Ladislaus Onodi,¹ reported an anatomic investigation of this same district, with corresponding findings, save for the Vidian nerve, which he did not observe. His method was to follow the nerve trunks in certain specimens, sometimes to remove the wall of the sphenoidal sinus, and then to study the relations of the nerve trunks thereby exposed. He found that they were in these close associations for varying distances, sometimes even as much as twenty millimeters. He did not consider the cavernous sinus in these relationships. He pictured specimens, however, where the sphenoid sinus extended close to the clivus of Blumenbach—so close as to make transparency of the separating bone—and showed how this brings the sixth nerve into these associations. I have not such a specimen. Five years ago, while looking over the exhibit of Dr. Mosher in the Harvard Medical School, I saw a number of such; but none of sufficiently thin wall to suggest their being classed with such material as I drew my conclusions from. It is interesting to know the length of such contacts; but I believe this to be of secondary importance to the fact that the exposure or contact exists, however short or long. Last February I enjoyed the personal favor of an inspection with Dr. Warren B. Davis, Keen Research Fellow of the Jefferson Medical College, Phil-

adelphia, of his matchless collection of one hundred and forty-five Caucasian specimens, showing the nose and accessory sinuses from the eighth week of fetal life to the twenty-fifth year uninterrupted, several specimens for each year (save the eleventh year, of which there is only one).^{*} With his sanction I now record the observation made then, that the sphenoid sinus spreads laterally at an early age, reaching to close proximity to the second division of the fifth as early as two and one-half years; and that this condition runs almost constant throughout the series. Its development (Davis) begins on the anterolateral aspect of the body and slowly extends backward. It, however, spreads rapidly laterally, to approach the foramen rotundum, and then proceeds backward. As early as the sixth year the Vidian canal may be approached.

These observations seem to me of great importance. They furnish anatomic findings to correspond with the clinical histories of this class of cases, i. e., that the neuralgias frequently begin quite early in life. For if I be right in the conclusion that the mode of production of these headaches—the pathologic sequence—is the close association of the sphenoid sinus to these nerve trunks, and that the inflammatory processes are transmitted through the thin bone separating the cavity of the sphenoid from the associated nerve trunks, it is necessary that such anatomic associations be formed in early life, as an explanation of such headaches beginning in early life.

Last May I made the statement that I thought the pathologic process underlying these cases to be a hyperplastic sphenoiditis. A year more of clinical observation strengthens this belief, although some cases are certainly not such, according to their clinical behavior, and bone removed from some of these patients was declared to be normal by Dr. E. L. Opie.

From an observation of about one hundred cases it has seemed that the second division of the fifth and the Vidian are the nerves most frequently involved (ninety-five per cent). They may be involved singly or together, then making the picture which would otherwise emanate from the sphenoid

^{*}These specimens were secured by the ingenious technic which Dr. Davis was clever enough to devise, and which he will publish in his monograph giving his observations on the collection.

palatine ganglion. The year's observation leads me to feel it to be more difficult than I once thought to separate this class of cases from sphenopalatine ganglion neuralgia,² so that I feel that one ought to be carefully on guard for this differentiation.

The third nerve is rather frequently involved, but I cannot now give percentages. Such patients are usually unconscious of a difference in their pupils, but upon observation show this difference with almost every coryza. Observations relative to the fourth nerve are not so readily made. So far I have not seen a case of sixth nerve involvement belonging in this category.

During the year I have tried for intrasphenoidal use three medicines not mentioned in the first text. Iodid of potassium in water (two per cent to five per cent) proved to possess nothing upon which its use may be recommended. It is apparently inert. One per cent chlorotone in water proved to lack recommendations. The proprietary "cresatin" also failed to prove better adapted for these purposes than carbolic acid or oil of wintergreen.

The medicines which have so far given the best satisfaction are one per cent carbolic acid in oil, two per cent to ten per cent oil of wintergreen, and aqueous solutions of sodium salicylate, two to five per cent. These have been successful in allaying the pain long after the sinus was satisfactorily opened and the wound healed.

REFERENCES.

1. Onodi, Ladislaus: *Archiv. für Laryngologie*, B. XXVI, Heft 2, July, 1912.
2. Sluder, Greenfield: *The Syndrome of Sphenopalatine Ganglion Neurosis*. *American Journal of Medical Sciences*, December, 1910.