(20) MOTT.—*Med. Clin. Trans.*, vol. lxxxiii, 1900, found leukæmic infiltration in cochlea and canals.

(21) LANNOIS.—*Annal. des Mal. de l'Oreille*, etc., 1892; found extravasation of blood in vestibule and in canals undergoing organisation; new connective-tissue formation in the bony canals; cellular infiltration in scala vestibuli of first turn of cochlea.

(22) PARKES-WEBER and LAKE.—*Proc. Roy. Med. and Clin. Soc.*, 1900; found new formation of fibrous and bony tissue in the scala tympani and in the perilymphatic spaces of the canals.

(23) SCHWABACH.—*Zeitsch. f. Ohrenheilk.*, Bd. 31, S. 103. Fifteen cases of leukæmic deafness; five had apoplectiform attacks.

(24) KOCK.—*Ibid.*, Bd. 50, S. 431. Hæmorrhage in cochlea and canals.

(25) MANASSE.—*Ibid.*, Bd. 52; examined thirty-one inner ears from cases of nerve deafness, and found two with evidences of labyrinthine hæmorrhages in addition to degenerative changes.

(26) FINLAYSON.—*Brit. Med. Journ.*, December 31, 1908, p. 1925; records another leukæmic case with hæmorrhage in vestibule and first turn of cochlea.

(27) MOOS.—*Virchow's Archiv*, Bd. 69, S. 313. Syphilitic patient: Ménière's symptoms engrafted on existing ear disease; periostitis in vestibule; small-cell infiltration of membranous labyrinth.

(28) HAUG.—“Die Krankheiten des Ohres in ihren Beziehungen,” etc., 1893. Tabetic case: the acoustic nerve-ganglion and accessory ganglia were affected.

(29) FRASER.—*JOURN. OF LARYNGOL., RHINOL., AND OTOL.*, August, 1909.

A NEW CONTRIBUTION TO THE OPERATIVE TECHNIQUE OF THE LABYRINTH.¹

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IN 1905, in our inaugural thesis, “The Surgical Anatomy of the Labyrinth,” we showed how we should understand the opening of the internal ear in case of diffuse suppurative labyrinthitis. We then extolled the opening of the cochlea and of the anterior branch of the external semi-circular canal, and as the facial nerve passes parallel to this anterior branch, we constructed a protector in order not to injure it. The French school, despite Lermoyez's article in *La Presse Médicale* at Bordeaux in 1904, the French school, we say, does not stimulate research in this matter. The Viennese school, on the contrary, with Alexander, Neumann, and Bárány (1), has used every effort to unravel and make precise the somewhat delicate symptomatology of this organ. The first of all these

¹ Slightly abridged from the *Bulletins et Mémoires de la Société Française d'Oto-Rhino-Laryngologie*, 1909.

researches is recorded in a monograph of Bárány, assistant in Politzer's clinic, in 1907. It is in consequence of this work that in France the experimental and pathological nystagmus of the vestibular apparatus is investigated. Lombard and Halphen (2), the same year, published a work "On Elicited Reflex Nystagmus as a Diagnostic Method in Functional Conditions of the Vestibular Apparatus." Pietri (3), in the *Journal de Médecine de Bordeaux*, studies elicited nystagmus in his reports with the labyrinthine affections, and, a little later, the same author, in collaboration with Maupetit (4), studies this same nystagmus apart from all pathological affection. Hautaut (5), Lemaitre and Halphen (6) have equally studied this subject.

We ourselves are again occupied with the surgery of the internal ear, and it is the result of this work that we would describe.

We consider that the opening, such as we practised (7), was insufficient, for we left the frontal, sagittal, and the posterior branch of the horizontal canal intact. Nevertheless, all these parts may contain pus in a case in which the suppuration is diffuse. The operation was incomplete, since we left a source of infection which might cause a meningitis or any other cerebral complication to follow. At the present time we open all the canals, making the operation as extensive as possible. The following is our method of procedure :

At the beginning, to make a large excavation, carrying it as far back as possible ; reaching above to the posterior prolongation of the zygomatic arch and to the point at which this arch recurves, and to remove as much as possible of the buttress over the facial, so as to bring part of the oval and round windows well into view. This is most important if it is wished to obtain a very clear view over the promontory. To facilitate this inspection it is good to resect the whole of the posterior wall of the membranous auditory meatus. In this excavation the descending branch of the lateral sinus is often laid bare, especially if it is slightly procident. Excavation thus practised extensively, the anterior branch of the horizontal canal is very clearly seen ; the edge of a sufficiently fine gouge is then applied to the point at which this canal changes its direction, and its curve is opened by one cut. Then, parallel to the buttress over the facial between it and the sinus, going from below up and a little behind forwards, the bone is excavated more and more deeply. The posterior canal is opened at its deepest part.

In a second stage digging with the gouge is continued between the sinus and the buttress over the facial, taking as a landmark the posterior branch of the horizontal canal, thus working behind the facial and on a plane slightly inferior, thus going in a forward direction. By this means the vestibule is opened in its posterior part. It is sufficient to take a light curette, to introduce it into the vestibule by the artificial opening, and to make it come out at the oval window, passing under the facial, in order to make sure that the vestibule is well opened behind.

In a third stage the heel of our protector (which we have modified) is introduced into the oval window, the metallic plate measuring about 3 mm., hugging the aqueduct of Fallopius, so as to protect the facial. The protector is held by an assistant. With the help of a graving chisel, this smooth, polished prominence of the aditus is removed from behind forwards, and the anterior branch of the horizontal canal is opened. The plate of the protector prevents the graving chisel from going astray towards the lower part and injuring the facial; similarly the beak of this same protector protects the nerve in front in cases where the chisel may tend to slip forward. It is enough, further, if the excavation has been large and sufficiently extended above, to give two cuts of the chisel in the vertical direction, at the point where the ampullary orifice of the horizontal canal has been opened, to lay bare the ampullary orifice of the frontal canal and a part of its anterior branch.

In a last stage, the protector remaining in place, the promontory can be ablated by means of a gouge, without any difficulty. It is enough to rest the convexity of the instrument against the buttress over the facial, the edge of the gouge applied on the line of separation of the round and oval windows, and to give a cut, followed by another cut on the side of the orifice of the Eustachian tube. This is sufficient to remove the cap of the cochlea formed by the promontory.

Thus the vestibule is laid open behind, by following the posterior branch of the horizontal canal; above, by opening the two ampullary orifices of the two canals, external and frontal; below, by throwing the two windows, oval and round, into one.

(1) BÁRÁNY.—"Physiologie und Pathologie des Bogengang—Apparates beim Menschen," 1907.

(2) LOMBARD and HALPHEN.—*Progrès Médical*, April 18, 1907.

(3) PIETRI.—*Journal de Médecine de Bordeaux*, April, 1908.

(4) PIETRI and MAUPETIT.—"Elicited Nystagmus Apart from all Pathological Affection," *Rev. de Laryngol.*, November 21, 1908, p. 609.

- (5) HAUTANT.—“Functional Examination of the Semi-circular Canals by Reflex Nystagmus,” *Ann. des Mal. de l'Oreille*, September, 1908, p. 245.
(6) LEMAITRE and HALPHEN.—“Nystagmus and the Internal Ear,” *ibid.*, p. 673.
(7) BOURGUET. — “Surgery of the Labyrinth,” *ibid.*, 1905, t. ii, p. 218.

**THE SENSORY SYMPTOMATOLOGY AND SYNDROME OF THE
FACIAL NERVE: OTALGIA, HERPETIC INFLAMMATIONS
OF THE GENICULATE GANGLION, REFLEX FACIAL
SPASMS.¹**

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A REVIEW of the sensory symptomatology of the facial nerve, with special reference to the following contributions by the author: “On Herpetic Inflammations of the Geniculate Ganglion; a New Syndrome and its Complications,” *Journal of Nervous and Mental Diseases*, February, 1907. “A Further Contribution to the Herpetic Inflammations of the Geniculate Ganglion,” *American Journal of American Sciences*, August, 1908. “Otalgia Considered as an Affection of the Seventh Cranial Nerve,” *Archives of Otology*, July, 1908. “The Sensory System of the Facial Nerve and its Symptomatology,” *Journal of Nervous and Mental Diseases*, June, 1909, by J. Ramsay Hunt, M.D., of New York.

The author reviews his contributions to the sensory symptomatology of the facial nerve. The facial nerve has been regarded as a mixed nerve by anatomists and embryologists for a decade or more, and as having a sensory root and ganglion similar in structure and function to the sensory ganglia of the spinal nerves and those of the mixed cranial nerves. This ganglion is called the geniculate ganglion, or the *intumescencia ganglioformis*, situated in the depths of the internal auditory canal at the entrance to the aqueduct of Fallopius, at which point the trunk of the facial nerve makes a sharp bend. The sensory root of this ganglion is the *pars intermedia* of Wrisberg, which lies between the facial proper and the auditory nerve. The nerve of Wrisberg enters the substance of the medulla between the roots of the seventh and eighth nerves and passes to the fasciculus solitarius, having the same mode of termination as the sensory roots of the glossopharyngeal and the vagus nerves. On the distal side of the geniculate ganglion, sensory fibres pass into the *great superficial petrosal nerve* to

¹ *Journ. of Nerv. and Mental Dis.*, vol. xxxvi, No. 6, 1909, etc.