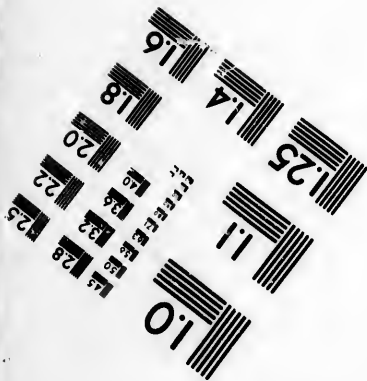
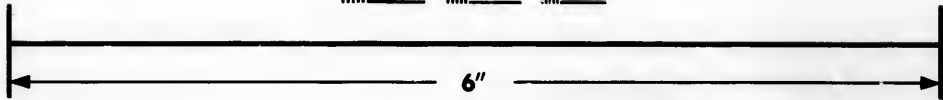
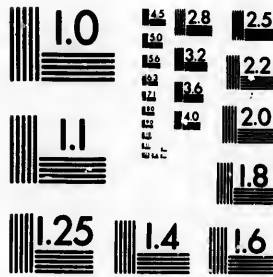


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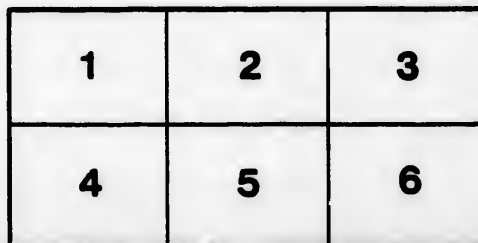
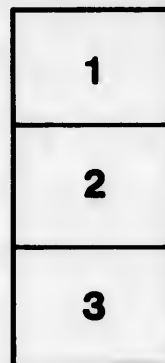
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Birkett, H. S.

(Reprinted from the MONTREAL MEDICAL JOURNAL, March, 1891.)

HEMIATROPHIA LINGUÆ OF EXTRA-CRANIAL ORIGIN.

By H. S. BIRKETT, M.D.,

Assistant Demonstrator of Anatomy, McGill University; Laryngologist to the Montreal Dispensary.

(Read before the Canadian Medical Association, at Toronto, September 11th, 1890.)

This case concerns a young man, W. C. B., aged 23 years, a bank clerk, who, in November 1889, consulted me in reference to a sensation of phlegm dropping from the back of the throat, or, as he called it, "catarrh," from which he had suffered for about one year.

Proceeding to examine the case, I was at once struck, when the patient opened his mouth, with the position of the tongue. It lay on the floor of the mouth, its tip pointing to the left and beyond the mesial line, and not in its normal position, as Gowers holds it to be when the hypoglossal nerve of one side is paralyzed,* (*vide* accompanying drawing, Fig. 1); the right half is observed to be more bulky and stands more prominently in front of the opposite half, which is much retracted and hidden by the bulkiness of the other side, due to the retraction of the genio-hyoglossus muscle of the left side.

Upon the patient protruding his tongue the exactly opposite conditions are to be noticed. (Fig. 2.) The tip deviates at once to the right side and turns beyond the middle line to the right. The right half is noticed to be much smaller: its surface

* Gowers: "Diseases of the Nervous System," 1888. Vol. ii, p. 275.

showing numerous rugæ or folds: its colour quite yellow, whilst that of the left side is almost purple: to the touch, the right half is quite soft and flabby. The special sense of taste (differentiat-



FIG. 1.

† This sketch was made by R. Harris, R.C.A., and is a very accurate representation. I have had the cavity of the mouth also photographed, but owing to the difficulty of illuminating the cavity the details do not come out so distinctly.

ing between sweet and sour, heat and cold) at the posterior third and anterior two-thirds of the tongue and that of ordinary tactile



FIG. 2.

[From a photograph by Wm. Notman & Son, Montreal]

sense are quite intact. No fibrillary twitching present. The electrical reaction of the muscles of the tongue was kindly tested by Dr. James Stewart, who found that the reaction of degeneration was present in the right half whilst that of the left was normal.

Directing the patient to phonate "ah" causes the soft palate to deviate to the left in its upward movement. (Fig. 1.)

In the next step of the examination it was ascertained that there was no response to titillating the mucous membrane of the fauces; the soft palate remaining quite passive: even touching the posterior wall of the pharynx caused no reflex movement, and it was an extremely easy matter, with the rhinoscopic mirror *in situ*, to pass a suitably curved probe into the naso-pharynx and touch the mucous membrane covering the roof, posterior and lateral walls of the pharynx, and the Eustachian tubes, without the velum palati being elevated or without the patient having any knowledge of the presence of the probe. Sensation, however, about the posterior extremities of the inferior and middle turbinated bones is intact. Sensation of the lips and buccal mucous membrane is also intact.

Proceeding to the laryngoscopic examination, the image showed that, during quiet respiration, the right vocal cord holds a position midway between that of extreme abduction and adduction, or in the so-called "cadaveric position." Upon the phonation of "ah" or "eh" the left vocal cord swings promptly across the median line to meet its fellow of the opposite side, this latter one at the same time making an imperfect movement of adduction. The effect of these movements is to give the larynx the appearance of being tilted somewhat to the right. Upon deep inspiration the left vocal cord abducts to its full extent, and the right makes but a small excursion in that direction.

The position of the epiglottis is that of midway between the vertical and horizontal, and upon phonating "ah" or "eh" there is an attempt at elevation on the left side. Upon testing the sensibility of the mucous membrane in these regions, I found it diminished all over as far as the level of the epiglottis, but beyond this point the laryngeal probe could not be passed without

the patient saying that he did not feel it. In appearance the mucous membrane of the larynx is normal, that of the nasopharyngeal space is slightly atrophic, the secretion being dried here and there into small scales.

The pulse at the wrist I found to be 96. Physical examination of the chest was negative in its result.

Upon questioning the patient the following history was obtained:—He had always enjoyed good health until nine years ago, when he was attacked with mumps, and whilst convalescing “caught cold” in the right side of the neck, which resulted in a large and painful swelling making its appearance on the right side just posteriorly to the angle of the lower jaw. About two weeks later the patient noticed that he had some difficulty in speaking and making himself understood, this being especially noticeable in words containing the letter “r.” There was no difficulty in eating or swallowing, nor did the food regurgitate through the nostrils. With the onset of this difficulty in speaking the patient noticed that when the tongue was protruded it deviated to the right side. About five years later he noticed that when washing the right side of the neck, if he used any undue pressure over the original site of the swelling it led to the right half of his face becoming flushed and moistened with perspiration, and further, that there was an extreme sense of dryness in the throat, which was of such a degree as to not allow him to speak, this condition lasting for nearly three minutes.

The examination of the eyes was kindly undertaken by Dr. Buller, who reports as follows:—The pupil of the right eye is found to be smaller than that of the left, the measurements being: R, 2.5 mm.; L, 4 mm.; both symmetrical in shape; each reacts to light and with accommodation; muscular movements normal. A narrowing of the right palpebral fissure is marked. Under atropine the vision, R, = $\frac{5}{6}$ with -1.00 D sph. L, = $\frac{5}{6}$ with -0.25 D sph. Fundi normal.

Upon examining the region where the swelling made its appearance there is found a firm, smooth, immovable infiltration situated close to the anterior border of the right sterno-mastoid muscle, at the level of a line drawn backwards from the angle

of the lower jaw ; it extends upwards and downwards from this point for one-quarter of an inch. The skin is freely movable over it. There is a small, irregular superficial cicatrix to be seen in this region, the result, the patient says, " of having had caustics applied to the swelling." Firm pressure upon this infiltrated and thickened area at once produces a redness of the right half of the face and right ear, also a marked degree of right-sided hyperidrosis ; concomitantly with these symptoms a dryness of the throat is produced, and to such a degree as to prevent the patient from speaking for a few minutes.

Atrophy of one half of the tongue as a symptom of a central nervous lesion is quite common, but as the effect of one, peripheral in situation, it seems to be rare, and this has led me to search the literature for all recorded cases in which the symptoms were of peripheral origin, and although I have been enabled to collect thirteen in which hemiatrophy of the tongue was present, yet none of these is exactly parallel to the one now under consideration. Those recorded and their authors are : (1) Paget¹ ; (2) Morison² ; (3) Fairlie Clark³ ; (4) Habershon³ ; (5) Fagge³ ; (6) Hutchinson⁴, this author at the same time mentions two others which came under his notice⁴ ; (9) Romberg⁵ ; (10) Erb⁶ ; (11) Ballard⁷ ; (12) Barlow⁸ ; (13) Trevelyan⁹. The lesion in the present case is certainly peripheral, the nature of which is doubtless the result of inflammatory changes set up either in or about (probably both) a cervical gland situated at a point just behind the angle of the lower jaw of the right side.

From the symptoms which the patient presents, the lesion has involved the hypoglossal and vagus nerves with its accessory branch, the pharyngeal plexus, and the superior ganglion of the cervical sympathetic—all of the right side, and which, from their

¹ Trans. Clinical Soc., Vol. ii, p. 238.

² Brit. Med. Jour., 1888, p. 75.

³ Lancet, 1871, p. 815.

⁴ Med. Times and Gazette, Vol. i, 1880, p. 57.

⁵ " Diseases of the Nervous System," Vol. ii, 1853, p. 302.

⁶ Deutsch. Arch. f. Klinische Medicin., Bd. xxxvii, s. 265.

⁷ Med. Times and Gazette, Vol. i, 1869, p. 296.

⁸ Lancet, 1889, p. 886.

⁹ Brain : Spring number, 1890.

anatomical situation, could be involved in a swelling situated where that in the present case is. The symptoms in this case are most striking and extremely interesting, and we may, with advantage, briefly consider each one.

1. *Hemiatrophy*.—Wasting of the muscles of one side of the tongue, tactile and the special sense of taste being intact, all point to support the view held at the present day that the function of the twelfth nerve is purely motor; the function of tactile sense being supplied by a small branch derived from the plexus ganglioformis vagi.

2. *Paralysis of the right half of the soft palate*.—This is due, of course, to the want of action of the levator palati and azygos uvulæ. The nerve supply of these muscles is, even at the present day, *sub judice*, and it is very generally taught at present that the nerve supply to these muscles is from the facial, through the large superficial petrosal nerve, and our clinical teaching is, that in every case of central facial paralysis we ought to look for paralysis of the soft palate, thus regarding the seventh nerve as supplying a motor function to the levator palati and azygos uvulæ muscles; but upon this point we have the valuable opinion of Hughlings Jackson, who says that “it is generally held by physicians that in paralysis of the facial nerve from lesion to its trunk before the giving off of the branch to Meckel’s ganglion (the large superficial petrosal) there is some paralysis of the palate; but I have never seen a case of this kind of paralysis from any cause in which the palate was paralysed. In cases even of paralysis of this nerve from disease in the pons Varolii, in which, of course, the injury must have been above the origin of the branch to Meckel’s ganglion, the palate seemed to be quite normal. Instances of slight deviation of the uvula are frequently met with in the out-patients’ room, and in patients who have no facial paralysis; but real paralysis of the palate is decidedly a rare thing. If we exclude diphtheria, it is very rare indeed.”¹ In support of this, I think the case now under consideration lends some weight, for very careful examination of the muscles supplied by the seventh nerve reveals that

¹ London Hospital Reports and Clinical Lectures, 1864.

there is positively no evidence of any of them being in the least implicated. Recent experimental investigations by Beevor and Horsley strongly support the view held many years ago by Hughlings Jackson, that the facial nerve plays no part in supplying the elevating muscles of the soft palate with motor power, and to corroborate this statement I quote the opinion of these investigators: "The idea (*i.e.*, that the levator palati and azygos uvulæ muscles are supplied by the facial nerve through the superficial petrosal nerve) upon which so much stress has been laid is entirely hypothetical, as might have been shown at any time by stimulating the facial nerve in the skull and observing the soft palate. We have found that stimulation of the peripheral end of the divided facial nerve in the internal auditory meatus failed to cause, even with the most powerful currents, the slightest movement of the soft palate, although the face was thrown into violent spasm. We find that the levator palati is supplied entirely by the eleventh nerve. When the peripheral end of the cut nerve was stimulated inside the skull, elevation of the soft palate on the same side was invariably seen. The path by which the fibres from this nerve reach the palate is probably through the upper branch of the pharyngeal plexus."¹

Fraenkel remarks that in all the cases of paralysis of the accessorius which have come before his notice the soft palate was always involved.²

3. *Diminished sensation of the mucous membrane of the buccal and naso-pharynx.*—These parts derive their sensory fibres from branches of the vagus, glosso-pharyngeal nerves, and from the upper cervical ganglion, these forming what is known as the pharyngeal plexus. That the glosso-pharyngeal nerve itself is not involved in the lesion in this case is proven by the fact that the special sense of taste at the posterior third of the tongue is quite intact—presuming, of course, that the view now generally accepted by physiologists that the function of the ninth nerve is, besides being sensory and motor, the nerve of special sense of taste to the posterior part of the tongue. (This view

¹ Brit. Med. Jour., 23th Nov., 1889.

² Berlin. Klin. Wochen., No. 8, s. 150, 1888.

is, however, opposed by Gowers, who holds that the trigeminus alone carries on this function to the whole of the tongue.¹) To support the statement that the nerve trunk itself is not involved, we find that the patient has not, and never had, any difficulty in swallowing, and recorded cases of unilateral involvement of the glosso-pharyngeal trunk have all been attended with difficult deglutition.

To support the view that the glosso-pharyngeal nerve is the nerve of taste to the posterior part of the tongue, Pope² has recently published a case of thrombosis of the vertebral artery pressing on the glosso-pharyngeal nerve and producing unilateral loss of taste at the back of the tongue.

Reference to the accompanying diagram (Fig 8) will show that it is quite possible for a lesion, situated as it is in this case, to press only on the branches of the pharyngeal plexus without involving the trunk of the glosso-pharyngeal nerve and at the same time give rise to the symptoms here present.

4. *Paresis of abduction and adduction of the vocal cord* on the same side as the lesion, with diminished sensation in the lower part of the pharynx; and a somewhat quickened pulse (96-98) suggest the implication of the vagus above the superior laryngeal nerve.

5. The most interesting group of symptoms which we now come to consider embraces (1) *myosis of the right pupil*; (2) pressure over the site of the inflammatory swelling produces (a) *flushing of the right side of the face*; (b) *hyperidrosis of the same side*; (c) *dryness of the throat*.

Such a group of symptoms is, as we know from the experiments of Bernard, produced by the unilateral section of the cervical sympathetic. The oculo-pupillary symptom is in this case permanent, indicating the implication of the function of the sympathetic as to induce a paralysis of the dilator fibres of the iris, leaving thus the action of the third nerve unopposed; but the flushing and hyperidrosis of the same side of the face, and the dryness of the throat, are in this case only transitory, being

¹ Gowers: "Diseases of the Nervous System," Vol. ii, p. 209.

² Brit. Med. Jour., 23rd, Nov., 1889.

brought about by pressure applied to the site of the inflammatory swelling, inducing, I would suggest, (1) a vaso-motor paresis, thus giving rise to the first-named symptom, (2) stimulation of the proper secretory fibres of the sympathetic, calling forth an hyperidrosis, and the pressure, if still continued, involving the salivary secretory fibres of the sympathetic to a degree equal to



Fig. 3—Quain's Anatomy, p. 591.

1, Facial nerve; 2, glosso-pharyngeal with petrous ganglion represented; 2', connection of the digastric branch of the glosso-pharyngeal nerve; 3, pneumo-gastric with both its ganglion represented, 4, spinal accessory; 5, hypoglossal; 6, superior cervical ganglion of the sympathetic; loop of union between the two first cervical nerves; 8, carotid branch of the sympathetic; 9, nerve of Jacobson (tympanic) given off from the petrous ganglion; 10, its filaments to the sympathetic; 11, twig to the Eustachian tube; 12, twig to the fenestra ovalis; 13, twig to the fenestra rotunda; 14, twig of union with the small superficial petrosal; 15, twig of union with the large superficial petrosal; 16, otic ganglion; 17, branch to the jugular fossa giving a filament to the petrous ganglion; 18, union of the spinal accessory with the pneumo-gastric; 19, union of the hypoglossal with the first cervical nerve; 20, union between the sterno-mastoid branch of the spinal accessory and that of the second cervical nerve; 21, pharyngeal plexus; 22, superior laryngeal nerve; 23, external laryngeal; 24, middle cervical ganglion of the sympathetic.

paralysis, for it is found that the saliva is diminished in amount in man in cases of paralysis of the sympathetic nerve.¹

In lesions of the cervical sympathetic, oculo-pupillary symptoms are more frequently observed than vaso-motor, and this is explained by Eulenberg and Guttman by the view that the oculo-pupillary fibres are more superficial in the ganglia than the vaso-motor,² and may not the conditions here present in this case support this view, for it is found that the myosis is persistent, due, doubtless, to the effect of constant pressure by the inflammatory thickening; but the symptoms of flushing, hyperidrosis, and dryness of the throat are only temporary, and induced when greater and deeper pressure is made over the site of the swelling.

Raymond,³ in a recent article, divides the cases of local sweating into the following groups:—

1st, Those in which there is an alteration in the cerebro-spinal system.

2nd, Those in which the cervical sympathetic or the first thoracic ganglion is affected.

3rd, Those in which the nerves of the face are affected.

4th, Those in which the sweating is reflex.

Thus there are two classes of cases characterized by increased sweating—those in which there are, and those in which there are not, vaso-motor disturbances. The lesion in the former is in the sympathetic of the neck. That the pupil is sometimes contracted and sometimes dilated depends upon the fact that the pupillary and vaso-motor nerves are probably distinct, and one set may be stimulated whilst the other is paralyzed. The author then gives an account of the various chronic inflammatory changes that have been found in the superior cervical ganglion, and concludes that these irritate the sweat secreting nerves. Lastly, he points out that the pupillary changes are permanent whilst the sweat ones are transitory, and in this respect the case now under consideration bears this out, for, as previously noted, the myosis is permanent and the lateral hyperidrosis is only pro-

¹ Landois and Stirling: A Text-book of Human Physiology, third edition, p. 215.

² E. Long Fox, "The Influence of the Sympathetic in Disease," 1885.

³ Arch. de Neurol., Jan. 1888. Vide review by White. Brain, Vol. xi p. 143.

duced by pressure (irritation) upon the inflammatory thickening. Takacs¹ also arrives at the conclusion that sweating is not dependent upon vaso-constriction, but upon special nerve action.

Referring one moment to the ocular symptoms, it is found that the patient is myopic to the extent of 1.00 D, R. eye, and 0.25 D, L. eye, under atropine; and I find a rather remarkable statement in this association, made by E. Long Fox, to the effect that "myopia, the necessary consequence of persistent paralytic myosis, is caused by the presumed direct influence of the sympathetic on the muscles of accommodation"²; but I regard the occurrence of the myopia in this case as being merely a coincidence. In a case I recently examined there is persistent myosis, which has been "so long as could be remembered," due to pressure on the sympathetic by enlarged glands, and the refraction proves the existence of hypermetropia (0.5 D).

In conclusion, I would draw the following deductions from this case:

1. That the hypoglossal is the motor and trophic nerve of the tongue.
2. That the glosso-pharyngeal nerve is concerned in the function of taste.
3. That the branches of the pharyngeal plexus supply the mucous membrane of the naso- and buccal pharynx with sensation.
4. That the motor nerve of the levator palati and azygos uvulæ muscles is probably the accessorius.
5. That the superior ganglion of the cervical sympathetic contains (a) dilator nerve fibres to the iris of the same side; (b) vaso-motor; (c) sweat; (d) secretory nerve fibres to the mucous glands of the pharynx.

¹ Centralblatt f. Nerv. hkd., 1881 and 3.

² "Influence of the Sympathetic in Disease," 1885.

