THE TREATMENT OF INTRACTABLE HAY FEVER AND PAROXYSMAL CORYZA BY RESECTION OF THE NASAL NERVE.

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FOR those cases of hay fever which may be termed "desperate," where all treatment has proved unavailing, where the patient is condemned to an annual period of miserable discomfort and of complete incapacitation, where, it may be, Ossa is heaped on Pelion by the supervention of chronic asthma or other sequelæ, almost any new plan of treatment that is legitimate is, I think, worthy of trial, provided that there are reasonable grounds for supposing the treatment to be capable of giving relief and assuming that the usual recognised therapeutic measures have been fairly weighed in the balances and found wanting. I propose, in the present communication, to describe a new method of treatment which appears to be applicable for these severe and intractable cases and which, up to the present, has given most satisfactory and encouraging results.

The method is based on the theory that the stimulus which induces the reflex manifestations that are observed in hay fever and in paroxysmal coryza¹ is conveyed to the centres by the nasal nerve (nasal branch of the fifth), this nerve therefore being the afferent path of the reflex. If this theory be correct the prevention of the attacks, which characterise hay fever and its congeners, by resecting a portion of the nerve on each side would apparently be possible. The evidence which can be adduced in favour of the theory may therefore be briefly examined. In this connexion there is to be considered, in the first place, the evidence suggested by a consideration of the distribution and the functions of the nasal nerve; in the second place, that suggested by the effects of a particular form of treatment (cauterisation of the nasal mucous membrane); and in the third place that suggested by the effects of bilateral resection of the nerve.

The distribution and functions of the nerve.—Many of the so-called "reflex nasal neuroses" represent an exaggeration or a tendency to precipitation of the normal nasal reflexes. In this category may, for instance, be included the neurosis known as *paroxysmal sneezing*, also that which is designated *paroxysmal rhinorrhœa* where the predominant symptom is reflex hypersecretion from the nasal mucous membrane. It seems not unreasonable to suppose that morbid or exaggerated reflexes of this character usually, although, of course, not invariably, follow the same afferent and efferent paths as the normal reflexes which they represent. Of the *afferent* paths, with which we are at present mainly concerned, for the normal reflexes of sneezing, of vaso-motor turgescence, and of nasal secretion only that for sneezing has, so far as I am aware, been exactly determined. The observations of Wertheimer and Surmont² appear to show that the stimulus for the ordinary sneezing reflex is conveyed by the nasal nerve and it may be conjectured that the stimulus which induces the manifestations of *paroxysmal sneezing* travels up the same nerve. The sneezing which sometimes occurs when a beam of bright light falls on the eye is generally considered to be also referable to this nerve, the impulse travelling from the eye *viâ* the ciliary branches. The afferent impulse for the other reflexes, vaso-motor and secretory, which have been mentioned, is usually stated, in rhinological works, to be conveyed by the "nerves of ordinary sensation," without reference to any special nerve being concerned. The nasal branch of the fifth is, of course, not the only sensory nerve of the nasal cavity as there are filaments, principally derived from the sphenopalatine ganglion, distributed to the posterior parts of the cavity. I believe, however, on theoretical grounds, that the nasal nerve conveys the impulse not only for the sneezing reflex but also for the other normal reflexes referred to. Moreover, I think it is this nerve which is also responsible for the convection of the abnormal reflexes which are represented in

the condition known as paroxysmal coryza and in hay fever, this conclusion being based on a surer foundation than the foregoing—namely, on the effects observed after division of the nerve.

In the clinical manifestations of hay fever we have, I think, a strong suggestion of the part played by the nasal nerve in relation to this malady; for if the clinical manifestations be considered in relation to the distribution of the nerve, it will be found that they closely correspond in localisation to the areas to which the latter is distributed, and, moreover, that the symptoms would be explicable on the assumption that they represent the reflex effects of irritation of the nerve. It will be recollected that the nasal nerve not only supplies the anterior region of the nasal cavity, but also sends branches to the conjunctiva, the lacrymal sac, the iris, ciliary muscle and cornea, the frontal sinus, the skin of the alæ and the tip of the nose, and the skin of the upper and lower eyelids. Let us take now the characteristic symptoms of hay fever. The initial symptom is usually a sensation of itching at the inner canthus. Following upon this is a feeling of irritation in the nose succeeded by sneezing, nasal obstruction, and hypersecretion. The patient may complain of frontal headache or of a sensation of constriction above the eyes. The eye-symptoms consist generally of congestion of the conjunctiva, lacrymation, and redness and swelling of the lids, and a certain degree of photophobia often supervenes. Usually also there is some redness of the skin at the tip and sides of the nose. The following table gives the symptoms of hay fever, together with the distribution of the nasal nerve:—

Branches of the nasal nerve.	Distribution of the branches.	Symptoms characteristic of hay fever (assumed to represent the reflex effects of irritation of the branches of the nasal nerve).
Internal branch.	Anterior part of septum.	Sneezing. Hypersecretion. Nasal obstruction. Relieved or cured by application of galvano-cautery to anterior parts of nasal cavity.
External branch.	Anterior part of external wall of nasal cavity.	
Infratrochlear branch.	Caruncula lacrymalis. Conjunctiva. Lacrymal sac. Integument of eyelids.	Itching at inner canthus. Congestion of conjunctiva. Lacrymation. Redness and swelling of eyelids.
Branch to frontal sinus.	Mucous membrane of frontal sinus.	Frontal headache.
Anterior branch.	Alæ and tip of nose.	Redness of alæ and tip of nose.
Long ciliary nerves. Branch to ciliary ganglion.	Ciliary muscle, iris, and cornea.	Photophobia.

The effects of cauterising the nasal mucous membrane.—The fact that in many instances benefit may be obtained as regards the hay fever attacks and the paroxysms of vaso-motor rhinitis by the application of cocaine during the attacks, or of the galvano-cautery between the attacks, to special areas in the anterior region of the nose, has been recognised for a considerable time, but the manner in which the beneficial effects are brought about not being evident, the treatment has commonly been regarded as empirical. Nevertheless, the fact that this relief is afforded by cauterising the nasal mucous membrane in the region supplied by the nasal nerve appears to me to be corroborative of the suggestion that the terminal filaments of this nerve represent the starting-point of the reflex disturbances and that the partial or total failure of the latter to be induced, in those cases in which the mucous membrane has been cauterised, is referable to the irritability of the terminal filaments having been diminished or abolished.

The effect of bilateral resection of the nasal nerve.—The strongest evidence in favour of the theory, if *ex post facto* proof may here be considered, is supplied by the effects which have been observed to follow bilateral resection of the nerve. In various forms of vaso-motor rhinitis in which this operation has been performed by me, the symptoms have been completely and, up to the present, lastingly abolished. It may be mentioned that in the first case in which the operation was performed the nerve, to begin with, was divided on the right side only. As a result of this procedure the symptoms—intermittent nasal obstruction with

¹ Paroxysmal coryza (variously termed "vasomotor coryza," "vasomotor rhinitis," "paroxysmal sneezing," &c.), is a pathological process which is essentially identical with hay fever, differing only in the nature of the exciting cause and the degree of severity.

² Wertheimer and Surmont: *Les Voies Centripètes du Réflexe de l'Éternuement*, Comptes Rendus de la Société de Biologie, 1888, p. 62.

profuse hypersecretion—were abolished in the nasal cavity corresponding to that on which the nerve had been divided, whereas the disturbances continued to recur periodically in the opposite nasal cavity, as before the operation. The sensation experienced when these attacks occurred was described by the patient as a "feeling of the nose being divided in half," one side being clear and the other obstructed. The asthmatic attacks from which the patient suffered also continued to recur at intervals. After section of the nerve on the left side the nasal symptoms entirely disappeared and the attacks of asthma ceased.

The considerations which, in the first instance, suggested that resection of the nerve might be performed with a successful result in severe cases of hay fever and paroxysmal coryza in which other methods had failed, were of course those relating to the functions and distribution of the nerve, &c., which I have already detailed. The following notes of the first case, which was operated upon, will serve to indicate the nature of the procedure and the description of case for which I have felt justified in recommending it:—

The patient, a male, aged 45 years, was first seen in 1907. He complained of asthma and intermittent attacks of nasal obstruction, sneezing and nasal discharge; also, in the summer, of severe attacks of hay fever. He had suffered from hay fever for about 15 years and had had asthma for about the same length of time. The hay fever generally began about the last week in May and continued for about six weeks. During this period he suffered great distress and was quite incapacitated for business. He frequently "wished he was dead." The asthma had gradually become more and more troublesome and he now experienced a bad attack every few weeks with frequent minor attacks in the intervals. In consequence of these he rarely enjoyed a proper night's rest and was often prevented from attending to his occupation. The patient had had treatment from a rhinologist for the hay fever and asthma by galvano-cautery, &c., without benefit to either condition; other methods of treatment had also been tried but no measures whatever had apparently been of any real value. There was a history of rheumatic fever in youth and of expectoration of blood. At the time of examination there was some emphysema, together with cardiac dilatation.

Operation.—Resection of the nasal nerve on the right side was first performed, chloroform anæsthesia being employed. The nerve was reached by an incision at the inner edge of the orbit, commencing just above the inner canthus and extending upwards and slightly outwards for about two-thirds of an inch. The cellular tissue having been cleared from the inner upper wall of the orbit by means of a blunt dissector and the nerve located at the anterior ethmoidal foramen, the latter was separated from the artery and divided close to the foramen, about a quarter of an inch of the nerve being removed. Horse-hair sutures were inserted and the wound was dressed with gauze and collodion. The stitches were removed on the fourth day. Resection of the nerve on the left side was carried out four weeks later.³

As I had been unable definitely to promise the patient a cure, or indeed any improvement, on account of the dearth of previous observations relating to the effects of resecting the nerve, I was much pleased when, two months after the operation, he called on me with the information that there had been an entire absence of the attacks of paroxysmal coryza and sneezing and a complete cessation of the asthma. He stated also that he had experienced much comfort and benefit from the increased freedom of nasal respiration⁴ and owing to the fact that he was able to insure a good night's rest. He had gained over half a stone in weight since the operation and his appearance indicated a manifest improvement in his general health. The minute scars on the skin were barely discernible even on close inspection. On examining the anterior part of the septum with a probe it appeared somewhat less sensitive than normal, but there was no definite anæsthesia either of this region or of the conjunctiva or the skin.

The effects of the operation in this case were such as to encourage me to perform it in other patients suffering from severe conditions of a similar character. Up to the present the results, as already mentioned, have been of a most

encouraging nature, not only with regard to hay fever and paroxysmal coryza but also with regard to the remaining constituent of the triad, which so often afflicts hay fever patients—viz., asthma. The fact that asthma is frequently associated with the foregoing neuroses and is often relieved by similar therapeutic measures suggests that, at least in some instances, there exists a pathogenetic relationship between the conditions, and the existence of this relationship doubtless explains the relief which has been afforded in my cases.

In conclusion, I desire to point out that the present paper merely constitutes a preliminary communication on the subject, as it would be premature, at any rate as yet, to form any final conclusions as to the permanence of the results obtained by this method of treatment or as to the entire absence of unfavourable effects.⁵ Nevertheless, in view of the intractable nature of the maladies for which the operation is suggested I have thought it worth while to publish my observations in their present form for the consideration of those who may be interested in the subject.

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THE GASTROSCOPE.

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GASTRO-DUODENOSCOPY AND DIAPHANOSCOPY.

THROUGH the kindness of Professor Thorkild Rovsing of Copenhagen, who was recently on a visit here, I was enabled to see his gastroscope for electric illumination of the stomach by transillumination and gastroscopy, of which he demonstrated the use on a patient in the Royal Victoria Infirmary, Newcastle-on-Tyne.

All surgeons must have realised the difficulty in making an exact diagnosis of diseases of the stomach, and these may not be cleared up when the stomach is exposed by operation for thorough examination by ordinary inspection and palpation. Doubt frequently exists as to the pathological conditions that are present—e.g., cases occur where the differential diagnosis between carcinoma and simple inflammatory exudation around an ulcer is not easy—or hæmorrhage from a small mucous erosion may be very difficult to trace to its source; or in cases of multiple ulcers one or more may be overlooked. In such cases Rovsing's gastroscope will be of immense service to supplement other known means of diagnosis.

Rovsing made his first observation on Nov. 7th, 1907. The patient, a woman, aged 50 years, had been ill for three years and was on admission frequently vomiting and in a very wretched and emaciated condition. No tumour could be felt, there was no retention 12 hours after a Bourget test meal, and after a Ewald test meal there was brought up 170 cubic centimetres of lumpy, somewhat slimy stomach contents with free hydrochloric acid 31 and a total acidity of 58. By Roentgen illumination after a pint of bismuth porridge the stomach was found to be much depressed, the small curvature being five centimetres and the greater 11 centimetres below the umbilicus. At the operation the diaphragm was found to be depressed, the edge of the liver reached to the umbilicus, and the stomach was as described. The stomach and six centimetres of duodenum were easily drawn outside of the abdomen; the pylorus admitted the forefinger, and no definite infiltration or thickening of the stomach wall was to be felt. Only on the boundary between the cardiac end of the stomach and the small curvature could a suspicious thickening be palpated. It was impossible to say whether this were only due to a normal fold the stomach wall forms here or to an ulcer. Through a small incision one centimetre long made in the anterior wall of the stomach Rovsing inserted a ureter-cystoscope, to the catheter canal of which he fitted a ball bellows, and making the opening in the stomach air-tight by passing a purse-string suture round the cystoscope he inflated the stomach with air until all the folds of the mucous membrane were smoothed out. As soon as the cystoscope lamp was lighted the whole of the stomach was illuminated like a faintly rose-coloured cupola. All the details in the walls of the stomach could be seen, the muscular fibres, the fine network of veins, &c. A slight

³ In all subsequent cases I have resected the nerve on both sides at the same operation.

⁴ Permanent increased freedom of nasal respiration (apart from the immunity from periodical or seasonal attacks of nasal obstruction) has been noted in several of the cases in which this operation has been done.

⁵ In a recent case, in which there was some myopia, this appeared to be slightly increased after the operation.