Abstracts of British and Foreign Journals.

Report on Visceral Neurology. "TROPHIC NERVES."—In this Report for January (see Vol. I. p. 581) an account was given at some length of the experiments of Steiner upon the effects of section of the cervical vagi on the nutrition of the lungs. Steiner confirmed Traube's view, that the pneumonia that follows this operation is traumatic and not trophic in its nature, and is proximately due to paralysis of the pharynx, larynx, and associated parts. Michaelson has studied the same subject (*Cenblt.* 1879, No. 22, p. 390), separating as far as possible the influence of the superior laryngeal from that of the vagus proper. He concludes that the changes in the lung consequent on section of the vagus proper are immediate; that they affect chiefly the lower and middle lobes; and that they are of the nature of oedema, hyperæmia, and splenization, with hæmorrhage and emphysema. By direct inspection Michaelson observed within a few minutes after section, an elevation of temperature in the lungs to the amount of $\cdot 25$ C.; and redness of the pulmonary tissue, which reached its height in half an hour, and then became complicated with hæmorrhage. On the other hand, the changes that follow section of the two recurrent nerves are chiefly located in the upper parts of the lungs; consist of a catarrhal pneumonia, which generally becomes caseous; and do not make their appearance until the laryngeal paralysis has exerted its injurious influence for a sufficient length of time. Michaelson concludes that the vagus contains vaso-motor fibres for the lungs.

It may be remembered that in the paper referred to above, Steiner attributed the death of the animals experimented on in this way to the inflammation of the lungs. A remarkable amount of attention appears to have been recently devoted in Germany to the subject of vagotomy, and an active controversy has been maintained between several observers on the point just mentioned.

Eichhorst, in a special work (reviewed in the *Centblt.* 1879, No. 10, p. 181), refers the death of the animals (birds) after section of both vagi to cardiac paralysis from fatty degeneration of the myocardium, which he considers a purely trophic lesion. This author therefore concludes that the vagus contains trophic fibres to the heart. Thus the question of the trophic function of the vagus, which seemed to be settled in the negative as regards the lungs, is now reopened on fresh ground, namely, as regards the heart. Zander of Königsberg opposes Eichhorst's view, and states (*Centblt.* 1879, No. 6, p. 99; and No. 7, p. 115) as the result of more than eighty experiments on birds, that the cause of death after vagotomy is starvation, with which fatty degeneration of the heart and cardiac failure are associated as *effects*. The latter point is confirmed by Wassiljew (*Centblt.* 1879, No. 21, p. 382); who, however, in a subsequent contribution (*Ib.*, No. 27, p. 494) states that injury to the cervical vagi in a rabbit produced after the lapse of several months fatty degeneration of the heart. Zander's position is however much more seriously assailed by Eichhorst, who contends in reply (*Centblt.* 1879, No. 10, p. 161) that in animals dying of starvation the change in the muscular tissue of the heart is not true fatty degeneration (such as is found after vagotomy) but a granular dulness—the *trübe Schwellung* of Virchow, which Zander had probably mistaken for the former lesion. Eichhorst maintains, therefore, that, after double vagotomy, birds die not of inanition, but of acute fatty degeneration of the heart, of trophic origin.

A subject which is closely related to the preceding is the localisation of acute disease of the respiratory organs in hemiplegia, to which Rosenbach has drawn attention. (*Centblt.* 1879, No. 16, p. 282.) This author believes as the result of his observations that the paralysed side is much more frequently than the sound side the seat of acute lung-disease. In searching for an explanation of this striking observation, Rosenbach found that both the direct and the reflex irritability of the involuntary muscular tissue of the paralysed side is decidedly lowered. One result of this condition will be that foreign matter (saliva), entering the bronchi of the corresponding side, will not give rise to sufficient expulsive efforts; and that unilateral broncho-pneumonia will be set up. The author withholds any explanation of the occurrence of croupous pneumonia and pleurisy under the same circumstances.

Professor Hagen has contributed to the subject of trophic lesions, the results of experiments upon the effect of section of the trunk,

of the fifth nerve within the skull, on the condition of the mucous membrane of the tympanum (*Archiv f. Experim. Path. und Pharm.* xi., 1 & 2, p. 39). These results are, however, as various and conflicting as the conclusions that have been previously drawn from similar experiments connected with the cornea; so that the question of the effect of lesion of the trigeminus on the nutrition of the parts that it supplies appears to be as far from being settled as before. Gellé had concluded (*Gaz. Méd. de Paris*, 1878, No. 1) from a single experiment on a dog, that the trigeminus contains trophic nerves to the mucosa of the middle ear, inasmuch as a lesion of the medulla oblongata involving the root of the fifth nerve was followed not only by inflammation of the eye and nose, but by suppuration of the corresponding tympanum, the animal having lived about ten days. Professor Hagen repeated this experiment upon thirteen animals, but instead of injuring the medulla, cut the trigeminus on one or both sides without opening the skull. In eleven of the cases not a trace of exudation was present in the tympanum. In the remaining two cases exudation was found after twelve hours and thirty-one hours respectively. In one of them there was also abundant sero-sanguinolent non-purulent fluid within the *opposite* tympanum—an appearance which Hagen (perhaps somewhat hastily) considers a proof that the inflammation was not on either side to be regarded as a trophic lesion. The presence of exudation in the second case he explains as accidental, and due to other causes (!). In one of the “negative” cases, although no “exudation” was present, there was found when the animal was killed, some sixty days after section of the right trigeminus, a perforation of the membrana tympani, which was stopped by a whitish-yellow tallowy mass. When these results are considered, it is somewhat surprising to find that Hagen concludes that the integrity of the tympanum after section of the trigeminus conduces to “completely support the traumatic nature of ‘trigeminus-keratitis.’”

A case of joint-change in consequence of lesion of the nerves of the hand is reported by Bouchut, who considers it “trophic” in origin. A child which had the distal phalanx of the right thumb crushed at the point six years previously, presented, at the age of 7, atrophy of the muscles and bones of the right forearm and hand; pains in the joints of the hand and fingers; and knobby prominences on the distal joints of *both* hands (*Centbl.* 1879, No. 12, p. 224).

THE HEART.—The attempts to discover a “centre” for the heart in the cerebral convolutions, that is, a point or region which could

be proved by faradisation to influence the cardiac rhythm, have not been successful in the hands of Eekhard (*Centbl. f. d. m. W.*, 1878, No. 34, p. 611). In non-curarised animals, faradisation of the cortex cerebri produces, as a rule, no effect upon the beat of the heart, so long as there are no sudden movements of the body. If sudden movements occur, whether from direct irritation of the so-called "motor" centres or from other excitation, then the heart and circulation may be affected. The rule is that no cardiac disturbance can be discovered as long as only single movements of the opposite anterior extremity are induced. If other movements occur, the pulse becomes less frequent and stronger (with weaker beats between), and that through the medium of the vagus. At the same time the blood-pressure rises somewhat, and that independently of the heart. Irritation of the *cornu ammonis* was found to have no influence on the cardiac movements, such as Balogh has described, so long as no muscular movements were induced.

Ludwig (of Pontresina) and Luchsinger publish (*Centbl.* 1879, No. 23, p. 404) the results of their researches on several points connected with the innervation of the heart, and especially with reference to the activity of the intracardiac ganglia. They find that the ganglia are paralysed by high temperatures, while their irritability is again restored on cooling. Just before the onset of paralysis, and again as soon as the impulse is restored, the vagus is irritable to a high degree. The inhibitory elements of the heart are therefore more resistant to heat than the motor elements are. The activity of the vagus falls as the intracardiac pressure rises, for the excitation of the motor elements increases with the pressure. Therewith also rises the frequency of the pulse; and this both as regards the heart as a whole, and portions of the heart artificially separated.

THE VAGUS.—The view of Arloing, Tripier, and Masoin, that the heart is more powerfully affected through the right vagus than it is through the left, that is, that the right vagus essentially contains cardiac fibres (whilst the left vagus essentially contains respiratory fibres), has not been confirmed by Langendorff (*Centbl.* 1879, No. 23, p. 406). The truth appears to be that the results obtained from galvanisation of both nerves are extremely variable.

A case of exceedingly frequent pulse (136–148 per minute, persistently) is recorded by Meixner (*Centbl.* 1879, No. 31, p. 573), in which the left vagus was found *post mortem* to be compressed by an enlarged and cheesy lymphatic gland.

The subject of vagotomy has been discussed above under "*Trophic nerves.*"

VASO-MOTOR CENTRES AND NERVES.—The view that is held by some physiologists that dilatation of the blood-vessels may be brought about by vaso-dilator nerves connected with vaso-dilator centres in the spinal cord, is supported by certain experiments of Dr. Ott of Baltimore (*Journ. of Physiol.* II. i. p. 51). He has determined that in the cat a centre of the vaso-dilator nerves for the skin of the posterior extremities is located between the tenth dorsal and the first lumbar vertebræ.

Jolyet (*Gaz. Méd.* 1878, No. 46) has found by experiments on curarised dogs that faradisation of the trunk of the superior maxillary branch of the fifth nerve of one side in the pharyngo-maxillary fossa, causes active hyperæmia, with elevation of temperature of the mucosa of the nasal fossæ and of the gums; of the mucosa and skin of the upper and lower lip; and of the skin of the ala of the nose of the same side. These effects are not produced if the vago-sympathetic trunk of the same side have been previously cut. Further, section of the superior maxillary is followed by slight hyperæmia of the above-mentioned parts, which is reduced by irritation of the peripheral end of the divided nerve. According to Jolyet, these results indicate that the vasor dilatation in the parts is due to reflex paralysis, through the trigeminus, of vaso-motor nerves contained in the sympathetic. This view is supported by the fact that faradisation of the superior maxillary of one side (with, as well as without, section of the corresponding sympathetic in the neck) also produces similar hyperæmia of the skin and mucosa of the opposite side, though to a less degree.

Vaso-motor fibres to the lungs are referred to under the head of "*Trophic nerves.*"

RESPIRATION.—The histological characters of the nerves of the lung in the frog and calf have been investigated by Egorow, working under Chrzonoszczewsky. In the frog, the great bulk of the nerve fibres entering the lungs are non-medullated. The trunks of these are provided with abundant ganglia, the cells of which mostly present the well-known "spiral fibres" of Beale. The medullated fibres enter the muscles of the alveolar septa; lose their medullary sheath; and, forming a network, end in the muscular fibres. The non-medullated fibres breaking up into fine and finer networks; end in the sub-epithelial muscular layers of the alveoli; and extend into the pleura. The vessels are supplied by the non-medullated fibres (*Centblt.* 1879, No. 18, p. 305).

Langendorff appears to have succeeded beyond other observers in obtaining experimental evidence of the existence of "expiratory," or "inhibitory" or "slowing" fibres to the respiratory centre, in the trunk of the vagus (*Centbl.* 1879, No. 21, p. 375). While Rosenthal and others found that a strong current applied to the central ends of the divided vagi causes acceleration of respiration, with finally tetanus of the diaphragm (extreme inspiration), and only occasionally slowing of respiration and arrest in expiration, Langendorff observed expiratory almost as often as inspiratory standstill. Mechanical and thermic stimuli in the same way caused respiratory slowing; which was even more pronounced by chemical irritation. No support was found for the view that inspiratory and expiratory fibres run chiefly in the one and in the other vagus respectively; nor for the view that the left vagus contains chiefly respiratory fibres (and the right vagus chiefly cardiac fibres). Langendorff also concludes that the respiratory centre is double, from the fact that acceleration of respiration may be induced by stimulation of one vagus after exhaustion of the other vagus by protracted stimulation. Finally, this observer believes from his experiments that the slowing and accelerating influence on the respiration of irritation of the vagus is not peculiar to this nerve; but that many, and probably all sensory nerves possess this property, slight excitation accelerating the breathing, and powerful excitation slowing it.

PERSPIRATORY CENTRES.—Dr. Ott in his investigations upon the physiology of the spinal cord (*Journ. of Physiol.* II. i., p. 51) endeavoured to localise the "perspiratory centre" of the hind foot (in the kitten); and confirms the view of Luchsinger that it is situated in the lower dorsal part of the spinal cord, whence the nerves pass to the limbs through the abdominal sympathetic and sciatic trunks. The sweat-nerves of the anterior extremity appear to emerge from the cord in the fourth dorsal nerve, and to pass through the stellate (or first thoracic) ganglion to the brachial plexus. Thus in both extremities the secretory nerves appear to follow closely the course of the vaso motor fibres. Sweat-centres, like vaso-motor centres, are also situated throughout the cord and medulla oblongata; for irritation of the latter causes abundant perspiration in all the extremities. An inhibitory sweat mechanism also appears to exist, and to be partly peripheral (multipolar nerve-cells in the glands,) and partly central—the fibres to the lower limbs running in the sciatic and abdominal sympathetic from the cord, and perhaps from the medulla.

Dr. Ott also found that the stimulant effect of asphyxia, i.e. of excess of carbonic acid in the blood, upon the sweat-glands, is exerted through the centres in the cord. The same applies to the stimulant effect of heat upon the perspiratory glands, which is not direct but central. On the other hand, pilocarpin appears to excite perspiration through a peripheral mechanism; and muscarin by direct stimulation of the secreting cells.

With respect to the *path* of the perspiratory fibres in the spinal cord between the lower extremity of the dorsal region and the medulla oblongata in the cat, Ott confirms the results of previous observers in the rabbit; namely, that the secretory fibres connecting the sweat-centres with each other run in the lateral columns, at least in the dorsal portion of the cord, about the sixth and seventh vertebræ. The sweat-fibres appear not to decussate in the case of the cat.

INNERVATION OF THE PELVIC VISCERA.—Dr. Ott (*loc. cit.*) determined several points of interest with respect to the rhythmical contraction of the sphincter ani under nervous excitation, and discovered a similar rhythmical contraction of the sphincter vaginae. The ano-spinal and vagino-spinal centres were determined to lie together between the sixth and seventh lumbar vertebræ. He made the further observation that irritation of the vaginal or rectal mucosa may induce rhythmical adduction and extension of the voluntary muscles of the posterior extremity of one side. The vesico-spinal centre is placed by Dr. Ott (as by Kupressow) between the fifth and sixth lumbar vertebræ (cat and rabbit). The *thalami optici* were proved to contain in part at least the centres of the inhibitory apparatus presiding over the ano-spinal and vagino-spinal centres, and restraining their rhythmical action.

LIVER AND PANCREAS.—In Zander's experiments upon the effects of section of the vagi, described above, the observation was made that the liver continued to secrete abundance of bile, and that the pancreas was most probably also active. Glycogen and sugar disappeared very soon after the operation. It must not be forgotten, in estimating the significance of these results, that the animals (birds) were dying of inanition from complete paralysis of the oesophagus.

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Locomotor Ataxy, and its Connection with Injuries. (*Revue Mensuelle de Médecine et de Chirurgie*, No. 3, 1879.)—Dr. L. H. Petit endeavours in this paper to throw light on the in-