

## PART II.

### DISEASES OF THE CRANIAL NERVES.

IF we once have a clear idea that in the cranial nerves we have to distinguish the origin, which in all probability is found in the cortex and the nuclear region of the medulla oblongata, from the partly central (intracerebral), partly peripheral (extracerebral) course, it is self-evident that the diseases of the cranial nerves are divisible into those which affect the nerve at its origin, the center, and those which affect it in its course. As we shall come to deal in the next part of our book with the affections of the brain substance proper, it necessarily results that in the following chapters we must either touch upon things which properly belong to Part III, or that in the latter we shall not be able to avoid some repetition. Neither of these courses is without objections; still, from a practical point of view, we have deemed it best to treat of the diseases of the cranial nerves here *in toto*.

The central lesions of the cranial nerves often form merely a part of a more general disease of the nervous system. Those of peripheral origin occur also independently—for instance, as the result of exposure to cold, traumatism, etc. In very many cases we are not able to determine definitely whether the disease has a central or a peripheral origin. For a clear understanding of the following chapters, a knowledge of the anatomy of the parts naturally can not be dispensed with. Some remarks bearing on this, which, of course, are not meant to take the place of a detailed study, have therefore been inserted at the head of each chapter to recall to the reader's mind in outline the necessary anatomical relations.

## CHAPTER I.

### DISEASES OF THE OLFACTORY NERVE.

THE olfactory nerve begins in a small pyramidal lobule, the tuber olfactorium (caruncula mamillaris), the base of which is situated in front of the anterior perforated space. At its beginning, the nerve is broad, but narrows into a band somewhat prismoidal on section, which is called the olfactory tract, and which in its turn ends in an oval gray swelling, the olfactory bulb. From the lower aspect of this bulb, which lies on the cribriform plate of the ethmoid bone, two groups of fibers pass through the little openings of the bone into the nasal cavity, and it is only the sum of these filaments (the fila olfactoria) which can be looked upon as the nerve of smell in the strict sense of the term. The olfactory tract and bulb are parts of a cerebral lobe, the so-called olfactory lobe.

The origin and the course of the roots of the olfactory nerve (the striæ olfactorii, Schwalbe) are not known. It is, however, generally agreed that there are three roots. The outermost, the strongest, is said to be traceable into the island of Reil. Schwalbe supposed the existence of a lateral root (radix lateralis, seu longa, seu externa) originating in the hippocampal convolution, and of a median (radix medialis, seu interna, seu brevis), coming from the gyrus fornicatus. Others have looked upon the anterior commissure and the corpus striatum as the starting points of the olfactory nerve, but nothing positive is known. An olfactory center has been assumed in the gyrus hippocampi and in the gyrus uncinatus. Lately Zuckerkandl (cf. lit.) has claimed that the cornu Ammonis is a part of the olfactory center (cf. also the extensive paper by Troland, De l'appareil nerveux central de l'olfaction, Arch. de Neurol., 1891, lx, p. 335; lxii, p. 183; lxiv, p. 69; lxv, p. 203).

Notwithstanding the fact that the affections of this nerve are not of very great practical importance, they afford a great deal of interest, because they may under certain circumstances (i. e., if a careful clinical description is followed by an exact and accurate post-mortem account) give us some information about the anatomical and physiological questions concerning the course and origin of the nerve, and again because they may attain a considerable importance and value in the diagnosis of certain cerebral diseases.

The olfactory nerve may be diseased in its central or in its peripheral portion. In the former case it may be the olfactory

center which is affected, or the conduction may be interfered with somewhere in the course of the intracerebral paths.

Since, as we have stated, the situation of the olfactory center is not definitely known, we can not be expected to know much about its diseases. It would appear, however, that it may be affected by destructive as well as by irritative lesions; the latter manifest themselves by hallucinations, the former by loss of smell (anosmia). Among the diseases in which hallucinations of smell occur are various psychoses, also migraine, tic douloureux, epilepsy, and tabes. Usually the smell which such patients describe is bad, disgusting—of fæces, sometimes of poisonous plants, putrid substances, etc. (kakosmia)—and it is rare for them to imagine that they smell pleasant substances. One of my cases, who, owing to an ocular paralysis, was treated with the galvanic current passed through his head from one side to the other, declared that he smelled oil of lavender from the moment the current was closed until it was again broken. This seems to point to the possibility that by the galvanic current the olfactory center may be stimulated. Central anosmia is sometimes observed in cerebral lesions following fracture of the skull, which cause hemiplegia and aphasia, the disturbance being confined to the nostril on the same side as the lesion. Anosmia is also known to occur in hysteria and in old age; in the latter case it is probably to be attributed to atrophy (senile anosmia). Cases have been repeatedly noted in which tumors of the anterior fossa of the skull, exostoses, meningitis at the base of the frontal lobe, have given rise to anosmia. The fact that several odors acting on the olfactory nerve at the same time suspend each other is probably to be explained on physiological grounds, as is also the fact that the acuteness of olfactory perception is diminished if at the same time another cranial nerve—e. g., the optic or the auditory—is strongly stimulated.

Interference with conduction in the olfactory nerve may be assumed in cases where there is a history of traumatism—a fall upon the head, more especially upon the occiput. According to Carbonieri, complete loss of smell suggests strongly disease of the olfactory tract or bulb.

The treatment in the central affections of the olfactory nerve must of course be directed against the underlying disease.

Of greater practical interest are the peripheral affections of

the olfactory, which chiefly consist in a decrease of the power of smell. Leaving out of consideration the common cases in which an acute or chronic nasal catarrh causes partial or, temporarily, even complete anosmia, the sense of smell may be affected as the result of abnormal dryness of the nasal cavity (diminution in the secretion of tears in trigeminal anæsthesia, diminished flow of tears into the nasal cavities in facial paralysis). Not rarely certain occupations give rise to anosmia, which is sometimes associated with a tolerance of disagreeable odors which at first were highly obnoxious to the workers. Such anosmias are to be found in soap-boilers, catgut spinners, tanners, skimmers, and butchers, whose sense of smell is often considerably dulled; again it may be due to disturbances in nutrition, to the action of caustic substances, or injury to the peripheral nerve endings—effects which are due to the chemical composition of the inhaled substances. Thus we have observed loss of the sense of smell in those working in chlorinated lime, while it was found to be diminished in laborers occupied with the pulverization of chrome-ironstone. Stricker has also known it to occur in an entomologist in consequence of the protracted inhalation of ether.

I have observed hyperæsthesia of the olfactory nerve in hysterical women especially during pregnancy, and also during galvanization of the brain (v. s.).

The treatment consists in faradization (Beard and Rockwell) and galvanization (Fieber) of the nasal cavity, or painting with a one-per-cent solution of strychnine (in olive oil). The use of irritative snuff powders has repeatedly been recommended for anosmia of peripheral origin, but has frequently been used without benefit. Spontaneous recovery is not rare. Finally, we may say a word or two about the method of testing the sense of smell. All those substances which irritate the trigeminal should be avoided, as, for instance, acetic acid, smelling salts, snuff, tobacco; the patient would feel what he can not smell, and we might be thus led astray in our conclusions. Cologne water, oil of rosemary, musk, camphor, anise, oil of turpentine, asafoetida, and sulphureted hydrogen, are sufficient for most tests. That each nasal cavity must be tested separately goes without saying. A special olfactometer has been devised by Zwaardemaker (*Berl. klin. Wochenschr.*, 1888, No. 47; *Fortschritte der Med.*, 1889, No. 19), and another more recently by Savelieff (*Neurol. Centralblatt*, 1893, No. 10).

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## CHAPTER II.

## DISEASES OF THE OPTIC NERVE.

THE optic nerves derive their fibers from the occipital lobes, the optic thalami, the outer and inner geniculate bodies, the anterior corpora quadrigemina, and the cerebellum (through the superior peduncle of the cerebellum).

What are known as the optic tracts before the chiasm is reached, after this point become the optic nerves. These are round hard cords, about four millimetres in diameter, which, passing in a diverging direction through the optic foramina, enter the orbits and reach the eyeballs after their passage through the orbital fat. Here they pass the sclerotic and choroid and spread themselves over the fibrous layer of the retina.

The outer covering of the nerve, which is a process of the dura mater, is called the dural sheath; the process of the pia, the inner or pial sheath. The two are separated by a space which belongs to the lymphatic system, the so-called intervaginal or subvaginal space. The arteria centralis retinae, a branch of the internal carotid, enters the optic nerve about fifteen or twenty millimetres from the eyeball and runs together with the vein of the same name in

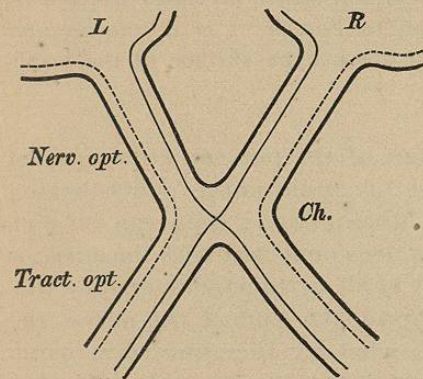


Fig. 2.—DIAGRAM SHOWING THE COURSE OF THE OPTIC FIBRES IN THE CHIASM.

the substance of the nerve to the retina.

The chiasm, which is formed by the union of the optic tracts, is a flattened four-sided body, in which the crossing of the optic fibers takes place. This crossing, as we now know with a fair amount of certainty, is, however, only partial, a semidecussation. The fibers from the outer half of the retina (represented by an interrupted line) pass to the center without decussating, while those of the inner half