facial being less common. Of the nuclear affections of the vagus coming on in the course of this paralysis nothing definite is known.

The duration of the disease varies much. In the "galloping form," in which, owing to the sleeplessness and inability to take sufficient food, the strength rapidly fails, it may require only a few months to bring about a fatal issue. At other times the disease may last two, three, five, or even more years, out of which no small proportion is liable to be spent in an asylum, as it is out of the question to keep the patient at home, in spite of all the care and devotion possible on the part of the family.

Pathological Anatomy.—The questions as to the anatomical nature of the disease have unfortunately not been as yet answered satisfactorily, and there is still a great deal of diversity of opinion among the authorities on this point, although the macroscopical appearances are usually very characteristic, the atrophy of the brain, especially in the anterior regions, being very striking. Although no one can doubt that the convolutions are diminished in size, that the frontal and the parietal lobes weigh less than in a normal brain, yet the precise mode in which this atrophy comes about, what are the microscopical changes in the nerve elements of the cortex, and what is the primary process in all this, are not as yet decided, but remain the subject of much controversy. According to Tuczek, there is a marked primary atrophy of the fine medullated nerve fibres, particularly in the outer layers of the cortex, in the tangential "association" fibres, which run parallel to the surface. The gyrus rectus is said to be relatively the earliest attacked, later, the remaining frontal brain and the island of Reil, then the temporal, but the occipital lobes never. This view, according to which the atrophy is the primary process, is in all probability correct, although it is still combated by some authorities (Mendel), who look upon the death of the nerve fibres as the secondary, upon the increase of the interstitial tissue, the thickening of the vessel walls, and the appearance of spider cells, as the primary process ("encephalitis interstitialis").

Analogous changes in the ganglionic cells have frequently been noted (Binswanger, Mendel, Gudden); a peculiar aggregation of nuclei associated with disease of the vessels, degeneration of the capillaries (Kronthal, Neurol. Centralbl., 1890, 22),

changes in the bodies of the cells in the large pyramids of the paracentral lobule, changes in the nucleoli and nuclei, and sclerosis and atrophy of the cells are not uncommonly found in this connection.

But, besides the cortex, the deeper regions also are the seat of alterations, and the manifold changes which the white matter of the hemispheres may undergo, have been studied among others by Friedmann. He describes four different forms of atrophy of the fibres of the white matter, the number of the fibres diminishing in a manner analogous to that which has been shown by Tuczek to be true for the cortex. The central ganglia of the brain do not remain exempt. Lissauer describes a degeneration extending from behind forward, by which the pulvinar is often only partially implicated, the internal geniculate body sometimes, the external geniculate body never; he is of opinion that this degeneration is present in cases in which well-marked sensory focal symptoms accompany the paralytic attacks, but admits that these changes in the thalamus are by no means constant. Westphal has shown that the pyramidal tracts or the posterior columns of the spinal cord are also often affected, a fact which probably accounts for a not inconsiderable part of the motor disturbances.

The condition of the pia varies. Frequently it is adherent over large areas of the underlying cortex, so that it can not be stripped off without loss of substance ("decortication"). In rare instances, although it is nowhere adherent, in places it is thickened, of greater consistence than normal, and contains variable amounts of fluid in its meshes. Whether the latter condition is only a later stage of the former—that is, whether adhesions only exist at first, but later disappear—is not definitely known.

A case reported by Rey (cf. lit.) shows that exceptionally all the symptoms of progressive paralysis of the insane may be observed during life, and yet at the autopsy no change be found. The same thing, as we have mentioned, has been known to occur in connection with multiple sclerosis.

Diagnosis.—The diagnosis may present some difficulty, inasmuch as in certain forms of chronic alcoholism the egoism may be exaggerated as in general paralysis, and inasmuch as cerebral syphilis, brain tumor, senile dementia, finally, chronic meningitis, especially the diffuse syphilitic basal form (Oppen-

heim), and multiple sclerosis, may more or less resemble general paralysis in their course and their symptoms. In alcoholism the hallucinations are wont to be a prominent feature, the speech disturbances are less marked, and the ideas are worked out in a more connected manner. The tremor and the history in cases of chronic alcoholism will also assist us in our diagnosis. In cerebral syphilis also the history as well as the age of the patient (who is, as a rule, younger than the paralytic) must be taken into consideration. Brain tumors present a similarly progressive course, but the stage of exaltation is absent and the characteristic delusions of grandeur do not occur; in place of them we have stupor and somnolence. Senile dementia, of course, occurs in people of advanced age, and is characterized by a tendency of the process to remain stationary for some time.

In meningitis we have febrile symptoms; the choked disks, which are found comparatively frequently here, and the delirium which occurs early will guard us against errors. In multiple sclerosis, finally, we have the scanning speech and the intention tremor, and when the disease is well developed, it can not be mistaken for general paralysis. In certain forms, however, the differentiation may be impossible. The most important points to be remembered in the diagnosis of general paralysis are, then, the following: The pronounced psychical weakness, which even in the initial stages is the most prominent feature of the disease; the constantly progressive course; the motor as well as the sensory changes, the former of which give rise to more or less marked alterations in the speech, the handwriting, and the walk, the latter to changes in the impressionability to external stimuli and to marked interference with the functions of the nerves of special sense—the cutaneous sensibility, the sense of taste, hearing, and smell. With this in mind we shall make a correct diagnosis at least in a good many cases; to avoid errors completely will be impossible even to the most experienced.

Prognosis.—We need hardly say much about the prognosis. From the above description we can well infer how unfavorable it must be. Almost all cases prove fatal in a few years, and the outlook for complete recovery is worse here than in tabes. To be sure, it has been claimed that such may occur in progressive paralysis (Wendt, Voisin), but, in the instances in which it was observed, the possibility that the case was not

one of dementia paralytica, but rather one of the so-called pseudo-paralyses, such as are known to occur after the abuse of alcohol, can not be excluded with certainty.

Treatment.—In the treatment of the disease we must chiefly endeavor to keep away all excitement from the patient, and, since this is best and most easily accomplished in an asylum, it is the first duty of the physician, after he has once made the diagnosis definitely, to urge the family to transfer the patient to some such institution. Only then is it possible to guard the patient as well as the family against all the accidents and fatalities to which he is otherwise necessarily exposed. This step must be taken as early as possible, not with the idea that the patient will be cured, but with the conviction that only in an institution is he safe, and that there alone it will be possible to secure for him the proper care and nursing so necessary for one in his condition. Where there is a history of syphilis, the treatment with inunctions must of necessity be given a trial, however slight may be the prospect of success. Once decided upon, let the antisyphilitic treatment be pursued with vigor; at least three to four hundred grammes (℥ix–℥xij) of mercurial ointment should be used altogether, to which must be added from two to three grammes (grs. xxx–xlv) of the iodide of potassium daily for a good while. The chloride of gold and sodium, a remedy which years ago was highly esteemed for its antisyphilitic action, has again been brought back from oblivion and used in cases of general paralysis (Boubila, Hadjes, and Cossa, Annal. méd.-psych., 1892, 1, 2); the results are not better than those obtained with any other drug. To meet the outbreaks of exaltation and the insomnia the usual hypnotics, which are, however, of little avail, should be tried. Sulphonal in doses of two or three grammes (grs. xxx–xlv), methylal in doses of from five to eight grammes (grs. lxxv–℥ij), by the mouth (Mairet and Combemale), morphine, from one and a half to three centigrammes (grs. ¼–½) hypodermically, chloral, paraldehyde, possibly also hyoscyamine, should be tried in turn. The cold-water treatment and baths, also galvanism to the brain, are decidedly contraindicated. All such procedures are likely only to increase the excitability of the patient, to give him all kinds of unpleasant sensations, and to make his troubles worse, without being in any way of benefit to him or relieving his condition.

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