mechanical influence a morbid relaxation in the connection of the ossicula is removed, or the fluid in the labyrinth is put under increased pressure. Such an India-rubber disc will act as a vibrating plate, and can transmit a considerable number of vibrations to one of the ossicula. (Politzer.)

This appears to me to be the best explanation. I use the cotton-wool for the necessary pressure on the remaining portion of the membrana tympani, and, at the same time, the India-rubber disc as a vibrating plate.

The improvement I suggest I have found of great service in nearly all cases of perforation. The instrument should not be worn at first for more than an hour at a time, the cotton-wool should be often changed, and the lotions altered occasionally; and, lastly, it is very essential that only a very small quantity of fluid should be applied to the cotton-wool.

ANALYSIS AND PATHOLOGICAL PHYSIOLOGY OF THE TROUBLES OF SPEECH IN THE GENERAL PARALYSIS OF THE INSANE.

By AUGUSTE VOISIN, M.D., Médecin de la Salpêtrière à Paris.

THE troubles of language which are observed in general paralysis are of various orders, and bear different denominations. They are termed stuttering (*ânonnement*); drawing; hesitation; jabbering; stammering; and quavering.

These denominations are too often confounded in the observations of general paralysis, and indifferently employed. The intimate cause of these symptoms does not seem to me to be sufficiently known. I will here speak of the analysis and pathological physiology of the modifications of language. The faculty of language infers soundness (1) of the cortical substance of the anterior lobes of the brain, the seat of the intellect; (2) of the nervous fibres which pass from the cortical substance to the bulb, and which serve as conductors of the will; (3) of the bulb and the intralobular nucleus of nerves animating the muscles which are called into play during speech; (4) of the nerves animating these muscles; (5) of the muscles themselves. The participation of these various organs is indispensable to the regular exercise of speech. It is not enough, indeed, for the movements of these muscles of tongue, pharynx, glottis, and face, to be rightly co-ordinated; it is necessary to have a sound intellect, a knowledge and memory of words; and the voluntary excitement must be easily transmitted to the nerves proceeding from the medulla oblongata. Every restraint on the action of the organs presiding over these functions will disturb speech.

1. Stuttering (*ânonnement*) is the embarrassment of speech produced by a slowness in the presentation and emission of letters, syllables, and words: this delay being occasioned by a disturbance of memory. It is most frequently accompanied with another symptom, the intimate cause of which is the same, and which consists of the omission of words in writing, and of the misplaced insertion of unintelligible signs and hieroglyphs, and indistinct and irrelevant words in the middle of a sentence. In nearly all cases, the patient has very little or no consciousness of the symptoms; this is readily understood, as the lesions by which they are occasioned occupy the part of the brain which is the seat of intellect. The alterations inducing this disturbance of speech are hyperæmia, infiltration with blastema, with exudation, and recent embryoplastic productions, and softening, of the cortical layer of the anterior lobes of the brain. If the stuttering do not exist in the earlier stages in certain cases of paralysis of the insane, it is always to be observed at a later stage, until the patient presents that other sign of the deep alteration of the cortical layer, viz., impossibility of conversing, of expressing thoughts, of pronouncing comprehensible words; finally, muteness. At that moment, the embryoplastic deposits have begun to be transformed into fibrillary tissue, the atrophic consequences of which are known. The circonvolution of the island of Reil, and the three frontal superior convolutions, are the parts the lesions of which, as they are observed in general paralysis, may induce stuttering. As well as the frontal convolutions, the island of Reil is softened on its surface, its substance is infiltrated with a somewhat serous liquid; and microscopical examinations, made when it is recent, show that embryoplastic deposits are blended with the nervous elements, and that endarteritis and embryoplastic bodies exist in the perivascular spaces. I have made a number of fine sections on specimens of the island of Reil, hardened by chromic acid, and my researches have led to the following results.

The vessels presented in their walls, and in the spaces by which they are surrounded, an abundance of embryoplastic nuclei in very close rows. I found vessels that were almost crammed with them, and in

some preparations no vessel was free from them. The nervous substance itself contained a numberless quantity of these nuclei. I found lesions of this kind in various stages. In one case, remarkable from the extent of the alterations, the patient offered several characters similar to those observed in cases of aphasia. When questioned, he almost invariably answered, *ça va mieux; ça fait mal* (I am better; it gives me pain).

Stuttering, drawing, and incomprehensibility of speech, may also be consequent upon lesions situated on the course of the nervous fibres, which pass from the cortical substance of the anterior circonvolutions to the medulla oblongata, through the white cerebral substance, the corpora striata, and the pons Varolii. In the course of these fibres, and in their interior, you meet with an enormous quantity of embryoplastic nuclei, which are especially abundant in the vascular sheaths, in the perivascular spaces, and which thence certainly have invaded the nervous substance; and you meet, also, with masses of hæmatosine, of hæmatine in yellow or colourless crystals, or effusion of blood-corpuscles more or less old. I have found even foci of softening between the anterior ascending fibres of the pons Varolii. You understand, in seeing these preparations, how the cerebral functions, and especially the will, must be disturbed by the presence of these enormous quantities of recent productions among the nervous fibres which act as conductors.

2. Stammering, jabbering, and quavering of speech do not result from any troubles of intelligence and will, but are consequent upon an absence of harmony in the co-ordinate acts performed by the muscles animated by the nerves proceeding from the medulla oblongata; I mean the hypoglossal, facial, spinal, and glossopharyngeal nerves. I will now explain these alterations, which have not as yet been described, within my knowledge at least.

The medulla oblongata, in cases of general paralysis, presents in most parts, not uniformly, but more on one side than on the other, an immense quantity of embryoplastic nuclei, of fusiform bodies, interposed among the nervous fibres, among the nerve-cells of the nuclei of origin of the nerves, among the fibres of these nerves, and among the nerve-cells of the olivary bodies. As in the brain, the multiplication of these new productions is especially abundant in the walls of the vessels, in the perivascular spaces, even along the most delicate vessels. The walls of the vessels are often doubled in thickness, with very firm fibrillary tissue. Vessels altered in this manner are found even among the fibres of the roots of the hypoglossal and facial nerves. The cells of the nuclei of origin of the nerves in the medulla oblongata may themselves be altered and transformed into fat in various stages, and suffer a necrotic change. The proportion of cells thus altered to sound ones may be as one to five. I have met more frequently with lesions in the cells of the nucleus of the facial than in those of the hypoglossal nerve; and when they were to be seen in both, the alteration was more advanced and more extensive in the nucleus of the facial.

Schröder van der Kolk, and other authors who have reproduced his opinions, represent the olivary bodies as playing so important a part in the mechanism of speech, that I expected to find considerable lesions in their cells; but there was nothing of the kind; I never found any alterations in the proper tissue of these bodies. With these alterations of the medulla, I have not yet found lesions of the commissural fibres or of the fibres of the nerves arising from the medulla.

The morbid state which I have just explained exists from the first periods of illness. I met with it in a woman who died between the twenty-fifth and thirtieth days of general paralysis. In that case, the number of nuclei was much less considerable, and they existed only in the vascular walls or in the perivascular spaces. In that case, also, the number of diseased cells in the nucleus of origin of the facial nerve, was at most two or three; whilst, in advanced stages, the number may be eight or ten. The nature and form of these alterations appeared to me to explain sufficiently the disturbance of the part of speech which requires the intervention of the medulla oblongata. In that organ, indeed, take place the numerous acts of automatic and involuntary co-ordination which are performed during the articulation of words, the rapidity and good execution of which are dependent on the education and exercise of the organ. Now, if you observe under the microscope the countless number of foreign bodies which are interposed in the fine and compact meshes of the constituent fibres of the medulla, and amidst the cells of the olivary bodies, you will understand the disturbance which this state must produce in the functions of the medulla and in the automatic co-ordination of the nerves proceeding therefrom, and of the muscles supplied by them. These troubles of speech, always accompanied with ataxy of the tongue and lips, demonstrate the important part which is played by the facial nerves in these phenomena. To prove it, comes also pathological anatomy. Alterations in the cells of the nuclei of the facial are indeed more frequent and more advanced than those in the nuclei of the hypoglossal, as has been said; and while, at the outset of the disease, the nuclei of the

facial only are injured, they are, at later periods, affected far more severely than the nuclei of the other bulbous nerves.

3. *Muteness occurring in General Paralysis.*—Lastly, there is a whole order of lesions which one of my pupils, M. Hanot, first observed in the muscles of the tongue in some patients in my practice, and which also produce muteness in general paralysis. I refer to fatty alteration of the muscular fibres of the tongue, and the multiplication of the nuclei of the sarcolemma. I have recognised that this alteration may correspond either with a lesion of the cells of the nuclei of the nerves arising from the medulla oblongata, and which are crammed with yellow granulations not coloured by carmine tincture, which are more or less deformed, and the nuclei of which have almost or quite disappeared; or with atrophic lesions of these nerves at their apparent origin; or, finally, with both these orders of alterations.

I have observed this pathological state in cases where patients with general paralysis are unable to protrude their tongue from the mouth, or to articulate any other than incomprehensible sounds. This state ordinarily coexists with paralysis of the pharynx and with dysphagia.

Upon the whole, patients suffering from general paralysis present troubles of speaking, the etiology of which is multiple. The causes of stuttering, of hesitation, of drawing in speaking, originate in the brain, because they are morbid phenomena, involving disturbance of the intellect, of the will, and of the memory of words.

The causes of jabbering, of stammering, of quavering in speaking, have their origin in the medulla oblongata; they are symptoms corresponding with disturbance of automatic and involuntary co-ordination.

Finally, the causes of muteness in the paralytic insane are of lingual and pharyngeal origin, being occasioned by paralysis of the tongue and pharynx.

The first order of troubles of speaking is determined by the infiltration of the cortical substance of the frontal circonvolutions and of the island of Reil with blastema, and by the softening of it by the production of embryoplastic nuclei, first in the vessels, next in the nervous substance among fibres conducting the will, and by the ulterior organisation of these embryoplastic nuclei into fibrillary tissue.

The second order of symptoms is occasioned by the infiltration of blastema, and by the multiplication of embryoplastic nuclei in the vascular sheaths of the perivascular spaces; next, amidst the nerve-fibres of the bulb; and by necrobiotic alterations of the cells of the original nuclei of the nerves of the medulla, and especially of the facial.

The third group of the troubles of speech is produced by atrophic lesions at the apparent origin of the bulbous nerves, and by fatty degeneration of the muscles of the tongue and pharynx.

THE DIAGNOSIS OF INSANITY, AND THE METHOD OF INVESTIGATING CASES OF SUPPOSED INSANITY.*

By JOHN MANLEY, M.D.,

Medical Superintendent of the Hants County Lunatic Asylum.

IN all well-marked cases, the physician can have no doubt that his patient is insane, and little difficulty in naming the form of disease the malady has taken; but it happens, in a great number of cases, that the early diagnosis of insanity is difficult; and, more unfortunately still, that insanity, to be treated successfully, must be treated early; whereas a delay in the diagnosis, and the consequent neglect of those precautions which are absolutely necessary in cases of mental derangement, has in too many instances led to the suicide of the patient, or to injury to those about him.

The diagnosis of mental disease is difficult, because it is so dependent on the evidence which the intellect alone appreciates, and because it presents itself in such a variety of forms, from idiosyncrasies in the patient. It is always well, when one has to examine a patient who is suffering from great excitement, and is supposed to be insane, to ascertain some particulars respecting him and his habits of life, and to inquire if there be any sufficient cause to account for the excitement, to find out if there be an hereditary tendency to insanity in the family, or if he have himself ever been insane. All this will probably be better learnt from neighbours and acquaintances than from relatives; for, in families who have a strong taint of insanity, many of the members are often themselves strange and eccentric, and not to be depended on for the information they give. It is advisable also to notice any

peculiarities about the house and furniture, and to watch the patient's conduct and demeanour, though without a seemingly marked attention. With a little tact, a clue will be probably obtained to the patient's state; and, by allowing him to talk, and showing oneself an interested listener, leading him on from time to time, as some salient point occurs, the subjects which are uppermost in the patient's mind will be discovered.

In the early stages of insanity, there is frequently a wasting of tissues, and a tendency to become thin. The head is often hot, the face flushed, and the skin does not look clear and healthy. The expression and the attitudes of the patient to a great extent indicate the state of his mind.

The descriptions of insanity given by Locke and Cullen embrace only those forms of the disease in which the intellects are affected. There are, nevertheless, cases in which the disorder is manifested chiefly in the state of the feelings, temper, and habits. An hallucination depends on an overactive sensorium, which gives to the visionary the conviction of the perception of a sensation when no external object suited to excite the sensation has impressed the senses. When a nerve is stimulated, a sensation is conveyed to the sensorium; but, if the sensation be wrongly interpreted, it is a delusion. All cases of delusion or hallucination, to be indications of insanity, must be fixed, persistent, and the subject of actual belief.

In making a diagnosis of insanity, there is a certain amount of assistance to be derived from a knowledge of the causes which are known to have more or less influence in producing the disease. These causes are generally divided into moral and physical. The moral causes are found in disappointed affections, grief and domestic troubles, excitements of every kind, wounded self-love, fright, over-study, and such like. The physical causes embrace epilepsy, intemperance, vice and dissipation, injuries, disease of the nervous system, and all disease of a depressing character, and intense disturbance, from whatever cause it may arise.

Of 962 patients admitted into the Hants County Lunatic Asylum during the past six years, the probable cause of insanity was ascertained in 828, or 86 per cent.: 263, or 31.8 per cent., were attributable to moral causes; 331, or 40 per cent., to physical causes; 54, or 6.5 per cent., to epilepsy; 30, or 3.6 per cent., to general paralysis; 99, or 11.9 per cent., to congenital defect; whilst 51, or 6.2 per cent., were probably due to strong hereditary disposition. Amongst the moral causes, 6 per cent. of the admissions were said to arise from intemperance, and 5.4 from religious excitement.

Passing over the forms of mental disease known as mania, melancholia, monomania, dementia, and idiocy, which are so well known as to require no description, I come to a form of mental disease which is rarely seen in its earliest stages in an asylum, whilst in its latest stages it is rarely met with elsewhere. It is the general paralysis of the insane. It is the most insidious form of insanity; and those suffering from it are constantly, before the disease is recognised, getting themselves into all sorts of trouble. I have recently had under my care two patients suffering from it, both of whom were sent from our county prison, and both of whom were, in my opinion, insane when they committed the offences for which they were subsequently punished. The subjects of this form of disorder, whatever their condition in life, become boastful, excitable, and reckless, and consider themselves possessed of boundless wealth. On investigating such a case, it will probably be found that, after a short period of excitement, the patient has become strange in his manner; that he has a little impediment in his speech, and talks like a man who has been drinking; whilst at the same time his gait is unsteady. He shows, however, none of those signs so often met with in a patient after an attack of apoplexy. Gradually all these symptoms increase; the senses are deadened, and the want of cleanliness is extreme. At last, the injuries of the nervous system, which affect the powers both of body and mind, approach their last point. Motionless and insensible, the patient exists simply in a state of vegetation.

In diagnosing insanity, we must guard against confounding the eccentricities which are the result of hysteria with the vagaries of the madman. So also must we recollect that there is a great deal of difference in the characters of eccentricity. A man of one class is endowed with strong good sense and moral courage, and acts in a manner contrary to his neighbours from conscientious motives founded on his own reasonings, setting at nought the ridicule of the world. The other class consists of weak-minded persons, whose conduct is influenced by vanity and the caprice of the hour, and in whose families probably there is often a strong hereditary predisposition to mental disease.

We may fairly agree with the dictum of Cullen, that hypochondriasis passes into insanity when it is accompanied by an hallucination. In distinguishing between real and feigned insanity, it is always advisable to watch the patient without being seen by him, so as to take him off

* Read before the South Hants District of the Southern Branch.