

encephalitis and abscess; with meningitis; with the various forms and varieties of tumors; and it may be a merely mental and moral condition. Associated with so many and varied maladies, and occasionally existing alone, as the sole evidence of disease it is necessary to give the subject independent and separate consideration. We can not occupy space with an extended historical account of the progress in the knowledge of this peculiar condition, but we may state some facts, and begin by saying that to Gall unquestionably belongs the credit of first suggesting the position of the language faculty. He says, "I regard as the organ of verbal memory that cerebral part which rests on the posterior half of the roof of the orbit."* Thomas Hood, quoted by Hammond,† so long ago as 1822 described accurately a case of aphasia. Bouillaud published a work in 1825 to prove the correctness of Gall's doctrines that the language faculty was situated in the anterior lobes. Marc Dax in 1836 made the remarkable statement that, in cases of aphasia, the paralysis was on the right side and the lesion on the left, thus limiting the seat of the language faculty to the left frontal lobe. The next and most important step was that taken by Broca in 1861, who sought to prove by cases that "the integrity of the third left frontal convolution, and perhaps also the second, is essential for the development of the power of articulate speech." The observations on man seem to be confirmed by the experiments of Ferrier ‡ and Fritsch and Hitzig, which show that electric irritation of a corresponding part in animals is followed by "alternate opening and closure of the mouth, with movements of the tongue." It seems to be now pretty definitely settled that lesions of the region supplied by the left middle cerebral artery, notably the island of Reil, the third convolution, and the neighboring part of the corpus striatum, are those accompanied by the various forms of derangement included under the term aphasia. Hence it is that right hemiplegia and aphasia are so often associated. First in point of importance are lesions of Broca's convolution, next those of the island. Why the left hemisphere should be alone the seat of such a faculty, and not the right, has received various explanations, but that offered by Broca is probably the most nearly true—that the left hemisphere is earlier and more rapidly developed, receives more blood, and is therefore first and chiefly instructed, whence the greater skill and education of the right hand. Cases of left-handed persons becoming aphasic from disease of the right hemisphere have been reported. There are cases of aphasia in which the power to write correctly is retained—aphasia without agraphia. In other cases there is an absolute inability to communicate ideas by written signs, all attempts resulting in a meaningless scrawl. The two functions

* Gall's "Works," vol. v, p. 11, translated by Winslow Lewis, M. D.
 † "Diseases of the Nervous System," *op. cit.*, p. 178, sixth edition.
 ‡ "Functions of the Brain," American edition, 1876, p. 143.

must therefore possess different centers and yet be in close proximity. Sign-speech, or the power to express ideas by signs, or sign-language, may or may not be simultaneously affected with the language faculty. As patients may or may not be conscious of the defect, there are consequently an *amnesic amimia* and an *ataxic amimia*. As amnesic aphasia may coexist with retention of the power of written language, by which the intellect may be tested, it has been demonstrated that the existence of aphasia is not incompatible with the full possession of the intellect in all other respects. A number of cases have now been reported in which amnesic aphasia was the sole lesion. The importance of this observation, from the medico-legal point of view, is very great. On the other hand, it is generally true that the mind is weakened or impaired in other respects, so that the presence of aphasia is *prima facie* evidence of mental impairment. Aphasics are often very curiously damaged. A musician could not read the musical notes, but could play by ear; on the other hand, Lasègue saw a musician with both aphasia and agraphia, who could write down notes that he heard (Kussmaul); others can not count money, or distinguish the uses of table-utensils.

Course, Duration, and Termination.—The forms of aphasia pursue a course parallel to the malady with which they are associated, as a rule, but sometimes aphasia ceases before the disease, or continues after the disease has disappeared. Aphasia may be hysterical or due to curable disease, as syphilis, or it may be produced by reflex disturbance of function, as parasites in the intestines, or constipation. The duration will be brief under these circumstances, and the termination be in recovery, if right means are used. As regards the influence of permanent lesions, the results depend somewhat on age, for in children extensive injuries to the language center may be overcome by training, but in the aged limited lesions are fixed in their effects. Simple amnesic aphasia is more favorable, and ataxic aphasia is less favorable, as regards the prospect of recovery. The longer the condition of aphasia has existed, the less the prospect of recovery. The case is still less favorable when the aphasic state is increasing *pari passu* with the disease on which it depends.

Treatment.—The local disease must be removed if of a curable kind. If the case is one in which aphasia persists after the disease on which it depended has been removed, much may be done by suitable training. An admirable example of the results which can be obtained by rightly directed effort is that of Bristowe,* of a Canadian in St. Thomas's Hospital, perfectly aphasic, whose speech was entirely restored in eight months by a course of carefully conducted speech-les-

* The Lumleian Lectures, on the "Pathological Relations of Voice and Speech," London "Lancet," June 21, 1879.

sons given by Dr. Bristowe. These Lumleian lectures deserve the attentive study of those who desire to have a truly scientific and philosophical knowledge of the subject.

VERTIGO.

Definition.—*Vertigo* is not properly a substantive disease, but it may be the only symptom of the morbid state to which it is referable. It is a subjective state, in which the individual affected, or the objects about him, seem to be in rapid motion, of a rotary, circular, or to-and-fro kind. In common language vertigo is known as dizziness.

Pathogeny and Symptoms.—Vertigo may arise from centric or eccentric causes; hence it may be cerebral, auditory, cardiac, or stomachal. One form of epilepsy mitior is vertiginous, or the manifestation of the seizure consists in an attack, more or less violent, of vertigo. Other affections of the brain have the symptom vertigo at various times in their course. These have been, or will be, alluded to at the proper time, and hence do not require further statement here.

AUDITORY VERTIGO is named after its discoverer—*Ménière's Disease*. It has long been known that puncture of the auditory nerve in rabbits is followed by rotary movements of the animal. An inflammation of the middle ear will often excite convulsions in children. Injecting water in the ear will induce vertigo. Ménière described, in 1861, a sudden, excessive vertigo, produced by an hæmorrhagic extravasation or some form of exudation into the semicircular canals of the internal ear. This is the true Ménière's disease, but vertigo is associated with other aural lesions. Thus, it may occur in the course of an otorrhœa, accompanied by noises, beating, singing, and other troubles of the ear. Again, without any known disease of the ear, the patient may be disturbed by temporary attacks of vertigo, occurring from time to time, until at last it becomes a permanent condition. In still other cases an individual in full health, apparently, is suddenly seized with a formidable attack of apoplectiform vertigo. Many of the cases of temporary or habitual vertigo, and of apoplectiform attacks which appear to be independent, in reality coexist with disorders of the ear which pass unnoticed. At the outset Ménière's vertigo manifests itself in short, sudden attacks, separated, by long intervals free from disturbance. If the malady is aggravated, the attacks approximate, and finally become constant but diversified by paroxysmal exacerbations. In the worst cases the victims are compelled to remain in a horizontal position, which moderates the distress. But even then they are in an unstable condition, and must preserve a most quiet attitude, with closed eyes, if they would avoid seizures. The forms taken by the vertiginous sensations are various; sometimes it is a see-saw, a gyratory motion, right or left; sometimes a vertical whirl, a sensation of rising and falling, like the

swell of the ocean, etc. It is not surprising that persons so affected, for months or years, experience changes in character—become morose, irritable, suspicious.

In other cases the vertigo, although habitual, is less severe, and those affected learn that severe seizures may be avoided by keeping a position of fixed attention, and rigidity of the head and members, somewhat inclined against the direction to which the vertigo carries them.

The permanent vertiginous sensations are often accompanied by various subjective noises in the ears. They assume every kind of tone—whistling, singing, beating, roaring, noise of escaping steam, etc.

Besides the subjective sensation of falling, in certain cases a sudden access of vertigo destroys the voluntary control, and the individual is precipitated to the floor. In a portion of these the sensation experienced is that of rapid rotation, but a fall may be prevented if some support can be seized in time. In others, an irresistible propulsion forward precipitates them on one side or the other, or they fall as if struck a violent blow on the nucha, and sometimes with sufficient force to be injured in coming down. The fall is forward, rarely backward, and obliquely to one or the other side, sometimes to the side of the affected ear, sometimes to the other side. This lateral propulsion, Gowers holds, is diagnostic of Ménière's vertigo. At the moment of the attack, the patient, although deprived of voluntary control, does not lose consciousness. Nausea and vomiting occur in many cases at the end of the seizure; in others, only nausea is experienced. Some glairy mucus and bilious matters are brought up by vomiting, and but little food, as a rule.

Not all cases of Ménière's disease become habitual and constant. In many cases the attacks are isolated, and separated by long intervals of entire freedom from the sensations. The attacks may present the most violent and characteristic features, or may be mild. The vertigo, the gyratory movements, and the vomiting, may take a predominant position, but they do not constitute a special form of the disease. Two distinct forms may be recognized: one, consisting of a constant state of vertigo, diversified by paroxysms; the other, made up of isolated seizures, separated by periods of good health.

There is no constant anatomical lesion associated with auditory vertigo. In many simple cases a sero-sanguineous exudation has been found in the semicircular canals; in other cases there have existed complicated lesions, resulting from traumatism. Various lesions of the internal ear have been associated with labyrinthine vertigo, such as catarrh of the drum and of the mastoid cells. Probably any trouble of the ear, external or internal, may produce the phenomena of Ménière's disease, by modifying the pressure on the terminals of the auditory nerve. These phenomena may also be caused by a neuritis or perineuritis of the auditory nerve, and have been associated with

facial paralysis, or other disorders of the facial or chorda tympani. When bulbar lesions produce vertigo, there are neuralgic pains in the distribution of the fifth nerve, and the same anatomical relationship explains the nausea and vomiting, the nucleus of the fifth nerve and of the pneumogastric having close connections.

STOMACHAL VERTIGO is much more frequent and more important, therefore, than Ménière's disease. There can be little doubt that it is frequently mistaken for cerebral disease. It is a misleading error to suppose that stomachal vertigo is always associated with pronounced stomachal disorder. There are cases in which the disturbance of the intracranial circulation—the vertiginous sensations—constitute the only apparent evidence of stomachal disturbance. In such cases the symptoms always come on during the stomach or intestinal digestion. In other instances there are felt, after eating, a sense of fullness and repletion of the stomach, and hebetude of mind. Again, the attacks of vertigo are experienced by some persons after eating an article of food especially indigestible, and are infrequent. Usually the cerebral symptoms occur in the course of well-marked and long-standing stomach and intestinal disease. Always after eating heartily there are heaviness and oppression, acidity and pyrosis, and frequent eructations occur; the abdomen some hours after meals is distended with flatus, and constipation is the rule. These subjects are usually of full habit, and tend to obesity, have acid urine loaded with urates, and are rather sluggish, physically, although active in their mental habits. Eating habitually more than is needed, and leading sedentary lives, unoxidized products accumulate in the blood, and uric acid and urates are largely present in the urine. Much flatus in the intestine is coincident with the vertiginous attacks in some subjects.

Stomachal vertigo may occur under opposite states of the intracranial circulation; under anæmia or hyperæmia, the latter more frequently. The evidences of hyperæmia are a rather flushed face, injection of the conjunctiva, rather full retinal vessels, and occasional epistaxis. The anæmic subjects are pale, the sclerotics pearly white, and the retinal vessels small. The mechanism of the vertigo is complex. There are two factors: one consists in the toxic effect of the imperfectly oxidized materials which accumulate in the blood; the other is reflex. An impression made on the end organs of the pneumogastric in the stomach is reflected over the sympathetic ganglia or over the auditory, including its terminals in the semicircular canals. The attacks of vertigo occur in two forms: acute and severe, chronic and light.

The acute and severe attacks occur during the digestion of a full meal, or of some especially indigestible material which lingers in the stomach. Suddenly there is felt an odd sensation in the scalp, a creeping coldness, a sense of constriction, surrounding objects appear

to go round and round with all the varied movements of the kaleidoscope, the individual reels and seizes some object or person for support, he has a seasick feeling, more or less intense, and may vomit; his face is pale, pulse feeble, and his vision is blurred. If vomiting occur and the stomach is entirely emptied, the symptoms subside. If there is nausea, merely, the sick feeling will presently subside and with it the vertigo, to return, it may be, in a few minutes, and be repeated several times, until the digestion is completed. In other cases the nausea persists until some intestinal uneasiness, followed by a copious evacuation, occurs. The consciousness is not usually lost in such attacks, but the mind is dazed; in some cases there are hallucinations and illusions during the period of vertigo. The depressing effect on the vaso-motor system is exhibited, not only in the feeble circulation and the sudden pallor, but the surface is bedewed with a cold sweat, or sweating is limited to one side of the head or of the body, or to one extremity. These acute attacks are doubtless entirely reflex.

The chronic form of stomachal vertigo is manifested by nearly constant headache, noises in the ears, and vertigo, which is daily in occurrence, or nearly so. In the most typical cases, a feeling of uncertainty and unsteadiness comes on after breakfast and increases until actual vertigo develops, reaching its maximum some time after dinner. At no time is there a degree of unsteadiness requiring support, but a feeling of reeling and dizziness, making an effort necessary to preserve the vertical position. Not all cases are nearly constant or daily. There may be intervals of entire exemption, caused by greater care in the selection of food, and by more perfect digestion. Although the vertigo may be only occasional, these subjects suffer from headache, uneasiness after food, acidity, and flatulence nearly constantly. There are a few cases in which, with severe vertigo, no trouble with the stomach appears to exist, but on close examination it will be found that digestion labors, and that there is a sense of oppression at the epigastrium.

The form assumed by the vertigo varies. It may be a sudden feeling of emptiness of the head, an apparent sudden deprivation of thought, volition, and consciousness. Sometimes there is a mist before the eyes, surrounding objects are blurred, the mind is confused, and the body reels. In other cases, the individual attacked feels firm, but all surrounding objects are whirling around him and around each other in inextricable gyrations. By closing the eyes and keeping perfectly quiet, the equilibrium may be maintained, but in some cases this stratagem only induces the sensation of rising and falling, of floating away, etc. When the attacks occur in bed or on the lounge, these objects whirl around, or float away, or rise and fall as on the ocean-swell. Various hallucinations of sight and illusions occur, but consciousness is not lost, and delusions are not produced.

While the attacks of vertigo, occurring during the course of the chronic form of the malady, are largely reflex, there is another factor of considerable pathogenetic importance. Imperfect digestion, especially the intestinal, lessened oxidation because of an excess of material to be acted on, or diminished supply of oxygen, and sluggish elimination, are concerned in the production of a morbid state of the blood, of special importance in this connection. The urine is acid in reaction, highly pigmented, and heavily loaded with urates and uric acid. The most highly specialized tissue will be the first to be acted on by such materials in the blood; hence the injury done to the brain and manifested in the headache, torpor of mind, etc., which are such prominent features in these cases of stomachal vertigo.

Cardiac Vertigo is a condition of anæmia of the brain, and is closely allied to fainting. The subjects of this malady are rarely free from vertiginous sensations on assuming the erect posture, and may be violently attacked on making any considerable exertion. They have a swimming sensation in the head, darkness falls on the eyes, and they become chilly and weak. Cardiac vertigo is associated with fatty heart and dilatation of the right cavities, conditions already described.

Cerebral Vertigo has received attention in connection with the several maladies of which vertigo is a symptom. It occurs as a symptom in cerebral anæmia and cerebral congestion; in cerebro-spinal meningitis, in which it is very pronounced in the stage of excitation; in tumor of the brain; in abscess of the brain; in cerebral hæmorrhage, as a prodrome; in sclerosis of the brain; in chronic endarteritis, with thrombosis especially; in epilepsy, chorea, and hypochondriasis; in chronic alcoholism, and chronic plumbic, paludal, and other forms of poisoning, etc.

Course, Duration, and Termination.—The conditions producing vertigo are so various that no uniform course can be laid down. Ménière's vertigo is usually incurable, as dependent on lesions that are not remediable. In some cases there is a gradual development of continuous vertigo from lesions of the ear, and so severe does it become that the victim is unable to pursue any occupation—to sit up, even. In other cases the attacks are paroxysmal, and occur in the course of chronic affections of the ear. The genuine Ménière's disease is a malady characterized by a sudden attack of vertigo, with nausea and vomiting so severe that the patient falls as if from an apoplectic attack. There has been no previous disease, and the change in the ear consists in an hæmorrhagic or sero-sanguineous extravasation into the semi-circular canals. Such cases without any other lesions have, in a few instances, terminated fatally. Permanent deafness results, and afterward paroxysmal attacks of vertigo occur, or the vertigo may become a permanent condition. The fortunes of vertigo, associated with

aural lesions, are those of the lesions: if the lesions are curable, vertigo ceases, but as a rule these cases are not hopeful.

Treatment.—The treatment of auditory vertigo resolves itself into the management of the aural lesions. Charcot* has recently called attention to the great value of quinine in full doses (ten to fifteen grains) in the treatment of Ménière's disease of that form characterized by the hæmorrhagic or sero-sanguineous exudation into the semi-circular canals. Confirmatory experience has been reported by Ménière,† and by Féré and Demars.‡ In 1875, say Féré and Demars, Charcot made known in one of his lectures at La Salpêtrière, the results of a new treatment which he had been using some months. He presented to the class in attendance a patient, who had many years been confined to bed with a vertigo nearly permanent, diversified by extremely severe paroxysms. She had subjective noises in the ear, which, joined to a purulent discharge from the external auditory foramen, left no room for doubt as to the origin of the disease. Charcot conceived the idea of modifying the ear-noises by the administration of large doses of quinine, which he gave during two months in doses of eight to fifteen grains a day. The roaring in the ears was, after a time, replaced by the noise produced by quinine; the vertigo diminished notably, and in two and a half months the patient was able to walk with the aid of a cane. Féré and Demars find that, when from eight to fourteen grains of quinine are given daily to the patients with auditory vertigo, the symptoms of the disease are notably increased. If, after eight to ten days' administration, the quinine is suspended, the *bruit* and the vertigo are then found to be much less than before the use of the remedy was begun. If the treatment is resumed again, a new exaggeration of the symptoms occurs, but usually much less than on the first trial, and, when again suspended, the improvement is found to be still greater. Excellent results have thus been produced. The author, from experience in one case only, is able to confirm the report as to the exceptional value of quinine in auditory vertigo.

In the treatment of stomachal vertigo, careful regulation of the diet is necessary. It is often extremely serviceable to begin the treatment by an exclusive milk-diet, and then to reconstruct the dietary, according to the condition of the individual subject. Arsenic—one or two drops of Fowler's solution, three times a day—is the best remedy. When the appetite is poor and the general state feeble, tincture of nux vomica is an efficient remedy. When there is much nausea, carbolic acid, with or without bismuth, is very serviceable. When there is gastro-duodenal catarrh, phosphate of soda is useful in a high degree. If the urine is loaded with uric acid and the urates, nitric

* "Progrès Médical," 1875, p. 733.

† "Quelques considérations sur la maladie de Ménière," etc.

‡ "Revue de Médecine," October 10, 1881, p. 796, *et seq.*

acid or the potash alkalies, as the case may be, will prove to be very beneficial. Each case must be studied by and of itself. Besides the merely medicinal and dietetic treatment, much good is accomplished by regulated active exercise in the open air.

DISEASES OF THE MEDULLA OBLONGATA.

HÆMORRHAGE.

Pathogeny.—It is a rare event to have hæmorrhage occur in the medulla or pons, but cases have been reported. The conditions causing the hæmorrhage are doubtless very much the same as those of the brain, miliary aneurisms and atheroma being the chief factors. The larger aneurisms of the basilar artery may by rupture cause a hæmorrhage affecting this as well as other organs. The medulla is compressed by hæmorrhages from above, breaking through on to the floor of the fourth ventricle. These conditions are not now under consideration, the inquiry being restricted to hæmorrhage into the pons or medulla. The vessel affected in any case is small, the resulting clot is small, but there are usually several clots at the same time. They vary in size from a pea to an olive, but those examples of hæmorrhage in which the pons is simultaneously affected, or which occur in the pons, are much larger. One case is reported in which the hæmorrhage filled the whole of the pons, burst through on the left side, and also filled the fourth ventricle.* Another, in which the pons and fourth ventricle were invaded, and into the right crus cerebri there was also an extravasation.†

Symptoms.—If the hæmorrhage is large, vomiting usually occurs, consciousness is lost, there is complete muscular resolution, abolition of all reflex acts takes place, the breathing is sighing and irregular, becoming rapidly shallower, or is stertorous and noisy, the pupils are apt to be irregular, one large and the other minutely contracted, or both minutely contracted, death occurring in an hour or two, or in a day or two, in a deeply comatose state. There is a fulminant form, in which, hæmorrhage taking place in the medulla at or about the spasm-center, the patient falls with a cry into general convulsions, becomes comatose, and dies in a few minutes, or in an hour or two. Not all pursue this rapidly fatal course. A small clot may form on one side of the medulla or pons, there occur the usual symptoms of apoplexy, and the patient

* Dr. T. S. Dowse, "Transactions of the Pathological Society," vol. xxvii, p. 7.

† Dr. J. W. Ogle, *ibid.*, vol. xv, p. 9.

emerges from the condition of unconsciousness, after some hours or days, paralyzed as to motion and sensation on the opposite side (hemiplegia), or all of the extremities may be paralyzed more or less fully; or there may be a paraplegia, the arms escaping, but usually both upper and lower extremities are affected both as to motility and sensibility. There are usually paralyses of the cranial nerves—the third, fourth, fifth, the sixth, the seventh, etc.—and there may be paralysis of the body, on the opposite side of a unilateral lesion, while the cranial nerves are paralyzed on the same side. The breathing, owing to the proximity of the respiratory center, is irregular in rhythm, sighing, dyspnoic—often of the Cheyne-Stokes type. The action of the heart is not so much disturbed, but the pulse may be exceedingly rapid and irregular. Epileptiform convulsions are very usual and important from the diagnostic point of view, since Nothnagel's "spasm-center" is located in this organ, and hence clonic spasm would *a priori* be expected. Difficulty in swallowing (dysphagia) from paralysis of the palatal and pharyngeal muscles, and difficulty of speech from paralysis of the tongue (ataxic aphasia), and sometimes an obstinate singultus, are present in those cases emerging from the first coma. Albumen or sugar may be present in the urine.

Course, Duration, and Termination.—As the facts above given sufficiently indicate, the course of hæmorrhage into the pons or medulla is rapid. Death may occur in a few minutes, in a few hours, or after several days. Very few recover in the damaged way above described. If such partial recovery ensue, the usual changes of an atrophic kind take place in the motor tract below the site of the hæmorrhage. The paralyzed muscles, innervated by the cranial nerves, it is probable, lose their electro-contraction in a few days.

Diagnosis.—It is often extremely difficult to distinguish between the coma and insensibility of hæmorrhage into the pons and the narcosis induced by opium or alcohol. There is no symptom produced by one which may not also accompany the other, but the antecedent history, taken with the group of symptoms as a whole, ought to conduct to right conclusions. The deviation of the head and eyes to the side of the intra-cranial disease, and from the paralyzed side, is a symptom of cerebral hæmorrhage, and not of opium or alcohol poisoning. Convulsions are uncommon in opium and alcohol poisoning, very common in hæmorrhage of the medulla. The pupils are often contracted in hæmorrhage, but never so minutely as in opium-poisoning. During the period of unconsciousness it may not be possible to diagnose between cerebral hæmorrhage and hæmorrhage of the pons and medulla, but the more frequent occurrence of convulsions, the vomiting, and the irregularity of respiration, may afford indications. Afterward the character of the paralysis, the manner in which the cranial nerves are affected, the paralysis of the palate, and difficulty of deglutition,