fied by heat in a manner incompatible with the vitality of the blood. Nerve and muscle-tissue are at the same time impaired.

Symptoms.—Genuine *sun*stroke is commonly sudden. Falling unconscious, the head is very hot, the temporal arteries distended; the breathing is apt to be stertorous (snoring), the pulse full and slow. In severe cases convulsions may precede death.

In heatstroke of the second variety (more common than the first), almost equal suddenness marks the attack. There is, however, no excessive heat in the head; the pulse is weak; unconsciousness is less complete, and without stertor of the breathing; the whole condition resembles syncope rather than apoplexy.

Causation.—It is remarkable that few cases of heatstroke occur in the country among farm laborers, and very few at sea, even in the tropics. *Large cities* afford nearly all the cases. In New York over 800 cases have occurred in a single week (1868). This looks as if the *atmosphere* had much to do with predisposing to it, at least by deteriorating the blood and lowering the resistance of the vital energy. In tropical climates the attack often occurs at night.

It is almost always, in the case of *heat-exhaustion*, those who have been *fatigued* by exertion in the sun or shade who are overcome. Drinking largely of cold water when thus exhausted increases the danger. Intemperate persons are particularly liable to heatstroke.

Treatment.—For sunstroke, or *heat-apoplexy*, cupping or leeching the back of the neck or behind the ears should generally be the first remedy, after the application of ice or iced water freely to the head. The head and shoulders should be kept raised. A purgative enema should also be administered, and sinapisms applied to the lower limbs.

Heat-exhaustion requires quite different treatment, in part at least. Cold water or ice should be applied to the head and body, and then sinapisms to the spine, epigastrium, and limbs, in turn. First *cool the blood*, and then excite physiological stimulation. Local depletion should be avoided. If syncopal symptoms be *decided*, ammonia may be for a few moments applied to the nostrils, and, if the patient can swallow, aromatic spirits of ammonia may be given by the mouth, 10 drops every fifteen minutes at first, gradually increasing the interval. *Mixed* cases of course occur, demanding an intermediate or composite treatment. A. R. Hall, of India, has found the utmost benefit from the hypodermic injection of sulphate of quinia in heatstroke.[1]

INSOMNIA.

Definition.—Morbid wakefulness; impossibility of sleep.

Causation.—Apart from pain, or severe acute disease affecting the brain (as delirium tremens), insomnia may be brought on by intense or prolonged mental labor or emotional excitement. Excessive use of strong coffee or tea, or belladonna, stramonium, or cannabis indica, may produce it.

[1] Dr. Herbert Norris treated successfully, in the Pennsylvania Hospital (1868), four cases, in which restlessness was a prominent symptom, by the hypodermic injection of one-quarter of a grain of sulphate of morphia.

Pathology.—Only within a recent period (Durham, Hammond) has the correct view been adopted, that during sleep the arterial circulation of the brain is at its minimum. In sleeplessness the most certain *error loci* is an *erethism* (morbid erectility) of the cerebral arteries, which keeps their circulation full and *prevents* sleep. It is not possible to be sure that this is all, as the precise nature of brain-action and nerve-force is unknown. But this furnishes a basis for rational management.

Treatment.—This must vary with the cause. The overworked brain of the professional, literary, or business man must be withdrawn from his employment. Irregularity of the circulation dependent upon general debility must be met by tonics and generous diet. Accumulation in the head must be diminished by such physical exercise as the strength will bear. Decided *cerebral exhaustion* is apt to be attended by such loss of nerve-force as will forbid much effort of any kind; but milder cases of insomnia will be benefited by exercise. The brain should be especially allowed to rest from excitement near the usual hour for sleep. Hence a walk, or the use of dumb-bells, just before bedtime, will be suitable. If the stomach be empty, a little easily digested food, even late at night, will promote sleep, notwithstanding the familiar fact that heavy suppers induce wakefulness or nightmare. A glass of lager beer at bedtime is, as my own experience has proved, one of the best of hypnotics.

The warm bath or pediluvium, with cold to the head, will sometimes be serviceable in abstracting blood from the brain. *Position of the body* is important. The sufferer from insomnia may often be very sleepy before lying down, yet once in bed he becomes wide awake. Several persons in such case, to my knowledge, have found it best to recline with the head and shoulders raised. Thus, by gravitation, the flow of blood to the head is retarded and sleep is promoted.

As medicines for simple insomnia, in the absence of pain, opium and other powerful narcotics are not appropriate. Hops, lactucarium, and hyoscyamus are safer. Bromide of potassium, in 10 or 20 grain doses, is much used as a cerebro-vascular sedative [F. 134]. Its action appears to differ from that of morphia, as it will not produce sleep by narcosis in a healthy person. It seems rather to relieve insomnia by allaying the local or general irritability which causes or maintains it. Dr. Da Costa[1] has found the combination of bromide of potassium (40 grains) with opium or morphia to correct the unpleasant effects of the opiate, while it adds to its hypnotic power. *Hydrate of chloral* is a positive and valuable soporific. In 15 or 20 grain doses it seldom fails, and it is rarely followed by any disagreeable after-effects.

NIGHT-TERRORS.

Dr. C. West[2] gives the following description of an attack which is not very uncommon, occurring in infants or children under ten years of age. "A child who has gone to bed apparently well, and

[1] Am. Journal of Med. Sciences, April, 1871, p. 359.
[2] Diseases of Children, p. 210.

who has slept soundly for a short time, awakes suddenly in great terror, and with a loud and piercing cry. The child will be found sitting up in its bed, crying out as if in an agony of fear, 'Oh, dear! oh, dear! take it away! father! mother!' while terror is depicted on its countenance, and it does not recognize its parents, who, alarmed by its shrieks, have come into its room, but seems wholly occupied with the fearful impression that has aroused it from sleep. In from ten minutes to half an hour, as the terror abates, it may become quiet at once and fall asleep; but frequently it bursts into a fit of passionate weeping, and sobs itself to rest in its mother's arms. In some instances a quantity of limpid urine is voided as the fit passes off, but this occurrence is by no means constant. Usually the remainder of the night is passed in tolerably sound sleep; two attacks do not often occur in the same night." "Seizures of this kind may come on in a great variety of circumstances, and, according to the cause whence they have arisen, may continue to return for many weeks together, or may occur but a few times. As far as I have had the opportunity of judging, they are never the indications of primary mischief in the brain, but are always associated with some disturbance of the intestinal canal, and more or less obvious gastric disorder. In the majority of cases constipation of the bowels exists."

My experience with such cases confirms that of Dr. West, as indicating that these attacks do not prove disease of the brain. But the nervous system of a child so affected must be morbidly susceptible; and signs of indigestion, constipation, or irritation of the bowels are not always present.

During the attack, the child should be at once gently lifted up from the bed, and either carried for a few moments or laid down in a different position. Washing the face softly with a rag dipped in cool or cold water may arouse thoroughly. If any medicine be suitable, it will be a teaspoonful or two of camphor-water. Care is needed to *prevent* the attacks. *Violent exercise* and mental *excitement* are almost as apt to bring them on as indigestion or constipation. The bowels should, however, be kept open, as by fluid extract of rhubarb, or senna, etc. Bromide of potassium is advised by Dr. S. Ringer in obstinate attacks. To promote tranquil sleep, some one should remain with the child, if timid, for a while after it goes to bed; or a light should be left burning low. A child liable to night-terrors ought to be allowed to finish its morning sleep undisturbed. Abundance of sleep is sedative to an over-excitable brain. Neglect of such precautions may convert a mere transitory functional disturbance into a serious attack of brain disease.

APOPLEXY.

Definition.—Sudden coma, produced neither by injury nor poison.

Varieties.—Some terms once used have been shown to be without pathological justification; as *serous* apoplexy, *nervous* apoplexy. Good authority still sustains, however, the mention of two forms at least of genuine apoplectic seizure: *congestive* and *hemorrhagic*.

Symptoms. Congestive Apoplexy.—Premonitory symptoms often seen are, flushed appearance of the face and eyes, heat of head, throbbing of the carotids, distension of the temporal arteries and jugular veins; constipation, languor, dulness, drowsiness; dimness of sight, vertigo, headache. The attack is marked by sudden stupor; with slow and sometimes snoring respiration, full and slow pulse, dusky or turgid appearance of the face. The total loss of perception may be brief, its partial absence or deficiency continuing for some time. Slight convulsive movements are not uncommon. Paralysis of the muscles occurs only for a short time after the attack, if this is recovered from.

Symptoms of Hemorrhagic Apoplexy.—Generally no clear premonition is given, the attack being very sudden; a *stroke*, literally. Unconsciousness is complete, for some seconds, minutes, or hours. After this, general or local paralysis, most often hemiplegia, is left; the mental powers also, in many cases, being impaired, at least temporarily. During the coma, the breathing is commonly stertorous, the pulse slow and somewhat full, the head hot, the face more or less dark or flushed. But the fulness of the blood-vessels and heat of the head are much less, as a rule, than in congestive apoplexy.

Anatomy and Pathology.—In the congestive form, excessive cerebral hyperæmia produces coma by pressure upon the brain; the extremest degree of which (vascular pressure) is met with in strangulation.

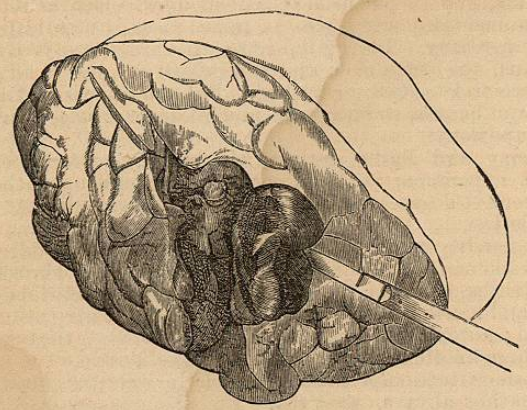
In hemorrhagic apoplexy, from the rupture of a degenerated artery, either in the substance of the cerebrum or cerebellum, in the ventricles, or under the arachnoid membrane, effusion of blood occurs, and a clot is formed. If this be small, it may be gradually absorbed; autopsic inspection sometimes showing the remains of such, where another hemorrhage has caused death.

Fatty degeneration of the arteries of the brain has been repeatedly, but not always, observed. Embolism is asserted to have sometimes produced apoplectic symptoms; but this, I believe, must be comparatively rare. Dr. Lidell,[1] however, follows Niemeyer in believing the immediate cause of apoplectic symptoms (whether produced by congestion, œdema, or hemorrhage) to be cerebral anæmia; or, at least, privation of oxygenated blood in the brain. Dr. Lidell has elaborately considered (*Am. Journ. of Med. Sciences*, Jan. and July, 1874) the clinical and pathological history of *cerebral thrombosis*, under its three varieties of origin, as *traumatic*, *inflammatory*, and *marasmic*. Of 130 cases, only 6 were traumatic, 86 inflammatory, and 38 marasmic, or due to debilitating influences. Among the inflammatory, facial carbuncle was the most frequent cause. Otitis and erysipelas are also liable to the same termination. The symptoms of cerebral thrombosis are not always distinctive, but they differ from those of apoplexy most of all in the comparative slowness of their successive occurrence; signs of brain trouble and failure being at last followed by stupor, often convulsions, and paralysis. *Intra-cranial aneurism*,[2] with

[1] Treatise on Apoplexy, New York, 1873.
[2] See an article by Dr. J. H. Hutchinson, Penna. Hospital Reports, vol. ii. 1869.

rupture of the sac, is probably not infrequent. Constant headache, with amaurosis, or some form of progressive paralysis, will, when aneurism is present, generally precede the apoplexy. The basilar artery is (Gouguenheim) most often affected; next, the middle cerebral; then, the internal carotid. Intra-cranial aneurism, or sacciform dilatation of some of the cerebral vessels (miliary aneurisms of Charcot and Bouchard) will no doubt account for a considerable number of cases of cerebral hemorrhage. *Atheroma* (fatty and calcareous degeneration and softening) may occur in the arteries of the brain, as well as elsewhere.[1] Zenker insists that minute inter-cranial aneurisms are due to sclerosis of the inner coat of the cerebral arterioles; although this is denied by Charcot

Fig. 84.



Hemorrhage in right hemisphere of brain.

and Bouchard.[2] The parts of the brain most liable to extravasation of blood are (Aitken) stated in this order: 1, corpus striatum, thalamus, and hemispheres above them; 2, corpus striatum alone; 3, hemispheres above the centrum ovale; 4, thalamus alone; 5, lateral lobes of cerebellum; 6, mesocephalon; 7, posterior lobe of cerebrum; 8, before the corpus striatum; 9, pons Varolii; 10, middle lobe of cerebellum; 11, meninges; 12, peduncles and olivary body. The age of the clot may be ascertained in part by the discovery, with the microscope, of *blood-crystals;* which are not found until after seventeen or eighteen days from effusion.

Diagnosis.—Apoplexy is to be distinguished from *uræmia*, *alcoholic intoxication* (dead drunkenness), *narcotic poisoning* (as from opium), *compression of the brain*, or *concussion*, from blows or falls, *asphyxia* (suffocation), *sunstroke*, *catalepsy*, *cerebral hysteria*, *cerebral thrombosis*, *acute sofening of the brain*, and *spotted fever* or "cerebro-

[1] Virchow, Billroth, Wilks, and Moxon have shown that, in arteries generally, atheroma is the result of a "sub-inflammatory" process.

[2] Le Mouvement Médicale, Jan. 11, 1873.

spinal meningitis;" as well as from all forms of *syncope*. From uræmic coma it is only to be known by the history of the case, showing a renal origin for the symptoms, in partial or total suppression of urine. Alcoholic intoxication is revealed by the odor of the breath, and the attendant circumstances. Similar aid exists sometimes in cases of narcotic poisoning; in opiate narcotism, moreover, the pupil is *contracted;* in that from most other narcotics, it is as firmly *dilated*. Concussion and compression of the brain are generally suggested by the position of the body (if found without a history), and the external marks of injury. Asphyxia is also usually pointed out by the condition of things surrounding the patient.

In asphyxia, blueness of the lips, and embarrassment of respiration, with coldness of the surface, show the origin to be in the function of breathing. Sunstroke is attended by feebleness of the pulse, at least in the majority of cases; in some, it *is*, identically, a congestive apoplexy. In catalepsy, there is rigidity of the muscles, with rapidity of the pulse, susceptibility of the pupil to light, brief duration and repeated recurrence of the attack, without any paralysis. Cerebral hysteria is rare, and occurs only in females, whose previous disorders of the nervous system will aid in interpreting even coma as belonging to the same category. Acute red softening of the brain may be very difficult to distinguish from apoplexy. It is, however, seldom if ever so sudden in its invasion; there is more slobbering or flow of saliva, and watering of the eyes; and there is not the partial or entire restoration of the faculties which an attack of apoplexy, not fatal, allows so often. Cerebral thrombosis, also, is more gradual in the course of its effects; with frontal headache, delirium, dilatation of pupils, swelling, sometimes ptosis of the eyelids; often convulsions. Thrombosis, moreover, is much more common in early life than apoplexy. Spotted fever, or "cerebro-spinal meningitis," will be especially described, and its diagnosis considered, in another place.

Syncope, of any form or origin, is always marked by *pallor*, *coldness*, and *loss of pulse*.

Prognosis.—This is always alarming; most so as there is the most reason to believe that cerebral hemorrhage has occurred; and, therefore, especially in those advanced in life. In younger subjects, where stertor of breathing is absent, under proper treatment, congestive apoplexy may be entirely recovered from. So may a single attack of the hemorrhagic form, with a small clot only, and limited, transient paralysis. Each succeeding attack becomes more dangerous; a third is seldom survived. The *immediate* danger connected with an attack of apoplexy should not be considered to have passed over for ten days at least after the stroke itself. Very seldom, indeed, after a hemorrhagic attack, are the mental or bodily powers so good, for the rest of life, as before.

Causation.—*Age* is the most constant promotive cause of apoplexy. Cases are on record, though of extreme rarity, in children;[1]

[1] One well-marked case has come to my knowledge in a child. Hanner, of Munich, asserts that it occurs in young patients more often than is commonly supposed. See *Journal für Kinderkrankheiten*, 1, 1871.

between thirty and fifty it is much more frequent; but after fifty it is one of the most common modes of death. Arterial degeneration is here generally the occasion of the catastrophe; some mental excitement, or bodily shock or effort, as danger, or joy, or a few glasses of wine, or the stooping posture, or straining at stool, causing a rupture of the weak vessel, and fatal cerebral hemorrhage. Neither sex seems to be more liable to this disease than the other.

Full living, especially with alcoholic intemperance (even moderate) and indolent habits, predispose to it in a marked degree. So does excessive brain-work. Florid, short-necked, big-bellied people are thought to be most exposed to it. Hypertrophy of the left ventricle of the heart is believed to promote it. So also (Quain) degenerative disease of the right side of the heart may favor it, by affording impediment to the return of blood from the brain through the veins. After dinner and during sleep are the two most likely times for the attack to occur.

Treatment.—The younger the patient, and the more vigorous his antecedent health, the more probable is the existence of the congestive form: and also, the better the prospect of recovery from hemorrhage within the cranium, if, only, the effects of pressure be averted at the time. If, then, in a person under fifty, not before of broken constitution, we find the head hot, face turgid and flushed, the arteries and veins of the neck and temples full, the pulse strong, and the *heart's* impulse strong also (or the heart's action vigorous though the pulse at the wrist be oppressed), *bleed.* Watch the effect, with the hand on the pulse. If the breathing improve, and the pulse rather gain than lose in naturalness and force, take out ten or twelve ounces. Should the improvement progress, but a relapse into deeper stupor afterwards threaten, either the lancet again, or cupping to the nucha, may be used.

Older or more doubtful cases may be treated tentatively, with cups alone, aided by mustard plasters to the legs, back, and epigastrium in turn; with laxative injections into the rectum during the attack, and saline purgatives afterwards. The head should be kept raised, and cooled with wet cloths until its temperature becomes normal. If the hair be thick, it should be cut very short or shaved off entirely.

When, however, there is reason, as usually is the case in really *old* or *broken-down* patients, to believe that *structural degeneration*, arterial or that of ramollissement, is the source of the attack, loss of blood will be *out of place.* It may even, by exhausting the enfeebled system, hasten death. Such cases, if they survive the first apoplectic fit, require rather nourishing diet, and sometimes even tonics, to support strength, favor repair, and prolong life. Great delicacy of judgment, of course, is necessary in deciding, in different cases, between these apparently so opposite modes of treatment. It is right to add, that the tendency of medical opinion, for the last ten or twenty years, has been towards the curtailment, to a great extent, of the use of the lancet in apoplexy.

Where a moderately plethoric condition is present, and the taking of blood, generally or locally, is not decided upon, purgation is safe and likely to be useful. Jalap, resina podophylli, or croton oil, in small doses, will have the advantage of convenient administration [F. 135, 136].

PARALYSIS.

Varieties.—*According to the proximate cause:* 1. Cerebral palsy; 2. Spinal; 3. Reflex paralysis; 4. Toxæmic (*e. g.*, lead palsy); 5. Hysterical palsy. *According to the extent of the affection:* Facial or other local palsy; Hemiplegia; Paraplegia; General paralysis. *According to its nature:* Motor (acinesia), and Sensory paralysis (anæsthesia).

Facial Palsy.—This is an affection of the *portio dura* of the seventh pair of cephalic nerves, the motor nerve of the face. It occurs at any age, usually from rheumatoid inflammation of the sheath of the nerve at its escape from the cranium through the stylo-mastoid foramen. One side of the face is without change of expression; and the eye on that side is not closed (in severe cases), on account of the paralysis affecting the *orbicularis palpebræ* muscle. The tongue is not affected in its movements.

The facial motor nerve is seldom involved in the much more serious cases of *cerebral* palsy. In facial palsy the retention of control over the tongue, while the power over the eyelid is partly or wholly lost, with the absence also of severe cerebral symptoms, will, especially in a young person, make the diagnosis easy as well as important. The **prognosis** is generally of recovery in a few days or weeks. The **treatment** of this form of local palsy may be by repeated small blisters behind the ear, followed, when convalescence has begun, by some warm covering (cotton wadding, flannel, or silk) to protect the part from cold.

Other local Palsies.—Pressure upon a nerve may cause its paralysis, generally temporary. I remember the case of a man, whose hand was rendered powerless for about three weeks by sleeping all night with his arm bent under his head. Frictions, the endermic application of strychnia, and galvanism were used in that case. *Writer's cramp*, or scrivener's palsy, is the result of exhaustion of certain muscles from over-use. Its cure is rest.

Palsy of the optic nerve is designated as *amaurosis;* of the sense of hearing, *cophosis*; of taste, *ageustia;* of smell, *anosmia.* Except the first, however, these terms are not much used.

Various other special palsies are described, which require further study; as, *labio-glosso-pharyngeal* paralysis,[1] and *pseudo-hypertrophic muscular sclerosis,*[2] etc.

Hemiplegia.—Brain-lesion is most often the cause of this affection; either an apoplectic clot, a tumor, embolism, or softening. Spinal disease may, however, produce it; and some cases are, by writers upon the subject, referred to a peripheral or reflex origin. There may occur also, transiently, *epileptic*, *choreic*, and *hysterical* hemiplegia. Owing to the decussation of the anterior pyramids of the medulla oblongata, lesion of one side of the brain produces

[1] See Guy's Hospital Reports, vol. xv.

[2] See a paper by Drs. Ingalls and Weber, Boston Med. and Surg. Journal, November 27, 1870, and one by Dr. W. Pepper, Philadelphia Med. Times, June 15, 1871, *et seq.*

paralysis of the other side. In spinal lesion the palsy is usually on the same side. Brown-Séquard, however, has shown decussation in the cord also, of the sensory nerve-filaments.

Symptoms.—Suddenly, almost always, but not always with loss of consciousness, the patient loses the power of motion, and more or less of sensation on one side. In *complete* cases the parts involved are the arm and leg, the muscles of mastication (with the buccinator), and the half of the tongue. In trying to protrude the tongue it is pushed out towards the affected side; in retracting it, the reverse happens; that is, it is drawn towards the sound side. The palsied cheek hangs; but the eye can be shut or opened at will. The third, fifth, and ninth nerves are especially apt to show implication by disturbance of the actions under their control; of the fifth, those of the muscles already mentioned, as well as of facial and lingual sensation; of the third, loss of power to lift the eyelid, strabismus, and dilatation of the pupil; the ninth, one-sided movement of the tongue, affecting also the speech.

Hemiplegia may be attended by either rigidity or relaxation of the muscles, and the former may be early or late. Where there is decided relaxation in cerebral paralysis, it is probable that white softening, or atrophy from thrombosis[1] or embolism of some of the vessels of the brain, is the lesion, with or without a clot; where early rigidity is marked, an apoplectic clot may be inferred. Late rigidity is probably due to an atrophic state of the muscles—a "*rigor mortis in vitæ.*"[2] Contradictory accounts are given by authorities as to the susceptibility to galvanic excitation of the muscles on the sound and on the *paralyzed* side. It is probable that the loss of excitability of muscles is in proportion to their atrophy.

The **prognosis** in hemiplegia depends greatly on the ascertainment of its causation. If it follow an epileptic fit, or attack of chorea, or occur in an hysterical subject, it may be of comparatively brief duration, ending in recovery. If an apoplectic attack precede it, or if any lesion of the brain be inferred from the history of the case, the prospect is bad. Partial improvement may occur, not often entire restoration; and renewed attacks or "strokes" are likely to take place.

Dr. S. Weir Mitchell has made the curious observation[3] that, in cerebral palsy the growth of the nails is retarded; a more rapid elongation of them being therefore a prognostic of partial or complete recovery. In hysterical palsy the nails grow as usual.

Treatment.—Essentially the same principles are applicable to this as have been mentioned in connection with apoplexy. The younger the patient, the more vigorous his previous health, and the fuller the circulation, the more appropriate will be the general or local abstraction of blood to diminish pressure upon the brain.

[1] Lidell, Am. Journal of Med. Sciences, April, 1873.

[2] I have above purposely avoided alluding to the complications introduced of late into the special pathology of paralysis by the vivisections of Brown-Séquard and others; because, brilliant as they are, while they have *unsettled* much, they do not appear to me to have positively *settled* anything.

[3] Trans. of Phila. College of Physicians, April, 1871; Phila. Med. Times, June 1, 1872.

Where softening is apprehended, bleeding should be exceptional and cautious. Epileptic, choreic, and hysterical hemiplegia indicate little or no depletion as a rule. Rest, regulation of the bowels, counter-irritation by dry cups to the upper part of the spine, and afterwards a blister, with frictions, as with brandy and red pepper, or whisky and hot water, or salt and spirits to the affected limbs; these are measures of general utility. A seton in the back of the neck is sometimes recommended. As to strychnia, it is not safe where cerebral or spinal irritation is likely to exist, as near the commencement of most attacks. Even at a late stage, it should be used with extreme caution, watching its effects [F. 137]. Precisely the same statement may, upon the best authority, be made as to electricity in cerebral paralysis. In the *hysterical* form, if it last long, electricity may be applied locally, with safety and advantage. In any curable case, *passive exercise* of the weak limbs will be very useful.

Paraplegia.—This is paralysis of both the lower extremities. *Spinal* disease or injury is its source; with or without cerebral implication or complication. It may come suddenly or gradually; generally its beginning, at least, is sudden. *Reflex* paralysis, as described by several authors, is sometimes paraplegic.

Symptoms.—In organic or spinal paraplegia, as well as in the reflex form, numbness in the feet and pain in the back are apt to be early signs. The power of motion is lessened or lost in the lower limbs. The muscles may be either relaxed or contracted. The lesion of the spinal marrow, if progressive, is productive, finally, in many cases, of loss of power over the bladder and sphincter ani. Bed-sores, with deep ulceration and sloughing, may occur in protracted cases.

Treatment.—When *myelitis* is believed to exist, at an early stage, local depletion to a moderate extent, in otherwise good subjects, may be advised. In any case, counter-irritation (not vesication, in a bed-ridden patient, unless he can lie well on either side), by repeated sinapisms, or stimulating liniments [F. 138, 139], will be proper.

While inflammation or active irritation of the spinal cord is made apparent by the symptoms (pain, cramps, muscular twitchings, or rigidity) strychnia is not suitable. After these have subsided, it may be given—not more at first than the thirtieth of a grain twice daily. If it produce jerking movements of the hands or feet, or nervous restlessness, or any marked uneasiness, it should be suspended. Electricity may be used, with similar caution, in a secondary or relatively late stage of paraplegia. Moderate (at first very gentle) shocks of the interrupted circuit are preferred.

Hysterical Paralysis.—In females, this is among the many forms of functional disorder which that strange and not yet clearly defined disorder, hysteria, may produce. It is diagnosticated by the aid of the history of the patient. Dr. Todd stated that, in it, the affected limb (it is most often hemiplegic) in walking is dragged after the other, as if a dead weight; while in cerebral hemiplegia the palsied leg and foot are brought round in a curve, the body being bent toward the sound side at the time. I am doubtful of the universality of this sign. The palsy in hysterical

paralysis is, at all events, incomplete, and has usually a marked degree of numbness associated with it. Briquet asserts that it affects the left side of the body much more often than the right.

Treatment.—Tonics, good nourishment, and change of air (in a word, analeptic management), are needed in nearly all hysterical cases. For the paralysis itself, electricity has been found useful. Mild shocks for a few minutes twice a day may be given with the magneto-electric apparatus.

Reflex Paralysis.—From the times of Whytt and Morgagni, occasional instances of palsy of motion or sensation, caused by an injury at a distance from the affected parts, have been recorded. Since Stanley's paper (1833) asserting the production of paralysis, sometimes, by disease of the kidney, a number of medical writers have added to the list of supposed cases of "paralysis without apparent lesion." Worms, dysentery, diarrhœa, uterine irritation, teething, and external injuries are all thought to induce reflex paralysis in certain instances. Diphtheritic and scarlatinal palsies have by some been placed in the same category. The simplest and clearest cases are those of wounds; *e. g.*, Morgagni's case, in which amaurosis was suddenly produced by a blow upon the eyebrow, affecting the supra-orbital nerve. I would exclude most of the asserted instances of *visceral* reflex paralysis.

The *pathology* of this form of palsy is a subject of much controversy. To my judgment (after reading considerably upon it) the best explanation is that of Handfield Jones and S. W. Mitchell; expressed in the term proposed by the former—"inhibitory action." Denying, against no matter what present authority, the existence of *inhibition* or repression as ever proved to be the *normal* function of any nerve (such as some assert on the ground of experiment in regard to the pneumogastric), I consider it most reasonable to admit it here *pathologically*. In other words, a *morbid* impression, from injury or disease, in one part of the body, being transmitted along a nerve in the nerve-centre, overwhelms or paralyzes it; the effect being shown, of course, in the parts to which it distributes nervous branches.

Treatment.—In true reflex paralysis, of short or moderate duration, the removal of the irritant cause produces instant relief; as in H. Jones's case, where strabismus from palsy of the external rectus oculi muscle disappeared after a piece of dead bone was extracted from a whitlow on the thumb; or Lawrence's, in which blindness of one eye (of thirteen months' standing) was cured by the extraction of a carious tooth, with a splinter of wood projecting from one of its fangs. When the nature of the case does not admit of such prompt relief, if the diagnosis be clear the same indication remains; to address our remedial measures to the seat or source of peripheral irritation. Palliate, if we cannot cure, the trouble there, and we will obtain palliation, if not relief, of the reflex disability. Electricity has proved signally useful in the subsequent treatment. This form of disorder is, however, very rare.

Diphtheritic Paralysis.—After the termination of an attack of diphtheria, commonly within three weeks, the muscles used in swallowing and speaking, or, less often, those of the upper and

lower limbs, or the sense of sight, may be partially paralyzed. Loss of sensibility usually accompanies the loss of motor power. This condition of things may last for weeks or even months, but is generally recovered from. Whether the immediate cause of the paralysis be the peripheral lesion of the nervous terminations (in the pharyngeal and laryngeal affection) or the toxæmic influence, upon the nerve-centres, of the morbid poison of diphtheria, cannot yet be decided. In extended palsy as a sequela, the latter is the more probable explanation.

Treatment.—Passive exercise, stimulating frictions, and electricity, sometimes with change of air, and sea-bathing, are suitable measures for this affection.

Syphilitic Paralysis.—The most unequivocal instances of this nature are accounted for by periostitis within the cranium, involving the dura mater, or by nodular exostosis, pressing upon the brain. The most remarkable fact connected with such cases is the recorded experience showing the prompt curative effect upon it of *iodide of potassium* [F. 140]. Obscure paralysis, without apoplectic symptoms, and in a syphilitic constitution, may be tentatively so treated, on the basis of such experience.

Lead Palsy.—Considerable time of exposure to the influence of lead is generally necessary to cause this. So commonly does it first affect the extensor muscles of the forearm, that the cognomen of "wrist drop" is often applied to it. When it lasts for some weeks, the muscles waste away. A blue line is observed to form along the edge of the gums. Pain precedes the palsy, and attends recovery of power. During the attack, the muscles have their excitability by electricity considerably diminished or lost.

Lead poisoning sometimes seriously (even fatally) involves the brain (*encephalopathia saturnina*). Tanquerel, Desboise, Rosenstein, Leidesdorf, and others have recorded cases, in which the symptoms were, amaurosis, hallucinations of vision, and epileptoid convulsions.

Mostly, though after a long time, lead palsy is recovered from. Iodide of potassium appears to act as an eliminant of the lead accumulated in the system. Ergot is asserted by some to be curative also. Faradaic electricity has been found decidedly beneficial; used in moderate strength for a few minutes two or three times a day. (See *Medical Electricity*, in Part I, Sect. III.) A milk diet is asserted by M. Péligot, an experienced glass manufacturer, to be preventive of lead poisoning in those exposed to it.

Mercurial Palsy is occasionally met with in those who work with the metal. Mostly *tremor* is a predominant symptom. Early withdrawal from the influence of the cause, and the continued use of the iodide of potassium, are the principal measures of treatment.

Paralysis agitans or shaking palsy is a more or less constant involuntary and uncontrollable shaking, of the hands, arms, head, or progressively of the whole body. Slight or moderate degrees of such tremor are common enough, from general nervous debility. Extreme cases evince the wreck of the cerebro-spinal system, and are therefore incurable. No especial treatment can be pointed out for this affection.

Wasting Palsy. (Cruveilhier's.)—A few of the muscles of one limb, or the voluntary muscles of the whole body, may lose their power, and then waste away almost to nothing. The shoulder and the ball of the thumb are frequent points of commencement for the palsy and atrophy. Insidious in its approach, the affection may last from six months to several years. It may end in recovery, in permanent arrest at a certain stage of the disease, or in death. Twelve months is the earliest recorded period for the occurrence of a fatal end. This is the result always when the *trunk* is invaded. After death, the spinal marrow has been examined in but a few cases. No lesion has been found in most of them; in a certain number it has. Dr. J. Lockhart Clarke in one case[1] found the diameter of the cord one-fourth less than the average. But our methods of inspection of nervous tissue are yet too imperfect for it to be pronounced that such an atrophic disease is independent of the nervous centres. It may be the *ganglia* which regulate *nutrition* that are in fault.

The same remark may be made in regard to the pathology of progressive muscular sclerosis, the *pseudo-hypertrophic muscular paralysis* of Duchenne; the singularity of which consists in the fact that while some of the muscles are wasted, or at least weakened, *enlargement* afterwards occurs, in the same or in other muscles,[2] by morbid proliferation of connective-tissue elements.

The subjects of this affection are mostly young. Its progress is gradual and not painful. The muscles of the calves of the legs, lumbar region, and buttocks are especially often involved. The affected muscles are not contracted at any stage.

General Paralysis of the Insane.—Only a minority of insane persons have this affection. Difficulty of speech, and general tremor, characterize it, followed by the gradual loss of all mental, muscular and sensory power. Delusions of an extravagant kind commonly attend it; whence some French writers have called it "folie ambitieuse." It is incurable. In diagnosis, Dr. Bucknill has pointed out the significance of the loss of electro-motor excitability in the muscles. In pathology, general paralysis, or *paresis*, seems to be connected with a change in the cortical substance of the brain. Calmeil, who first clearly described it (1825; Bayle, 1822), believed it to be due to chronic inflammation of the brain. More probably, its cause is a defect of nutrition; a degeneration; whether or not preceded by inflammation. Dr. Howden, of Montrose, has found granular degeneration of the nerve-cells in some cases.[3] Granulations of the lining of the ventricles are asserted by M. Joire[4] to be peculiar to general paralysis; but Maudsley, Blandford, Shew, and Seguin[5] have found them in cases of mania and dementia. Allbutt has, by the ophthalmoscope, detected atrophy of the optic nerves in nearly every case. Luding Meyer,

[1] Brit. Med. Journal, Dec. 7, 1872.
[2] See a careful analytical report of a case of this affection by Dr. W. Pepper, Phila. Med. Times, June 15th, 1871. The researches of Lockhart Clarke have made it certain that wasting palsy is essentially a *central* disease.
[3] London Lancet, July 31, 1869, p. 157.
[4] Bulletin de l'Acad. Imperiale de Médecine, 1861.
[5] Amer. Journal of Med. Sciences, July, 1871.

of Göttingen (Virchow's Archiv, Aug. 1873), advocates the view that the essential affection is a chronic inflammation of the brain and its membranes; involving the minute vessels and interstitial material, not the nerve-cells.

Constitutional *syphilis* has probably a causative relation to some, but certainly not to nearly all cases of general paralysis. When there is room to suspect this, anti-syphilitic treatment ought to be tried for its relief.

LOCOMOTOR ATAXY.

Though recognized in its essential features by Sir Charles Bell, Matthew Baillie, Hufeland, and others, this affection has been better known since its especial study and designation by Duchenne (of Boulogne) not many years since. Dr. R. B. Todd called it *ataxic paraplegia;* an older name, especially in Germany, was *tabes dorsalis.*[1]

Symptoms.—*Pains* generally first occur; mostly in the limbs, sudden, variable, but often very severe; compared sometimes to *toothache in the legs.* Occasionally they are in the face or trunk; and commonly they are aggravated by pressure, as well as by cold and wet. *Strabismus* and *dimness of vision* (amblyopia) are apt to be early symptoms. *Loss of sensibility* of the skin, or more deeply seated, especially in the feet, and afterwards in the upper extremities, follows. Insensibility to pain (analgesia) on pinching or pricking with a needle occurs in many cases. More rarely, there is local *hyperæsthesia*, or excessive tenderness to the touch. *Retention* or *incontinence* of urine come usually later; spermatorrhœa often quite soon in the case. Impotence, in an advanced stage, is the general rule. The *bowels* are generally constipated; though the patient may lose power to control the act of defecation. The *pulse* is moderatly accelerated. The *stomach* is subject to attacks of indigestion and vomiting. Sometimes a rheumatoid affection of the *joints* occurs.

The *pathognomonic* sign of this affection is *asynergia* (Bazire), *i. e.*, loss of co-ordination of the muscular movements of the lower limbs. The gait, in walking, is *unsteady* and insecure; the limbs feel heavy and are easily fatigued. Each step, in an advanced case, is apt to be made with a sort of jerk forwards; quite differently from the slow and dragging movement of ordinary hemiplegic paralysis. If the patient shuts his eyes, he is likely to fall down. A similar loss of co-ordination in the arms and hands is met with not unfrequently, but to a less extreme degree. Although Duchenne asserts the persistence of muscular power without loss in this disease, it is almost certain (Oppolzer, Allbutt) that it is more or less impaired from the beginning in every case.

Prognosis.—It is a progressive disease, but of various duration; from six months to thirty years; average perhaps about seven years. Recovery is scarcely to be hoped for.

Causation.—This is a disease of middle life, especially in males. Obscure in its origin, and perhaps, as Trousseau insisted, connected

[1] See Appendix, by Dr. Clymer, to Philada. Edition of Aitken's Practice of Medicine, vol ii., p. 978.