Original Articles.

CEREBRO-SPINAL MENINGITIS. FIVE CASES. ONE, OF THE FULMINANT (FOUDROYANT) TYPE, TREATED BY SUBCUTANEOUS INJECTION OF APOMORPHIA, MORPHINE, AND ATROPINE; RECOVERY. ONE AUTOPSY.¹

BY A. L. MASON, M. D.

NOVEMBER 13, 1881. G. H., a healthy young gentleman of twenty-one, was seized without premonition, immediately after a hearty dinner, during which he had been in his usual spirits, with sudden vertigo. He staggered with assistance to a sofa, and became unconscious, with pallid countenance, clammy skin, and no pulse. I saw him fifteen minutes later, at 8.45 P. M., when the condition was as follows: semi-conscious, eyes vacant, pulse 70 of fair strength, breathing shallow, skin moist, hands and feet cold. Movements indicated that there was pain or distress in the head and cardiac region. In a few minutes convulsive shivering and twitching of the lips and jaw were observed. Ammonia was applied to the nostrils and hot bottles to the extremities. An attempt to swallow brandy and water caused a convulsion of great severity, the muscles of the neck, back, and thorax being in a state of prolonged contraction, with upward rolling of the eyes and clenching of the jaws. The breathing stopped, the heart became feeble, there was cyanosis and, apparently, impending asphyxia, which was averted by the gradual relaxation of the spasm. These convulsions recurred in rapid succession, and seemed to be very exhausting. The friends could assign no possible cause for the symptoms. The patient had never had a similar attack; there was now no frothing at the mouth, paralysis, or vomiting. There had been no previous complaint of any discomfort whatever up to the moment of attack; uræmic or irritant poisoning seemed improbable; cerebro-spinal meningitis was not prevalent, and it was not until the following day that a probable diagnosis could be arrived at.

The state of the patient was critical, and I immediately sent for Dr. J. Collins Warren to consult with me, requesting him to bring a stomach pump and ether. Dr. Warren came at 9.30 P. M., one hour after the beginning of the attack, and he also brought some apomorphia, which proved to be of the greatest possible service. The patient, who was a large, heavy man, was with difficulty carried up to bed, mustard was applied to the extremities, and ether was administered. The latter was found to be of no use, as the convulsions were excited to an alarming extent by the first inhalations. At 10.30 P. M. one sixth of a grain of muriate of apomorphia was injected under the skin, and in eight minutes the stomach was emptied, without retching, as if it had been turned inside out. A basinful of solid food, quite unchanged, was evacuated. Relief followed. The face, which had been congested, became pale, free perspiration ensued, the convulsive action subsided, the pulse was 72, and the patient rested quietly until five A. M. without further treatment.

November 14th. At nine A. M. there was a return of convulsions of the same type. The patient was unconscious; face dusky, pupils dilated, head drawn back, with rigidity of cervical muscles. There was inability

to swallow and retention of urine. A pint, normal in character, was drawn by catheter.

At 11.30 A. M. Dr. Warren again saw the patient in consultation. It was determined that he was suffering from cerebro-spinal meningitis, and a guarded prognosis was given.

The bowels were emptied by a large stimulating enema, six grains of calomel were given, ice was applied to the head, and leeches to the nucha. The leeches and ice were of no benefit, however, because their application caused general convulsions, with opisthotonos, and after a few minutes it was evident that the subcutaneous injection of morphia was the only remedy likely to prove of any value. The patient was kept constantly under its influence, one eighth grain of morphia combined with one one hundredth of atropine being given at varying intervals for many days. Owing to the inability to swallow, nutritive enemata of milk, beef-tea and brandy were given every three hours. Bromide of potassium was also administered by the rectum. The calomel acted once.

November 15th. Drs. Borland, Warren, and William Appleton saw the patient in consultation. Dr. Borland, who had been the family physician for many years, concurred in the diagnosis and treatment. The condition thirty-six hours after the attack began remained about the same. But the convulsions were partially controlled, the enemata were retained, the kidneys secreted about two pints of normal urine daily, which was drawn by catheter, there was a good pulse of 85, and little or no fever. Still the condition was dangerous, and during the following days Dr. Warren met me frequently in consultation. After the first forty-eight hours the patient was placed under the constant medical care of Dr. Charles P. Strong, who for twelve nights gave him the benefit of much judicious attention, which contributed greatly to his recovery. From Dr. Strong's notes I make the following extracts regarding the progress of the case:—

November 15th, third night. The convulsions were recurring in series of three or four, with several hours' intermission, with less severity, but the muscles of the face, neck, and extremities were in a state of constant spasm, producing twitching movements, which were, however, to a great extent under the control of morphia.

The sensibility to external impressions had become very great, sudden admission of light, shutting the door, and the like, producing convulsions. There was hyperæsthesia of the whole body, most marked over the cervical vertebræ however, where the slightest touch produced a spasm.

Pulse, temperature, and respiration were normal, but the pupils were widely dilated. Slight epistaxis. Nourishment was given by enema. Subcutaneous injections of morphia, grain one eighth, atropine grain one one hundredth, were required at eleven A. M., 2.45 and ten P. M.

During the third day the patient swallowed two ounces of milk by teaspoonfuls, though showing no other consciousness.

November 16th. Aside from two convulsions produced by enemata the night was passed very quietly. Hyperæsthesia of the neck was fully as marked as on previous days, and several convulsions were induced by the patient's putting his hands on that region. The pupils were a little less dilated than on the preceding days, and pulse and temperature both normal.

¹ Read before the Boston Society for Medical Improvement, January 28, 1884.

Bromide of potassium was given in twenty-grain doses, and to the amount of a drachm and a half daily during the rest of the sickness, being omitted sometimes because of bromism, which was readily induced. Nourishment was given through a soft rubber tube, around which the patient's lips were held. There were no convulsions between eight A. M. and 2.30 P. M., or 2.30 and 10.30 P. M. Temperature 99°; pulse 65.

Subcutaneous injections of the same amount as yesterday were given at 4.30, 8, and 10.30 A. M. 2.30 and 10.30 P. M.

November 17th. There were but two convulsions during the night, and the muscular twitchings were much less marked. Considerable nourishment had been taken, and the patient's general appearance was improved. There seemed at times a semi-conscious condition, as shown by the patient opening the mouth when told, smacking his lips in a peculiar manner when he wanted water, and at such times refusing to drink anything else. He could close his lips around the tube when it was put in his mouth without requiring them to be held. His pulse was stronger and temperature still normal.

Subcutaneous injections were given at 10.30 A. M. and 9.30 P. M.

November 18th, fifth day. There had been an intermission of fourteen and one half hours without convulsions, most of the time the patient sleeping quietly, but at two P. M. a series of very violent ones began, requiring morphine frequently. As the patient continually put his hands upon his abdomen, and some flatus was noticed, it was thought that an enema might produce a more comfortable condition, but no sooner was the tube inserted than there were convulsions of as severe a type as he had on the first night. The whole body would become rigid, then the head and knees would approach until nearly touching, when, suddenly, he would throw himself into complete opisthotonos, and lie so until the face became livid, when relaxation took place. There were four of these convulsions, with about two minutes' interval between before the subcutaneous injection, which was at once given, produced its effect.

After lying about two hours in a perfectly exhausted condition, his temperature meanwhile rising to 100.2° F., he began to talk with perfect distinctness. These were the first articulate sounds he had made since the commencement of his sickness. The words were perfectly intelligible and the sentences well arranged, but his ideas were all terrible delusions. He saw strange and frightful animals about, whose attacks he tried in vain to ward off, but they always bit his head; he was caught in the sands, and the tide was rising around him; his head was bound with hot irons, etc. He remained in this condition of delirium nearly all night, but as the morphine took effect his fancies became more pleasant. The head and limbs were in constant motion until he fell asleep, towards morning. Pulse 58.

Subcutaneous injections at 2, 4.15, 6.15, 9.30, and 11 P. M.

November 19th. When he awoke he was in the same lethargic condition as before the delirium, but this soon passed away, and his delusions returned; yielding, however, more readily to morphine. The temperature was 101° F.; pulse 60. There were no convulsions until evening, then but two slight ones, and he passed the night more quietly and naturally than any previous one.

Subcutaneous injections at 1.45 and 8 A. M., and at 8 P. M.

November 20th, seventh day. When he woke he recognized his relatives, who were in the room, but did not speak to them. He took full amounts of nourishment, and appeared perfectly conscious of his surroundings, dozing at intervals during the day. In the evening, without apparent cause, there was a very severe convulsion, after which the customary delirium. When asleep there was absence of those muscular twitchings which were present during most of the waking hours, and were especially induced by any excitement, however trivial, such as drinking, etc.

Subcutaneous injections at 3.15 and 11 P. M.

November 21st, eighth day. During the night he complained of pain in the front of the head, but said this had passed away in the morning. He was perfectly rational, knew and spoke to those about him, inquired the day of the week, and, when told, said, "I've been sick only a day then." He slept much during the day, but at night grew very restless. No morphine given.

November 22d, ninth day. Perfectly rational during the day. Micturition and defecation voluntary for the first time. Although perfectly quiet through the day, at night he was very restless. No morphine given.

November 23d. After a restless night the temperature was 103° F., pulse 90, and the general condition worse. The muscular twitching returned, and he lay in a lethargy so deep it was impossible at times to rouse him for nourishment.

Subcutaneous injections at 5.45 A. M. and 8 P. M.

November 24th. During the night the skin became moister, and he was greatly improved when he woke in the morning. The same condition of nervous excitement returned at night, although he slept a great deal during the day. Yawning was quite a noticeable symptom. Pulse was 78, temperature 100.4° F.

Subcutaneous injections at eight and eleven P. M.

November 25th. Complained of pain in the head, especially in front, and passed the day in the same somnolent state, growing restless towards evening. Epistaxis.

Subcutaneous injections at nine and ten P. M.

November 26th. Pulse 66, temperature 99° F. Epistaxis. Patient was very much improved, sleep was natural, and nourishment was taken freely. The history of succeeding days was that of steady convalescence, the only point of interest being the pulse, which remained below 60 for some time, and then gradually rose to its normal rate.

December 7th. Convalescence, beginning at the end of the second week, was interrupted in the middle of the fourth week, after the patient had been about the house for some days and out of doors once, by a return of convulsions, in a less severe form, accompanied by dilated and insensible pupils, and followed for two or three days by moderate fever, restlessness, and debility. The patient complained of renewed pain in the head, neck, abdomen, præcordia, and legs. The cervical muscles were contracted, there was intolerance of light, frequent spasmodic twitching of the face, lips, and arms, coated tongue, and a sluggish mental state as before, with active delirium at night. The subcutaneous injection of morphine was resumed, and the services of Dr. Strong were again needed for three nights, after which progress toward recovery was rapid. At the end of five weeks the headache had disappeared, but there was still some stiffness of the neck,

and after two months the patient was well enough to return to college.

Six weeks later he had a severe attack of diphtheria, involving the tonsils, soft palate, pharynx, and nostrils, attended by marked prostration. As neither of the above attacks could be traced to any local cause, it was thought that they indicated an unusual susceptibility to zymotic influences on the part of the patient.

CASE II. J. C., aged fourteen, school-boy, entered the City Hospital November 27, 1881. He had been taken two days before with headache, pain in the back and legs, and persistent vomiting. Tongue moist and coated. Bowels constipated. Pulse 99; temperature 101.6° F. An ice-cap was ordered. Cracked ice; milk and lime water; sponge bath. Ten grains of bromide of potassium were given every four hours. Bowels evacuated by enema. The night after entrance he became delirious, and on the next day the head was strongly retracted, with tenderness over spinous processes and hyperæsthesia of the extremities. The skin was cool, the face somewhat cyanotic, and an eruption of herpes appeared on the lips. Vomiting continued. Ptosis of right eyelids.

On the fourth day he was transferred to the care of Dr. Webber in the Department for Nervous and Renal Diseases. December 1st it was noted that attempts to straighten the head caused much pain, and that the skin was hot and dry. No *taches cérébrales*. The ice-bag was continued, with the use of ergot, morphine, and chloral.

During the second week the temperature, which had been as high as 105° F., remained at about 100° F., with a pulse of 60, strong and full. The pain diminished, but the head was still bent back and vomiting was frequent, so that small quantities only of milk and Mellin's food could be given, with stimulants. The mind was pretty clear.

In the third and fourth weeks the head was straighter, there was slight deafness, and complaint of pain in the neck and head. There was no recuperation, however; the stomach remained irritable; and the temperature was sub-normal most of the time, falling to 96.5° F. the day before death, which took place one month after entrance. There was no autopsy.

CASE III. J. H., laborer, aged twenty-four, was admitted to the hospital May 12, 1883, in wild delirium. The surface of the body was cool and bluish; head drawn back; eyelids closed; pupils contracted; tongue and lips dry, the former brown and cracked; sordes on teeth; jactitation of limbs; a few brown maculæ, apparently of recent origin, on shoulders and thighs. No rose spots; no œdema; no paralysis. The bladder extended nearly to the umbilicus and fifty-nine ounces of bloody urine were drawn by catheter, the patient becoming more tranquil afterward, and the next morning he had recovered consciousness. He then stated that for several days he had had a dull headache, and suddenly without warning fell down, remembering nothing afterward. At entrance the temperature was 102° F., pulse 100. Urine normal, with the exception of the blood. Catheterization was necessary for several days, during which he was roused with some difficulty, lying with the head thrown back and suffering pain in the neck when touched or moved. The temperature remained at 101° F., and the pulse at about 100, during the first week. An eruption of herpes appeared on the lips, and debility was great. Half an ounce of whiskey was given every hour for several days, with

milk, and an ice-cap was in constant use. There was no vomiting, but constipation was marked.

In the second week after admission the pain disappeared, leaving no stiffness; the temperature was sub-normal, tongue clean; emaciation and weakness considerable. Convalescence slow, the patient remaining six weeks in hospital. In the treatment no drugs were used except morphine.

CASE IV. M. C., laborer, aged twenty-six, was admitted May 15, 1883, having suffered three days with pains in the head, neck, and extremities, constant nausea, occasional vomiting, nosebleed once or twice, insomnia, and constipation. At the time of entrance there was severe pain in the dorsal region of the spine, with constant groaning, the slightest movement causing intense suffering. Temperature 101° F.; pulse 84. A poultice was applied to the nape of the neck, ice-cap to the head, and large doses of morphine were given. The bowels were moved by calomel and enemata. The next day there was extreme spinal tenderness, retraction of the head, and herpes on the mouth and nose. For ten days the patient remained in a stupor, with temperature 103° F., pulse about 80. But the signs of pain gradually subsided, and on the eleventh day after admission he was comfortable, with a sudden fall of five degrees to the normal temperature, and a pulse of 70.

Convalescence was interrupted early in the fourth week by a recurrence of the spinal pains and stupor, which lasted two days, but after a month the patient could walk about, though there was considerable muscular stiffness.

CASE V. C. H., aged thirty-six, was brought into the hospital by the police September 25, 1883, in a semi-comatose condition. He had no friends, and no previous history could be obtained. His conjunctivæ were slightly congested; pupils equal; considerable apparent deafness; retention of urine, and mild delirium from the time of entrance until death. There was no paralysis of the extremities, no nausea or vomiting, and no muscular tremor. Fifty-one ounces of urine were withdrawn by catheter, and his bowels moved once. Temperature 102.6° F.; pulse 94.

September 26th. Last night he complained of considerable pain and was quite noisy. He took little nourishment, owing apparently to difficulty in swallowing. The urine was slightly high colored, strongly acid, of 1018 specific gravity, and contained a slight trace of albumen. Pulse very weak. Brandy was given subcutaneously.

September 27th. He gradually failed, and died this morning at 2.10, about thirty-six hours after entrance. Dr. George B. Shattuck, under whose care he was, gave me the above notes and the report of the autopsy.

Autopsy by Dr. Gannett (eighteen hours after death). Body of medium size and fairly well developed and nourished. Marked lividity of dependent portions. Rigor mortis present.

Brain. Nothing unusual about *calvaria*. Dura everywhere thin and translucent. Sinuses contained a moderate amount of coagulated blood; sulci of pia of convexities opaque and of a grayish-yellow color. Surface of convexities dry. Convulsions flattened. Pia at the base of brain along clivus and the under surface of cerebellum opaque and of a greenish-yellow color. On scraping with the knife, soft greenish-yellow masses could be removed. Vessels at the base and of the fissure of Sylvius showed nothing unusual. Lateral ven-

tricles distended three times their usual size, containing an opaque grayish fluid. Ependyma everywhere velvety, softened, opaque, and of a grayish tint. Velum interpositum reddened and injected. Fourth ventricle showed similar appearances. Section of the brain substance in general showed the puncta cruenta of normal size. Brain substance of normal consistency. Section of pons, medulla, and basal ganglion showed nothing of especial importance. Vessels of pia contained considerable blood.

Cord. Abundant escape of puriform fluid from sub-mural space of the cord. Vessels of pia along surface of enlargements and along whole dorsal posterior region showed an abundant collection of greenish-yellow puriform fluid. Anterior region, same appearances of a less degree. Cord not opened; preserved.

Diaphragm. Right and left upper border of fourth rib.

Pericardium contained fifteen cubic centimetres clear fluid. Visceral surface of pericardium thickened and grayish in portions over anterior surfaces.

Heart somewhat enlarged in long diameter. Left ventricle very firmly contracted. Right ventricle and auricle distended with partly coagulated blood. Mitral valve admitted tips of three fingers; tricuspid tips of four. Valves and cavities not remarkable. Muscular substance of left ventricle increased one third in amount. Color and consistency good. Nothing remarkable about coronary arteries. Pleural surfaces of both sides free from adhesions.

Lungs partially contracted and everywhere crepitant, on section showed a rather pale red somewhat moist surface, and yielded on pressure a slight amount of pale fluid. Bronchi contained throughout a moderate amount of thick mucus. Bronchial mucous membrane showed nothing remarkable.

Spleen nearly double in size; usual color; somewhat diminished density. On section, pulp somewhat increased in amount and softer than normal.

Left kidney diminished one third in size; of a red color; density slightly increased; capsule detached with tolerable ease; external surface granular. On section, cortex somewhat diminished in size; of a grayish-red tint, and somewhat opaque. The distinction between convoluted and straight tubules not easily made out. Pyramids showed numerous gray lines parallel to course of tubules.

Right kidney slightly smaller than usual; had a few cysts size of large filberts beneath capsule with clear fluid contents. Otherwise kidney presented same appearances as described in the other. Oesophagus, stomach, intestines, and liver, not remarkable.

Diagnosis. Acute cerebro-spinal meningitis; acute ependymitis; acute hydrocephalus; chronic circumscribed pericarditis; hypertrophy of left ventricle of heart; acute hyperplasia of spleen; chronic interstitial nephritis (moderate degree) with cyst formation.

Remarks. In commenting on the above cases it may be said that all were severe, Cases I., II., and V. presenting many of the graver symptoms. All were adult males except the boy of fourteen. What the first case would have developed into in twelve or twenty-four hours if it had been left untreated it is impossible to say, but I thought at the time that the early evacuation of the stomach by apomorphia prevented exhausting vomiting, and that the anti-convulsive effect of morphine and atropine, with the use of nutritive and stimulating enemata during the period of unconscious-

ness, might have been the means of saving life. In epidemics, cases of the fulminating type rarely recover, the initial collapse usually becoming complete and death ensuing rapidly, sometimes in a few hours. Patients who survive the shock to the vital functions and live for a few days have a fair chance of recovery, a majority of fatal cases ending within five days.

Diagnosis. Hospital cases are seldom seen at the beginning of the attack. When they are brought in unconscious, as in Case V., an accurate history is not obtainable, and it is hardly possible during life to discriminate between the various causes of coma. The absence of paralysis, however, with normal or slightly albuminous urine, and the exclusion of hysteria, epilepsy, and poisoning, might, in times of epidemic, determine a probable diagnosis. The general appearance is not characteristic of typhoid, more so of typhus. In some epidemics of cerebro-spinal meningitis the petechial eruption, from which the synonym, spotted fever, is derived, is often seen, in others rarely. It was not present in any of the cases reported. The retracted head and hyperæsthesia of body and extremities due to the spinal meningitis are usually noticeable even in a state of partial coma. Herpes of the lips and face is of some value as a diagnostic sign. Certain cases of malignant or suppressed scarlet fever, so-called, fatal within twenty-four hours, may present much the same symptoms as those of the severest form of cerebro-spinal meningitis, and even an autopsy might not aid the diagnosis.

Symptoms. In these five cases retraction of the head with intense pain in the back of the neck, and prolonged headache with general hyperæsthesia, were the most noticeable indications of the disease, in all except the last, who entered the hospital moribund. Persistent vomiting, in Case II., seemed to be the main cause of exhaustion. In two other instances it was an early symptom. Constipation was present in every case; herpes of the lips and face in four; retention of urine in three, in one of whom it lasted a week; hæmaturia once, and a small amount of albumen twice; epistaxis in two cases; sore throat in one. The patients usually lay upon the side, as that position favors retraction of the head and relaxation of the cervical muscles.

The skin was dusky or cyanotic in most instances, the tongue dry and coated. There was in all more or less fever, the temperature rising to 105° F. in one case, but the height of the thermometer was not always proportionate to the severity of the symptoms, especially in Case I., whose axillary temperature was usually about 99° F., occasionally rising two or three degrees. In Case II. a sub-normal temperature and high pulse prevailed during the last week or more, the case ending fatally. The pulse generally ranged below 100, in two cases falling to 60.

Among the symptoms referable to the nervous system delirium, more or less prolonged, was noticed in every case, sometimes with subsultus and carphologia. Stupor, in varying degrees to complete coma, with hyperæsthesia, as before mentioned, usually coexisted. Convulsions occurred in one case. One patient had dilated and insensible pupils for a week; in another they were contracted. The conjunctivæ were congested in two cases. Deafness was observed twice; ptosis of the eyelid once. There was no other form of muscular paralysis, and this comparative immunity

among the subjects of cerebro-spinal meningitis has often been remarked.

Relapses or recurrence of symptoms, lasting a few days, happened twice in the third and fourth weeks. Muscular stiffness and debility in most instances lasted some time, and in one case there was effusion into the knee-joint, rapidly absorbed. Two cases were fatal. The death-rate in epidemics has varied from thirty-six to eighty per cent.

Pathology. The pathological appearances are well illustrated by the autopsy in Case V. The inflammation of the arachnoid and pia mater generally assumes a purulent form. In cases immediately fatal from shock and collapse, the anatomical evidence may be slight or wanting, although the brain is usually anæmic and cedematous. The ventricles are often found at a later stage distended with serum.

Treatment. In treating a self-limited disease of short duration with such a violent onset that the vital functions are often disabled at the start it is all-important to try to bridge over the few most critical days by artificial means. At the outset, if the stomach and bowels are full, it is well to empty them, and no emetic agent is so good as apomorphia, which may be used hypodermically in doses of one sixth to one tenth grain in adults, and one twentieth to one thirtieth in children. The sedative and relaxing effect of apomorphia is also very valuable in cases of convulsion, like Case I. A comatose condition or vomiting of cerebral origin would indicate the propriety of rectal alimentation. In many cases early blood-letting is advisable, and the utility of cold applications to the head and spine is generally conceded, although I could see no direct benefit from them in the cases reported, on the contrary, they were often uncomfortable.

Beyond this, symptomatic treatment is necessary, and chief among drugs is opium, supplemented, perhaps, by atropine and bromide of potassium during the acute stage of the disease; there is little fear of narcotism. Diuretic and diaphoretic measures are useful, especially the hot-air bath. Quinine and ergot, with iodide of potassium and mercury as absorbents of the effused product at a later stage, have been recommended, but in no disease is the "post ergo propter" mode of inference as applied to the effect of drugs more likely to be fallacious.

Causation unknown. Under the same sanitary conditions cerebro-spinal meningitis prevailed extensively in Boston in 1873, when there were 216 deaths as compared with sixty the year before, and thirty-five the year after, the violence of the influence appearing to exhaust itself in a single year. In 1872-1873 it went hand in hand with an extensive outbreak of scarlet fever, following closely or accompanying the end of the severest epidemic of small-pox that Boston has experienced since the introduction of vaccination, items which I quote from the late Dr. T. B. Curtis's valuable report on the Sanitary Condition of Boston, published in 1875. Of course those localities suffered most from these diseases where the worst sanitary conditions prevailed, and the victims were least able to withstand their ravages, but the surroundings play a less important part in the causation of cerebro-spinal meningitis than of other epidemic diseases. Winter and spring have been the seasons, and crowded barracks the favorite places for its attacks, excessive fatigue, insufficient food, and exposure to cold acting as predisposing causes. A few doubtful cases only of

contagion have been reported. Robust males between fifteen and thirty-five are the usual subjects, although in children, among whom the disease has at times extensively prevailed, the disproportion between the sexes of the patients is not great. The occurrence of cerebro-spinal meningitis in animals has often been observed, especially among horses in New York for some months before the epidemic in 1872, which preceded the outbreak in this vicinity by about a year.

History. Although there is not time to enter at length upon the history of cerebro-spinal meningitis in New England the narrative is interesting, and brief mention may be made of the earliest epidemic in Massachusetts, in 1806, when nine cases occurred in the town of Medfield, all fatal; of the report on Spotted or Petechial Fever, in 1810, by Drs. Thomas Walsh, James Jackson, and John C. Warren, a committee of the Massachusetts Medical Society; of the report to this Society, by Dr. Joseph Sargent, of a limited epidemic in Worcester County in 1849; and again, in 1866, that of a committee of the Massachusetts Medical Society, who found that 280 cases had been recorded in the State during the previous nine years, with a mortality of sixty-one per cent.

Much of the earlier literature on this subject is French, and admirably presented since the beginning of this century. Great Britain, with the exception of Ireland, where one epidemic among the constabulary caused a mortality of eighty per cent., has been comparatively free from the disease, and in Germany it attracted little notice until about twenty years ago. In this country, however, no disease has been more carefully watched and recorded, and among the numerous publications of later years the Boylston Prize Essay for 1866, by Dr. Samuel G. Webber, is especially complete and suggestive. Dr. Webber called attention to the pneumonic form of the disease, in which the lungs bear the brunt of the attack, the cerebro-spinal symptoms being delayed or imperfectly developed. Such a class of cases, in which croupous pneumonia was complicated by cerebro-spinal meningitis, especially in children, was afterward described by Immermann, Heller, and other German writers. Dr. J. Lewis Smith, of New York, in commenting upon this type of disease, states that in the epidemic season of 1872 in that city an unusually large number of cases of pleuro-pneumonia of an asthenic kind occurred among old people, suggestive of a common atmospheric cause.

The monographs of Professor Stillé and of Dr. Meredith Clymer portrayed the disease as it appeared in Philadelphia and New York, and the Sanitary Memoirs of the War contain a valuable article by Dr. S. B. Hunt. The State Board of Health of Michigan published an excellent report by Dr. Henry B. Baker in 1874, and in the same year Dr. J. Baxter Upham, who had previously described the Epidemics in the Camps about Newbern, N. C., in 1863, wrote a very complete and interesting history of the epidemic of 1873 for the State Board of Health of Massachusetts, in which it appears that 517 cases were returned by 199 physicians, and that there were 216 deaths in Boston alone. Dr. Upham informs us that it was not until 1867 that "cerebro-spinal meningitis" appeared as such in the nomenclature of the city records, and not until 1872 in those of the State, cases of this disease having previously been classed with others under the head of "cephalitis."

During the decade 1873-1883 2053 deaths have oc-

curred from cerebro-spinal meningitis in Massachusetts, 747 of them in 1873 alone, leaving an average of 130 fatal cases for each of the other nine years. Suffolk County has returned 476 deaths, Middlesex 412, and Worcester 240, but there has been a steady though small rate of mortality from this cause in most of the cities and many country towns in all sections of the State except Cape Cod and the islands, where it has been trivial. For the last two or three years the number of deaths has increased moderately, namely, to 157 in 1881, and 166 in 1882, the distribution in 1881 being chiefly as follows: Middlesex County, 27; Suffolk, 24; Hampden, 21; Essex, 19; Worcester, 14.

The valuable Mortality Tables of the State Board of Health, published weekly in the JOURNAL, show that neither of the diseases mentioned above, small-pox, scarlet fever, and cerebro-spinal meningitis, has prevailed during these years to an alarming extent, the epidemic type having been mild, but the seed has still lingered in our midst, and is wide-spread, cases of cerebro-spinal meningitis cropping up from time to time among the susceptible in such a way as to suggest the probability of a future outbreak whenever the mysterious combination of influences occurs on which such visitations depend.

A CASE OF SUDDEN AMAUROSIS. RECOVERY.¹

BY HASKET DERBY, M. D.

THE following case is both so unusual, as to occurrence, and so unexpected, as to result, that I have thought a brief report of even the scanty details I have at my command might not be without interest.

October 13, 1883, I saw Mary T., aged fifteen, for the first time. Near sighted since early childhood, she had grown steadily more so during her school life, and was using spectacles, right -9.5 D, left -8 D, all the time and for all purposes. A close, ambitious student, and attending a public school, she had worked unremittingly for the past year, making her studies her principal object in life, and paying little or no attention to her general health. This, however, had ordinarily been very good, with the exception of catamenial irregularity. The flow commenced at the age of thirteen, and had never been present oftener than once in two months. She was large for her age, and apparently neither nervous nor imaginative. Since the spring of this year she had, for the first time, been subject to severe headaches, not attended by nausea, extending over the whole head, lasting both day and night, materially worse during this fall. She came to me on account of failure of sight, which had been coming on for two weeks. Observing that her eyes were watering and her vision blurry, she had covered her left eye, and ascertained, to her astonishment, that she could not see with the right. Since making this discovery, a fortnight ago, the left eye had rapidly lost ground, and she was now unable to continue her studies.

The eyes were prominent and the pupils large, but presented no abnormal appearance to external inspection. Ophthalmoscopically there was a large, but defined and apparently non-progressive sclerotic-choroiditis posterior surrounding each optic entrance.

¹ Read before the Ophthalmological Section of the Suffolk District Medical Society, January 29, 1884.

The remaining fundus of each eye was entirely normal; no isolated patches of atrophy, no change in the circulation, no whiteness of the nerves. With 13 D concave the left eye had vision one tenth, the visual field being not contracted. *The right eye had no perception of light whatever*, either when tried by the mirror of the ophthalmoscope, by a lighted candle in a dark room, or exposed to the full glare of sunlight. The pupil of this eye was most active, contracting and expanding under light and shade, the other eye of course being closed.

What was the diagnosis? The first suspicion was naturally of malingering. The perfect honesty and simplicity of the patient went far towards removing this, and the usual tests with prisms showed the entire correctness of her statement. There were no other symptoms to encourage the diagnosis of hysterical amaurosis, no signs of general hysteria, of nervous derangement, of affections of other organs of special sense, or of local hyperæsthesia. All ophthalmoscopic indications were wanting. The ready response of the pupil to light and shade showed the deep-seated character of the affection, and that, according to Flourens, it must be located beyond the corpora quadrigemina; hence that it was likely to be diffused through a considerable portion of the brain. Such affections, says Leber, may occupy a region the integrity of which is essential to the maintenance of life itself. When the blindness is complete the general prognosis, according to him, is always grave. Should, in a short time, however, no affection of the general health occur, the chance of an ultimate restoration of sight is encouraging, the probability then being that there is no gross material lesion, but a local derangement that may readily disappear.

Four days later the condition of the patient was wholly unchanged. Entirely at a loss as to diagnosis, but in the hope that a possible derangement of the cerebral circulation might be connected both with the headache and the loss of sight, and if so, be affected by a local abstraction of blood, I applied the artificial leech to the right temple, removing an ounce and a half of blood. Lactate of zinc was also ordered in moderate doses.

The next day showed a result as remarkable as it was unexpected. The headache, which had been continuous and severe for six months, disappeared after the cupping, and has never since returned. Five days later there was distinct perception of light in the right eye, and even ability to follow the motions of the hand, held close to the eye. The cupping was now repeated, and again applied a week later. During this time each eye steadily gained. October 30th the right eye, armed with -12 D, had vision four tenths. The left, with -13 D, had two tenths. Each visual field could now be taken, and was found to be normal. November 6th there was

o. d. V 0.5 nearly.
o. s. V 0.4.

and this amount of vision continued when I last saw the patient, December 8th. In her own opinion her sight had fully returned. Her health was perfectly good, and she was wholly free from headache. Except for the high degree of myopia, and consequent imperfect vision, each eye seemed normal. She returned to school early in the present year.

None of the ordinary causes of cerebral amblyopia seem to have been active here. The termination of