Three cases of cranial surgery ... / by William H. Morrison.

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BY

WILLIAM H. MORRISON, M.D.,

OF HOLMESBURG, PHILA., PA.

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By WILLIAM H. MORRISON, M.D.,
of Holmesburg, Pa.

[Read May 25, 1892.]

The cases which I shall bring before the Society to-night, although differing in their pathological characters, are topographically related, and may with propriety be reported together. Each of the cases presents certain instructive points for consideration, and, thinking that it might interest the members of the Society to have an opportunity to examine the patients, I have had them brought before you.

The first case is one of linear craniotomy, an operation suggested some two years ago by Lannelongue,[1] of France, as possibly of service in certain cases of microcephalus and deficient mental development. In the case now reported thirteen months have elapsed since the operation, and the child certainly shows a decided improvement in its mental and physical condition. The second case is one of epilepsy, in which there were certain somewhat indefinite localizing symptoms. Exploratory trephining was done nine months ago with negative results. The third case is one of abscess of the brain, symptoms of compression of motor areas developing rather abruptly eight days after injury to the head. The skull was at once opened, and an

[1] L'Union Médicale, July 8, 1890.

ounce of pus evacuated from beneath the dura mater. The patient has perfectly recovered.

CASE I. *Defective mental development. Linear craniotomy at the age of two years and five months. Decided improvement. Report of condition at the age of three years and six months.*—The subject of the present report, M. L., male, was born August 30, 1888, and has now reached the age of three years and six months. The mother was a primipara. The head presented in an occipito-posterior position, the occiput rotating into the hollow of the sacrum. Forceps was applied and the child delivered. There was no apparent injury to the head, but in the course of a few days there formed, as a result of the pressure, a slough back of the left external angular process and one in front of the right ear. Whether or not this had anything to do with the development of mental defect, I am not prepared to say. When the child had reached the age of a few months it became evident that its mental condition was not up to the average, and as it became older this mental deficiency became more observable, and the child presented every appearance of drifting into complete idiocy. In regard to family history, it may be said that the parents are young and healthy and there is no known tendency to mental disease or deficiency on either the paternal or maternal side. Two children have since been born and both are normal, mentally and physically.

In December, 1890, I suggested a trial of the operation of linear craniotomy, which had been brought forward a few months previously by Lannelongue. The suggestion was accepted, but the performance of the operation was postponed for four months on account of the expected confinement of the mother. During this time the parents tried every means at their command to educate and improve the mind of the child, but no signs of betterment could be detected.

The operation was done April 17, 1891, thirteen months ago, and a report of it appeared in the New York *Medical Record*.[1] I quote from this report an account of the child's condition at that time and of the steps of the operation.

"Age two years and five months; height, 32 inches; length of right leg, 15¾ inches; length of left leg, 15⅝ inches, a difference of ⅛ of an inch; circumference at middle of thighs, 8½ inches. The measurements of the head were: occipito-frontal circumference, 18½ inches; semi-circumference from one external auditory meatus to the other, 12 inches; antero-posterior diameter, 6½ inches; biparietal diameter, 4¾ inches; bifrontal diameter, 3⅞ inches.

"He is able to sit alone but cannot stand. He moves from one place to another by sliding on his buttocks. There is some contraction of the gastrocnemii muscles, so that when he is supported on his feet the body is thrown backward. The grasp of the two hands is equal and strong. The right patellar reflex seems absent, the left normal. There is no apparent paresis or paralysis. He is unable to talk. He can utter a few words. 'Bert,' 'baby,' 'six,' and 'seven' is the extent of his vocabulary, and it is seldom that he can be induced to say even these words. He cannot understand what is said to him. His only means of indicating that he wants

[1] July 18, 1891.

something is by crying, and it is only by offering him various articles that it can be determined what he desires. His attention can be gained with difficulty, and when gained can be held but for a moment. He does not show that he understands when his name is called. Almost every day he has, without apparent cause, spells of crying, without tears, which will continue for two or three hours. When pleased, he shows it by a broad, idiotic smile. He eats fairly well and is well nourished. There is no incontinence of bladder or bowels.

"*Operation.* The head was shaved and the usual antiseptic precautions adopted. An incision was made through the scalp, beginning at the line of the hair, two inches above the superior edge of the left orbit and extending backward eight inches, parallel with the median line and one inch distant from it. Bleeding was controlled by hemostatic forceps. During the early part of the operation a rubber tube was placed around the head to prevent bleeding, but it was found unnecessary and was laid aside. A one-half inch trephine was applied at the anterior extremity of the wound, its center being three-fourths of an inch from the median line, being so placed that the section in the bone would not correspond with the incision in the scalp. The button of bone removed was one-sixteenth of an inch in thickness. With the rongeur forceps, as modified by Dr. W. W. Keen, a strip of the skull three-eighths of an inch wide was removed, beginning at the trephine opening and extending backward seven inches, parallel with the median line and half an inch distant from it. The dura mater appeared healthy and was not markedly adherent. Bleeding from the bone stopped spontaneously and no ligatures were required for the scalp vessels. The wound was thoroughly cleansed and united by numerous silk sutures. A few strands of catgut were placed at each extremity of the wound for drainage and a moist bichloride dressing applied."

For a day or two following the operation there was some fever and signs of cerebral irritation. Removal of the dressing showed that the difficulty was due to the fact that the posterior extremity of the wound was occluded, the catgut failing to act as a drain. The catgut was then removed and a short rubber drainage-tube substituted. Following this the recovery was uninterrupted, all parts of the incision, save the posterior extremity, uniting by first intention. Two weeks after the operation the wound was completely healed.

As soon as the patient had recovered from the direct effects of the operation it became evident that there was a change in his mental condition. His attention could be engaged readily and he would follow the speaker with his eyes. Within a few weeks he was able to indicate food or drink by pointing toward the desired object and began to pick up new words. The mental improvement has been continuous.

May 22, 1892, the condition is as follows: age three years and six months; height, 37¾ inches, a gain of 5¾ inches; length of right leg, 17¼ inches; length of left leg, 16¾ inches, a gain of 1½ inches; circumference at middle of right thigh, 11 inches; of left thigh, 10½ inches, a gain of 2 inches. The measurements of the head are, occipito-frontal circumference, 19 inches, a gain of ½ inch; semi-circumference from one external auditory meatus to the other, 13 inches, a gain of 1 inch; antero-posterior diameter, 6¾ inches, a gain of ¼ inch; biparietal diameter, 5 inches, a gain of ¼ inch; bifrontal diameter,

3⅞ inches, no gain. The incision through the bone which was made three-eighths of an inch in width is now not more than one-eighth of an inch in width. In studying the measurements of the head, it will be noted that while all the dimensions have been increased, the greatest gain has been in the semi-circumference from one auditory meatus to the other, amounting to one inch. As the biauricular line represents two-thirds of the circumference of the skull at this point, an increase of one inch in the length of this line would correspond to an increase of about one-half inch in the diameter, but as the biparietal diameter shows an increase of only one-fourth of an inch, it appears clear that the skull has expanded more vertically than laterally.

While the nutrition of the muscles of the lower extremities has improved, there is still decided want of development. He climbs up by chairs, and stands indefinitely. He will follow the chair as it is moved and will walk if supported by the hand, but his gait is very unsteady. He can stand alone and has done so for half a minute at a time, but is in great fear of falling. He has been found half way up a steep stairway. He listens attentively when spoken to and seems to understand what is said to him. He protrudes his tongue or offers his hand when asked. When lying down, if told to get up, he does so. He knows what he wants and asks for it. He has acquired many words and puts them together intelligently in short phrases and sentences. On parting, he waves his hand and says "Good-by." He plays with other children and seems to enjoy himself. The annoying, unmeaning crying spells, which were of daily occurrence prior to the operation, have not since occurred.

It is certain that in this case the operation has been followed by decided improvement in the mental condition. The question, of course, arises whether this is the result of the operation or simply a sequence. Although I approached the operation with considerable scepticism, I believe that the change noted is the direct result of the operative procedure, and the principal reason for this view is, that for four months after the operation was decided upon, the child was kept under observation and every effort made to improve it by education. At the end of that time there was no apparent change; but within a few months, and in fact within a few weeks after the operation, the other conditions remaining the same, there was a distinct and positive improvement. It, therefore, seems fair to assume that the operation was the cause of the change. I do not mean to claim that this operation will be followed by benefit in all cases. I simply report the facts as I find them in this instance. It may be that the operation is not indicated in many cases of defective mental development, for, as I have said in the article already referred to: "It does not seem logical to suppose that this procedure will benefit a large proportion of these cases, for in many of them there is probably more than a relative disproportion between the development of the brain

and its bony covering; but, even if a small number be reclaimed from utter idiocy and be permitted even a moderate intellectual development, it is so much gained, and would justify a procedure attended with much greater risk to life than is linear craniotomy."

This matter has been studied, particularly from a neurological standpoint, by Dr. M. Allen Starr, of New York. In a recent paper[1] he takes the same view as that just expressed. He says: "Hemiplegia, sensory defects, and imbecility occurring with or without epilepsy in children, are chronic diseases incurable by medical treatment. Any means which may be legitimately used to save the individual from a life of invalidism and to take the burden of his care from the family is to be employed." Dr. Starr has collected reports of twenty-five cases, eighteen of which, including two of his own, were operated on in this country. Of this number, seven died within a short time after operation. In the remaining eleven cases improvement is noted, but the period at which the reports have been made has been too short to warrant any definite deductions. The determination of the value of linear craniotomy is still a question for the future.

Case II. *Exploratory trephining in epilepsy, with negative results.*—In the early part of 1889, G. G., white, male, aged eight years, came under my observation, with the following history: The parents were living and healthy. The mother had suffered from *petit mal* in childhood and had had occasional attacks of major epilepsy at intervals of one or two years. When two years of age the child had a convulsion without apparent cause, but promptly recovered. At the end of three months he had a second spasm, and after another interval of three months he had a third. There had been no more convulsions, but when four years of age he began with attacks of minor epilepsy. Under treatment these disappeared for nine months, but then returned and have remained until the present time. In these attacks there is sudden loss of consciousness without aura, accompanied by rhythmical contractions of the muscles of the face and arms and swaying of the body, but the boy does not fall. In a few seconds he recovers consciousness, and resumes the occupation that has been interrupted. These attacks may be repeated one after another until he has had ten or twelve within a short time. They are especially frequent on rising in the morning, and scarcely a day passes without his having from ten to twenty of the mild seizures.

The lad was placed on the use of bromides, antipyrin, and other agents, without apparent improvement.

In the latter part of 1889 attacks of major epilepsy made their appearance, and recurred at irregular intervals varying from two weeks to two or three months. These paroxysms were ushered in by a peculiar sort of moan, and were marked by complete unconsciousness, general convulsions, frothing at

[1] New York Medical Record, January 23, 1892.

the mouth, and occasionally by biting the tongue. Ordinary treatment seemed to have no effect. The patient had some phimosis, with adhesions between the prepuce and the glans, and, at the request of his parents, I did circumcision, although expressing the opinion that it would not afford relief. This operation had no influence upon the attacks. He still continued to have daily attacks of *petit mal*, with occasional severe paroxysms.

At this time the parents were instructed to observe the major attacks carefully when opportunity was presented, and to note whether or not the spasm began in in any particular part, or was limited to any set of muscles. This was done with the result that in all of the attacks where the commencement of the paroxysm was observed it was found that the face and head were drawn markedly to the right, and remained so throughout the attack.

On December 2, 1890, the head was shaved and examined carefully for the presence of scars. None were found, nor was there any history of injury to the head. In a seizure noted December 7th, it was observed that the spasm was most severe in the right arm and leg, the face and head being drawn to the right as usual. During the early part of 1891 the paroxysms continued to recur, gradually increasing in frequency so that in July he had five attacks.

The continuance of the epileptic seizures uninfluenced by treatment, their increasing frequency, and the presence of certain localizing symptoms seemed to warrant exploratory trephining with the view of ascertaining whether or not there was any lesion involving the centers for rotation of the head and face.

The situation of the centers for rotation of the head and face to the opposite side has not been definitely limited, or rather it may be more correct to say that these movements have a wide representation. They are located by Horsley and Ferrier in the posterior portion of the middle frontal convolution, thence probably extending upward into the superior frontal convolution. It was, therefore, decided to make the opening over the posterior portion of the middle frontal convolution, and to extend it upward as seemed advisable. The position of this convolution is readily located. Posteriorly it is separated from the ascending frontal by the precentral or vertical sulcus which runs parallel to the coronal suture and just behind it. Below, the second frontal gyre is bounded by the inferior frontal sulcus which leaves the vertical sulcus beneath the junction of the superior temporal ridge and the coronal suture (the superior stephanion).

The operation was performed August 29, 1891, nine months ago. The day preceding the operation the head was shaved, thoroughly scrubbed several times with soap and water, and finally washed with ether, and a moist bichloride dressing applied, the position of the parts involved having been first located and marked with ink. As the intention was to enlarge the opening in the skull upward as needed, the flap was cut with its base upward. A half-inch trephine was applied just above and in front of the point where the ridge for the temporal fascia crosses the left coronal suture, and a disc of bone three-sixteenths of an inch in thickness removed. With rongeur forceps this opening was enlarged upward a distance of two inches parallel with the coronal suture, the suture being included in the section. The opening in the bone was about three-fourths of an inch in width. The hemorrhage from

the divided bone was free, but was controlled with hot water. The dura, which presented a normal appearance externally, was then opened, but no evidence of local trouble was discovered. The electrodes connected with a faradic battery were then applied to the convolutions at various points, but no response was elicited. During the operation nothing but simple boiled water was used. The dura was closed with catgut sutures. The fragments of bone, which during the operation had been preserved in warm boric-acid solution, were now replaced. The flap was then adjusted and stitched with silk, a short rubber drainage-tube being placed at the posterior angle of the wound, and a horse-hair drain laid across it. A moist bichloride dressing was applied, and the patient returned to bed.

There was no marked shock, and the patient reacted well. Twelve hours later the dressing, which was found saturated with serous fluid, was renewed and the drainage-tube withdrawn. The horse-hair drain was allowed to remain for three or four days. Healing by first intention was perfect, save at the points where the horse-hair drain emerged. There was no suppuration. Following the operation and during the healing of the wound there was no elevation of temperature, and in fact no unfavorable symptoms of any kind. It was with difficulty that the boy could be kept in bed, and if vigilance were relaxed for a moment he would be out of bed with his head out of the window calling to playmates on the street.

Immediately following the operation there was decided improvement, as is the usual history in all operations for epilepsy. For two weeks the minor attacks, which he had been having with great frequency daily for years, almost entirely ceased. They then began to appear again, and soon became almost as frequent as before. The first severe attack occurred September 20th, three weeks after the operation. In this spell it was noted that the head was drawn to the left instead of to the right. The attacks have since been repeated at about the usual interval of from two to four weeks, but it should be noted that in the paroxysms observed since the operation the face and head have not been drawn to either side. For several months after trephining no internal treatment was employed, in order that the effect of the procedure might be determined. The use of bromides was then resumed, and these agents seemed to exert a more beneficial effect than before the operation. The combination of antipyrin with the bromide was tried, but it seemed to act no better than the bromides alone.

Case III. *Abscess of the brain following a blow upon the head, with fracture of the internal plate of the skull; hemiplegia appearing abruptly eight days later; trephining; evacuation of one ounce of pus from beneath the dura; recovery.*— On February 25, 1892, I was called to see Mrs. S. L., white, aged thirty-nine years, the statement being that her scalp had been cut. She with two others had been drinking, and in a row that followed she had received the injury. I found a cut through the left side of the scalp, one and one-half inches in length, parallel with the Rolandic line, and one inch in front of it. The upper extremity of the wound was one inch from the median line. Immediately beneath this wound, and corresponding to it in length and position, was an injury to the bone, as though it had been cut with an edged instrument. This cut was one-fourth of an inch posterior to the coronal suture. There was no fracture of the external plate, and a probe passed into the cut in the

bone did not seem to penetrate beyond the diploë. There were no symptoms of brain-injury. The patient had not lost consciousness, although the blow had forced her against the wall.

I felt that it was very probable that the internal plate had been fractured, and considered the advisability of immediate trephining; but, as the woman presented no symptoms, and it being late at night, and as I was separated from assistance by three miles of muddy roads, I decided to postpone operative interference and await the development of symptoms. The wound was thoroughly cleansed with bichloride solution, approximated by one suture, and an iodoform and corrosive sublimate dresssing applied. The attendants were directed to watch the patient carefully, and to notify me at once if there were observed any twitching or weakness of the muscles of the right side. That night there was some nausea and vomiting, which continued during the following day, and then ceased. During the next three or four days the patient did well, there was no fever and no change in the pulse, and I began to think that had I trephined I should have made a mistake. On the third or fourth day the patient commenced to complain of severe pain in the left temple. She, however, slept well at night and rested comfortably during the day, and as I knew, from previous experience, that she was not in the habit of minimizing painful situations, I did not attach as much importance to this symptom as I might otherwise have done. She was kept quiet in bed, and bromide of potassium administered. The bowels acted regularly under small doses of laxatives, and the vomiting and nausea did not recur.

March 3 (seventh day). There was no change in her condition. She still complained of the pain in the temple. The pulse was normal, the temperature as taken in the mouth was not above normal. The wound was carefully examined, but there was no suppuration. The scalp seemed a little puffy at the position of the injury and the edges of the wound. The latter had united and I separated the edges with a probe, but no pus was present. The wound was then redressed. The following day, March 4th, I did not see her.

5th (ninth day). I saw the patient at 9 A.M., and was told that the previous afternoon she had begun to lose power in the right arm and leg, so that she had to be assisted in and out of bed. When I saw her she was in a semi-stupid condition, with no delirium and no convulsive movement. There was complete paralysis of the right arm and leg, the right side of the face and tongue, and thick, indistinct speech. I ordered the head shaved and scrubbed, and at once made preparations for opening the skull.

The operation was done at noon. The patient was slightly etherized, and a flap three inches wide, with its base downward, and its apex corresponding to the upper extremity of the scalp wound was turned back. For three-fourths of an inch on each side of the wound in the skull the periosteum was found separated from the bone, but no pus was present. A half-inch trephine was applied immediately in front of the middle of the bone injury, and a disc of bone one-fourth of an inch in thickness removed. It was then found that the internal plate had been separated from the external plate for half an inch on each side of the cut. With rongeur forceps the whole of the seat of fracture was removed, leaving an opening one and one-half inches in length by one inch in width. The dura protruded into the wound and slight pulsation was observable. The membrane was covered with inflammatory exu-

date, in which were imbedded fragments of the internal plate. At the upper part of the opening was a small, dark, extra-dural blood-clot, about three-fourths of an inch in diameter. There was no sign of suppuration external to the dura. The fragments of bone were then picked away with forceps. One of the fragments seemed to have penetrated the dura, and in drawing it away an opening was made in the membrane, through which escaped about one fluid-ounce of yellowish-green pus. The opening in the dura was then enlarged, care being taken not to separate the adhesions which had formed between the dura and pia mater, and thus open up new areas for infection. The cavity of the abscess was found to be one and a half inches in depth. It was carefully washed out with plain boiled water, and a rubber drainage-tube was inserted. The liquid left in the abscess cavity could be seen distinctly rising and falling in the drainage-tube with each pulsation of the brain. The flap was then replaced and secured with silk sutures, the drainage-tube being brought through the original wound. The scalp was thoroughly irrigated with corrosive sublimate solution and an iodoform and bichloride dressing applied.

5 P.M. of the same day she was resting quietly. The pain had disappeared. There was no nausea. She could speak a little more distinctly, and replied intelligently when spoken to, although still somewhat dull.

9 P.M. Condition the same. Temperature normal, pulse 80 per minute.

During the week following operation the condition continued satisfactory. The temperature which was taken twice daily, at no time went above 98.6°. The pulse ranged from 70 to 80 per minute. There was no pain. The wound was dressed at intervals of two or three days, and at each dressing was washed out with a solution of peroxide of hydrogen. There was little discharge from the abscess, and the drainage-tube was gradually shortened. During this period, while apparently rational on most points, she presented some delusions, the principal one being that she was detained on a boat away from home.

By March 12th the paralysis had nearly disappeared from the muscles of the larynx and face. The tongue was protruded nearly straight. At this time there was slight movement of the thigh muscles when the leg was pinched. There was no anæsthesia at any time. The stitches in the flap were now removed and primary union found throughout the wound, with the exception of the point at which the drainage-tube emerged.

The patient continued steadily to improve, and on March 23d the following note was made: "The abscess cavity is almost entirely closed, and the drainage-tube was removed. There has been no discharge for some time, and a short tube has been retained simply to keep the external wound open as a matter of precaution. The paralysis of the tongue has disappeared. The voice is almost normal. The appearance of the face is natural. The thigh and leg muscles have been steadily gaining in power. She can move the foot and draw up the leg when bidden. No movement of the muscles of the upper extremity can be detected."

24*th*. The use of faradism to the arm and leg was begun, and the current induced decided contraction of the muscles.

26*th*. She is able to flex and to extend the fingers.

31*st*. She is able to be out of bed and to walk across the room without sup-

port. The arm movements are increasing in force. The drainage-tube opening has closed, but there is a distinct depression of the scalp at the seat of the abscess. The mental condition is normal, but she is easily excited.

From this time she steadily improved and gained in strength, and has now practically returned to her normal condition.

A study of this case offers several interesting and instructive lessons. In the first place, it forcibly illustrates the danger of delay. The trephine should have been applied at once, for although there was no fracture of the external plate, but simply an incision extending through it to the diploë, yet the character of the wound rendered it almost certain that the internal plate had been fractured. I recognized the advisability of immediate trephining, and have to offer in palliation for the sin of omission only the facts before stated.

The absence of symptoms, although not unusual, is of interest. Dr. Chas. B. Nancrede,[1] in a paper on "Surgical Interference in Cerebral Abscess," in speaking of this condition, says: "Mental hebetude, slow pulse, headache, perhaps rigor, subnormal temperature, constipation, and at the end sudden development of the compression symptoms, as evidenced by profound coma, hemiplegia, respiratory failure, and death, seemed to have in all cases marked the occurrence of brain abscess." In this case, prior to the appearances of the signs of compression of motor areas, there was an absence of all the symptoms noted above with the exception of the pain and the non-elevation of temperature. I regret that the exact temperature was not recorded; it is simply noted that the temperature was not above normal. Dr. Nancrede, in the article referred to, lays stress upon subnormal or normal temperature as a diagnostic feature of abscess involving the cerebral tissue, saying that "where high temperature is noted, either the pus collection is a localized suppurative arachnitis or there is meningitis in addition to the abscess."

The position to which the pain was referred corresponded very closely with the situation of the abscess, although Dr. Spitzka[2] states that "the pain is sometimes localized, but the subjective localization does not correspond to the actual site of the morbid focus."

The abscess in this case was situated just anterior to the middle of the ascending frontal convolution, and, as would naturally be supposed, the chief brunt of the pressure fell upon the centers for the upper extremity, while those for the leg and those for the face were not so seriously implicated. The muscles of the face, tongue,

[1] Transactions American Surgical Association, 1884, vol. ii. p. 94.

[2] Pepper's System of Medicine, vol. v, p. 795.

and larynx began to regain their power within a short time after the pressure was relieved. Motion in the muscles of the leg was first observed at the beginning of the second week, but three weeks elapsed before voluntary movement reappeared in the arm.

So far as I am aware this is the second case of recovery after trephining for cerebral abscess to be recorded in this city. Dr. D. Hayes Agnew,[1] in a paper on "The Present Status of Brain Surgery," read before the American Surgical Association at its last meeting, collected from the practice of surgeons of this city eighteen cases of trephining for abscess of the brain following traumatism, aural disease, and syphilitic necrosis, and says, "All the patients died, life in no instance being prolonged beyond fourteen days." Looking over the literature relating to cerebral abscess in this city, I found that on November 7, 1888, Dr. Thomas G. Morton[2] had reported to the College of Physicians a case of trephining for abscess of the brain, and at that time the case presented every prospect of recovery. On inquiry from Dr. Morton I learn that the case eventually made a perfect recovery, but that in sending to Dr. Agnew a list of his cases this one was accidentally omitted. The history of Dr. Morton's case is briefly as follows: The patient was a colored boy, ten years of age, who had received a lacerated wound of the scalp, which was cleansed and closed, and the boy sent to the Pennsylvania Hospital, September 29, 1888. The wound suppurated freely, the boy became delirious, and there were symptoms of compression. Dr. Morton's attention was then called to the case. The skull was exposed and a stellate fracture of the temporo-frontal region discovered. The trephine was applied and a number of pieces of separated bone removed. An incision carried into the bulging brain mass evacuated about an ounce of pus and broken-down blood-clot. The dural incision was then increased and disorganized brain substance and disorganized clot removed with the dull curette. The wound was closed, drained, and an antiseptic dressing applied. Convalescence was rapid, and the patient was discharged thoroughly recovered on January 4, 1889.

In conclusion, I desire to express my indebtedness to my friends, Dr. H. A. P. Neel and Dr. E. E. Keiser for valuable aid and counsel, and to my brother, Fred. S. Morrison for much assistance in connection with these cases.

[1] Transactions American Surgical Association, 1891, vol. ix, p. 24.
[2] Transactions College of Physicians of Phila., 1888, vol. x, p. 447.