TRAUMATIC CERVICAL MYELOMALACIA.

REPORT OF A CASE WITH NECROPSY.*

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In this paper attention is directed to the nature of lesions in the spinal cord, which are produced by traumatism to the spinal column, in cases in which pressure on the spinal cord by dislocated bone is absent or present only for a short time. The diagnosis of such a lesion is difficult, especially when it is, as in this case, practically confined to the anterior horns. It is most important, from a practical standpoint, to differentiate the symptoms from those produced by pressure on the cord and from traumatic hysteria, both of which require materially different treatment. The differential diagnosis between a hysterical and an organic affection may be difficult, but it is even more difficult to decide, in some cases, whether certain symptoms present in a case of undoubted organic disease may not be of hysterical nature. For instance, Claude and Rose¹ report a case in which they make a diagnosis of hysteria combined with symptoms of compression of the spinal cord probably due to Pott's disease. The interest in these cases resides not only in the diagnosis and prognosis, but also in the semeiologic value of certain signs which we usually regard as signs of hysteria.

A case illustrating these points was referred to my service in the hospital of the University of Michigan on Nov. 11, 1907, by Dr. McColgan, of Grass Lake, Mich. The history and pathologic findings were as follows:

History.—A farmer, aged 32, gave a negative family history and previous medical history and denied alcoholic abuse and venereal diseases. On Nov. 10, 1907, he fell about six feet striking his back on the frozen ground. He was not unconscious but said that he could not move his left leg and was carried to bed. About seven hours later he had some vague pain in all four extremities and then found his right leg also affected. He could move his arms as before. Dr. McColgan found that a prominence in the cervical region of the spinal column probably indicated a dislocation of the vertebræ and he was brought to the University Hospital the next day.

Examination.—On examination at the hospital it was found that he could not raise his arms above his head. He was able to flex both forearms but unable to extend them. He could neither flex nor extend the fingers of either hand. He could flex both wrists but could not extend them. The pectoral muscles on both sides contracted but weakly. He could not move the left leg but the movements of the right leg were fairly well performed. The biceps jerks were present on each side, but the triceps jerk was not obtained on either side. The knee jerks were equal though somewhat diminished on each side. The Achilles jerks were normal. Irritation of the soles of the feet produced flexion of the toes on both sides. Sensation to touch was apparently normal over both arms and the chest and abdomen. He said that he felt touch and pin-point more distinctly on the left leg than on the right, but felt pain normally all over except on the back of the left hand and fingers where he was unable to distinguish the point of a pin from the head. No area of anesthesia was made out and he never failed to respond promptly when touched, but all over the body and in both legs he would apparently keep on feeling impressions even though he was not touched, sometimes as many as four or five. He could also be made to feel a touch by suggestion. He had passed urine and feces in bed and said that he could not retain

them long. This was apparently benefited by suggestion. There was tenderness of the spines of the fourth and fifth thoracic vertebræ but no deformity of the spine at any part. A radiograph of the spine showed no displacement and apparently no fracture of the vertebræ.

He was reexamined the following day because of complete inability to make any movements in either leg except slight movement in the toes of the right side. He said that during the night he could move both legs freely. Except for added paralysis of the right leg the result of the examination was the same as the day before. No areas of anesthesia were present anywhere. An examination of his heart and lungs was negative. Urine and blood examination was also negative.

On examination made Nov. 25, 1907, the patient said that he felt well. He did not move his fingers. He could not or would not, extend his forearms but he flexed both forearms strongly. He moved the right leg freely and with strength. He was able to contract the adductor of the left leg and the quadratus femoris but produced no movement of the leg thereby. The extremities showed no evidence of vaso-motor disturbance and no atrophy. He said that he felt touch and pin-point equally well over both arms and both sides of the body. On the right side of the body there was an area extending from the sixth rib in the axillary line to the lower edge of the ribs and coming forward almost to the median line in which pin-point and touch were evidently promptly felt and, he said, were felt as accurately as on the other side. But in this area with his eyes closed he invariably referred the sensations to the opposite side. There was no transference from the left to the right. He said pin-point was felt as accurately in the left leg as in the right. No area of anesthesia was made out. The soles of the feet were somewhat hypersensitive. There were a number of places on the back near the sacrum where there were skin abrasions. The knee jerks and biceps jerks were present and normal. Irritation of the soles of the feet caused flexion of the toes on each side. He had no incontinence of urine or feces.

On Dec. 7, 1907, examination showed that the right pupil was larger than the left. He could raise the upper arms to a level with the shoulders and in this movement the deltoid contracted normally. He could flex the arms with normal contraction of the biceps and supinator longus, but the triceps were paralyzed, and he could not extend the arms. He could flex both wrists strongly but extension of the wrists was weak. He could not move the fingers or the thumb. There was marked atrophy of the interossei of both hands; there was some atrophy of both forearms and of the triceps on both sides. The skin was very dry and scaly but not atrophied. The triceps jerks were lost on both sides; the biceps jerks were increased on both sides. The ribs did not move in respiration, breathing being entirely diaphragmatic. He had hypalgesia of the right side from the level of the third costal cartilage on down the body extending all over the right thigh, leg and foot. There was no analgesia in the upper extremities. He felt touch equally well all over the body on both the right and left sides. He still referred sensation to the opposite side when the right side was touched in the above described area on the chest. Sensation for touch seemed to be somewhat delayed in the body and limbs and he would keep on counting even though not touched. The left leg and thigh were decidedly atrophied. Left thigh 33.5 cm. (13¼ in.), right thigh 43.5 cm. (17 in.), left calf 28 cm. (11 in.), right calf 34 cm. (13½ in.). The skin of the left leg was dry and scaly. The skin of the right leg was moist and normal. The knee jerks were present on each side and about normal. He moved the right leg at all points. The left leg remained paralyzed. Irritation of the sole of the foot caused flexion of all toes on the right side, no movement of the toes on the left side. Sense of position was lost in the left hand, present in the right hand. He was a little uncertain about the position of the toes on both sides.

Jan. 20, 1908, the patient showed general emaciation and weakness his pulse being very weak, but his neural condition remained as before. The biceps jerks were large on both sides; there was also a biceps jerk obtained by tapping the small bones of the wrist on each side. The knee jerks were present on each side, about equal and normal. The skin of the extremities was exceedingly dry and was kept greased in order to avoid

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1. Rev. Neurolog., Jan. 30, 1908.

cracking. Pain was felt very decidedly in the soles of both feet. Plantar irritation caused no movements of the toes on either side. The patient gradually became weaker, developed an obstinate diarrhea, bed sores over the sacrum and trochanters, and died March 12, at 12:45 p. m. Necropsy was held at 2 o'clock the same day.

Autopsy.—Pathologic findings: There were found several fair-sized bed sores over the sacrum and a bed sore over the right trochanter. The body showed considerable emaciation, with localized atrophy of both forearms and both hands. The lungs were crepitant throughout but appeared decidedly small. The heart contained some air. Other organs were approximately normal. The brain showed no gross pathologic change. The spine appeared to be normal but after cutting through the arches of the vertebrae and removing the cord there was noticed a linear fracture in the body of the sixth cervical vertebra which allowed motion. Apparently there was no dislocation. The spinal cord showed a depression in the middle of the seventh cervical segment and was hardened in formalin for further examination.

On cross section of the cord at the level of the depression (middle of the seventh cervical) the gray matter was seen to be distinctly softened, distorted on both sides. The white matter was uninjured except the anterior portion of the posterior column. Cross section of the spinal cord at the top of the seventh cervical segment showed that both anterior horns contained softened areas. The lesion was slightly more marked on the left side than on the right and extended into the region of Clark's column (?) and intermediolateral tract. The top of the lower third of the sixth cervical segment showed slight softening in both anterior horns. The lower border of the upper third of the sixth cervical segment showed no lesion. The lesion apparently did not extend upward beyond the middle of the sixth cervical segment. Going downward the lesion disappeared in the upper half of the first thoracic segment. Below this level there was no gross disease visible in the spinal cord.

The sixth, seventh and eighth cervical and first thoracic segments were each cut in three pieces and sections made from the top of each of these pieces. Sections also were made from the mid-thoracic and lumbar regions. A summary of the microscopic findings includes: An area of softening in both anterior horns which, in the eighth cervical segment and the lower third of the seventh cervical, caused complete destruction of them and extended a little into the left lateral column and very slightly into the posterior column. There was a slight inflammatory reaction about the blood vessels in and adjacent to the softened areas but for the most part they consisted simply of softened areas filled with fatty granule cells. There was no free blood pigment. Areas of softening extended upward in the anterior horns as high as the middle of the sixth cervical segment and downward as far as the middle of the first thoracic segment. They were situated in the center of the horn on both sides and did not completely destroy them as they contained some normal staining nerve cells. In the eighth cervical segment and the lower portion of the seventh, the white matter in the vicinity of the anterior horns stained lighter by the Weigert hematoxylin stain and was evidently partially degenerated. Above these segments there was a degeneration in the anterior parts of the posterior column which did not appear to belong to any system but involved the anterior part of the column of Goll and the cornucommissural zone. There was also distinct degeneration in the region of the right direct cerebellar tract and a doubtful degeneration along the periphery of the left lateral column. In the first thoracic segment there was a slight degeneration in the left crossed pyramidal tract and in the comma tracts of Schultz.

AUTHOR'S EXPLANATION.

My explanation of the pathology of the condition is that there was a slight dislocation of the vertebrae pressing on the spinal cord sufficiently to block the anterior spinal artery but not sufficient to arrest impulses in the spinal cord. This dislocation was spontaneously reduced some time before he arrived at the hospital, as it was not present then, but in the meantime a thrombosis of the

anterior spinal artery or its branch in the anterior median fissure caused the areas of softening in the parts supplied by those vessels, namely, the anterior horns and to some extent the adjacent white matter.

I am aware that the usual lesion in these cases of trauma to the spinal column is a hemorrhage into the cord which affects the gray matter more often than the white because of its lesser density; also that the researches of Schmaus show that areas of softening can be produced in the spinal cord of animals by traumatism without the intervention of any such mechanism as I have described. A hemorrhage into the gray matter may have been present in this case at the onset and have been absorbed, but on microscopic examination there was no evidence, such as blood pigment or a cavity, that any such condition had previously existed. Also in the reported cases of hemorrhage the paralysis is more complete and comes on more quickly than in this case. That a traumatic myelitis produced the softening seems to me less probable, both from a clinical and pathologic viewpoint, than that the softening produced the inflammatory reaction which was present. The fact that it was practically confined to the anterior horns of only three spinal segments is, to my mind, much in favor of the latter. Whether it was a hemorrhage or myelitis it seems to me that one of the important points in the pathologic findings was the location of the lesion in the center of the cord, where totally inaccessible to operative procedure; and the destructive nature of the lesion which for another reason would contraindicate an operation, by the impossibility of making a cure.

DIFFICULTY OF DIAGNOSIS.

The diagnosis of the condition present was not free from difficulty until the atrophy of the paralyzed muscles in the hands. On admission clinical examination and skiagraphs showed no apparent injury to the vertebrae. This, no doubt, was due to the fact that in an ordinary dorsal position the unbroken arches prevented apparent deformity, and pressure on the spine was not painful at this point. There was no increased motility or ecchymosis. The condition present in the bones in this case, fracture of the body of the vertebra without injury of the spines or arches, is not often described, though self-reducing fracture is not rare in the cervical region of the spine.

We have no clear history of previous hysterical condition in the patient, but hysteria is a common condition in our clinic among the agricultural classes of Michigan and Indiana. The traumatism was not severe. The paralysis was peculiar inasmuch as it apparently advanced and receded, and was of a peculiar distribution for an organic lesion of the cord; both forearms and one leg seemed to be the seat of permanent paralysis, while the paralysis of the other leg apparently appeared one day to disappear the next. The biceps, knee and Achilles tendon reflexes were normal on each side.

There was no Babinski reflex, but we would not have relied on it to make a diagnosis of spinal cord injury, since it is so frequently found absent even though the spinal cord is severely injured. J. J. Thomas² reports cases in which the plantar reflex was retained even though the spinal cord was completely severed and refers to such conditions as not uncommon. Allen³ says

2. Five Cases of Injury of the Cord from Fracture of the Spine, *Med. and Surg. Reps. Boston City Hosp.*, 1900, xl, 1.

3. Injuries of the Spinal Cord, with a Study of Nine Cases with Necropsy, *THE JOURNAL A. M. A.*, March 21, 1908.

that "unquestionably the majority of cases of complete transverse lesion reported have abolition of the plantar reflex." The cases reported by Potts⁴ of traumatic cervical hematomyelia and complete division of the spinal cord had normal plantar reflexes. It will be seen, therefore, that at present the condition of the plantar reflex has but little clinical value in these cases. Probably more factors enter into it than are at present understood.

AN APPARENT HYSTERIC ELEMENT.

The changes found on examination of the sensation were regarded at the time as probably hysterical. No area of anesthesia or analgesia was present at the first examination. On the back of the left hand and fingers he called the point of a pin the head, and there was apparently a hypalgesia of the right leg. The patient while responding to all touches promptly, would at times keep on feeling touches after the examination was finished; whether this was due to suggestion or to so-called after-sensations can not be definitely stated, though it appeared to be due to the former. It will be evident that at this stage none of the symptoms were incompatible with a diagnosis of traumatic hysteria.

Such a diagnosis was rendered more probable at an examination made a few days later by the discovery that in a localized area he had the interesting symptom of allochiria, a transference of sensory impressions from one to the opposite side of the body. This was apparently a true allochiria, since there was no other error in localization. This symptom, the precise diagnostic value of which has been recently written on by Ernest Jones,⁵ is considered by him as always due to hysteria. Obersteiner⁶ was the first to describe and name this symptom. In his original definition he seems to exclude cases where there is a general defect in localizing sensation which when sufficiently great might cause an error as to which side of the body is touched, but it is doubtful whether Obersteiner really made this distinction in his cases.

This condition is now named by Jones alloesthesia or false allochiria, meaning thereby simply such a severe defect in sensory localization that the point touched or otherwise stimulated may be erroneously located by the patient on some point on the opposite side of the body. True allochiria exists only when the localizing sense is intact, except that the patient refers the stimulus to a corresponding point on the opposite half of the body. Jones publishes a very complete analysis and bibliography of the cases of true and false allochiria, and according to him there are only forty-one cases of sensory allochiria on record, of which only twenty-nine can be considered as cases of true allochiria. These were reported by Obersteiner, one, 1881; Ferrier and Debie, each one, 1882; Hammond, one, 1883; Magnin and Féré, one each, 1888; Janet, one, 1890; one by Weiss, 1891; two by Bosc and one by Kerr, 1892; one by Gay, 1893; eleven by Sollier, 1897; one by Lapidous, 1899; three by Trapieznikow, 1901, and one by Sabrazès and Bousquet in 1905. To sum up, out of these twenty-nine undoubted cases of true allochiria, in twenty-six there was no reason to suppose that any other condition besides hysteria was present; in the other three, cases of tabes hemiplegia, and diphtheric paralysis, there was

reason to suppose that hysteria was present in addition to the organic affection.

In conclusion, I wish to emphasize my explanation of the mechanism of production of the lesion found in the spinal cord. I would also call attention to the difficulties in the early diagnosis between hysteria and an organic affection of the spinal cord in a case, such as this, in which there was no anesthesia and with normal reflexes and in the presence of allochiria. Finally, while there are numerous cases in which necropsy show that an operation on the spinal column for the relief of a traumatic condition would have been useless, this is such an excellent illustration of the point that I simply call attention to it.

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DISCUSSION.

DR. J. J. THOMAS, Boston: One lesson that I should like to draw from this paper is that not all cases with hysterical symptoms are cases of hysteria. In a paper I published recently I called attention to a case of organic hemiplegia in a child, in which there were distinct hysterical symptoms that appeared and disappeared. There was contracture on the paralyzed side by which the foot was drawn down, so that the top of the toes touched the ground. Under suggestion this symptom was made to disappear. Frequently, in other cases besides those of multiple sclerosis, where we know hysterical symptoms appear, we get combinations of hysterical symptoms with organic disease; and that fact we can not be too careful to bear in mind. In the cases which I have seen, injury to the spinal cord in which it is impossible to detect either fracture or dislocation of the spine, is the rule. In a number of cases which came to autopsy at the Boston City Hospital, I persuaded the pathologist to remove a portion of the spine, and we could find the dislocation, the seat of injury of the bones, only when the spine was sawed in two lengthwise. It is the rule in injuries to the spinal column not to find dislocation or crepitus, and one has to make very frequently the diagnosis of injury of the spinal column from the injury to the spinal cord. Myelomalacia from dislocation of the spine is rather rare. Hemorrhage is much more common; yet that hemorrhage, in a number of cases which I have seen, is often at a great distance from the actual point which could have been compressed by the dislocation. I have found it as far removed from the point which was crushed as the fifth or sixth segment.

DR. FRANK R. FRY, St. Louis: I believe that traumatic cervical cord lesions are by all odds the most difficult of the traumatic cases to diagnose. We can never be sure from an x-ray picture as to everything that has happened. We may see a displacement of the bone in that way, but we can not tell what effect that displacement has had on the cord. As Dr. Thomas has said, we have to make the diagnosis of lesion of this cord from the nervous symptoms, irrespective of the degree of injury that seems to have been inflicted on the bone as revealed by an x-ray picture or otherwise. Some years ago I took the ground rather emphatically that we ought to operate in these cases when there is evidence of an important injury; that we ought to cut down if there were a fair opportunity to do so soon enough and investigate. I have seen a number of cases that impressed me that way. I do not see how we are to determine what has happened to bone except by a surgical investigation of this kind. We do not find it out reliably by an x-ray picture. We find out certain things, but that is not always convincing, or should not be. I believe that lesions of all kinds in the cervical region are particularly predisposing to hysteria. I have seen them so often.

DR. WILLIAM W. GRAVES, St. Louis: I can hardly agree with Dr. Camp in the idea that the variability in symptoms which seems to have been the main point leading him to suspect a hysterical condition in his patient, could be accounted for only on a hysterical basis. In the very beginning such an assumption might have been warranted, but when we consider the case in the light of his pathologic findings, and

4. Jour. Nerv. and Ment. Dis., 1905, xxxiii, 359.

5. Brain, 1907, cxx, 490; also Lancet, Sept. 21, 1907.

6. Allochiria, a Peculiar Sensory Disorder," Brain, July, 1881, 153.

when we know from them that there must have been interference with the blood supply in these particular segments of the cords, it is certainly thinkable that the interference with the nutrition of that part of the cord might have been sufficient to bring about variability in the sensory findings; and so, inasmuch as in his case there were absolutely no other evidences of a hysterical condition, and everything from the very beginning pointed really to an organic affection, the assumption of hysteria was hardly justifiable. The symptom of allochiria, while I can not explain it in this case, must be considered as due to some organic affection or to some interference with the function of certain segments of the cord.

Dr. Camp's paper emphasizes another point. There was for a long time doubt and some controversy as to the particular segment of the cord in which the reflex arc for the triceps reflexes was located. The lesion found by Dr. Camp microscopically was in the seventh cervical, eighth cervical and first dorsal segments of the cord. Oppenheim in his studies laid particular stress on the fact that the reflex arc is mainly in the last cervical and in the first dorsal segments. Dr. Camp's findings—radial and biceps reflexes, and the absolute absence on both sides of the triceps reflex—confirm the assumption of Oppenheim. These findings pointed conclusively, independently of any other symptoms present, to some interference with certain segments of the cord. Furthermore, disturbance of motility pointed unmistakably to this interference. The individual could make a fist, he could pronate and supinate his forearm; he could flex his arm at the elbow; but extension of the wrist and extension of the elbow were impossible; furthermore, he had another symptom which pointed to the involvement of these segments of the cord, namely, dilatation of the pupil on one side—at any rate, a difference in pupils—so that the findings, even in the beginning, pointed to an involvement of the cord.

I believe that the best indication for surgical interference in injuries to the bony coverings of the nervous system, is always to be found in the consideration of the nervous symptoms present; that however extensive a fracture there may be of the skull, or however much deformity there may appear to be about the vertebral column, those symptoms in themselves rarely warrant surgical interference; but that it is only by a careful consideration of the nervous symptoms that we can determine positively as to whether or not we should interfere surgically.

DR. CARL D. CAMP, Ann Arbor: I can not agree with Dr. Graves when he assumes that the diagnosis between hysteria and organic affection was not difficult. It was, of course, as an afterthought not particularly difficult to see that all the symptoms, or almost all the symptoms, at any rate, might have been due to the lesion found. I can not agree that the triceps reflex is constant. I have found it difficult to obtain in many cases. The peculiar fluctuations of the paralysis and the absence of sensory changes, with the exception of allochiria, in the early stages, would rather point to the conclusion that this was a case of traumatic hysteria. Of course, after the microscopic examination of the lesion and its demonstration as being probably a vascular condition, it is easy to say that the changes in the blood supply might have caused a fluctuation in the extent of the paralysis, but that is still doubtful. I also disagree with the statement that the neural condition is the most important as deciding for or against an operation in these cases. I think that the neural condition (the extent of the paralysis, etc.) has very little to do with deciding for or against an operation. In cases in which the spinal cord symptoms alone are obtained, and in which there are no surgical indications from a clinical or x-ray examination, I think that operation is probably contraindicated.

Psychologic Nomenclature.—One of the principal tasks before the Sixth International Congress on Psychology, which is to meet at Geneva, Switzerland, Aug. 31 to Sept. 4, 1909, is the revision of the nomenclature of psychology. It is expected that several sessions will be devoted to the determination of terminologic equivalents in the four languages, English, French, German and Italian.

CEREBRAL ABSCESS.*

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History.—A local physician told me incidentally that he was treating a girl about 12 years old whose ears had been discharging since soon after birth, and that a few days since chills had set in and the child was very sick. I told him that the child in all probability had a thrombosis of the lateral sinus and that its condition was a very critical one. The doctor succeeded in sending the patient to Grace Hospital the next day.

Examination.—I saw the girl for the first time Sunday, January 19 at 4 p. m. The temperature was 103.2 F., pulse 144, respiration 28; the mother reported a chill at noon and one during the night.

Operation.—I operated immediately, performing a radical operation on the left side and exposing the lateral sinus freely. I removed the thrombus, reaching almost to the jugular bulb, until free hemorrhage occurred from below. Large masses of thrombotic material were removed also towards the torcular Herophili, but there was practically no hemorrhage. Saline solution was administered hypodermically and by rectum.

Postoperative History.—January 20: Chill at 9 a. m., at 10 a. m. the temperature was 104.8 F., at 11:50 a. m., 104.6 F. At 9 p. m. temperature was 97.2 F., pulse 92. Urine examination: Color yellow, sediment none, reaction acid, appearances turbid; specific gravity 1020; albumin absent, sugar absent, epithelium, few squamous; crystals of uric acid.

January 21: Slept well until after midnight, cried at times with pain in the ear. At 7:45 a. m. temperature rose to 105 F., at 10 a. m. chill; appetite reported as good. At 5 p. m. temperature 98.8 F.; at midnight 97.2 F.; had a fair day.

January 22: At 5 a. m., temperature 97.4 F.; at 9, 97.8 F.; at 12 m., 98.2 F.; at 6 p. m., 101. A fair day.

January 23: Had a good night, appetite good. At 5 a. m., temperature 97.6 F.; at 12 m., temperature 98 F.; at 8 p. m., 100 F. Passed a good day.

January 24: Slept at intervals, appetite poor; at 5 p. m., temperature 103.2 F.; at 6 p. m., temperature 99.2 F.

January 25: Good night; at 6 a. m., temperature 100 F., appetite good; at 9 a. m., temperature 100.6 F.; at 11:30 a. m., 104 F.; at 12:45 p. m., 99 F.; at 3 p. m., 100.8 F.; at 5 p. m., 98.4 F.

January 26: Had a fair night; complained of headache in the morning. At 5 a. m., temperature 99.4 F.; at 6 a. m., temperature 104 F.; severe chill, delirious; at 9 a. m., temperature 99.4 F.; at 2:30 p. m., 98 F.; at 6 p. m., 97.6 F.; appetite fair to good.

January 27: Restless all night. At 6 a. m., temperature 105.8 F.; severe chill, delirious; at 8 a. m., temperature 101.6 F.; at 11 a. m. patient was taken to operating room and examined; wound at posterior cranial fossa looked grayish; offensive odor; cleaned. Appetite fair to good. At 3 p. m. temperature 102 F., slight chill. At 5 p. m., temperature 104.6 F.; pulse 160; refused supper; did not like the light; complained of pain in left temple.

January 28: Had a good night; at 5 a. m., temperature 99 F.; at 9:30 a. m., 100.6 F.; appetite fair.

Second Operation.—January 28, at noon, I operated again. First I tied the internal jugular vein. It was filled with blood. I opened the middle cranial fossa and evacuated about two drams of not offensive yellowish-green pus which seemed to have been liberated from a well defined, apparently clean cavity. The patient received about 6 ounces of physiologic saline solution hypodermically during the operation, and saline solution per rectum for one hour after the operation. The child left the operating room with a good pulse, although about 125. At 3 p. m. the temperature was 104.2; comfortable since the operation. At 5 p. m., temperature 100.4, at 11, 98.2.

Postoperative History.—January 29: Had a good night; at 9 a. m., temperature 98 F.; at 10 a. m., 97.8 F.; at 2 p. m.,

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