

to distilled water he noticed an article a year ago by Swift in which he experimented on guinea-pigs and he injected salvarsan suspended in guinea-pigs' serum and that obviated the possibility of the menstruum being contaminated; he found where he did use guinea-pig serum there did supervene these anaphylactic-like symptoms.

Dr. G. E. Price, as the president's address, read a paper entitled, "The Story of a Sixteenth Century Paranoic and His Autobiography."

## CHICAGO NEUROLOGICAL SOCIETY

NOVEMBER 8, 1913

The President, DR. RALPH C. HAMILL, in the Chair

Dr. Harvey Cushing, of Boston, Mass., gave an illustrated talk on the year's experience in neurologic surgery, reporting the results in one hundred operations on the brain and spinal cord. From the results in these cases, he felt very much encouraged in these neurologic operations.

Dr. Charles Elsberg, of New York, said he had benefited by hearing the experiences of Dr. Cushing, and in discussing the paper he would limit himself to a short résumé of his own experience in intracranial and spinal surgery during the past year—a working period of a little more than nine months. During that time he had performed sixty-eight intracranial operations upon forty-eight patients, and twenty-eight spinal operations upon twenty-six patients. Of the sixty-eight intracranial operations there were four deaths, a mortality of six per cent. He was very much gratified to see that his statistics happen to be exactly those of Dr. Cushing. This may have been due to the character of the cases—he probably did not have as many cases that presented difficult problems as Dr. Cushing had. Subtemporal decompression was done twelve times, with one death, which death occurred in a patient who was operated on when in coma. We all know how difficult it is when a patient has once become comatose from an intracranial neoplasm to have him recover. In spite of a large subtemporal decompression, this patient died, and the post-mortem showed an enormous infiltrating glioma occupying almost the entire left cerebral hemisphere, having given very few symptoms before the patient finally became comatose. As a decompressive method, puncture of the corpus callosum was done eleven times. During the past two years he has been doing puncture of the corpus callosum, first suggested and recommended by Anton and von Brahmman, more and more frequently. In cases in which there is an internal hydrocephalus which contributes considerably to the symptoms, in not a few of the patients, a puncture of the corpus callosum,—making a communication between the ventricles and the subdural or subarachnoidal space,—will bring about most satisfactory palliative effects without the deformity that so often occurs with the ordinary subtemporal decompressive method. Especially in mid-brain tumors pressing upon the iter, tumors for which we often can do nothing, he has seen very satisfactory results lasting as long as nine months, with improvement not only in the general symptoms, headache, vomiting, papilledema and optic neuritis, but also in a return of the upward movement of the eyeballs. He finds himself doing puncture of the corpus callosum more and more

frequently. This method has not given him any satisfactory permanent results in one of the bugbears of intracranial affections, namely, chronic internal hydrocephalus. He would not go into the question of why this, as well as most other methods, have given few permanent results, but hoped that the patients would be referred to the surgeon earlier, before the convolutions had become atrophied from pressure.

The speaker performed craniotomy for tumor five times during the past year, and of these five patients four recovered. Four were dural endotheliomata, so-called, dural or subarachnoidal, and one was a tumor in the cerebello-pontine angle. Craniotomy, in which an irremovable tumor was found, was done five times, with three deaths, which consisted of the following. First, a patient where there was a question whether he had a tumor of the cerebellum pressing on the pons or vice versa. Only the first stage of a bilateral suboccipital craniotomy was done. The child succumbed, although she had left the operating table in perfectly good condition. Post-mortem examination showed a large tumor springing from the pons and growing into the cerebellum.

A second patient died after the exploration of the right temporal lobe, and the post-mortem showed a large infiltrating tumor in that lobe.

The third patient died shortly after the second stage of a suboccipital operation for an angle tumor. When Dr. Cushing spoke of the patient with the very large tumor, measuring seven centimeters in length, Dr. Elsberg was very strongly reminded of this patient. At the first stage he did the regular suboccipital craniotomy, bilateral, and removed not only a part of the foramen magnum, but also a part of the arch of the atlas. At the second operation he opened the dura. As soon as it was opened there was an escape of at least fifty to seventy-five c.c. of fluid from the left lateral recess, and there was respiratory difficulty. The speaker then dislocated the cerebellum to the right, very slightly, and at once came upon a very large tumor which had the character of an ordinary neuro-fibroma of the auditory nerve. Every time the tumor was touched the patient had disturbances of respiration. So it was decided to close the wound and wait until a third stage. Within an hour or an hour and a half after the operation the patient succumbed to respiratory disturbances. Post-mortem examination showed a tumor measuring seven centimeters in length and six at its greatest width, in the left cerebello-pontine angle, a neuro-fibroma arising from the auditory nerve.

Then there were two cases of abscess, one of which was fatal, and post-mortem examination showed that the abscess had ruptured into the lateral ventricle. The other patient recovered.

He has attacked the hypophysis three times during the past year by the transfrontal route, and has used a method which he has modified from the original McArthur and then the Frazier operation, minimizing the scar and making a larger opening. In one of these instances there was a tumor that could be seen by the X-ray, of which Dr. Cushing showed such beautiful pictures, and he believes that he removed the greater part of the tumor through the anterior approach without any difficulty. This was the case of a young man of eighteen. So far as injury of the frontal lobe is concerned, the first patient on whom he operated did have symptoms referable to his frontal lobe lasting for a number of days. He learned a number of lessons from the first operation, and in the other two cases had no trouble at all. The speaker believes that in selected cases there is an advantage in attacking the hypophysis by the transfrontal route; in the cases operated upon by him, the exposure was very satisfactory.

Then, there were eight intracranial operations for trigeminal neuralgia, and all of the patients recovered.

He had also operated on a number of patients and done decompressions for fracture of the skull.

During the same period there were twenty-eight spinal operations. In the first place, there were seven for tumor, and all patients recovered. Of these, five were in the cervical, one in the upper dorsal, and one in the mid-dorsal region. Then there were seven exploratory operations. In four instances there were found cystic collections of fluid, and he is beginning to believe that cysts are very much more frequent in the spinal cord than one had a reason to expect before this time.

Then there were three more instances of intramedullary tumors, and in that connection he wanted to speak especially of intramedullary spinal tumors.

There were four instances of root section; one instance of the Spiller-Martin operation for persistent pain—division of the anterior lateral tract with considerable relief. There were four operations for fracture of the spine, two for recent fractures, of which one patient succumbed and one recovered. The patient that recovered is interesting in that she had a fresh fracture. The speaker followed the suggestion of Dr. Allen, of Philadelphia, of making an incision into the cord for decompression and drainage purposes. The patient recovered, and now, after four months, is back at work. The other two operations were done for old fractures with deformity and angulation.

As all physicians know, up to comparatively recent times it was very seldom that attempts were made to remove tumors from within the substance of the spinal cord. It was claimed by some that such tumors, localized, were of rare occurrence, but it has been shown that that belief was based upon the fact that when the tumors were seen, when the patients died, they usually had burst through the cord and were no longer localized or encapsulated tumors. It has been shown within recent years that they are very much more frequent than had been supposed. Therefore, the question was, How could one attack those localized intramedullary tumors? If the tumor were exposed by an incision through the cord, and then the tumor enucleated, no matter how carefully and skilfully and delicately it was done, there was apt to be so much injury to the tissue that a transverse myelitis occurred and symptoms of a transverse lesion persisted if they had existed before, or appeared if they had not. By a method which was described by the speaker a few years ago, called the "method of extrusion," it is possible to remove these intramedullary growths with safety. This method is based on the fact that normally there must exist in every soft structure like the spinal cord a certain pressure. If a tumor grows there, that pressure is increased. If an incision is made in the location where the pressure is increased, nature must try to readjust pressure conditions, and in doing so she must push out whatever is there that is increasing the pressure. Therefore, if the surgeon makes an incision down to the growth and then waits, nature will push out the tumor slowly by pushing a few fibers away here and there. At the end of a week or so—no arbitrary period of time, of course—the tumor should lie outside of the substance of the cord, and could then be easily removed. The process would have occurred with a minimum amount of injury to the cord tissue. He has operated on fourteen intramedullary lesions. The incision is made in the posterior column of the cord, near the median line, so that if any

fibers are divided they are only those from the lowermost lumbar and sacral posterior roots.

(Dr. Elsberg then showed lantern slides on the screen from cross-sections of the cord; also pictures of cases of intramedullary tumors removed by him, one of which was a large tumor of about five centimeters in width, which gave relatively few cord symptoms, in the cervical region. In this case it is now eight or nine months since operation, and the patient is practically well.)

Dr. Ernest Sachs, of St. Louis, Missouri, said that he had no statistical report to make, but wished to say that in the state of Missouri up to the present time they have not succeeded in getting as good statistical results as they have in the east. This may be accounted for in several ways. One at least that he feels very strongly about is that up to the present time he has not been able to get hold of his cases as early as Dr. Cushing does. Dr. Cushing pointed out that in the past perhaps his results were not so good; that is, not so good as those reported this evening, and consequently the optimistic view that one gets of neurological surgery as presented by Dr. Cushing is perhaps a little too good for the present status of neurological surgery. Dr. Cushing presents his side of a case so forcibly that one wonders whether there can be any other side to the particular thing that he speaks of. He had in mind particularly Dr. Cushing's attitude in regard to pituitary tumors. He said to-night, and has said before, that he believes that palliative treatment of pituitary disease is the only thing that we could hope for. It seems to the speaker that in taking that attitude he takes the attitude that the abdominal surgeon held some years ago in reference to carcinoma of the stomach, when he did nothing more than a gastroenterostomy. Dr. Sachs has not had the amount of material that Dr. Cushing has had, and it may sound presumptuous for him to express an opinion, but it seems to him that in order to get better permanent results in pituitary disease, especially in those cases in which the process has not grown down and enlarged the sella turcica, but is growing upward into the brain substance, they should be attacked from above, as McArthur and Frazier have done, and Elsberg reports in three cases. But in order to help those cases it is necessary to perfect our methods of diagnosis in those particular types of cases. He has recently had the opportunity of seeing at autopsy two cases of tumors of the pars intermedia, tumors that had grown up and involved the basal ganglia. This had been suspected. The X-rays showed a sella turcica normal in size, and, guided by Dr. Cushing's precepts, he did a sellar decompression, but lost both cases. It seemed to him that the autopsy showed clearly that a sellar decompression in those cases was absolutely of no avail. A thing which he had not gone into with sufficient detail, but which he hoped to do in the future, was to determine whether or not these cases could not be recognized earlier, by a more careful study of the sensory changes due to involvement of the basal ganglia. The sensory examinations, as suggested by Head and Holmes about a year ago, may throw light on the earlier recognition of tumors of the pars intermedia, that grow upward and involve the thalamus or the corpus striatum.

He was interested in noting in these one hundred cases of Dr. Cushing's that one particular group of cases that has interested him for a number of years was not reported. He gathers from that either that Dr. Cushing does not consider them cases that require surgical care, or perchance—which seems unlikely—that he has not seen them, and that is a

certain type of cerebral syphilis which does not yield to "606" and the usual older specific remedies. He refers to the type of case of cerebral syphilis in which there are changes in the eye grounds, which do not yield to specific treatment. It is needless to say, of course, that the type of cerebral syphilis characterized by a gumma would come under the head of intracranial tumors, which are operable in the same way as any other intracranial tumor. He speaks of changes in the eye grounds, and does not use the expression choked disc advisedly. We all are agreed that the changes due to intracranial pressure in the eye grounds ordinarily are pressure phenomena, but the question does come up in cerebral syphilis whether the changes in the eye grounds are choked disc, that is, pressure phenomena, or whether they may be neuritic, that is, true optic neuritis. Based on a number of cases seen, he believes that these cases are choked disc and not neuritic. A case seen by him some years ago may illustrate the point perhaps somewhat better, and the necessity of operating in these cases. The woman was brought in with all the symptoms of intracranial pressure, with a strongly positive Wassermann, and symptoms referable to her temporal lobe—typical uncinat fits. There was marked contraction of the fields on both sides. There was nothing suggestive of pituitary disease. The eye grounds, besides being markedly contracted, showed a high grade of choked disc. The speaker wanted to decompress her at once, but she refused and was put on specific treatment (that was before the days of "606"), and all her symptoms—the uncinat fits and headache—all disappeared, but her fields continued to contract and her choked disc in no way improved. As her general symptoms, however, had improved, she went home satisfied. She was brought back some weeks later in the condition of acute compression, and with respiratory symptoms—sighing respirations—and the typical picture of medullary compression. A decompression at that time relieved her and the choked disc disappeared very rapidly, as it would in any tumor case. The question might be raised whether this patient did not also have an intracranial tumor as well as the specific disease, but from the subsequent course of the case, however, he thinks that may be excluded.

He has seen a number of other cases like the one just cited, and it is his belief that in those cases of cerebral syphilis in which there is a choked disc which does not promptly respond to specific treatment a decompression operation is distinctly indicated, and he thinks those cases may be very markedly benefited by such a procedure.

He wanted to take issue with Dr. Cushing on what he advocated in regard to the treatment of all basal fractures by means of decompression. Dr. Cushing's statistics show he has in the past year had four of those cases. Those of us who have seen a large traumatic service in the city hospitals have seen a great many cases of basal fracture that clear up completely, quite rapidly, without a decompression, and it is Dr. Sachs' belief that though decompression is clearly indicated in a certain number of those cases, unless there are definite symptoms usually indicating on which side the pressure is from the blood clot, it might be better to be a little more conservative in operating on these cases.

In closing, he wished to emphasize what Dr. Cushing had already said, but what he thinks cannot be said too frequently, that if we are to advance this subject of neurologic surgery more rapidly or effectively, coöperation between the neurologist and the surgeon is absolutely essential. The days are long since past, or they ought to be, when the surgeon is

merely the hands of the neurologist. They must work on an equal footing, and it seems to him that we can get ahead more rapidly in neurologic surgery by working together and not at cross-purposes. Dr. Cushing's very optimistic picture of the surgical procedures on the central nervous system should be sufficient guarantee to the neurologists that they should no longer wait and resort to surgical measures when everything else has been exhausted. It should be one of the earliest procedures rather than the last.

Dr. Albert E. Halstead, of Chicago, said that anyone presuming to follow Dr. Cushing in the discussion of neurologic surgery—that is, anyone from the west—must first feel like apologizing for his meager material. None of us can hope to have any such an experience to relate as Dr. Cushing has had.

The one branch of brain surgery in which he might compare his experience with that of Dr. Cushing is traumatic surgery. During the last year he has had records of seventeen fractures of the base of the skull, in which there was no question of diagnosis. The fracture was shown either by the X-rays or by free discharge of cerebrospinal fluid from the ears. Of these seventeen cases, nine recovered without operation—that is a little over fifty per cent. A little over two years ago he operated on a series of cases, acting on Dr. Cushing's suggestion, and did decompressions, and his experience showed him that the mortality was probably a little higher in the cases where he operated than where he did not operate. He can see no good logical reason for operating on an injured brain, where there are no localizing symptoms to direct you to the seat of injury. If choked disc is considered as evidence of increased intracranial pressure, we do not have this in head injuries, as a rule. In Dr. Halstead's work, both at the County Hospital and St. Luke's Hospital, he has had very careful examinations of the eyes made in traumatic head cases, during the last three years, and in over fifty cases carefully examined choked disc was not found, except in those cases in which a meningitis was developing. He did not mean to say that the choked disc is absolutely dependent upon an increased intracranial pressure, but it is a very strong presumptive evidence of increased intracranial pressure, and when you find it uniformly absent, as he has, he cannot see why a decompression should help the patient very much.

He believes very strongly in spinal puncture, with the withdrawal of a certain amount of cerebrospinal fluid for diagnostic purposes, and in some cases it seems to him to give relief from the symptoms for the time being, but, as a rule, he believes that the patients will recover as well without operation as with one, where a simple decompression is done.

In the other departments of brain surgery, he did not care to compare his material with that of Dr. Cushing. He has had in the last four years six hypophysis tumors, with two deaths and four recoveries, that is to say, four lived. One lived without having any improvement whatever in the symptoms. One of them has recently been operated upon only a week, and the improvement is not yet apparent. Two of his cases have done fairly well, one being cured and the other practically cured. The eye symptoms have not been relieved, however, as in his first case, which he operated on four years ago. In this case he did the transsphenoidal operation through the inferior route, employing his sublabial method. The patient is well and absolutely cured, so far as symptoms are concerned. He showed this patient at Washington three years ago, and he is still in good health.

In spinal injury he has had one case this year that was remarkable, the case of a fracture of the fourth cervical vertebra, with complete paraplegia, lasting four weeks. He saw the man the night after he was injured, and refused to operate on account of his bad condition. Four weeks later the speaker went back and operated, removing a fragment of bone that had pressed upon the cord. The patient entirely recovered in the course of six weeks.

Another case that gave him considerable satisfaction was one of paraplegia from a gunshot wound of the cord, the bullet lodging in front of the cord, at the level of the last dorsal vertebra, passing to the side of the cord and then in front of it, producing a complete paraplegia. Recovery was immediate and complete after the removal of the bullet, with the exception of a transient paresis of the flexor of the great toe.

Another spinal case that has been satisfactory was an operation for paraplegia which had lasted six months after spinal fracture. The man has not recovered completely, but so nearly so that he gets about without much difficulty.

The operations the speaker has done for decompression have not been so satisfactory as he would like. There is no disguising the fact that a decompression operation gives a considerable deformity in most cases, and, furthermore, in some cases you have cortical symptoms resulting from the brain tumor, and in a good many cases where decompression is done for choked disc it has been his experience that the improvement in the vision is not as great as he would like. That is, if the choked disc is pretty well developed, you can hope for little real improvement, but it may be that the loss of vision will not progress.

Operations on the posterior part of the brain have been in his hands rather difficult, and sometimes followed by unfortunate results. In his experience posterior operations are associated with a great deal more shock and the risks of operation are greater than in the other parts of the brain; that is, referring to the pontine angle cases and the tumors of the posterior fossa, in general. He has never been able to get through with one of these operations without having the patient in a considerable degree of shock, and he has lost several from the immediate effects of the operation. This has happened when a decompression alone was performed.