

Minutes of the Scientific Sessions

The

Third Annual

Congress of Neurological Surgeons

The Roosevelt Hotel

New Orleans, Louisiana

November 12, 13, 14, 1953

The meeting opened at 10:00 A.M. with a business meeting. It was conducted in an efficient manner, and during which time the officers for 1954 were elected. (I did not attend this initial meeting, and any elaborations upon the meeting would have to be done by someone else.)

At 11:00 A.M. Sir Geoffrey Jefferson of Manchester, England opened the professional portion of the meeting with an address entitled "Changing Ideas on the Integration of the Brain". This very enlightening talk was devoted chiefly to a historical review of the changing concepts of the functional areas of the brain, especially the motor area and the "seat of consciousness". Sir Geoffrey emphasized the fact that early investigators considered the medulla as the center from which originates the motor impulses. There was then a gradual shifting of this center by investigators from the medulla to the midbrain, internal capsule, and finally into the cortex. He stated that in the past two decades attention had been largely directed to the investigation of the exposed cortical areas. More recent investigators have concentrated their efforts again to the brain stem, and Sir Geoffrey stated that perhaps we have been too intent on looking at the brain from above, rather than from underneath. We have been looking at the brain wrong way around.

The meeting reconvened after lunch, and a panel discussion on the anatomy and physiology of the frontal lobes was held. The members of the panel were Robert Heath, Moderator, Harold Hemwich, Gerhardt Von Bonin, and A. Earl Walker. Doctor Stanley Cobb was unable to attend, and Sir Geoffrey Jefferson gracefully stood at the wicket for him. After a few introductory remarks by Robert Heath, Gerhardt Von Bonin presented a discussion on the developmental anatomy of the frontal lobes. He pointed out with the aid of comparative anatomy the gradual increasing of complexity of the frontal lobes through the animal kingdom. The first area to appear was that corresponding to the motor-premotor area in man. The second area to appear phylogenetically was the frontal eye area. The third area to appear was that which corresponds to the "vagus" area, which centers chiefly in the anterior cingulate gyrus. Doctor Von Bonin emphasized the continued functional differentiation which these three areas have in man.

Harold Hemwich of Galesburg, Illinois, then proceeded to discuss some of the aspects of brain metabolism. He reviewed the facts that the respiratory quotient of brain tissue was unity, and also that approximately 1/5 of the oxygen consumption of the body occurred in the brain. He briefly described the method of Kety and Schmidt in using nitrous oxide to determine the cerebral blood flow. He cited evidence that cerebral blood flow was unchanged in hypertension, and also following the administration of Nicotinic Acid. On the other hand, intravenous papaverine resulted in an increased blood flow through the brain. He also discussed some of the data concerning cerebral oxygen consumption in various neurologic and psychiatric disorders. It was noted that in cerebral arterio-sclerosis the oxygen consumption averaged 85% of normal. On the other hand, in studying a group of asymptomatic aged patients, the oxygen consumption was 83% of normal. He speculated that perhaps there is a gradual decrease in activity or dying out of brain cells during the process of aging, and that, depending upon which areas of the brain are involved, will govern whether any symptoms occur. He also mentioned the interesting fact that following pre-frontal lobotomy, the total cerebral oxygen consumption is reduced by approximately 5/6, which is more than would be expected merely on the basis of amount of brain tissue destroyed.

A. Earl Walker described the functional anatomy of the frontal lobes. He devoted most of his discussion to the subcortical connections of the frontal lobes, and divided these connections into two chief categories, the afferent system and the efferent connections. In discussing the afferent connections, he stated that these were entirely from the thalamus. He stated that the thalamic afferent systems were again divided into two chief types. The first type consisted of a diffuse system. This was a system which connected the thalamus with all of the association areas of the cortex. Its apparent function is to alert the areas of cortex for the more specific stimuli which occur through the specific systems to be mentioned next. These specific systems are as follows: 1. Projection from the medial-dorsal nucleus of the thalamus to the orbital surface of the frontal lobes. This functions as a pathway by which impulses from the hypothalamus are relayed to the frontal lobes. 2. Projection from the ventral-lateral nucleus of the thalamus to the motor and premotor area. This serves as a pathway by which impulses from the cerebellum reach the frontal lobes via the brachium conjunctivum. 3. Projection of the anterior nucleus of the thalamus to the anterior cingulate area. 4. Projection from the interthalamic neurons to the lateral portions of the frontal lobes. This system serves to integrate motor and autonomic activities. In addition to these subcortical connections, there are afferent connections of the frontal lobes with the temporal, occipital, and parietal lobes.

Doctor Walker then proceeded to discuss the efferent connections of the frontal lobes. He divided these into the following: 1. Cortical-spinal and cortical-pontine. These arise chiefly from areas 4, 6, and 8. 2. Projection from the prefrontal areas to the ventral-lateral, dorso-medial nuclei of the thalamus, and also to the hypothalamus. 3. The projection of fibers from frontal lobes to caudate, globus pallidus, and subthalamic nucleus. 4. The cortical-cortical projection from the frontal lobes to the other lobes of the cortex.

In summarizing his discussion, Doctor Walker stated that the frontal lobes were chiefly concerned with the integration of somatic stimuli, while the temporal lobes were chiefly concerned with integration of the specific special sense stimuli of seeing and hearing. He then presented some very interesting data on the differences of social behavior in monkeys who had frontal lobectomy in comparison to those monkeys who had temporal lobectomy. In outward appearance both groups of monkeys were apathetic. However, those monkeys who had had frontal lobectomy were able to maintain their previous status in their society, while those who had had temporal lobectomy were unable to do so.

Robert Heath of New Orleans opened his portion of the panel with a discussion of the basic drives of an organism. An organism which is in equilibrium with its environment will be presented with some need, either physical or emotional, and this will evoke a response of activity directed towards correcting this need and returning the organism to a state of equilibrium. He then discussed the so-called septal region. He described this as an area of the frontal lobe in the basal region just rostral to the anterior commissure. Destructive lesions in this region produce physiologic changes similar to those which occur with removal of the adrenal cortex. The serum sodium decreases, the serum potassium increases, and there is an inability of the patient to store glucose. Stimulation in this area results in a facilitation of motor responses evoked from cortical stimulation. There is also an apparent alerting of the animal with an increase in the 17 keto-steroids. There are also apparent changes in the serum protein and serum

cholesterol. Doctor Heath then proceeded to discuss some very interesting data which had been obtained from stimulating, and also from recording through electrodes placed in the septal area. In recording from the septal area, it was found that in a series of 30 schizophrenic patients, a spike discharge was found which was not usually present in the non-schizophrenic patient. This spike discharge was found to be altered much more by sodium amital than by phenobarbital. Stimulation of the electrode in these patients resulted in a frequent decrease in their abnormal symptoms. He also briefly discussed the results of anterior septal stimulation in patients with rheumatoid arthritis and with metastatic cancer. In the former patients there was a marked change in the blood chemistry, and in the latter patients there was rather marked relief of pain. Sir Geoffrey Jefferson then proceeded to comment on each of the preceding portions of the panel, and entered into a rather lively discussion with A. Earl Walker.

The panel discussion was followed by a movie which had been made under the direction of J. Grafton Love of Rochester, Minn., concerning the decompression of the posterior root of the 5th nerve for trigeminal neuralgia. Hendrik J. Svien briefly discussed the movie and some recent statistics concerning the results of this treatment in patients operated upon at the Mayo Clinic. He stated that approximately 80 patients had been operated upon with approximately 75% complete relief of pain.

The first day of the meeting was then adjourned.

Friday, November 13, 1953

The meeting opened at 9:00 A.M. with a panel discussion entitled "Psycho-Surgery; Indications and Sequelae". The moderator was A. Earl Walker, and the members of the panel were Gerhardt Von Bonin, J. Lawrence Pool, and Robert Heath. Doctor Walker started the discussion with a short introduction. He told of the early experiments on the chimpanzee which lead Moniz, and later Freeman and Watts into the use of psycho-surgery for mental disorders.

Doctor Von Bonin reviewed some of the anatomic differences between the various types of prefrontal lobotomy. He pointed out the projection of the anterior nucleus of the thalamus to area 24. He also noted the probability of connections of the agranular medial cortex (area 24) with the hypothalamus and the pontine nuclei. He stated that the projection fibers from this medial cortex were those most affected through a transorbital lobotomy. Doctor Walker, in summarizing the anatomic considerations of the frontal lobes, stated that area 24 could be considered chiefly a suppressor area; the lateral surface of the frontal lobe, a granular cortex, could be considered chiefly to be concerned with bodily function; and the orbital surface of the frontal lobe to be chiefly considered with "vagal" functions. He then asked Doctor Heath to comment on the deleterious effects of prefrontal lobotomy. Doctor Heath summarized the deleterious effects by stating that the patients exhibit a lack of concern.

Doctor Pool presented some of the data which he had obtained from patients who had had cortical ablation. It was his opinion that the reaction of the patient postoperatively depended upon the amount of tissue removed, and the preexisting disease. He stated that in their studies little difference could be detected between patients who had had topectomy on the orbital surface, in comparison to those who had tissue removed from the lateral surface of the frontal lobe. Doctor Walker discussed the incidence of postoperative epilepsy. He stated that in approximately 16% of patients who had topectomy, postoperative seizures developed. However, only 3% were considered difficult to control with medication. He stated that studies on postoperative convulsive seizures following the classical prefrontal lobotomy, ranged from approximately 25% to 50%. It was noted that patients who had had cortical stimulation procedures carried out during the course of lobotomy, were found to have a much greater incidence of postoperative seizures. Doctor Heath was then asked to summarize the good effects of prefrontal lobotomy. He stated that the good effects were similar to the bad effects, in that the patient developed inability to anticipate the future in relation to past experiences. In any type of psychosis in which there is a large degree of "painful affect", the reduction of this "painful affect" when accomplished by prefrontal lobotomy, was considered a good effect. Doctor Heath discussed some of his indications for topectomy. He stated that it had been used with good effect in pseudoneurotic schizophrenics, patients with metastatic carcinoma, and depressed patients with Parkinson's disease. He cited one case of a patient who had phantom limb pain in an upper limb in whom an undercutting of the postcentral area was carried out with good results.

Doctor Walter Freeman of Washington, D. C., was present and was asked to discuss some of the effects of transorbital lobotomy. He presented some statistics comparing the physical and social morbidity in transorbital and prefrontal lobotomies. It was noted that while the incidence of postoperative hemorrhage following transorbital lobotomy was greater than that following prefrontal lobotomy, the incidence of other complications, and consequently the overall mortality and morbidity was less. Of special interest was the much lower incidence of postoperative convulsive seizures. The members of the panel then answered questions from the floor. Doctor Pool in answer to questions, stated that it was his opinion that transorbital lobotomies should be done by a neurosurgeon. He stated that he had had no experience in the use of unilateral lobotomy for pain. Lobotomy may be useful in the chronic alcoholic patient, if there is a large component of anxiety present. He described his technique of undercutting the parietal lobe for phantom limb pain. Doctor Heath stated that it was his opinion that prefrontal lobotomy interfered with psychotherapy. He also stated that prefrontal lobotomy was contraindicated if there was no "painful affect" in the psychosis. Concerning the legal status of a patient who had had a prefrontal lobotomy, it was stated that each case would have to be decided individually. Doctor Pool told of two cases he knew of personally that had had their legal status returned by court decision after the patients had had a prefrontal lobotomy. A brief discussion on the use of prefrontal lobotomy in severe behavior disorders in children, resulted in a disagreement of opinion. Doctors Heath and Pool felt that prefrontal lobotomy was not indicated, and Doctor Freeman stated that he thought it was indicated in certain cases. In answer to a question concerning the relief of pain by prefrontal lobotomy, Doctor Von Bonin outlined a pathway through which visceral pain may be relayed through the hypothalamus on to the orbital surface of the frontal lobe.

Having covered a large segment of the evergrowing topic of prefrontal lobotomies in an excellent manner, the panel discussion was brought to a close.

Following the panel discussion on psycho-surgery, Sir Geoffrey Jefferson presented his second address to the Congress. This was entitled "Trigeminal Tumors - Benign and Malignant." Sir Geoffrey maintained the extreme interest of the group throughout his talk, which was well illustrated with numerous lantern slides. He spent considerable time discussing the tumors which arise in the nasopharynx and involved the Gasserian ganglion secondarily. These tumors are chiefly the reticulum cell sarcomas and carcinomas, and the primary origin may easily be overlooked if it is not carefully considered. He discussed the differentiation of Tic Douloureux from the pain resulting from tumor invasion of the Gasserian ganglion, and emphasized that the pain secondary to tumors is frequently more continuous in nature.

On the last day of the meeting, Saturday, November 14, the program opened with a panel discussion entitled "The Use of Fluids and Electrolytes in the Neurosurgical Patient." Doctor Hyman Mayerson was the Moderator of the panel, and the panel consisted of Harold Hemwich, Alton Ochsner, J. Lawrence Pool, A. Earl Walker, and Walter Wilde. Following an introduction of the subject by Dr. Mayerson, Doctor Hemwich presented some considerations on the blood-brain barrier. He stated that this barrier is especially efficient in blocking the passage of acid substances with electro-negative ions. The passage of substances

into the extracellular spaces of the brain is controlled by the choroid cells for the cerebro-spinal fluid and the cells lining the Virchow-Robin spaces for the interstitial fluid. There is also a barrier for the passage of material into the intracellular spaces. He cited experimental work which indicates that there is a greater increase in cerebro-spinal fluid pressure following the administration of 5% glucose in water, than there is following the administration of normal saline solution intravenously. This he felt had practical application in determining the type of fluids to give the patient with increased intracranial pressure during an operative procedure. Doctor Hemwich also stated that the blood-barrier was not as significant in the hypo-thalamus, which apparently is more permeable to substances carried in the blood stream.

Doctor Wilde discussed some aspects of potassium metabolism and cited as a good reference book for this subject "The Metabolic Basis of Surgery" by Frances Moore. Doctor Wilde discussed the loss of potassium during stress, and presented an interesting concept of potassium leaving the cell and being replaced by sodium and hydrogen ions in the relationship of 2 sodium and 1 hydrogen ion to each 3 potassium ions which left the cell. By this mechanism the cell becomes relatively more acid, and the plasma becomes more alkaline during such an exchange. He also described the potassium in the cell as being in two chief categories: potassium which is relatively fixed in the cell, and potassium which is more easily available and exchanged through the cell membrane. This latter potassium is called by him "the free--swimming potassium".

Doctor Pool in his discussion presented material which he and his associates had accumulated from a series of patients operated upon for brain tumors. There were 23 pituitary tumors and two craniopharyngiomas in this group. It was their experience that the plasma sodium is an extremely good index to follow in the postoperative care of such patients, and it will frequently indicate a developing abnormality before other manifestations occur.

Doctor Walker discussed their experiences with hypophysectomy in man for malignant disease. He emphasized the occasional difficulty of maintaining the plasma sodium level following hypophysectomy, and described their regime consisting of the preoperative administration of Cortisone and Desoxycorticosterone Acetate preoperatively, and in addition to these materials, the administration of Sodium Chloride postoperatively. He also cited the occasional necessity of maintaining the blood pressure by the use of Levophed or other similar material.

Doctor Ochsner emphasized the similarities and dissimilarities of the general surgical patient and the neurosurgical patient. He pointed out that the widespread use of low sodium diets in persons of the older age group has introduced a new, and at times, unrecognized problem of maintaining adequate sodium levels in the postoperative period.

A question and answer period followed. In answer to a question regarding hypophysectomy, Doctor Walker stated that they had done their hypophysectomies for metastatic carcinoma of the prostate. In comparing patients with this disease who had had hypophysectomy with those who had had bilateral adrenalectomy, he stated that the pathologists were of the opinion that there was greater tissue tumor necrosis following bilateral adrenalectomy. However, the clinicians felt that the patient's general status and their relief of pain was more favorably influenced by hypophysectomy. Doctor Wilde discussed the difficulty in evaluat-

ing the patient's need for potassium. He emphasized especially that the plasma potassium level does not necessarily reflect the intracellular plasma level, and also pointed out the limitations of utilizing the changes in the electrocardiogram.

The final presentation of the meeting was Sir Geoffrey Jefferson's third address entitled "Pituitary Adenomas". He was able to draw on his extensive experience with 280 cases of pituitary adenomas which had been operated upon with 9.7% mortality. He pointed out that the mortality was much higher in patients in whom the tumor had extended in an extrasellar direction. He recommended that a fractional pneumoencephalogram be done on any patient in whom an extrasellar extension is suspected, in order to determine, if possible, the direction and extent of the extrasellar spread. He then presented, by means of lantern slides, a group of pituitary adenomas which were invasive. These tumors frequently invaded into the cavernous sinus, and in one he even showed an extension of the tumor into one of the cranial nerves running through the cavernous sinus. Sir Geoffrey's tremendous ability to present his material in a dynamic fashion, and ever present wit were particularly highlighted in this presentation. It was indeed fitting that the meeting should come to a close on such a high note.

Respectfully submitted,

Robert D. Weyand, M. D.