REPORT OF THE FIRST INTERNATIONAL CONGRESS OF NEUROLOGICAL SCIENCES, BRUSSELS, BELGIUM, JULY 21–27, 1957

The six medical disciplines that formed the First International Congress of Neurological Sciences met first in joint session and then separated into their sectional meetings.

JOINT SESSIONS

SYMposium on Extrapyramidal Pathology

Under the direction of Professor Raymond Garcin (Paris, France), the symposium on “Extrapyramidal Pathology” expressed, but did not answer, many of the problems that have arisen with the current reawakened interest in abnormal involuntary movements. One of the major problems was to explain the success of the treatment of Parkinsonism and other disorders of involuntary movement by making lesions in the globus pallidus. P. C. Bucy (Chicago, Ill., USA) was of the strong opinion that all the benefits from this type of treatment result from destruction of a portion of the pyramidal fibers of the internal capsule adjacent to the globus pallidus. The investigators who have had considerable experience with the surgical treatment of Parkinsonism, led by A. E. Walker (Baltimore, Md., USA) and H. Narabayashi (Tokyo, Japan), were of the opinion that lesions of the globus pallidus have a specific beneficial effect upon the “extrapyramidal diseases,” and do not depend upon damage of the pyramidal system. The neurophysiologists reported some basic work which will aid in the measurement of motor control from higher centers and promises to shed future light on the control that the globus pallidus exerts upon the rigidity and tremor of Parkinsonism. R. Granit (Stockholm, Sweden) reported on his investigation of the “gamma loop” with intracellular electrodes. These loops connect small neurones in the anterior horns of the spinal cord with muscle spindles. A discharge from the gamma loop activates the muscle spindle and precedes all but the very fast reflex contractions of a muscle bundle. The activity of the loop is a facilitatory influence on the ventral horn cells. The gamma cells are in turn facilitated by supraspinal centers, particularly the reticular activating system of the brain stem. The interchange of facilitatory stimuli between the reticular activating system and various portions of the basal ganglia was eluded too frequently by the clinicians in their discussion of extrapyramidal disorders. Data gathered from stimulation and pickup studies with implanted electrodes in human subjects, led F. A. Mettler (New York, N.Y., USA) to believe that the globus pallidus is the highest level of the proprioceptive circuit. An attempt to use these neurophysiological data clinically is being made by G. Schaltenbrand and Hufschmidt (Würzburg, Germany). They measure tension, resistance and the electromyograph in extremities that are being put through a standard routine of passive exercise by a motor. They feel that the gamma loop system is responsible for the alterations in rigidity and tremor which they demonstrated during changes of emotional state and other bodily functions in individuals with extrapyramidal disorders.

Both J. G. Greenfield (London, England) and R. Hassler (Freiburg, Germany) believe that the primary cause of the symptoms of Parkinsonism is a lesion in the zona compacta of the substantia nigra. A statistical study made by J. W. T. Redfearn
(Forest Green, England) of all the reports of postencephalitic Parkinsonism since 1923 also indicated that those with marked tremor had lesions of the substantia nigra. Those without much tremor had lesions in the substantia nigra, but they had additional lesions in the reticular formation of the brain stem. He concluded that the lesion in the reticular formation had either prevented the tremor from developing or abolished it after it had developed. L. H. Schreiner et al. (Rochester, Minn., USA) produced tremor, cogwheel rigidity and poverty of movement and facial expression in monkeys by making lesions in the reticular formation of the midbrain immediately overlying the substantia nigra at the level of the red nucleus. These symptoms could be stopped in the contralateral limbs by making lesions in the caudal portion of the globus pallidus. Greenfield was of the opinion that the choreiform movements of choreo-athetosis are caused by a lesion in the corpus Luysii, and the spastic component of the disorder arises from scattered lesions in other parts of the basal ganglia.

SYMPOSIUM ON THE STATES OF CONSCIOUSNESS IN NEUROLOGY

This symposium brought up again the old discussion of how much of the brain is needed to preserve consciousness. F. M. R. Walshe (London, England) is of the opinion that consciousness demands all the structural facilities that the nervous system can provide. Percival Bailey's (Chicago, Ill., USA) idea that consciousness is most profoundly disturbed by lesions of the brain stem between the "hypothalamus and bulb" met with the approval of most of the neurosurgeons. It is a well-known finding that alterations in the conscious state can be produced by stimulation of the medial and inferior areas of the human frontal and temporal lobes. An extension of these studies indicates that "arousal" can be produced by stimulation in many of the thalamic nuclei as well as in the external portions of the globus pallidus. Wilder Penfield's (Montreal, Canada) statement that the support of consciousness depends upon a constant flow of impulses from the higher brain stem to the cortex and back, was nicely illustrated by the presentation of P. Solomon et al. (Boston, Mass., USA). These investigators exposed human subjects to "sensory isolation" in a tank-type respirator for 24 to 72 hours. Some of the subjects, after being deprived of external stimulation, exhibited alterations in the conscious state and became disoriented, confused and had hallucinations.

Studies of deeply comatose patients by M. Nathanson et al. (New York, N.Y., USA) showed that the absence of oculocephalic and caloric responses is not specific for lesions of the brain stem as these reflexes are also absent in other conditions that give rise to coma. Acting upon his interesting theory that the choroid plexus is a "dangerous organ" in the presence of increased intracranial pressure, F. A. Verbeck (Groningen, Holland) performed 106 choroid plexectomies which improved the state of consciousness of 88 of the patients so treated.

Sixteen cases of unconsciousness following vertebral angiography were studied electroencephalographically by A. Lundervold (Oslo, Norway). The patients that demonstrated filling of the posterior cerebral arteries had theta and delta waves by electroencephalography. Some of these also had a homonymous hemianopia. Congenital anomalies of the vertebral and basilar arterial systems occurred in a fairly large percentage of these patients. He conjectured that damage to the structures supplied by small pontine arteries was responsible for the alterations of consciousness. He did not state how long or profoundly consciousness was altered.
REPORT OF MEETING

SYMPOSIUM ON THE THERAPEUTIC USE OF HYPOTHERMIA

Hypothermia is gaining widespread acceptance as a means of treating disease of the nervous system and as an adjunct to neurosurgical operations. E. H. Botterell (Toronto, Canada) presided over the symposium and presented a rather complete picture of spontaneous intracranial hemorrhage. The mortality rate is extremely high during the week after the first episode of bleeding. He feels that to combat the early high mortality the surgeon should assume his responsibility of the patient soon after the first hemorrhage occurs, rather than waiting to treat only those patients who survive the most critical period. Improved knowledge of the natural history of patients with proven vascular abnormalities is needed as a basis for evaluating the various therapeutic methods used.

Several reports on the use of hypothermia in the treatment of craniocerebral trauma expressed caution for the dangers of hypothermia itself. G. Lazorthes and P. Wertheimer (Toulouse and Lyon, France) were of the opinion that it should be reserved only for very grave injuries. K. Kristiansen (Oslo, Norway) stated the fear that some patients who have sustained such a severe brain injury that mentality is affected, are kept alive unduly long with hypothermia, and remain a burden to society. H. Elliott (Montreal, Canada) reported success in the treatment of massive intracranial hemorrhage by hypothermia. An enthusiastic report for the use of hypothermia during surgery for 173 brain tumors was given by C. B. Sedzimir (Liverpool, England). He found that retraction of the brain was easier, and bleeding and operative time were diminished because a decrease in brain volume allows the surgeon more room within the cranium. All of the reports warned against dropping body temperature below 27°C. since this increases the risk of ventricular fibrillation of the heart. Intracranial pressure dropped markedly at body temperatures between 24° and 27°C., satisfactorily between 27° to 30°C., and not significantly between 30° to 33°C. when measured in humans through an intraventricular cannula by N. Lundberg (Lund, Sweden). He was not as enthusiastic as Sedzimir for the use of hypothermia during intracranial surgery from his experience with 35 operations for brain tumor.

H. L. Rosomoff (Bethesda, Md., USA) reported that hypothermia is effective in preventing neurological deficits in animals if it is started within 15 minutes after occlusion of a blood vessel and the temperature is dropped to 24°C. within 90 minutes. R. W. Porter and G. J. Hayes (Washington, D.C., USA) found that major cerebral vessels of monkeys, cooled to 24° to 30°C., can be occluded to expedite surgery on them for four periods of 10 minutes each if the time elapsed between occlusions is increased by a 10-minute increment after each occlusion. Rapid cooling of the brains of dogs was produced by the use of extracorporeal hypothermia by B. Woodhall and D. H. Reynolds (Durham, N.C., USA). The temperature of the body dropped only 2° to 4°C. while the brain was cooled 23°C. There was no difficulty with cardiac irregularity even during rapid cooling of the brain. W. H. Sweet et al. (Boston, Mass., USA) find that ventricular fibrillation results from unequal cooling of the cardiac musculature during rapid cooling of the body. They advocate a slow cooling rate of 1°C. each 15 to 20 minutes until a minimum level of 25.8° to 28.8°C. is reached.
SYMPOSIUM ON SUPRATENTORIAL ANGIOMAS

Seven hundred cases of supratentorial angiomatosis were mentioned during the presentations over which H. Olivecrona (Stockholm, Sweden) presided. The results of treatment by all the authors implied that a more optimistic future can be predicted for people with intracranial angiomatosis. H. Krayenbühl (Zürich, Switzerland) found 1,000 cases of angiomatosis in the literature; 83.7 per cent were supratentorial, 6.2 per cent were in the cerebellum and 8.1 per cent arose from the external carotid circulation.

The vessels in close approximation to angiomata of the brain were found to be normal by W. B. Hamby (Buffalo, N.Y., USA). He feels that this information supports the theory that intracranial angiomata are congenital in origin and that their gradual enlargement extends only within the limits of the abnormal vessels, and not to the adjacent normal vessels. K. Decker (Munich, Germany) found that most of the patients with convulsions as a prominent symptom showed an accumulation of abnormal vessels about the motor cortex. In those with subarachnoid hemorrhage, the lesion is more likely to be in the central or occipital areas of the brain. Normal areas of the brain were found to be deprived of blood by the fast circulation through the angioma by G. Norlén (Göteborg, Sweden). Removal of the angioma restored normal circulation. The importance of differentiating between centrally lying angiomata and those in the ventricular walls was stressed by C. A. Carton and E. C. Alvord (New York, N.Y. and Houston, Texas, USA). They advocate combined pneumoencephalography and angiography to demonstrate these lesions adequately. They operated upon 3 in the thalamus, 3 in the caudate nucleus and 3 in the choroidal arteries. A review of 500 cases of spontaneous subarachnoid hemorrhage by O. Höök (Stockholm, Sweden) showed a ratio of arteriovenous aneurysm, 1, arterial aneurysm, 2, and no angiographic evidence of vascular anomaly, 1.5.

Prognosis is best for those in whom no lesion is demonstrated angiographically, and poorest for arterial aneurysms.

There was rather universal agreement that surgery is the best treatment for supratentorial angiomata. The frequently stated contraindications for surgery of these lesions were severe mental deterioration, lesions involving the "central portion" of the brain, or those that are fed from both carotid or both vertebral arteries. D. Petit-Dutaillis (Paris, France) expressed the feeling of many of the neurosurgeons that hypotension produced by ganglioplegic drugs is very helpful in the removal of angiomata, and that hypothermia, while good in theory, is more dangerous and more troublesome. L. A. Mount (New York, N.Y., USA) stressed the use of several techniques that may be overlooked. The Matas test demonstrates adequacy of the brain’s collateral circulation. Ligation of the common carotid artery should be done close to the bifurcation to prevent thrombosis in the stagnant portion of the artery between the ligation and the bifurcation. Angiography should always be carried out after the surgical treatment of an intracranial vascular lesion to learn whether it has been dealt with adequately.

SYMPOSIUM ON STEREOTACTIC SURGERY

The timing of the Symposium on Stereotactic Surgery was appropriate as 1957 is the 100th anniversary of the birth of Sir Victor Horsley who with R. H. Clarke did the first stereotactic surgery in animals. It was also the 10th anniversary of Spiegel and Wyceis’ report of the first successful stereotactic operation in man.

Three topics received major attention in this symposium: 1) anatomical varia-
tions of the human brain, 2) technics of stereotactic surgery, and 3) clinical experiences with the technic.

Stereotactic surgery in man was slowed for some time by attempts to relate structures of the brain to landmarks in the skull, as is done for animals. Several investigators concluded almost simultaneously that there is no constant relationship between the human skull and the nuclei of the brain, and developed intracerebral landmarks. At the time of the symposium, all of the investigators were using a line between the anterior and posterior commissures ("ventricular base line") as the reference for their stereotactic coordinates. These two points have been chosen because they can be identified in roentgen-ray contrast studies of the brain and have a relatively constant relationship to the nuclei of the brain. The ventricular base line is an accurate reference for the basal ganglia, which are close to it, but not for the cerebral white matter and cortex which are further away.

Several groups of investigators have tried to establish formulae to relate nuclei of the brain to size and shape of the skull. Such measurements have not demonstrated any constant similarities of pattern. It has been shown, however, that the silhouettes of the various nuclei overlap enough to allow accurate placement of electrodes into them.

Numerous methods have been sought to determine whether the tip of an electrode has reached the desired point in the depths of the brain. Electroencephalographic data as used by W. Umbach (Freiburg, Germany) are of much benefit in this regard. None of the structures of the brain has an electrical discharge that is characteristic enough to identify it with certainty, although differences in activity can be detected as an electrode is passed from one structure into another. Stimulation and electrical pickup are helpful in determining when the electrode is not in the desired structure, by demonstrating the characteristic electrical or motor activity of adjacent structures, such as the internal capsule or optic tracts. The stimulation method for determining the position of the electrode may eventually be a more precise means of localization than the anatomical coordinates.

Most of the investigators have developed their own system of stereotactic coordinates. Only a small portion of the accumulated anatomical data was discussed. J. Talairach, M. David and co-workers (Paris, France) presented a well-documented paper on the relationship of the basilar nuclei to roentgen-ray landmarks, and also had on display a newly printed stereotactic atlas demonstrating their carefully prepared system of coordinates. G. Schaltenbrand and Percival Bailey (Würzburg, Germany and Chicago, Ill., USA) displayed parts of a beautifully prepared and printed atlas which promises to be an authoritative addition to the stereotactic approach and to human neuroanatomy. Some variations in the size and shape of the nuclei of the brain were pointed out in a scholarly work by J. B. Brierley and E. Beck (London, England). It became apparent that a great deal more investigation is needed in this field.

Each group that has carried out a sizeable volume of human stereotactic surgery has developed a technique of its own. All of the apparati described have a similar appearance. They are comprised of a superstructure which can be attached rigidly to the patient's head. The superstructure allows the accurate holding and directing of a needle or electrode into the depths of the brain. All of the investigators have found it necessary to attach the apparatus to the skull itself, since methods that hold it by plugs in the orifices proved to be insecure and painful. In most cases a rectangular system of coordinates has been used. The measurements for the place-
ment of the electrode are usually determined from pneumoencephalograms. In some clinics, radiopaque oils are used to demonstrate the anterior and posterior commissures.

Since roentgenograms are essential in determining the precise placement of lesions, a great deal of effort has been utilized to diminish the errors that might be produced. Radiological magnification is eliminated in some clinics by placing the tube more than 5 meters from the patient to produce parallel beams, and in others by keeping magnification constant and correcting for it mathematically. Distortion is minimized by maintaining the patients in a given relationship to the roentgen-ray tube, either by attaching the stereotactic apparatus to the roentgen-ray tube or to an immovable object.

E. A. Spiegel and H. T. Wycis (Philadelphia, Pa., USA) compared the controllability and uniformity of brain lesions produced stereotactically by a number of different agents. They concluded that electrolytic lesions are more uniform than those produced by mechanical, thermal, chemical or radioactive means. Most investigators are using electrocoagulation of one sort or another. From the reports made in Brussels, lesions produced by ultrasound are neither as accurate nor as discrete as those produced by the other agents.

The largest clinical experience in human stereotactic surgery has been in the treatment of Parkinsonism. Success in this field has probably created and sustained much of the interest that has arisen. About 500 stereotactically treated patients with Parkinsonism were mentioned in the papers and discussions. The majority of these patients have had lesions placed in the globus pallidus.

R. Hassler’s (Freiburg, Germany) finding that bilateral lesions of the globus pallidus may lead to dementia concurred with that of most of the authors. Lesions in the region of the ansa lenticularis and the medial segment of the globus pallidus are most effective for the control of rigidity and, to a lesser extent, of tremor. Some authors were of the opinion that tremor was occasionally benefited on both sides, after a unilateral lesion of the globus pallidus. H. Narabayashi (Tokyo, Japan), from his experience with 180 cases of Parkinsonism, finds that tremor is improved only temporarily by lesions in the globus pallidus. It is his opinion that the only permanent effect of destruction of the globus pallidus is relaxation of rigidity which indirectly benefits the control of tremor. L. Leksell’s (Lund, Sweden) group gave the only report of a detailed analysis of results of the treatment of Parkinsonism. The rigidity and tremor of all 61 of his patients were improved enough to allow them to be more independent. However, none of the patients who were so incapacitated as to be unable to work preoperatively was able to return to work after the operation. Apparently, all of those who worked before surgery were able to continue afterward.

A few cases were reported in which the globus pallidus was not the target (Zielpunkt) of the stereotactic lesion for the treatment of Parkinsonism. R. Hassler (Freiburg, Germany) discussed 11 patients in whom lesions were placed in the ventrolateral nucleus of the thalamus. There was improvement of tremor and rigidity without paralysis. Temporary nystagmus developed toward the side of the lesion, but no sensory troubles. If the thalamic lesions were made bilaterally, there was a severe disturbance of intellect and behavior similar to that occurring with large frontal lobe lesions. This change was not as pronounced when the lesion was made on only one side, but apparently even the unilateral procedure was abandoned because of it. I. S. Cooper (New York, N.Y., USA) reported that he relieves the occasional tremor that is not benefited from a lesion in the medial globus pallidus,
by making a lesion more posteriorly, presumably in the region of the ventrolateral nucleus of the thalamus.

Because of the infrequent occurrence of hemiballismus, each author who mentioned its treatment had only one or two cases to report. The threat of death from exhaustion seems to have prompted most of the surgical approaches to treatment. Most of the surgical attempts to relieve hemiballismus have been directed toward the pyramidal system at the level of the cortex, capsule or peduncles. R. E. Strain and I. Perlmutter (Miami, Fla., USA) achieved the same result by anterolateral chordotomy at the level of the 2nd cervical segment. It was interesting to note that relief may also be achieved through the "extrapyramidal" system, by making lesions in the posterior portion of the globus pallidus.

The hopes for relief of choreo-athetosis have not been completely realized. The stereotactic treatment of about 50 patients with choreo-athetosis was mentioned during the symposium. T. Riechert (Freiburg, Germany) reported a few cases of choreo-athetosis in which lesions were made in the ventrolateral nucleus of the thalamus. "Dementia aental" developed fairly regularly after the bilateral lesions and sometimes after the unilateral. The majority of patients with choreo-athetosis reported were treated by producing lesions in the globus pallidus. No one claimed success in relieving athetosis, but a number of patients were said to be able to walk and use their hands more effectively because of improvement of the choreiform movements. H. Narabayashi (Tokyo, Japan) found that children 5 to 10 years of age with choreo-athetosis received more benefit from lesions placed in the globus pallidus than do older individuals.

Huntington's chorea was treated in a few cases by destruction of the external portion of the globus pallidus and ansa lenticularis with some improvement of motor function for a few years, followed by progression of symptoms. The patients were not benefited to any great extent in their psychic behavior.

The placement of radioactive materials into the depth of intracranial neoplasms is a promising part of the armamentarium of stereotactic surgery. It seems to be particularly valuable for the treatment of tumors impossible or difficult to approach by open surgery.

Stereotactic production of lesions in the hypophysis was reported by three authors. T. Riechert (Freiburg, Germany) approaches the pituitary gland through the frontal lobe and implants radioactive materials to ameliorate carcinomas and for the treatment of patients with pituitary tumors, in whom vision was not affected. J. Talairach et al. (Paris, France) use the same indications, but insert radioactive gold particles into the hypophysis through the nose and sphenoid sinus. He has an ingenious system for inserting a tantalum screw into the hole made in the floor of the sella turcica, to prevent cerebrospinal fluid rhinorrhea and infection. E. Klar (Heidelberg, Germany) showed a fascinating moving picture demonstrating the use of a roentgen-ray image amplifier to direct an electrode through the floor of the sella turcica to destroy the pituitary gland.

Although the first human stereotactic surgery was directed toward the relief of pain, relatively little attention was paid to this type of treatment during the symposium. Three approaches have been made for relief of pain: destruction of the spinothalamic tracts cephalad and posterior to the quadrigeminate tubercules, interruption of the terminal nuclei of the spinothalamic tract in the medial thalamus, and destruction of the medial nucleus of the thalamus for its psychic reaction on pain. By stimulating the areas during some of these operations, R. Hassler (Freiburg, Ger-
many) found that there is a patterned lamination of distribution of pain in the medial thalamic nuclei similar to that in the spinothalamic tract.

The study of epilepsy is another area in which stereotactic surgery offers promising possibilities. Deep epileptogenic foci have been sought without destroying more superficial structures. The spread of abnormal electrical activity from an epileptogenic focus can be mapped more adequately by this technique. T. Riechert (Freiburg, Germany), in a brief report, stated that destruction of the fornix in 5 patients with psychomotor epilepsy markedly decreased the number and severity of seizures. He attributed the success of the procedure to diminution of the facilitatory impulses carried through the fornix to epileptogenic foci in the temporal lobe.

Even hydrocephalus has received the attention of the stereotactic surgeon. Lesions have been made in the lamina terminalis by P. Crezee (Rotterdam, Holland) and drainage of the posterior third ventricle into the cisterna ambiens using a special punch attachment for his stereotactic apparatus is advocated by T. Riechert.

Some interesting data gathered during the performance of stereotactic surgery were reported. R. Hassler (Freiburg, Germany) found that he could produce somnolence or excitation by varying the stimuli introduced through electrodes in the central nuclei of the thalamus. He also speculates that the globus pallidus is part of the activating system of the brain because certain stimuli in its external segments resulted in arousal. R. G. Bickford et al. (Rochester, Minn., USA) produced repetitive, writhing, slapping, rubbing, movements of the contralateral arm and hand by stimulating in an area "one centimeter lateral to the middle of the tail of the caudate nucleus." They were able to alter the pattern of the movements by changing the stimulus, or the position of the patient's hand at the start of the stimulation. E. L. Foltz and L. E. White (Seattle, Wash., USA) were able to abolish symptoms and signs of morphine withdrawal by producing lesions in the cingulate fasciculus of the monkey. They were also able to modify emotional and autonomic hyperactivity by producing similar lesions in humans. D. Brage et al. (Buenos Aires, Argentina) showed profound metabolic, electroencephalographic, electrocardiographic and endocrine changes in patients who had destructive lesions made in the globus pallidus. These disturbances are greatly increased by bilateral lesions of the globus pallidus, and in some cases they contributed to the patient's death.

One of the interesting controversies raised during the symposium involves the need for extreme precision in placement of lesions. I. S. Cooper (New York, N.Y., USA), who popularized destruction of the globus pallidus for treatment of hyperkinetic disorders, reported the largest group of patients treated. He introduces needles into the globus pallidus, freehand, using simple roentgen-ray controls. He reported results in the treatment of Parkinsonism and choreo-athetosis which compare favorably with those of the surgeons who use a more precise mechanical method of placement of lesions. Cooper reported no greater mortality rate or incidence of complications. A variation of Cooper's technique using the landmarks described by Fénelon was reported by A. D. Kaplan (Buenos Aires, Argentina). It was obvious from discussions in the corridors after the Symposium on Stereotactic Surgery that a considerable number of surgeons, all over the world, are making lesions in the globus pallidus using the freehand method. The growing popularity of this procedure indicates that it must be meeting with sufficient success to satisfy both doctors and patients.

**FREE PAPERS**

Some interesting ideas were expressed in the papers that were not classified with
any of the symposia. P. C. Boone (Utrecht, Holland) finds that intact nerve fibers in man may “sprout” to innervate adjacent denervated muscles. For example, nerves from the buccinator may innervate the adjacent denervated facial muscles. This author believes that fasciculations of muscle, regardless of cause, result from “peripheral reinnervation.”

“Atlas stenosis” can be demonstrated by plain roentgenograms or myelography in children with Arnold-Chiari malformation associated with spinal meningocoele or myelomeningocele. H. A. Maslowski (Manchester, England) believes that the presence or absence of this finding may be decisive in determining whether the hydrocephalus that develops is communicating or noncommunicating.

Fourteen patients have been treated with hypophysectomy for severe diabetes mellitus (Kimmelstiel-Wilson type) by M. T. Javid et al. (Madison, Wis., USA). There have been 3 deaths. The remainder have had a 50 per cent to 80 per cent reduction of their insulin requirements and are doing quite well.

E. A. Smolik et al. (St. Louis, Mo., USA) found that there is an increase in blood volume in a large share of patients after intracranial surgery and cerebral trauma. They are of the opinion that studies of blood volume using radioisotopes should be performed to guide administration of fluid after acute brain damage.

J. J. Barcia Goyanes (Valencia, Spain) amplifies the bruits and normal vibrations of the brain electronically. He also percusses the brain with low-frequency sounds and picks up the echoes with an amplifier. He finds the percussion method more precise for the detection and localization of brain tumors than any of the other methods.

Injection of the internal cerebral veins after death reveals that the large network of “transcerebral veins” which travel through the hemispheres to join the cortical veins are partially occluded in subdural hematomas. H. A. Kaplan and J. Browder (Brooklyn, N.Y., USA) suggest that this finding may explain the severe edema and widespread pathology associated with large subdural hematomas.

Infrathalamic tractotomy for pain has been performed through the posterior fossa in 20 cases by B. Zapletal (Olomouc, Czechoslovakia). He dissects superior to the cerebellum across the cisterna ambiens and makes a cut “on the borderline of the brachia colliculi and corpus geniculatum mediale,” with a special tractotomy knife. F. Mikula from the same clinic finds that this infrathalamic tractotomy is an improvement in the treatment of intractable pain, as it does not leave the dysesthesias and paraesthesias that occur after mesencephalic tractotomy.

Attempts are still being made to improve the results of surgical treatment for temporal lobe epilepsy. A. E. Turner (London, England) has made some “tiny rotary leucotome” lesions, presumably cutting the fibers going from the anterior temporal pole to the diencephalon through the tail of the caudate nucleus. He reports decreased frequency of seizures and improvement of psychiatric disorders.

FIFTH SYMPOSIUM NEURORADIOLOGICUM

Attention in this symposium was directed toward pneumoencephalography, and the positions and maneuvers for filling various intracranial spaces, rather than to angiography. A roentgen-ray image amplifier has been used in the performance of pneumoencephalography by O. Wiedenmans and K. H. Leuchs (Munich, Germany). They watch the air as it ascends the spinal canal and are able to direct it through the intracranial spaces by changing the position of the head. They take films only when an area is well demonstrated. One of the many advantages cited for this technique was the ability to demonstrate cerebellar herniation with only a few
cubic centimeters of air. The shortest distance between the posterior contour of the third ventricle and the *cisterna ambiens* is important in demonstrating tumors in the region of the *pineal body*. E. Klaus (Olomouc, Czechoslovakia) found that this distance is less than 0.7 cm. with hydrocephalus and more than 1.3 cm. in the presence of a tumor in the region of the pineal body.

Visualization of the posterior cerebral artery during carotid angiography is thought by B. Chrast and B. Vagner (Brno, Czechoslovakia) to cast the suspicion of tumor or vascular malformation of the temporal lobe on that side. A medial shift of the distal portion of the *posterior cerebral artery* on the anterior-posterior projection indicates a tumor of the occipital lobe. An isolated depression in the *cisternal portion of the posterior cerebral artery*, under a line drawn from the *nasion* to the *processus alae parvae* on the lateral projection, is the indication of a mass in the medial temporal lobe.

The over-all picture created by the First International Congress of Neurological Sciences is that each of the disciplines represented is preparing itself to explore the depths of the brain more thoroughly. The next few years promise significant advances in knowledge of portions of the brain that have heretofore been inaccessible.

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