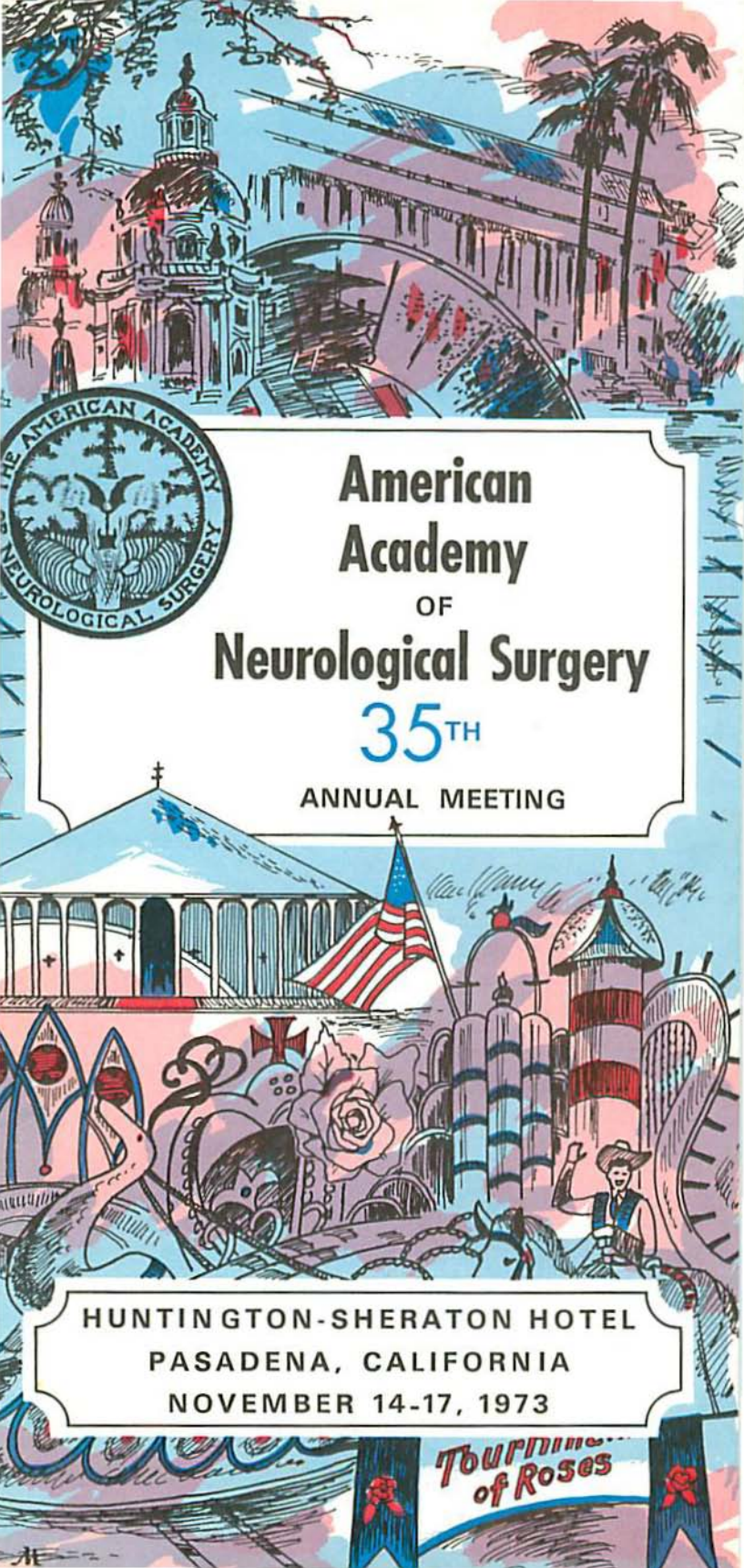

American Academy OF Neurological Surgery

35TH ANNUAL MEETING

HUNTINGTON-SHERATON HOTEL
PASADENA, CALIFORNIA
NOVEMBER 14-17, 1973

Tournament of Roses

ANNUAL

HUNTINGTON-SHERATON HOTEL

MEETING

PASADENA, CALIFORNIA

1973

THE AMERICAN ACADEMY OF NEUROLOGICAL SURGERY

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PROGRAM
1973

WEDNESDAY, NOVEMBER 14

4:00 - 6:00 p.m. ..... Registration
Georgian Room Foyer

6:00 - 9:00 p.m. ..... Reception — Buffet
Georgian Room

THURSDAY, NOVEMBER 15

8:00 - 5:00 p.m. ..... Registration
Georgian Room Foyer

8:30 a.m. - 12:00 noon ..... Scientific Session
Georgian Room

12:00 Noon ..... Lunch
Ship Room

1:30 p.m. - 5:00 p.m. ..... Scientific Session
Georgian Room

5:00 - 6:00 p.m. ..... Executive Meeting
Wentworth Room

7:00 p.m. ..... Mexican Fiesta — Dinner and Entertainment — *Georgian Room*

FRIDAY, NOVEMBER 16

8:00 a.m. - 5:00 p.m. ..... Registration
Georgian Room Foyer

8:30 a.m. - 12:00 Noon ..... Scientific Session
Georgian Room

6:30 p.m. ..... Formal Banquet
Viennese Room

SATURDAY, NOVEMBER 17

8:30 a.m. - 12:00 Noon ..... Scientific Session
Georgian Room

12:00 noon - 1:00 p.m. ..... Executive Meeting
Georgian Room

SCIENTIFIC PROGRAM

THURSDAY, NOVEMBER 15

1 **8:30 a.m.**

"Surgical treatment of vascular lesions in the brain stem"

Shelley N. Chou, Minneapolis, Minnesota

■ This presentation will document cases of arteriovenous malformation and angioblastomas located partly or entirely in the brain stem. Each case will be presented from the standpoint of angiographic analysis, indications for surgery, intraoperative technical approaches and quality of survival.

2 **8:50 a.m.**

"Prostaglandin F$_{2}$a Levels in Normal and Bloody Spinal Fluid: The Vasospastic Substance"

James T. Robertson, William Dawson, and Charles Sweeley, Memphis, Tennessee

■ Prostaglandin F$_{2}$a has been shown to be a very vasospastic substance when injected into the subarachnoid fluid by the cisterna magna route as well as the chiasmatic cistern route. In addition, it will cause spasm when injected into the carotid artery of dogs and monkeys. Prostaglandin F$_{2}$a is synthesized by platelets and also is synthesized by the brain. Obviously, if it has a role in the production of cerebral vasospasm, the normal levels of prostaglandin F$_{2}$a in animal and human spinal fluid must be compared with the levels in bloody spinal fluid in patients with and without cerebral vasospasm. Preliminary work indicates that the levels increase markedly in bloody spinal fluid of dogs, and human material studies are presently underway. If the results prove to be as promising as the initial studies the cause of cerebral vasospasm may become clearly evident.

3 9:05 a.m.

"Brain Catecholamines in Cerebrovascular Disease"

N. T. Zervas, R. J. Wurtman, H. Hori, M. Lavyne, Boston, Massachusetts

■ In experimental animals, vasoactive biogenic amines were studied following cerebral ischemia and subarachnoid hemorrhage. A profound change in the localization and concentration of certain monoamines, notably dopamine and serotonin was found. Attempts to inhibit these changes by reducing the synthesis of catecholamines and serotonin suggested that ischemia related to cerebral vasospasm could be reduced. Some preliminary observations in patients with subarachnoid hemorrhage will be presented along with biochemical and photofluorescent studies of monoamine activity in these diseases.

4 9:20 a.m.

"A Study of Cerebral Arterial Spasm"

George S. Allen, S. N. Chou, L. A. French, Minneapolis, Minnesota

■ This report describes the application of an *in vitro* method, utilizing, a small volume chamber, to the problem of cerebral arterial spasm. It will be shown that this *in vitro* method offers a quantitative and well-controlled investigative approach. The relative sensitivity of the canine basilar and middle cerebral arteries to a variety of known, or suspected vasoactive agents will be demonstrated and conclusions will be drawn concerning the agent's physiologic role in the production of spasm. In addition, *in vivo* experiments will be described which will show that these *in vitro* results are applicable in the intact animal.

5 9:45 a.m.

"An Intrinsic Metabolic Mechanism to Protect the Brain During Progressive Cerebral Ischemia"

Derek A. Bruce and Thomas W. Langfitt, Philadelphia, Pennsylvania

■ In patients with acute brain injuries in whom cerebral blood flow (CBF), intracranial pressure (ICP), and the cerebral metabolism of O_2 ($CMRO_2$)

were measured before and after mannitol therapy, we noted frequently an increase in CBF without a change in ICP following mannitol, and in some patients an increase in $CMRO_2$ that paralleled the rise in CBF. These observations suggested that $CMRO_2$ was reduced in compensation for the decrease in CBF rather than due to brain damage. Animal experiments were designed to test the hypothesis.

■ CBF was measured continuously in lightly anesthetized dogs using the torcular venous outflow technique which approximates total cerebral blood flow. Arterial blood gases were kept constant throughout the experiments. ICP was increased in 10 mm Hg increments by infusion of mock CSF into one barrel of a double-barrel needle in the cisterna magna, and ICP was recorded continuously from the other barrel. Systemic arterial pressure (SAP) was recorded from a catheter in the aorta, and the EEG from extradural leads placed through twist drill holes. At each level of ICP arterial and cerebral venous samples were obtained to measure arteriovenous differences of O_2 and glucose, then $CMRO_2$ and the cerebral metabolism of glucose (CMRG1) were calculated. The oxygen glucose index (OGI) was also calculated. This provides an estimate of the ratio anaerobic-aerobic metabolism. The onset of ischemic brain damage is marked by an increase in anaerobic glycolysis.

■ There was no change in CBF until cerebral perfusion pressure (CPP = SAP − ICP) was reduced to 40-50 mm Hg due to intact autoregulation. Then CBF gradually fell as CPP was further reduced by raising ICP. At a CBF 60% of control a highly significant ($p < .001$) fall in $CMRO_2$ had occurred. There was not a significant decline in CMRG1. At a CBF 45% of control $CMRO_2$ was approximately 50% of normal and a highly significant fall in CMRG1 had occurred. At a CBF 30% of control, $CMRO_2$ was 32% of normal, but CMRG1 had risen, and the OGI had fallen to 61% of normal ($p < .005$) manifesting anaerobic glycolysis and evidence of ischemic brain damage. The EEG became isoelectric at CBF values less than 40% of control.

■ Previous studies have shown that CBF is adequate to prevent ischemic brain damage to values approximately 45% of normal. The present experiments confirm those observations in that anaerobic glycolysis did not commence until CBF had fallen below 45% of normal. However, *before* anaerobic glycolysis developed a marked reduction in $CMRO_2$ and CMRG1 had occurred demonstrating that the decrease in metabolism preceded the derangement of metabolic pathways produced by inadequate delivery of

metabolites to the brain. Thus, the animal experiments lend support to the clinical observations.

■ Hypothermia appears to reduce brain metabolism by a direct effect on cell function. As brain temperature falls CBF declines in concert with $CMRO_2$ because of metabolic autoregulation of the resistance vessels of the brain. The present data suggest a reverse mechanism in which a *primary* decrease in CBF (in this instance produced by increased ICP) causes a compensatory and approximately equal decrease in $CMRO_2$. Patients with acute brain insults and reduced CBF may have neurological deficits because of brain damage or, if our limited clinical observations can be confirmed, the deficit may be due to decreased metabolism *because* of a decrease in CBF in which circumstance the involved brain is not damaged but is "idling" as it does under hypothermia. Then the deficit should improve as CBF is increased (by reduction of edema and ICP, for example) and metabolism follows. Metabolic pathways that might be responsible for these observations are currently under investigation.

10:15 a.m.

Coffee Break

6 **10:40 a.m.**

"Carotid Endarterectomy in Patients with Occlusion of the Contralateral Carotid Artery"

Russel H. Patterson, Jr., New York, New York

■ A review of the literature suggests that carotid endarterectomy in the presence of an occluded contralateral carotid artery carries a substantial risk of worsening the patient's neurological state. For example, the Joint Study of Extracranial Cerebrovascular Disease reported an operative mortality in this group of 16%. Since 23 such patients have been operated on the neurosurgical service at Cornell without postoperative morbidity or mortality, our material was reviewed to see what measures may have contributed to the satisfactory result. Technical aspects that may have been important included taking care that the distal intima of the internal carotid artery would not be the site of a future subintimal dissection, the intraoperative use of heparin and induced hypertension, and the use of a temporary shunt. Timing of the operation may also be important. As a rule, surgery was delayed for 1-3 weeks after a completed stroke, but 2 patients

with stroke-in-evolution who failed to respond to anticoagulation were operated during the acute phase. During the period of follow-up, 3 patients died and 2 have sustained a cerebral infarct. The rest have remained well for an average of 24 months.

7 **11:00 a.m.**

"Activation of the Extracranial Carotid Atherosclerotic Lesion."

James W. Correll, New York, New York

■ Previous studies have shown that most atherosclerotic lesions in the extracranial carotid, causing symptoms of cerebral ischemia, are too small to impede blood flow and in fact, active lesions resulting in ischemia can be present in completely non-stenotic or even ectatic carotids. Furthermore, it has been observed that when multiple lesions, usually in both carotids, become active, as indicated by the appearance of symptoms, it is usually in close temporal sequence or concurrently even though the lesions vary considerably in size. It is concluded that activation of an atheromatous lesion depends, in part, on some generalized factor, possibly blood born, which promotes degenerative changes, such as ulceration, and its ability to be a source of emboli.

8 **11:15 a.m.**

"External Carotid Artery — Cavernous Sinus Fistulae Treated by Arterial Embolization"

M. S. Mahaley, Jr., Stephen C. Boone, and John P. Kapp, Durham, North Carolina

■ A unique occurrence of a carotid-cavernous fistula supplied entirely by branches of the external carotid artery is presented. This lesion and another somewhat similar one was successfully treated by arterial embolization.

9 **11:30 a.m.**

"Current Status of Reconstructive Cerebrovascular Surgery"

John M. Tew, Jr., Cincinnati, Ohio

■ At the 1961 Princeton Conference of Cerebrovascular Disease, Dr. Harold Wolff remarked that, "Surgeons have made rapid and dramatic advances

in the treatment of people with occlusive vascular diseases in the upper chest and neck. Perhaps we should encourage them to think of ways of going inside the head and modifying the circulation there." Subsequently pioneering efforts in this direction have been forthcoming. Donaghy, Yasargil, and Lougheed along with others have devised techniques which permit the cerebral circulation to be increased in a number of vascular disorders which previously defied surgical treatment. Transplantation of a branch of the external carotid artery (superficial temporal artery) to the middle cerebral artery, as conceived by Donaghy and Yasargil, may be an effective method of treating occluding lesions of the proximal middle cerebral trunk. Similarly, (Lougheed) interposition of a saphenous vein graft between the common carotid artery and the supraclinoid internal carotid artery could provide hope for the individual with severe stenosis of the carotid siphon due to atherscleroses, meningioma or other such chronic lesions. Presently, these techniques are in our surgical armamentarium.

■ It is then, the purpose of this report to outline our present experience in the treatment of 18 patients with various forms of intracranial occlusive vascular diseases. In doing so, we shall present a discussion of our understanding of the indications for reconstruction of the circulation using these extraordinary means. In addition we shall tabulate complications and patency figures as proven by angiography and blood flow measurements. We have also attempted in this report to relate the alteration of the neurologic picture to the functional status of the grafted vessel.

■ Speculation concerning the future of these surgical exercises, some of which stretch the imagination of the eye, will be encouraged from the audience. Illustrative visual aids available include 16 mm. cinema strips and 35 mm. kodachromes produced through the Zeiss surgical microscope.

12:00 n.

Lunch

10 **1:30 p.m.**

"Multiple Sclerosis: — A Clinical and Theoretical Review of Pathophysiology, Pathogenesis and Cause"

Augustus S. Rose (by invitation),
Los Angeles, California

■ Multiple sclerosis as a clinical disease, is re-

viewed in the light of present knowns in pathology, course, pathophysiology, response to therapeutic effort and theories of pathogenesis and cause. It is considered that multiple sclerosis is of increasing importance to recognize and manage clinically. The hope of finding the cause or causes grows somewhat brighter with improved laboratory techniques in immunology and virology — but the solution does not appear to be on the horizon as yet.

11 **2:00 p.m.**

ACADEMY AWARD
First Honorable Mention

"Microconduit Transport Within Astrocytes Following Blood-Brain Barrier Injury"

W. Michael Vise, Columbus, Ohio

12 **2:20 p.m.**

"Antibiotic Neuro Toxicity: A Laboratory and Clinical Study"

Martin H. Weiss, Theodore Kurze,
Frank E. Nulsen, Los Angeles, California

■ The evolution of potent antibiotics to combat severe infections of the central nervous system as well as systematically, continually raises the question of toxicity to the central nervous system from the agents themselves. We have studied a group of these agents administered directly into the central nervous system using the technique of ventriculo-cisternal perfusion to evaluate the clinical and histopathological effects on CNS parenchyma. The agents studied were (1) Polymyxin B, (2) Penicillin G, (3) Ampicillin, (4) Keflin, (5) Gentamicin and (6) Carbenicillin. After an eight hour ventricular perfusion with therapeutic concentrations of the particular agent, the animals were allowed to recover and then followed clinically for a period of ten days to three months following which they were sacrificed and the brains sectioned for any evidence of any pathological changes. Varied concentrations of the agent in multiples or therapeutic doses were studied to define levels of toxicity and their relationship to establish levels of therapeutic concentration. Influence on CSF production using Inulin dilution techniques were simultaneously carried out.

■ A subsequent series of seven patients with gram negative ventriculitis have been treated successfully using the technique of ventriculo ventricular perfusion with appropriate antibiotic agents. In addition, the data derived provides a basis for topical irrigation of the brain or cavitary instillation of antibiotics at the time of craniotomy or abscess drainage.

■ Safe, therapeutic concentrations of these agents as defined by the studies will be discussed with the development of an effective regime for direct instillation into the central nervous system.

13 2:40 p.m.

"Microfilaments and in Vitro Cell Motility of Neoplastic Human Astrocytes"

Yoshio Hosobuchi, San Francisco, California

■ Migratory activity of human glial tumor cells in vitro over a substrate has been observed by numerous previous workers. Neoplastic astrocytes migrate faster than the normal adult astrocytes. The higher the degree of malignancy of the parent tumor the more active their pseudopond formation in culture.

■ Similar cellular activities have been observed in cultured vertebral cells. It has been speculated that intra cellular microfilament present in cultured cells are responsible for locomotion by their contractile activity.

■ It has been known that normal human glial cells as well as neoplastic glial cells possess gliofibrils which have rather characteristic staining affinities with Mallory's phosphotungatic acid haematoxylin. Electron microscopic study shows these intracellular microfilaments are 60-80°A in diameter. Similar fibrils have been observed in cultured normal human glial cells as well as their neoplastic counterpart.

■ The drug Cytochalasin B inhibits cytokinesis, salivary gland morphogenisis, esterogen-induced oviduct gland formation and "growth cone functions in nerve cell axon elongation" apparently by altering microfilament systems in cytoplasm. Spooner et al demonstrated that in cultured chick embryonic cell the cytoplasmic microfilament system is responsible for locomotion by use of Cytochalasin B.

■ Using time-lapse cinematography and electron-microscopy, the present study demonstrates the possible role of the cytoplasmic microfilament (glial fibrils) of neoplastic astrocytes in vitro cellular move-

ment. Cytochalasin B was used as cytokinesis inhibitor.

3:00 p.m.

Coffee Break

14 **3:20 p.m.**

ACADEMY AWARD PRESENTATION FOR 1973

"Intracellular Recording During Focal Cooling in Normal Cortex, the Penicillan Focus, and the Aluminia Focus"

Arden F. Reynolds, Jr., Seattle, Washington

15 **3:50 p.m.**

"Role of the Intracarotid Amytal-Metrazol EEG Test in the Surgical Treatment of Patients with Complex Seizure Problems"

T. Rasmussen, P. Gloor, A. Altazarro, and H. Garretson, Montreal, Quebec

■ The intracarotid amytal-metrazol test was devised to help identify those seizure patients with bilateral epileptiform abnormality in the EEG whose seizures were actually arising in one hemisphere and were thus potential candidates for surgical therapy by unilateral cortical excision. Two groups of patients were involved, those with bilaterally synchronous 2-3.5/sec and spike and slow wave abnormality and those with temporal lobe epilepsy and bilateral, independent temporal lobe spiking.

■ The test was carried out in 94 patients in the 10-year period 1963-72, with cortical excision being subsequently carried out in 30. The role of the test in selecting patients for operation, and its predictive value as to a subsequent satisfactory reduction in seizure tendency is analyzed. The importance of accurate information as to the symmetry of the cerebral arterial supply in interpreting the test results is emphasized.

16 4:10 p.m.

"Effects of Lesions in Caudate Nucleus and Ventral Anterior Thalamus on Experimental Focal Epilepsy"

John A. Kusske, George A. Ojemann, and Arthur A. Ward, Jr., Long Beach, California

■ The effect of stereotaxic lesions of the caudate nucleus or the ventral anterior thalamus on experimental models of focal cortical epilepsy was studied. Acute tungstic acid foci and chronic aluminum hydroxide gel preparations were observed in cats and monkeys respectively. Following ipsilateral lesions of ventral anterior thalamus there was a reduction in electrographic seizure frequency and duration in cats; and, in monkeys, followed four weeks after thalamic lesions, there was a decrease in seizure frequency and duration. Ipsilateral caudate head lesions, on the other hand, led to an increase in the amplitude of afterdischarge along with a decrease in the rate of unit firing in cats. In monkeys, subsequent to caudate head lesion, there was an increase in seizure amplitude and motor hyperactivity. These findings indicate that pathways passing through ventral anterior thalamus play a role in the generalization of focal cortical seizures, while activation of the caudate nucleus by afterdischarge may modulate seizure activity much in the same way that the caudate is thought to be involved in the control of motor and sensory phenomena. The results are discussed in light of recent anatomical and physiological data, their possible application in the treatment of intractable epilepsy is mentioned, and implications for further research are outlined.

17 4:30 p.m.

"Noxious and Non-noxious Response Patterns of Single Neurons in Rostral Trigeminal Nuclei"

Ghassan F. Khayyat, Young J. Yu, Robert B. King, Syracuse, New York

■ A post-stimulus time (PST) histogram analysis was made of second-order neuron responses in rostral trigeminal nuclei to electrical dental pulp (noxious) stimuli and light touch (non-noxious) stimuli. All units without exception were fired by dental pulp and light touch stimulus. The dental pulp response was characterized by a prolonged firing, often mani-

fest as a bimodal pattern, in contrast to a single short burst response to touch. These neurons also responded to electrical stimuli applied into nucleus caudalis, but with long latencies of 6-8 msec. We interpreted this as a polysynaptic route via nucleus caudalis which would be triggered by a dental pulp stimulus producing the delayed activity in the PST histogram so characteristic of the dental pulp response. Strychnine application into nucleus caudalis exaggerated late neuron responses to dental pulp and touch stimuli in rostral nucleus nuclei. Light touch, dental pulp or caudalis stimulation used as conditioning stimuli produced inhibition of second-order neuron response to both dental pulp and touch stimuli with similar time courses.

■ We suggest that discriminatory mechanisms exist at the level of second order neurons in the rostral trigeminal nuclei which are characterized by response patterns associated with noxious and non-noxious stimuli. Nucleus caudalis contains neural elements which are essential for integrating these patterns.

5:00 p.m.

Executive Committee Meeting

18 FRIDAY, NOVEMBER 16

8:30 a.m.

"Panel on Neuropharmacology"

W. Kemp Clark, Moderator:
James E. Burleson, Dissociative Anesthesia;
Jim Atkinson, Mood Elevating Drugs;
Bennett Stein, Unusual Uses of Old Drugs;
William Hunt, Smooth Muscle Relaxants;
Kemp Clark, Skeletal Muscle Relaxants

19 9:30 a.m.

SOME FAMILIAR AREAS REVISITED

"Flow Analysis of Operated Civilian Nerve Injuries"

David G. Kline and Earl R. Hackett,
New Orleans, Louisiana

■ Data on 128 operated nerve injuries in 95 civilians was organized into flow charts so that factors responsible for success or failure could be analyzed at each phase of management. Excluded were nerves known pre-operatively to be transected or not in continuity. Lesions were categorized as either complete or incomplete by pre-operative clinical studies. Subsequent course was then recorded including results of pre-operative electromyography (EMG), operative stimulation (S) and nerve action potentials (NAP), pathology of the 57 resected specimens, and post-operative clinical and electrical status. The importance of proper selection of patients for either neurolysis or resection is stressed by the results:

1) Three of 64 patients with complete lesions both by clinical and EMG study responded to stimulation while 12 in the complete category with no response to stimulation had NAP's. Five patients had evidence of incomplete deinnervation by EMG, responded to stimulation, and had NAP's. These twenty patients had neurolysis with a 90% recovery rate. By comparison, 8 patients in the complete category had no response to stimulation and absent NAP's but still had a neurolysis done. Only one of these patients has improved.

2) Despite pre-operative evidence of incomplete deinnervation, operative studies suggested a complete lesion in 14 instances. This was confirmed by resection and histologic study in 10 cases. Four of these patients had a neurolysis and none have improved.

3) Axon populations of resected specimen correlated best with data observed at the operating table. Four lesions were resected 3 to 9 months post-injury because of pre-operative findings and despite positive intra-operative studies. Relatively well organized 6-9 μ in diameter axons predominated despite heavy scarring. Pathology of resected specimens will be shown as well as the flow analysis.

20 9:50 a.m.

"Transoral Approach to the Clivus and Dens with Proposal of a Method of Anterior Atlanto-axial Fusion"

William Beecher Scoville and Alvin D. Greenberg, Hartford, Connecticut

■ Transoral approach to the clivus and dens has proved a simple and quick operation. Infection has not occurred in eleven consecutive operations.

■ Proposal is made for future simultaneous anterior fusion of the atlas to the axis by plating and screws. This will be necessary for lesions of the dens when posterior decompressive removal of the arch of the atlas has been carried out. In such cases posterior fusions have proved laborious and fraught with considerable danger.

■ Immediate ambulation is carried out using the S.O.M.I. neck brace.

■ Surgical technique is described.

■ Unusual cases of metastatic clivus chordoma; "sleep paralysis"; and congenital malformations of the atlas-axis are described.

21 10:10 a.m.

"The Role of the Posterior Primary Ramus in Chronic Back and Leg Pain: Electro-coagulation of the Posterior Ramus"

Stewart B. Dunsker, Frank H. Mayfield, Cincinnati, Ohio

■ Patients who have a lateral lumbar fusion have relatively less postoperative pain than might be expected from the extent of the muscle dissection. From this observation we inferred that the posterior divisions of the spinal nerves were injured in the operation. Moreover, elective destruction of those nerves might help patients with intractable back and leg pain.

■ Rees reported a percutaneous technique using a scalpel to cut these nerves. However, because of complications with the scalpel, Shealy introduced a percutaneous radiofrequency method. He classified patients according to previous operations and performed nerve coagulations bilaterally.

■ Using the radiofrequency technique, we attempted to correlate the level of the lesion with the patient's symptoms. Some patients had a neurotomy

at one level; others had neurotomies at multiple levels. Some coagulations were unilateral and some were bilateral. All patients had part or all of their pain reproduced by stimulation before any lesion was made.

■ This is a preliminary report of our results and recommendations.

10:25 a.m.

Coffee Break

22 **10:50 a.m.**

"Neurosurgical Complications Associated with Organ Transplantation"

Wolff M. Kirsch, Israel Penn, John C. Stears, Denver, Colorado

■ A wide variety of disease states involving the central and peripheral nervous system have been found to attend the course of human organ transplantation. Over the past decade the neurosurgical service at the University of Colorado Medical Center has participated in the diagnosis or management of these complications in both the immediate and last post-transplantation period. The transplant population from which these complications emanate totals over 450 patients (400 kidneys, 50 livers, and 4 hearts). Complications arising in the early post-transplant period are usually of metabolic origin: kidney transplants associated with the so-called "reverse-urea" syndrome, liver transplants by severe hypoglycemia, and one cardiac transplant by air embolism resulting in paraplegia. Complications arising weeks, months, or years after apparently successful organ transplantation are for the most part related to prolonged immunosuppressive therapy. These cases include six patients with brain abscess, three patients with intracranial tumors of the lymphoma type, and one patient with spinal epidural abscess. In addition there have been three cases of torula meningitis (one palliated with a shunting procedure, and one case of subdural hygroma mimicking a rejection crisis. Important factors in the diagnosis and management of these cases are discussed, with special attention being placed on the occurrence of intracranial tumors in this chronically immunosuppressed population.

■ From the University of Colorado Medical Center and Denver Veterans Administration Hospital, Division of Neurosurgery, Departments of Surgery and Radiology.

23 **11:20 a.m.**

"A Review of Cervical Fractures: A Ten-year Survey From the LAC-USC Medical Center"

A. W. Rosenberg and J. Heiden,
Encino, California

■ This paper represents a ten-year review of the experiences of the Division of Neurosurgery at the LAC-USC Medical Center in the surgical and non-surgical treatment of cervical fractures.

■ Four hundred-sixty two cases were reviewed and categorized with respect to neurological deficit, treatment, complications, length of hospital stay, and disability. Length of follow-up varied from months to over eight years, and included 46 surgeries done in the acute unit ranging from anterior fusions to posterior decompressions and immobilizations. Comparison of the surgical with the non-surgical methods of treatment were undertaken.

24 **11:40 a.m.**

"Evaluation of the Diagnosis and Treatment of 65 Cases of Brain Abscess"

John N. Meagher, Carole A. Miller,
William E. Hunt, Columbus, Ohio

■ This review of brain abscesses covers a 20-year period from 1953 to 1973, at the Ohio State University Hospitals and Children's Hospital in Columbus, Ohio. During this time, a total of 65 cases of brain abscesses were encountered, or slightly more than three per year for the 20-year period. The continued high morbidity and mortality, around 20% in most series, even with the advent of antibiotic therapy and newer surgical techniques, suggests the necessity for the re-examination and updating of the methods of evaluation and treatment of brain abscess. It was with this in mind that this review was undertaken.

25 **12:00 n.**

PRESIDENTIAL ADDRESS

"Some Health Care Issues"

Lyle A. French

NEWER TOOLS OF THE TRADE

26 **8:30 a.m.**

"Initial Three Months' Experience with Computerized Axial Tomography (EMI System)"

Paul J. New and Juan M. Taveras (by invitation), Boston, Massachusetts

■ After approximately 300 cases widely differing in intracranial pathology have been studied, we think the dramatic value of this non-invasive technique has been confirmed. Its strengths and limitations will be discussed with illustrative cases.

27

"The EMI Scanner"

David F. Reese (by invitation), Rochester, Minnesota

28 **9:30 a.m.**

"An Experience with 50 Trans-sphenoidal Operations for Pituitary Tumors"

Charles B. Wilson, John Grollmus, Lawrence Dempsey, San Francisco, California

The trans-sphenoidal approach has been used to treat 50 pituitary adenomas. This procedure is an alternative to trans-frontal craniotomy for adenomas with super sellar extension, and it appears to be the procedure of choice for functioning microadenomas. It has been used in other situations, e.g., CSF fistula following trans-frontal craniotomy and irradiation and pituitary tumors recurring after either primary operation or primary irradiation. The contra indications to the trans-sphenoidal approach are relatively few. With increasing experience I now prefer the trans-sphenoidal over the trans-frontal approach to the majority of chromophobe adenomas with visual impairment.

29 **9:50 a.m.**

"Facial Nerve Preservation in an Acoustic Neuroma Removal"

Albert L. Rhoton, Jr., Gainesville, Florida

■ The anatomy of the internal acoustic meatus which provides the basis for facial and acoustic nerve identification and preservation in removal of acoustic neuromas will be reviewed. The anatomic description based on 200 dissections at autopsy provides an understanding of the direction of displacement of facial and cochlear nerves in acoustic neuroma. After reviewing the basic neurovascular anatomy, the author will show brief movies from five cases illustrating the principles of facial nerve identification and dissection in acoustic neuroma removal. Movies taken immediately postoperatively in these cases will show the quality of facial nerve preservation. In addition, the neuroanatomic principles essential to cochlear nerve preservation in acoustic neuroma removal will be presented.

10:20 a.m.

Coffee Break

30 **10:50 a.m.**

"Surgical Exploration of the Fourth Ventricle"

John Guarnaschelli, Theodore Kurze,
Los Angeles, California

■ Conventional sources do not make detailed recommendations for operational exploration of the fourth ventricle. It is generally believed that in order to explore the fourth ventricle it is necessary to split the vermis.

■ On the basis of fifteen recent surgical experiences it was possible to explore the fourth ventricle to exclude neoplasm, to relieve obstruction of the aqueduct of sylvius and to remove neoplasms from the fourth ventricle without splitting the vermis. This is performed by a direct entrance into the ventricle via the foramen of magendie. The technique to be discussed reduces the morbidity inherent in splitting the vermis.

31 **11:10 a.m.**

"Neurological Evaluation of Swallowing"

Robert Keim, Judy Hargedine, Theodore Kurze,
Los Angeles, California

■ The frontiers of microsurgical dissection now include intra as well as extra-axial dissection of the brain stem with reasonable surgical expectations. However, temporary or permanent interference with the function of swallowing may result. Systematic evaluation of this distressing symptom is essential to its management. Conventional neurological examination fails to provide this. Therefore a discussion of the various types of swallowing deficits, their diagnosis and management will be reviewed, along with examples based on recent experience.

32 11:30 a.m.

"Ten Years Experience with Microneurosurgery"

Robert W. Rand, (by invitation),
Los Angeles, California

After ten years of experience using the surgical microscope in a variety of neurosurgical operations, especially pituitary tumors, acoustic neuromas, and aneurysms, I have been surprised that our resident group over these years until recently has been reluctant to really become involved either in the laboratory or clinical setting. Our current group of resident neurosurgeons seem to be more open minded regarding the importance of being able to see exactly what they are doing in any given operation, especially around the base of the brain. It is my conviction that if current and future neurosurgical residents do not take up the use of the binocular surgical microscope for the vast majority of their spinal cord tumors, pituitary tumors, acoustic tumors, aneurisms and the like, they will find that their fellow physicians will refer them fewer and fewer patients who have these more interesting surgical problems. In addition there is a certain medical legal aspect to the use of the microscope in that it will in time become a standard practice in the neurosurgical community and those who do not use it to repair such problems as peripheral nerve injuries, will find themselves facing potential negligent lawsuits. This does not mean for a moment that the operation will be successful because the surgical microscope has been used, but it does imply that if failure occurs, it was because a surgical microscope was not used. In my opinion, patients deserve the best service that can be delivered and in the aforementioned areas, including others, this can only be accomplished by the use of the binocular surgical microscope and appropriate microsurgical instruments.

ACADEMY AWARD WINNERS

Paul M. Linn	1955
Hubert L. Rosomoff	1956
Byron C. Pevehouse	1957
Norman Hill	1958
Jack Stern	1959
Robert Ojemann	1960
Lowell E. Ford	1962
Charles H. Tator	1963
Earle E. Crandall	1964
Stephen Mahaley, Jr.	1965
Chun Ching Kao	1966
John P. Kapp	1967
Yoshio Hosobuchi	1968
Gary G. Ferguson	1970
Richard L. Pressley	1971
David G. McLone	1972
Arden F. Reynolds, Jr.	1973

ACADEMY AWARD
1973

ARDEN F. REYNOLDS, JR.

University of Washington
Seattle, Washington

"Intracellular Recording During Focal Cooling in Normal Cortex, the Penicillin Focus, and the Aluminia Focus."

1ST HONORABLE MENTION

MICHAEL VISE

Ohio State University
Columbus, Ohio

"Microconduit Transport Within Astrocytes Following Blood-Brain Barrier Injury"

GUEST LIST 1973

GUEST	HOST
George S. Allen Minneapolis, Minnesota	John Garner
George Austin University Med. Center Loma Linda, California	Academy
James Burleson Dallas, Texas	Academy
Shelley N. Chou Minneapolis, Minnesota	Barton Brown
Edward S. Connolly San Francisco, California	Dean Echols
Wesley A. Cook, Jr. Durham, North Carolina	Guy Odom
Thomas Craigmile Denver, Colorado	Wolff Kirsch
William Dawson Memphis, Tennessee	Jim Robertson
Stewart B. Dunsker Cincinnati, Ohio	Frank Mayfield
Fredric I. Fagelman Chapel Hill, North Carolina	Peardon Donaghy
Henry D. Garretson Louisville, Kentucky	Everett G. Grantham
Julian Hoff San Francisco, California	Charles Wilson
Yoshio Hosobuchi San Francisco, California	E. B. Boldrey

Edgar M. Housepian New York, New York	J. Correll
R. Wayne Hurt Boston, Massachusetts	Robert Ojemann
Fred Jackson Camp Pendleton, California	Lyle French
Fred Jackson Camp Pendleton, California	Lyle French
Robert Keim Pasadena, California	T. Kurze
Nicholas Kitrinos Washington, D.C.	C. Hunter Shelden
Louis A. Levy Van Nuys, California	E. Mack
Donlin M. Long Baltimore, Maryland	R. H. Patterson, Jr.
Albert Lussenhop Washington, D.C.	N. Zervas
John Meagher Columbus, Ohio	George Tindell
Ernest J. Penka Los Angeles, California	George Hayes
Robert W. Rand Los Angeles, California	Courtland Davis
David Reese Rochester, Minnesota	Academy
Arden F. Reynolds Seattle, Washington	Academy
Albert Rhoton Gainesville, Florida	Raeburn Llewelyn
Theodore S. Roberts Salt Lake City, Utah	Cone Pevehouse
Augustus S. Rose Los Angeles, California	Academy

Alan Rosenberg Encino, California	R. H. Pudenz
James R. St. John Santa Barbara, California	Howard A. Brown
Jack Siefert Oakland, California	Gale Clark
Eugene W. Stern Los Angeles, California	Academy
John Tew, Jr. Cincinnati, Ohio	H. Thomas Ballantine
Joan Venes New Haven, Connecticut	William Collins
Javier Verdura Mexico 18 D.F.	Juan Cardenas
Michael Vise Columbus, Ohio	Academy
Phillip J. Vogel Los Angeles, California	Academy
Martin H. Weiss Los Angeles, California	Frank Nulsen
Fremont P. Wirth St. Louis, Missouri	Henry Schwartz
Frank R. Wrenn Greenville, South Carolina	Kemp Clark

PAST PRESIDENTS

Dean H. Echols	1938-39
Spencer Braden	1940
Joseph P. Evans	1941
Francis Murphey	1942
Frank H. Mayfield	1943
A. Earl Walker	1944
Barnes Woodhall	1946
William S. Keith	1947
Howard A. Brown	1948
John Raaf	1949
E. Harry Botterell	1950
Wallace B. Hamby	1951
Henry G. Schwartz	1952
J. Lawrence Pool	1953
Rupert B. Raney	1954
David L. Reeves	1955
Stuart N. Rowe	1956
Arthur R. Elvidge	1957
Jess D. Herrmann	1958
Edwin B. Boldrey	1959
George S. Baker	1960
C. Hunter Shelden	1961-62
Samuel R. Snodgrass	1963
Theodore B. Rasmussen	1964
Edmund J. Morrissey	1965
George Maltby	1966
Guy L. Odom	1967
James G. Galbraith	1968
Robert H. Pudenz	1969-70
William B. Scoville	1971
Robert L. McLaurin	1972

PAST VICE-PRESIDENTS

Francis Murphey	1941
William S. Keith	1942
John Raaf	1943
Rupert B. Raney	1944
Arthur R. Elvidge	1946
John Raaf	1947
Arthur R. Elvidge	1948

F. Keith Bradford	1949
David L. Reeves	1950
Henry G. Schwartz	1951
J. Lawrence Pool	1952
Rupert B. Raney	1953
David L. Reeves	1954
Stuart N. Rowe	1955
Jess D. Herrmann	1956
George S. Baker	1957
Samuel R. Snodgrass	1958
C. Hunter Shelden	1959
Edmund Morrissey	1960
Donald F. Coburn	1961-62
Eben Alexander, Jr.	1963
George L. Maltby	1964
Robert Pudenz	1965
Francis A. Echlin	1966
Benjamin Whitcomb	1967
Homer S. Swanson	1968
Augustus McCravey	1969-70
Edward W. Davis	1971
John R. Green	1972

PAST SECRETARY-TREASURERS

Francis Murphy	1938-40
A. Earl Walker	1941-43
Theodore C. Erickson	1944-47
Wallace B. Hamby	1948-50
Theodore B. Rasmussen	1951-53
Eben Alexander, Jr.	1954-57
Robert L. McLaurin	1958-62
Edward W. Davis	1963-65
Robert G. Fisher	1966-68
Byron C. Pevehouse	1969-72

PAST MEETINGS OF THE ACADEMY

Hotel Netherlands Plaza,
Cincinnati, Ohio .....October 28-29, 1938

Roosevelt Hotel,
New Orleans, Louisiana .....October 27-29, 1939

Tudor Arms Hotel,
Cleveland, Ohio .....October 21-22, 1940

Mark Hopkins Hotel, San Francisco,
and Ambassador Hotel,
Los Angeles, California .....November 11-15, 1941

The Palmer House,
Chicago, Illinois .....October 16-17, 1942

Hart Hotel,
Battle Creek, Michigan ..... September 17-18, 1943

Ashford General Hospital,
White Sulphur Springs,
West Virginia ..... September 7-9, 1944

The Homestead,
Hot Springs, Virginia ..... September 9-11, 1946

Broadmoor Hotel,
Colorado Springs, Colorado .....October 9-11, 1947

Windsor Hotel,
Montreal, Canada ..... September 20-28, 1948

Benson Hotel, Portland, Oregon .....October 25-27, 1949

Mayo Clinic,
Rochester, Minnesota ..... September 28-30, 1950

Shamrock Hotel, Houston, Texas .....October 4-6, 1951

Waldorf-Astoria Hotel,
New York City .....September 29-October 1, 1952

Biltmore Hotel,
Santa Barbara, California .....October 12-14, 1953

Broadmoor Hotel,
Colorado Springs, Colorado .....October 12-14, 1953

The Homestead,
Hot Springs, Virginia .....October 27-29, 1955

Camelback Inn, Phoenix, Arizona ...November 8-10, 1956

The Cloister,
Sea Island, Georgia .....November 11-13, 1957

The Royal York Hotel,
Toronto, Canada .....November 6-8, 1958

Del Monte Lodge,
Pebble Beach, California .....October 18-21, 1959

Hotel Sheraton Plaza,
Boston, Massachusetts .....October 5-8, 1960

Royal Orleans,
New Orleans, Louisiana .....November 7-10, 1962

El Mirador,
Palm Springs, California .....October 23-26, 1963

The Key Biscayne,
Miami, Florida .....November 11-14, 1964

Terrace Hilton Hotel,
Cincinnati, Ohio .....October 14-16, 1965

Fairmont Hotel & Tower,
San Francisco, California .....October 17-19, 1966

The Key Biscayne,
Miami, Florida .....November 8-11, 1967

Broadmoor Hotel,
Colorado Springs, Colorado .....October 6-8, 1968

St. Regis Hotel, New York City .....September 21, 1969

Camino Real Hotel,
Mexico City .....November 18-21, 1970

Sahara-Tahoe Hotel,
Stateline, Nevada ..... September 26-29, 1971

New College, Oxford, England ..... September 4-7, 1972

1972-73
MEMBERSHIP ROSTER
THE AMERICAN ACADEMY OF NEUROLOGICAL SURGERY

HONORARY

	Elected
Wilder Penfield Montreal Neurological Institute 3801 University Street Montreal 2, Quebec, Canada	1960
R. Eustace Semmes 20 S. Dudley Street, Suite 101-B Memphis, Tennessee 38103	1955

SENIOR MEMBERS

George S. Baker 200 First Street, S.W. Rochester, Minnesota 55901	1940
E. Harry Botterell Faculty of Medicine Queens University Kingston, Ontario, Canada	1938
Howard A. Brown 2001 Union Street San Francisco, California 94123	1939
Harvey Chenault 2134 Nicholasville Road Lexington, Kentucky 40503	1949
Donald F. Coburn 6400 Prospect Avenue, Room 204 Kansas City, Missouri 64132	1938
Francis A. Echlin 100 E. 77th Street New York, New York 10021	1944
Arthur Elvidge Montreal Neurological Institute 3801 University Street Montreal 2, Quebec, Canada	1939

Theodore C. Erickson — 1940
University Hospitals
1300 University Avenue
Madison, Wisconsin 53706

Joseph P. Evans — Founder
Edificio El Dorado
Cr. 34 x Calle 11, Apt. 304
"El Poblado"
Medellin, Columbia, S.A.

Everett G. Grantham — 1942
234 E. Gray Street
Louisville, Kentucky 40202

James Greenwood, Jr. — 1952
1117 Hermann Professional Building
6410 Fannin Street
Houston, Texas 77025

Wesley A. Gustafson — 1942
Rt. 1, Box 125
Sewall's Point
Jensen Beach, Florida 33457

Wallace B. Hamby — 1941
3001 N. E. 47th Court
Fort Lauderdale, Florida 33308

Jess D. Herrmann — 1938
P. O. Box 135
Mountain Pine, Arkansas 71956

Henry L. Heyl — 1951
Dartmouth Medical School
Hanover, New Hampshire 03755

William S. Keith — Founder
Toronto Western Medical Building, Suite 207
25 Leonard Avenue
Toronto, Ontario, Canada

George L. Maltby — 1942
31 Bramhall Street
Portland, Maine 04102

Augustus McCravey — 1944
1010 E. Third Street
Chattanooga, Tennessee 37403

Edmund J. Morrissey — 1941
450 Sutter Street, Suite 1504
San Francisco, California 94108

Francis Murphey — Founder
20 S. Dudley Street, Suite 101-B
Memphis, Tennessee 38103

J. Lawrence Pool 1940
710 W. 168th Street
New York, New York 10032

Robert H. Pudenz 1943
744 Fairmount Avenue
Pasadena, California 91105

Stuart N. Rowe 1938
302 Iroquois Building
3600 Forbes Street
Pittsburgh, Pennsylvania 15213

C. Hunter Shelden 1941
744 Fairmount Avenue
Pasadena, California 91105

Samuel R. Snodgrass 1939
John Sealy Hospital
University of Texas Medical Branch
Galveston, Texas 77550

Homer S. Swanson 1949
1938 Peachtree Road, N.W.
Atlanta, Georgia 30309

A. Earl Walker 1938
1000 Stanford, N.E.
Albuquerque, New Mexico 87106

Exum Walker 1938
490 Peachtree Street, N.E.
Atlanta, Georgia 30308

Thomas A. Weaver, Jr. 1943
146 Wyoming Street
Dayton, Ohio 45409

Barnes Woodhall 1941
Duke University Medical Center
Durham, North Carolina 27706

CORRESPONDING MEMBERS

Karl August Bushe 1972
Chirurgie Universitat
Gosler-Strasse 10
34 Goettingen, W. Germany

Fernando Cabieses 1966
Instituto Peruano de Fomento Educativo
Av. Arenales 371, Of. 501
Apartado 5254
Lima, Peru

Juan Cardenas y C. 1966
Av. Insurgentes Sur 594
Mexico, D.F.

Juan C. Christensen 1970
Alvear 1399
Buenos Aires, Argentina

Giuseppe Dalle Ore 1970
Dipartimento di Neurochirurgia
Ospedale Maggiore 37100
Verona, Italy

Hans E. Diemath 1970
Prim. Univ. Doz.
Neurochir. Abt. d. Landersnervenklink
Salzburg, 5020, Austria

John Gillingham 1962
Boraston House, Ravelson
Edinburg 4, Scotland

Kenneth G. Jamieson 1970
131 Wickham Terrace
Brisbane, Queensland, Australia 4000

Katsutoshi Kitamura 1970
University Kyushu Hospital
Faculty of Medicine
Fukuoka, Japan

Kristian Kristiansen 1962
Oslo Kommune
Ullval Sykehus
Oslo, Norway

Lauri Laitinen 1971
Neurokirurgiska Kliniken
Toolo Sjukhus
Helsinki, Finland

B. Ramamurthi 1966
2nd Main Road, C.I.T. Colony
Madras 4, India

Charas Suwanwela 1972
Chulalongkorn Hospital Medical School
Bangkok, Thailand

Kjeld Vaernet 1970
Rigshospitalets neurokirurgiske afdeling
Tagensvej 18, 2200
Copenhagen, N., Denmark

ACTIVE MEMBERS

Eben Alexander, Jr. (Betty) 1950
Bowman-Gray School of Medicine
Winston-Salem, NC 27103
(1941 Georgia Avenue, Winston-Salem, NC 37104)

James R. Atkinson (Lona) 1970
302 W. Thomas Road
Phoenix, AZ 85013
(5806 East Lewis Avenue, Scottsdale, AZ 85257)

H. Thomas Ballantine, Jr. (Elizabeth) 1951
Massachusetts General Hospital
Boston, MA 02114
(30 Embankment Road, Boston, MA 02114)

Gilles Bertrand (Louise) 1967
Montreal Neurological Institute
3801 University Street
Montreal, Quebec, Canada
(385 Lethbridge, Montreal 16, Quebec, Canada)

Edwin B. Boldrey (Helen) 1941
University of California Hospital
3rd Avenue & Parnassus
San Francisco, CA 94122
(924 Hayne Road, Hillsborough, CA 94010)

Barton A. Brown (Martha) 1968
2001 Union Street
San Francisco, CA 94123
(1648 — 8th Avenue, San Francisco, CA 94122)

Gale G. Clark, Capt. (Marian) 1970
12621 Brookpark Road
Oakland, CA 94619
(12621 Brookpark Road, Oakland, CA 94619)

W. Kemp Clark (Fern) 1970
5323 Harry Hines Boulevard
Dallas, TX 75235
(3909 Euclid Avenue, Dallas, TX 75205)

William F. Collins, Jr. (Gwen) 1963
Yale Univ. School of Medicine
333 Cedar Street
New Haven, CT 06510
(403 St. Ronan Street, New Haven, CT 06511)

James W. Correll (Cynthia) 1966
Neurological Institute
710 W. 168th Street
New York, NY 10032
(Algonquin Trail, Saddle River, NJ 07458)

Courtland H. Davis, Jr. (Marilyn) 1967
Bowman-Gray School of Medicine
Winston-Salem, NC 27103
(921 Goodwood Road, Winston-Salem, NC 27106)

Edward W. Davis (Barbara) 1949
Providence Medical Office Bldg.
545 N. E. 47th Avenue
Portland, OR 97213
(Box 974, Route 3, Troutdale, OR 97060)

Richard L. DeSaussure (Phyllis) 1962
20 S. Dudley Street, Suite 101-B
Memphis, TN 38103
(4290 Heatherwood Lane, Memphis, TN 38117)

Donald F. Dohn (Betty) 1968
2020 E. 93rd Street
Cleveland, OH 44106
(3010 Huntington Road, Shaker Heights, OH 44120)

R. M. Peardon Donaghy (Frances) 1970
Mary Fletcher Hospital
Burlington, VT 05401
(466 S. Prospect Street, Burlington, VT 05401)

Charles G. Drake (Ruth) 1958
111 Waterloo Street, Suite 211
London, Ontario, Canada
(R.R. 3, Medway Heights, London, Ontario, Canada)

Dean H. Echols (Fran) Founder
Ochsner Clinic
1514 Jefferson Highway
New Orleans, LA 70121
(1550 Second Street, New Orleans, LA 70130)

George Ehni (Velaire) 1964
1531 Hermann Professional Building
6410 Fannin Street
Houston, TX 77025
(16 Sunset, Houston, TX 77025)

William H. Feindel (Faith) 1959
Montreal Neurological Institute
3801 University Street
Montreal, Quebec, Canada
(39 Thornhill Avenue, Westmount, P.Q., Canada)

Rogert G. Fisher (Constance) 1957
800 N.E. 13th Street
Oklahoma City, OK 73104
(107 Lake Aluma Drive, Oklahoma City, OK 73121)

Eldon L. Foltz (Catherine) 1960
Chairman, Division of Neurosurgery
Univ. of Calif., School of Medicine
Irvine, CA 92664
(2480 Monaco Drive, Laguna Beach, CA 92651)

John D. French (Dorothy) 1951
The Center for the Health Sciences
University of California
Los Angeles, CA 90024
(12841 Sunset Blvd., Los Angeles, CA 90049)

Lyle A. French (Gene) 1954
University of Minn. Medical School
Minneapolis, MN 55455
(85 Otis Lane, St. Paul, MN 55104)

James G. Galbraith (Peggy) 1947
University of Alabama Medical School
1919 Seventh Avenue, South
Birmingham, AL 35233
(4227 Altamount Road, Birmingham, AL 34213)

John T. Garner (Barbara) 1971
744 Fairmount Avenue
Pasadena, CA 91105
(3075 Monterey Road, San Marino, CA 91108)

Sidney Goldring (Lois) 1964
Barnes Hospital Plaza
Division of Neurosurgery
St. Louis, MO 63110
(11430 Conway Road, St. Louis, MO 63131)

Philip D. Gordy (Elizabeth Ann) (Lisa) 1968
1025 Walnut Street
Philadelphia, PA 19107
(420 N. Rose Lane, Haverford, PA 19041)

John R. Green (Georgia) 1943
Barrow Neurological Institute
302 W. Thomas Road
Phoenix, AZ 85013
(2524 E. Crittendon Ln., Sutton Pl.,
Phoenix, AZ 85016)

Hannibal Hamlin (Margaret) 1948
270 Benefit Street
Providence, RI 02903
(270 Benefit Street, Providence, RI 02903)

John W. Hanbery (Shirley) 1959
Division of Neurosurgery
Stanford Medical Center
Palo Alto, CA 94304
(70 Mercedes Lane, Atherton, CA 94025)

George J. Hayes, Dir. of Staff (Catherine) 1962
Office, Deputy Ass't. Secty of Defense
Pentagon, Room 3E-172
Washington, D.C. 20301
(1362 Geranium Street, N.W., Washington, D.C.)

E. Bruce Hendrick (Gloria) 1968
Hospital for Sick Children
555 University Avenue
Toronto, Ontario, Canada
(63 Leggett Avenue, Weston, Ontario, Canada)

William E. Hunt (Charlotte) 1970
410 W. 10th Avenue
Columbus, OH 43210
(1000 Urlin Avenue, Columbus, OH 43212)

Robert B. King (Molly) 1958
University Hospital
Upstate Medical Center
750 E. Adams Street
Syracuse, NY 13210
(408 Maple Drive, Fayetteville, NY 13066)

Wolff M. Kirsch (Marie-Claire) 1971
University of Colorado Medical Center
Denver, CO 80220
(635 Bellaire, Denver, CO 80220)

David G. Kline (Carol) 1972
Louisiana State Univ. Medical Center
1542 Tulane Avenue
New Orleans, LA 70112
(46 Thrasher St., Lake Vista,
New Orleans, LA 70124)

Robert S. Knighton (Louise) 1966
Henry Ford Hospital
2799 W. Grand Boulevard
Detroit, MI 48202
(27486 Lathrup Blvd., Lathrup Village, MI 48075)

Theodore Kurze 1967
Los Angeles County — U.S.C. Med. Center
1200 North State Street, Suite 5046
Los Angeles, CA 90033
(13856 Bora Bora Way, #306-C,
Marina Del Rey, CA 90291)

Thomas W. Langfitt (Carolyn) 1971
Hospital of the University of Pennsylvania
34th and Spruce Streets
Philadelphia, PA 19104
(71 Merbrook Bend, Merlon, PA 19066)

Raeburn C. Llewellyn (Carmen) 1963
Tulane University
1430 Tulane Avenue
New Orleans, LA 70112
(32 Versailles Boulevard, New Orleans, LA 70124)

William M. Lougheed (Grace Eleanor) 1962
Medical Arts Building, Suite 430
170 St. George Street
Toronto 5, Ontario, Canada
(67 Ridge Drive, Toronto, Ontario, Canada)

Herbert Lourie (Betty) 1965
713 E. Genesee Street
Syracuse, NY 13210
(101 Thomas Road, DeWitt, NY 13214)

John J. Lowrey (Catherine) (Kay) 1965
Straub Clinic
888 S. King Street
Honolulu, HA 96813
(2299-B Round Top Drive, Honolulu, HA 96822)

Ernest W. Mack (Roberta) 1956
505 S. Arlington Avenue, Suite 212
Reno, NV 89502
(235 Juniper Hill Road, Reno, NV 89502)

M. Stephen Mahaley, Jr. (Janet) 1972
Duke University Medical Center
Durham, NC 27706
(3940 Nottaway Road, Durham, NC 27707)

Frank Mayfield (Queenee) Founder
506 Oak Street
Cincinnati, OH 45219
(1220 Roodwood Drive, Cincinnati, OH 45208)

Robert L. McLaurin (Kathleen) 1955
Division of Neurosurgery
Cincinnati General Hospital
Cincinnati, OH 45229
(2461 Grandin Road, Cincinnati, OH 45208)

William F. Meacham (Alice) 1952
Vanderbilt University Hospital
Division of Neurosurgery
Nashville, TN 37203
(3513 Woodmont Boulevard, Nashville, TN 37215)

John F. Mullan (Vivian) 1963
University of Chicago Clinics
Department of Neurosurgery
950 E. 59th Street
Chicago, IL 60637
(6911 S. Bennett Avenue, Chicago, IL 60649)

Blaine S. Nashold, Jr. (Irene) 1967
Duke University Medical Center
Durham, NC 27706
(410 E. Forest Hills Blvd., Durham, NC 27706)

Frank E. Nulsen (Ginny) 1956
Division of Neurosurgery
University Hospital
2065 Adelbert Road
Cleveland, OH 44106
(21031 Shaker Blvd., Shaker Heights, OH 44120)

Guy L. Odom (Matalaine) 1946
Duke University Medical Center
Durham, NC 27706
(2812 Chelsea Circle, Durham, NC 27706)

Robert G. Ojemann (Jean) 1968
Massachusetts General Hospital
Division of Neurological Surgery
Boston, MA 02114
(85 Nobscot Road, Weston, MA 02193)

Russel H. Patterson, Jr. (Juliet) 1971
525 East 68th Street
New York, NY 10021
(535 East 86th Street, New York, NY 10028)

Phanor L. Perot, Jr. (Elizabeth) 1970
Medical University of South Carolina
80 Barre Street
Charleston, SC 29401
(704 Willowlake Road, Charleston, SC 29407)

Byron C. Pevehouse (Maxine) 1964
2001 Union Street
San Francisco, CA 94123
(135 Mountain Spring Avenue,
San Francisco, CA 94114)

Robert W. Porter (Aubrey Dean) 1962
5901 E. 7th Street
Long Beach, CA 90804
(5400 The Toledo, Long Beach, CA 90803)

John Raaf (Lorene) Founder
833 S. W. 11th Avenue
Portland, OR 97205
(390 S. W. Edgecliff Road, Portland, OR 97219)

Aiden A. Raney (Mary) 1946
2010 Wilshire Blvd., Suite 203
Los Angeles, CA 90057
(125 N. Las Palmas, Los Angeles, CA 90004)

Joseph Ransohoff II (Rita) 1965
New York Univ. Medical Center
500 First Avenue
New York, NY 10016
(140 Riverside Drive, New York, NY)

Theodore B. Rasmussen (Catherine) 1947
Montreal Neurological Institute
3801 University Street
Montreal 2, Quebec, Canada
(29 Surrey Drive, Montreal 16, Quebec, Canada)

David H. Reynolds (Marjorie) 1964
1150 N. W. 14th Street, Suite 209
Miami, FL 33136
(1701 Espanola Drive, Miami, FL 33133)

James T. Robertson (Valeria) 1971
20 S. Dudley
Memphis, TN 38103
(628 N. Trezevant Street, Memphis, TN 38112)

R. C. L. Robertson (Marjorie) 1946
Shamrock Professional Building
2210 Maroneal Boulevard, Suite 404
Houston, TX 77025
(5472 Lynbrook Drive, Houston, TX 77027)

Richard C. Schneider (Madeleine) 1970
C5135, Out-Pt. Building
University Hospital
Ann Arbor, MI 48104
(2110 Hill Street, Ann Arbor, MI 48104)

Henry G. Schwartz (Reedie) 1942
Barnes Hospital Plaza
Division of Neurological Surgery
St. Louis, MO 63110
(2 Briar Oak, Ladue, St. Louis, MO 63132)

William B. Scoville (Helene) 1944
85 Jefferson Street
Hartford, CT 06106
(27 High Street, Farmington, CT 06032)

Bennett M. Stein (Doreen) 1970
Department of Neurosurgery
171 Harrison Avenue
Boston, MA 02111
(16 Tamarack Road, Weston, MA 02193)

Jim L. Story (Joanne) 1972
7703 Floyd Curl Drive
San Antonio, TX 78229
(3211 Stonehaven Road, San Antonio, TX 78230)

Thoralf M. Sundt, Jr. (Lois) 1971
200 First Street, S.W.
Rochester, MN 55901
(1406 Weatherhill Court, Rochester, MN 55901)

Anthony F. Susen (Phyllis) 1965
3600 Forbes Avenue
Pittsburgh, PA 15213
(3955 Bigelow Boulevard, Pittsburgh, PA 15213)

William H. Sweet (Mary) 1950
Massachusetts General Hospital
Division of Neurological Surgery
Boston, MA 02114
(35 Chestnut Place, Brookline, MA)

Ronald R. Tasker (Mary) 1971
Toronto General Hospital
Room 121, U. W.
Toronto, Ontario, Canada
(12 Cluny Drive, Toronto 5, Ontario, Canada)

George T. Tindall (Suzie) 1968
University of Texas Medical Branch
John Sealy Hospital
Galveston, TX 77550
(2938 Dominique Drive, Galveston, TX 77550)

John Tytus (Virginia) (Gina) 1967
Mason Clinic
1118 Ninth Avenue
Seattle, WA 98101
(1000 N. W. Northwood Road, Seattle, WA 98177)

Alfred Uihlein (Ione) 1950
200 First Street, S.W.
Rochester, MN 55901
(Box 1127, Naples, FL 33940)

Arthur A. Ward, Jr. (Janet) 1953
Department of Neurological Surgery
University of Washington Hospital
Seattle, WA 98105
(3922 Belvoir Place, N.E., Seattle, WA 98105)

W. Keasley Welch (Elizabeth) 1957
Children's Hospital Medical Center
300 Longwood Avenue
Boston, MA 02115
(25 Gould Road, Waban, MA)

Benjamin B. Whitcomb (Margaret) 1947
85 Jefferson Street
Hartford, CT 06106
(38 High Farms Road, West Hartford, CT)

Lowell E. White, Jr. (Margie) 1971
Professor & Chairman
Division of Neurosciences
Univ. of S. Alabama Medical School
Mobile, AL 36688
(912 Regency Drive West, Mobile, AL 36609)

Charles B. Wilson (Mary) 1966
Department of Neurological Surgery
University of California Medical Center
Third and Parnassus
San Francisco, CA 94122
(215 Round Hill Road, Tiburon, CA 94920)

David Yashon (Myrna) 1972
410 W. 10th Avenue, N., #911
Columbus, OH 43210
(5735 Saranac Drive, Columbus, OH 43227)

Nicholas T. Zervas (Thalia) 1972
330 Brookline Avenue
Boston, MA 02215
(100 Canton Avenue, Milton, MA 02186)

DECEASED MEMBERS	Elected	Date
Dr. Percival Bailey Evanston, Illinois	1960	(Honorary) 1973
Dr. William F. Beswick Buffalo, New York	1949	(Active) 1971
Dr. Spencer Braden Cleveland, Ohio	Founder	(Active) 1969
Dr. F. Keith Bradford Houston, Texas	1938	(Active) 1971
Dr. Winchell McK. Craig Rochester, Minnesota	1942	(Honorary) 1960
Dr. Olan R. Hyndman Iowa City, Iowa	1942	(Senior) 1966
Sir Geoffrey Jefferson Manchester, England	1951	(Honorary) 1961
Dr. Donald D. Matson Boston, Massachusetts	1950	(Active) 1969
Dr. Kenneth G. McKenzie Toronto, Ontario, Canada	1960	(Honorary) 1964
Dr. James M. Meredith Richmond, Virginia	1946	(Active) 1962
Dr. W. Jason Mixter Woods Hole, Massachusetts	1951	(Honorary) 1958
Dr. Rupert B. Raney Los Angeles, California	1939	(Active) 1959
Dr. David L. Reeves Santa Barbara, California	1939	(Senior) 1970
Dr. C. William Stewart Montreal, Quebec, Canada	1948	(Corresponding)
Dr. Glen Spurling La Jolla, California	1942	(Honorary) 1968
Dr. Hendrik Svien Rochester, Minnesota	1957	(Active) 1972