

AMERICAN ACADEMY OF NEUROLOGICAL SURGERY



THIRTY-THIRD ANNUAL MEETING

**Sahara-Tahoe Hotel
Lake Tahoe, Nevada
September 26-29, 1971**

ANNUAL MEETING 1971



**SAHARA-TAHOE HOTEL
LAKE TAHOE, NEVADA**

The American Academy of Neurological Surgery

Officers 1971

President William B. Scoville
President-Elect Robert L. McLaurin
Vice President Edward W. Davis
Secretary-Treasurer Byron C. Pevehouse
Historian Edwin B. Boldrey
President of Women's Auxiliary Mrs. Ernest W. Mack

Committees

Executive Committee

William B. Scoville, **Chairman**

Robert L. McLaurin

Edward W. Davis

Robert H. Pudenz

Byron C. Pevehouse

Lyle A. French

Subcommittee on

Corresponding Membership

William B. Scoville, **Chairman**

Charles G. Drake

Richard L. De Saussure

Hannibal Hamlin

William H. Sweet

Program Committee

Charles B. Wilson, **Chairman**

William H. Feindel

Courtland H. Davis, Jr.

Round Robin Committee

Richard L. De Saussure, **Chairman**

William F. Meacham

Byron C. Pevehouse

Robert H. Pudenz

Membership Advisory Committee

James G. Galbraith, **Chairman**

Donald F. Dohn

Robert B. King

Byron C. Pevehouse

Robert H. Pudenz

William B. Scoville

Academy Award Committee

Henry L. Heyl, **Chairman**

William F. Collins

Ernest W. Mack

Local Arrangements Committee

Ernest W. Mack

PROGRAM — 1971

Sunday, September 26

- 12:00-6:30 p.m. Registration — Hotel Lobby
6:30-8:30 p.m. Reception — Tamarack-Alpine Room
8:30 p.m. Dinner/Show — (individual arrangements)

Monday, September 27

- 8:00 a.m.-12:00 Noon Registration — Alpine Room
8:30 a.m.-12:00 Noon Scientific Session — Glenbrook Room
12:00 Noon-1:00 p.m. Executive Meeting — Glenbrook Room
7:00 p.m.-8:00 p.m. Cocktail Party — Tamarack Foyer
8:00 p.m.-12:00 p.m. Formal Banquet — Dinner/Dancing
— Alpine & Brookside Rooms

Tuesday, September 28

- 8:00 a.m.-1:00 p.m. Registration — Alpine Room
8:30 a.m.-1:00 p.m. Scientific Session — Glenbrook Room
5:00 p.m. Trip to Ponderosa Ranch for Bar-B-Que and
Western Entertainment

Wednesday, September 29

- 8:30 a.m.-12:00 Noon Scientific Session — Glenbrook Room
12:00 Noon-1:00 p.m. Executive Meeting — Glenbrook Room

Scientific Program

MONDAY, SEPTEMBER 27, 1971

CHAIRMAN: Dr. William B. Scoville

8:30 a.m.

1. "Spontaneous Dissecting Aneurysms of the Internal Carotid Artery"

Robert G. Ojemann, M.D., C. Miller Fisher, M.D., and Charles Rich, M.D.

A case of acute cerebral vascular accident due to a spontaneous dissecting aneurysm of the internal carotid artery is presented and the ten other reported patients are reviewed.

The disease may present with transient ischemic attacks, a sudden neurological deficit, or a complaint of head noise. The age range in the majority of symptomatic cases has been from 35 to 41 years. A characteristic angiographic picture may be present if the artery is not completely occluded. Detailed pathologic study of the reported case is presented. The treatment is surgical and a surgical approach to the lesion is outlined. The importance of early angiography in acute cerebral vascular accidents is emphasized.

8:50 a.m.

2. "A Study of Cerebral Autoregulation in Man Following Severe Head Injury"

George T. Tindall, M.D., C. P. McGraw, Ph.D., H. O. Wendenburg, M.D., and K. Iwata, M.D.

Twelve comatose patients with acute severe cerebral contusions were tested for cerebral autoregulation. This was accomplished by raising arterial pressure with the intravenous infusion of norepinephrine and observing the response of cerebral blood flow (CBF). After obtaining control CBF, norepinephrine was administered intravenously to increase the mean arterial pressure at least 30% over the control level. The arterial blood pressure was maintained at this increased level for five minutes and a repeat CSF determination performed. In addition to measuring CBF, continuous measurements of intracranial pressure (ICP), vital signs, and jugular venous pressure were made. Also frequent determinations of arterial pO₂, pCO₂, and pH were carried out.

RESULTS: As measured by the Krypton 85 technique in the 12 patients, CBF averaged 36.5 cc./min./100 gm. brain. This figure is less than

the 56.5 cc. value reported by McHenry for normal subjects. Eight of 12 patients with severe head injury showed preservation of cerebral autoregulation. Six of these regained consciousness and are now functioning normally. One patient who autoregulated improved and then expired from septicemia two months after the head injury. Another autoregulated one day after the injury, then deteriorated, and expired before further tests for autoregulation could be made.

Cerebrovascular autoregulation was absent in four patients; three of these died soon after injury, and one stabilized in deep coma.

Cerebrovascular resistance increased an average of 34% in the patients showing preservation of autoregulation but did not change when autoregulation was absent. The patients who autoregulated showed a 21% decrease in their heart rate, while those who did not autoregulate had only a slight increase.

It is concluded that autoregulation is often preserved in patients with severe head injury. The results also imply that the presence or absence of autoregulation may have some prognostic value as this vascular phenomenon does appear to be lost in patients who have irreversible brain damage as a result of trauma.

9:10 a.m.

3. "Cryogenic Destruction of the Choroid Plexus"

H. Dale Richardson, M.D. and Takashi Tsubokawa, M.D.
(by invitation)

Surgical attack on the choroid plexus to reduce cerebrospinal fluid (CSF) production in communicating hydrocephalus offers a potentially definitive method of treatment not requiring subsequent operations or revision. Cryogenic destruction of the choroid plexus in cats was undertaken to determine its effectiveness and safety.

A 5 minute application of the cryoprobe on the choroid plexus at the trigone at -40 to -50° Centigrade produced histological destruction. The temperature changes in the cortex adjacent subcortical areas, and in the ventricles were monitored by stereotaxically implanted thermistor needles. The EEG, body temperature, and vital signs did not change significantly. CSF pressure and the rate of production were measured. Baseline CSF production was 1.68 ml/hour which was increased by intravenous hypotonic saline to 4.56 ml/hour. After bilateral cryogenic lesions of the choroid plexus, CSF flow decreased to 0.18 ml/hour and the response of hypotonic saline was abolished. Light microscopy and electron microscopic studies showed a nonhemorrhagic necrosis of the choroid plexus. When the anterior and posterior choroidal arteries were

included in the lesions at the trigone, changes occurred at some distance from the area of direct necrosis with as much as 70% of the unilateral choroid plexus destroyed by a single lesion.

9:30 a.m.

4. "Transphenoidal Surgical Approach to the Sella – Experiences Since 1957"

Donald R. Olson, M.D. for Professor Gerard Guiot, Paris, France (by invitation)

Since 1957 at Hospital Foch in Paris, France, an experience of over 443 transphenoidal operations has been established. In the course of this experience, many conclusions and observations have been made. Oval or round shaped pituitary tumors, with or without suprasellar extension, are most approachable tumor via the transphenoidal route. In such cases, the risks are very low and the complications are few. Other problems lend themselves to the transphenoidal surgical approach, which include sphenoidal tumors, mucocoeles, and the symptomatic empty sella. The symptomatic empty sella is an entity which may occur as a result of prior treatment to a pituitary adenoma or may be idiopathic. In either case, experience has been gained utilizing the transphenoidal approach in the successful treatment of this problem.

9:50 a.m.

5. "The Clinical Spectrum of Dural-Cavernous A-V Malformations and Fistulae"

T. Hans Newton, M.D. and William F. Hoyt, M.D. (by invitation)

A Huntley-Brinkley type presentation of light and sound, providing a radiographic and clinical review of arteriovenous malformations and fistulae involving the dural and cavernous venous sinuses.

10:20 a.m.

Coffee Break

10:35 a.m.

6. "Transphenoidal Hypophysectomy (Microsurgical) for Metastatic Carcinoma of the Breast"

Stewart B. Dunsker, M.D., John M. Tew, Jr., M.D., Richard L. Meyer, M.D., and Frank H. Mayfield, M.D.

Hypophysectomy frequently affects the growth of carcinoma of the breast. However, indications for it are not clear and techniques to perform it varied. In conjunction with the Oncology Departments at Good

Samaritan and Christ Hospitals, Cincinnati, Ohio, a research protocol was established to help evaluate the role of hypophysectomy in selective patients. The purpose of this presentation is to present a progress report of our study and to discuss the problems encountered in establishing a research project in a community hospital using an operation which had not been done previously by the surgeons.

The protocol was designed to involve several departments: Oncology, Otorhinolaryngology and Neurosurgery. All patients were chosen for hypophysectomy by oncologists and, except for the immediate post-operative care, all primary care and evaluation of response was done by them. Rhinologists performed the initial part of the operation, the sublabial transphenoidal exposure of the sella. The hypophysectomies were performed by either one of two surgeons using the surgical microscope. All payment derived from the hypophysectomies was returned to the educational funds of the hospital so that no one derived monetary gain from this new procedure. With this design, the medical staffs of the hospitals accepted and endorsed the protocol.

This preliminary report is on the first 22 patients. Thirteen of these were chosen because of intractable pain, of whom 13 (77%) obtained relief within 24 hours of surgery. Six of nine patients were operated upon for extensive visceral disease and three with local recurrence obtained no response. Only five (23%) showed objective evidence of amelioration.

Four of five patients who demonstrated the response to preoperative hormone manipulation responded to hypophysectomy. However, five of thirteen patients (37%) who did not respond to preoperative endocrine alterations responded with immediate loss of intractable pain. There were eight patients operated upon for pain who had no previous response to endocrine alterations. Of these eight, five obtained relief (62%).

Mortality, morbidity and growth hormone and autopsy analyses will be presented.

Hypophysectomies are most efficacious in patients with bone metastases and pain. They should not be limited to those patients whose tumor responds to endocrine therapy.

11:05 a.m.

**7. "Experiences with Hemispherectomy during
the past 20 Years"**

Lyle A. French, M.D.

Review of a total of 28 cases, the majority of which were done between 1950 and 1953. The procedures were done for various reasons, but primarily because of intractable seizures, personality aberrations, and of course, they all had hemiparesis. The follow up will include some observations relative to personality, their ability to adjust to their environment and the control of the seizures. The report is presented because of some general interest in the subject, rather than any dramatic observations that were not anticipated.

11:30 a.m.

**8. "Gates, Gateing, Pain and Positive
Dorsal Root Potentials"**

W. F. Collins, M.D., Arthur Taub, M.D., and L. M. Kitahata, M.D.

A heuristic theory of pain processes advanced by Melzack and Wall, and currently offered as a rationale for relief of otherwise intractable pain by electrical stimulation of larger myelinated fibers in peripheral nerve and dorsal columns, concludes, from the presence of positive dorsal root potentials, that hyperpolarization of primary afferent fibers occurs within the spinal axis, thus facilitating synaptic transmission presynaptically. These positive dorsal root potentials are said to be produced via activity of smaller myelinated and unmyelinated primary afferents. The major deflection of the dorsal root potential, produced by activity in larger myelinated primary afferents is said to be negative, and its enhancement to be related to presynaptic inhibition. This study demonstrates: (1) that the conventional method for recording dorsal root potentials introduces a major artifact; (2) that in reality the major deflection of the dorsal root potential is positive, and is produced by the activity of large myelinated cutaneous afferents; (3) that the sign of the dorsal root potential in itself does not determine the state of polarization of primary afferent intra-axial terminals; (4) that the major deflection of the dorsal root potential is decreased, rather than increased, by analgesic agents. Presynaptic theories of "gateing" are seriously open to question at this time.

11:50 a.m.

Adjourn Scientific Session

12:00 Noon

EXECUTIVE SESSION (Members Only)

TUESDAY, SEPTEMBER 28, 1971

CHAIRMAN: Dr. Edward W. Davis

8:30 a.m.

**9. "Torkildsen's Ventriculocisternostomy:
Complications and Their Avoidance"**

George Ehni, M.D., Richard Moiel, M.D., and Guy Bragg, M.D.

Torkildsen's shunting remains a valuable procedure for certain special indications such as neoplastic obstruction of the third ventricle and aqueduct. Numerous modifications have been published, but these have not obviated all of the difficulties. Five serious early and late complications of this type of shunting will be described together with technical suggestions for their avoidance.

8:50 a.m.

**10. "Hydrocephalus, and Hydrocephalus Myelomeningocele,
Thirteen Year Survival in 401 Patients"**

D. B. Shurtleff, M.D., R. Kronmal, Ph.D. and, Eldon L. Foltz, M.D.

The results of a 13 year study of 401 patients with hydrocephalus only or hydrocephalus and myelomeningocele are reported, including an active therapy group and a minimal therapy group. These patients were all studied by an interdisciplinary clinic group consisting of the same personnel over the entire 13 year span. Conclusions may be summarized:

1. The etiology of the hydrocephalus varied considerably as demonstrated by pneumoradiology and post-mortem examinations.
2. The cause of death in 138 hydrocephalic patients is presented showing a striking difference in those treated for hydrocephalus and those not treated for hydrocephalus.
3. The survival rate of a patient group treated for hydrocephalus myelomeningocele shows survival rates of 52% and 53% respectively at 13 years of each follow-up.
4. In the hydrocephalus only group, survival of treated patients at 10 years of age is 63%; survival of the untreated group is 9%.

5. In the hydrocephalus only group treated by VA shunt, patients at 13 years showed 42% functional and 10% retarded with a total survival of 52% only. The same type of group but without treatment showed all survivors were retarded (9% survival).
6. In the hydrocephalus-myelomeningocele group, the treated group showed a survival of 60% at 12 years, with 17% retarded; the untreated group in this classification showed 14% survival at 10 years, all of them retarded.
7. The study of patients with myelodysplasia and no hydrocephalus (or inactive) showed overall survival of 89% at 13 years with 56% functional and 33% non-functional.
8. The large group of patients with myelodysplasia and variable hydrocephalus were studied at 13 years relative to quality of survival versus level of myelodysplasia:
 - (a) With thoracic - high lumbar lesions, overall survival was 52%, and functional survival 29%.
 - (b) With mid and low lumbar lesions, overall survival was 75%, and functional survival 48%.
 - (c) With sacral lesions, overall survival was 86%, and functional survival 64%.
9. The study of functional survival of patients with myelodysplasia and controlled hydrocephalus was divided into thoracic high lumbar, mid-lumbar, and sacral level groups — showing 70%, 84%, and 94% functional survival respectively.
10. The major factor in achieving functional survival in patients with myelodysplasia appears to be control of hydrocephalus. The degree of motor paralysis does not appear to be a major factor in functional survival through achievement is time-related to the severity of paralysis.

9:10 a.m.

11. "Traumatic Subdural Hygroma"

Julian Hoff, M.D., E. Bates, M.D., B. Barnes, M.D.,

M. Glickman, M.D., T. Margolis, M.D., and Charles B. Wilson, M.D.

Thirteen cases of traumatic subdural hygroma treated at San Francisco General Hospital from 1963 through 1970 were reviewed. The pa-

tients sustained closed head injuries from blunt trauma within two days of admission; all demonstrated depressed levels of consciousness, but only three exhibited lateralizing neurologic signs. Skull roentgenograms were normal in nine patients, and showed a fracture in two, pineal shift in one and bulging fontanelle in one. Lumbar puncture done in six patients disclosed xanthochromic fluid with elevated pressure and protein. Arteriograms done in 12 of the 13 patients showed bilateral extracerebral spaces in six patients and unilateral extracerebral spaces in the other six. However, they did not allow differentiation between subdural hematoma and subdural hygroma. Definitive diagnosis was possible only at operation.

Craniotomy in one patient and multiple bur holes in 12 patients provided adequate drainage of the subdural hygromas. The drained fluid was consistently clear, xanthochromic and sterile, with increased protein (average 316 mg%) and pressure, and was of sufficient quantity (75-200 cc) to be clinically important. Subdural membranes were absent in all patients, and the brain surface was grossly normal in 11 of the patients.

Evacuation of the fluid resulted in clinical improvement in nine of the 13 patients. Hygromas recurred in three patients: one found at autopsy and two confirmed at reoperation. In one of the last two cases, recurrence was diagnosed correctly before reoperation by radioisotope cisternography. Passage of the isotope from the lumbar subarachnoid space to the subdural space directly rather than via the blood stream was suspected but not proved.

9:30 a.m.

12. "The Effect of Current Density on the Blood Brain Barrier"

Robert H. Pudenz, M.D., Andrew Talalla, M.D., Leo Bullara, M.D., and C. Hunter Shelden, M.D.

With the increasing exploration of techniques for the long-term electrical stimulation of the central nervous system, it has become of paramount importance to determine the deleterious effects of such stimulation and to define the limits of stimulus parameters that can safely be used.

Our interest in this subject began with our participation in the N.I.H. sponsored human visual prosthesis project, for it seemed mandatory to undertake damage studies in animals using stimulus parameters that were proposed for human visual cortex stimulations.

One of the more refined indices of brain damage is an observation of a breakdown in the blood brain barrier and of the commonly used methods of detecting such a breakdown, we have chosen the intravital dye staining technique, using Evan's Blue.

Our experience with acute and short-term experiments on approximately 100 cat cerebral hemispheres will be presented, and this paper describes the techniques of stimulation and the results obtained; it will also correlate the predictability and reversibility of a breakdown in the blood brain barrier with total charge density of the electrical stimulus delivered.

9:50 a.m.

ACADEMY AWARD PRESENTATION FOR 1971

13. "Sodium Sequestration in Brain Nuclei and the Relationship of this Observation to the Pathogenesis of Cerebral Edema"

Richard L. Pressley, M.D.
University of Colorado Medical Center, Denver, Colorado

10:20 a.m.

Coffee Break

10:35 a.m.

14. "Neurological Control of Cerebral Circulation"

Richard H. Licata, Ph.D., and Ernest W. Mack, M.D.

A continuing study of innervation of cerebral arteries and veins has been conducted, utilizing the autofluorescent technique for the determination of the in situ presence of catecholamine nerve fibers. Intricate neural nets of catecholamine fibers of sympathetic origin were found to surround the adventitia of cerebral arteries and veins. The mode of innervation of the deeper penetrating cortical vessels were also studied. Special attention was given to areas of vessel bifurcation and transitions to different anatomical zones. Some apparent deductions of mechanisms of neurological control of cerebral circulation are suggested.

10:55 a.m.

15. "Infected Ventriculo-Atrial Shunts: Review of 20 Cases"
Robert L. McLaurin, M.D.

Bacterial colonization of ventriculo-venous shunts continues to present a difficult problem. Most authors have concluded that successful treatment of shunt infection requires removal of the foreign body to achieve sterilization. Twenty cases of infection have been reviewed from this clinic. Using intraventricular and systemic antibiotics without removal of the shunt, twelve cases have remained asymptomatic for over one year and are thought to be cured of infection. Another five patients have remained asymptomatic for periods between five and twelve months. Ten of the twenty patients have had immediate shunt replacement in addition to antibiotic therapy. The remaining ten have been treated without shunt replacement. The authors conclude therefore, that vigorous intensive antibiotic therapy is successful in a significant number of patients and that sacrifice or replacement of the shunt is not invariably necessary. The types and dosages of antibiotics used will be reviewed.

11:15 a.m.

**16. "Cerebral Spinal Fluid Sterols in Patients
Undergoing Treatment for Malignant Gliomas"**
Joseph Ransohoff, M.D.

A biochemical test for the diagnosis of the presence of brain tumors in man, based on the elevation of CSF desmosterol levels after 5 days oral administration of triparanol, has been proposed by Paoletti et al. Sterol levels were measured in the CSF of 7 control patients and 41 patients with proven malignant gliomas, and correlated with biological activity of the tumors. Cholesterol and desmosterol concentrations were determined in these patients with gliomas at various stages in their treatment: initially; after triparanol administration; after surgery; after chemotherapy (usually BCNU); or after a combination of therapy.

Cholesterol levels were higher in the CSF of patients with gliomas than in control patients. After triparanol administration, there was a definite increase in CSF desmosterol (0.1 mg/ml) in approximately 60% of the patients with gliomas. The effect of surgery and/or chemotherapy on CSF sterol levels after triparanol administration are inconclusive because of the small number of patients studied. The evaluation of CSF sterols as a guide to therapy is being continued in additional group of patients with gliomas.

11:35 a.m.

17. "Regional Cerebral Blood Flow and Metabolism in Patients with Severe Head Injuries"

Thomas W. Langfitt, M.D., Derek Bruce, M.D., and J. Douglas Miller, M.D.

Regional cerebral blood flow (rCBF), cerebral metabolism (CMRO₂) and intracranial pressure (ICP) have been measured in 22 comatose patients. The patients were divided into those with and those without a mass lesion. rCBF did not correlate with ICP until ICP equalled the systemic arterial pressure. Autoregulation was defective in the majority of patients but intact in some patients with severe brain injury. Mannitol increased rCBF in the majority of patients even when it had little or no effect on ICP.

12:00 Noon

18. PRESIDENTIAL ADDRESS—"World Neurosurgery Today"

William Beecher Scoville, M.D.

WEDNESDAY, SEPTEMBER 29, 1971

CHAIRMAN: Dr. Charles B. Wilson

8:30 a.m.

19. Anterior Cervical Disc Removal with and without Fusion"

James T. Robertson, M.D. (by invitation)

Review of approximately 80 cases with a six year followup. Emphasizes the role of saline disc injection in the selection of the patient plus our experiences with the operative removal of the disc without fusion in over 20 cases.

8:50 a.m.

20. "Neurophysical Mapping of Human Descending Trigeminal Tract - Clinical Application"

J. F. Mullan, M.D., Y. Hosobuchi, M.D., and J. Dawley, M.D.

In an attempt to relieve post herpetic trigeminal neuralgia and atypical facial pains, we designed an attack upon the second order of neurone. This involved mapping the descending tract and nucleus caudalis of the trigeminal. The role of such mapping in descending trigeminal tractotomy and nucleotomy will be discussed in reference to a series of 24 patients with a wide variety of facial and nasopharyngeal pains.

9:10 a.m.

21. "The Syndrome of Incipient Unilateral Optic Nerve Compression"

William F. Hoyt, M.D. and T. Hans Newton, M.D. (by invitation)

The dynamic duo, sometimes known as the Gold-Dust Twins, make their second appearance at this meeting to discuss the problem of failing vision in one eye (without other symptoms), with Bill Hoyt presenting the clinical findings that should lead to early radiographic studies and appropriate treatment, rather than the prolonged observation often followed in such patients, and Hans Newton providing the techniques for specific diagnosis.

9:40 a.m.

ACADEMY AWARD — 1st Honorable Mention

22. "Role of Prostaglandin F₂ in the Genesis of Experimental Cerebral Vasospasm"

Menno Pennink, M.D.

University of Tennessee, Memphis, Tennessee

10:10 a.m.

23. "Current Treatment of Paget's Disease of the Spine, including Use of a New Chemical Agent"

J. L. Pool, M.D.

Paget's Disease (osteitis deformans) of the spine seldom causes spinal cord symptoms, but when it does, it frequently threatens the victim with permanent paraplegia. Treatment by decompressive laminectomy is often beneficial, but in some cases it is not, because several contiguous vertebrae are affected, with a tendency to progressive collapse following laminectomy that results in paraplegia. To avoid this complication it is suggested that spinal fusion be combined with laminectomy, and that a new drug, a diphosponate, be administered to restore high alkaline phosphatase values to normal, an indication that this agent slows bone destruction. A case report illustrates the effect of this agent. A review of the literature and our own cases illustrate the value of decompressive laminectomy and also of spinal fusion.

10:30 a.m.

Coffee Break

10:45 a.m.

24. "Types of Cysts Encountered in the Spinal Extradural Space"

Robert H. Wilkins, M.D. and Guy L. Odom, M.D.

The clinical and radiographic features of various types of spinal extradural cysts will be presented. These include congenital extradural cysts, root cysts, cysts associated with ankylosing spondylitis, occult

meningoceles, cysts associated with nerve root avulsions, post-laminectomy cysts, and miscellaneous cysts (e.g. ganglion cyst, hydatid cysts, etc.). In each instance, the pertinent medical literature will be reviewed and illustrative cases will be presented.

11:15 a.m.

25. "Techniques of Carotid Endarterectomy"

W. M. Lougheed, M.D.

Discussion centers on certain aspects of repairing the vascular tree from the arch of the aorta distal. A 16 mm. color movie on the technique of carotid endarterectomy will be shown during presentation and discussion.

11:40 a.m.

26. "Perfusion of the Cortical Microcirculation by Reverse Arterial Flow"

William Feindel, M.D., Lucas Yamamoto, M.D., and Henry Garretson, M.D.

The anatomical basis for collateral flow from one major arterial system of the hemisphere to another by way of leptomeningeal anastomoses was established by the injection studies of Beevor in 1907 and confirmed more recently by Van der Eeken and others. Such reverse arterial flow has been documented on angiography after occlusive lesions particularly of the proximal part of the middle cerebral artery.

The functional potential of this reverse flow in relation to the cortical microcirculation rendered ischemic by proximal arterial occlusion has however not been well defined because of the limits of resolution of x-ray angiography. In an experimental model of focal cerebral ischemia and in several patients we have been able to demonstrate that this reverse arterial flow does contribute to the microvascular perfusion. Fluorescein angiographic studies provide evidence that this collateral flow is one of the most important factors in reduction of the zone of ischemia and in the response of the cerebral vessels to carbon dioxide which may further benefit the disordered focal cerebral blood flow. Examples from the experimental and clinical series will be summarized.

11:55 a.m.

Adjourn Scientific Session

12:00 Noon

EXECUTIVE SESSION (Members Only)

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 |

ACADEMY AWARD 1971

Richard LaMarr Pressley, M.D.
University of Colorado Medical Center
Denver, Colorado

**"Sodium Sequestration in Brain Nuclei and the Relationship of this
Observation to the Pathogenesis of Cerebral Edema"**

1st HONORABLE MENTION

Menno Pennink, M.D.
University of Tennessee Medical Center
Memphis, Tennessee

**"Role of Prostaglandin F₂ in the Genesis of Experimental Cerebral
Vasospasm"**

2nd HONORABLE MENTION

M. Peter Heilbrun, M.D.
Washington University Medical Center
St. Louis, Missouri

**"Relationships between Perfusion Pressure and Regional Cerebral
Blood Flow in Patients with Severe Neurologic Disorders"**

GUEST LIST — 1971

| Guest | Host |
|---|--------------------------|
| Ernest Bates San Francisco, Calif. | Charles Wilson |
| Richard M. Bergland Hershey, Pa. | Robert McLaurin |
| Perry Black Baltimore, Md. | Earl Walker |
| Stewart B. Dunsker Cincinnati, Ohio | Academy |
| John T. Garner Pasadena, Calif. | Hunter Shelden |
| Julian Hoff San Francisco, Calif. | Edwin Boldrey |
| Yoshio Hosobuchi San Francisco, Calif. | John Mullan |
| William F. Hoyt San Francisco, Calif. | Academy |
| Peter J. Jannetta Pittsburgh, Pa. | Robert Pudenz |
| Wolff Kirsch Denver, Colo. | Keasley Welch |
| Thomas W. Langfitt Philadelphia, Pa. | James Galbraith |
| Keith Langford Melbourne, Australia | Raeburn Llewellyn |
| Jay M. Levy Napa, Calif. | Dean Echols |
| Richard Licata Professor of Anatomy Univ. of Nevada Med. Sch. | Academy |
| Leonard I. Malis New York City | Frank Mayfield |

| | |
|-----------------------------|-------------------|
| Richard Meyer | Academy |
| Cincinnati, Ohio | |
| T. Hans Newton | Academy |
| San Francisco, Calif. | |
| Donald R. Olson | Ernest Mack |
| Reno, Nevada | |
| Russel Patterson | William Scoville |
| New York City | |
| H. Dale Richardson | Homer Swanson |
| Atlanta, Georgia | |
| Jim Robertson | Byron Pevehouse |
| Memphis, Tenn. | |
| Adolf Rosenauer | Joseph Evans |
| Reno, Nevada | |
| Michael Scott | Augustus McCravey |
| Philadelphia, Pa. | |
| Thomas Scully | Academy |
| Director, Medical Education | |
| Washoe Medical Center, Reno | |
| George T. Smith | Academy |
| Dean, School of Medicine | |
| University of Nevada | |
| Gerhard Svare | Lawrence Pool |
| Lake Tahoe, Calif. | |
| Andrew Talalla | Robert Pudenz |
| Pasadena, Calif. | |
| Arthur Taub | William Collins |
| New Haven, Conn. | |
| Robert D. Weyand | Gale Clark |
| Oakland, Calif. | |
| Lowell E. White | Robert King |
| Gainesville, Fla. | |
| Robert H. Wilkins | Guy Odom |
| Durham, North Carolina | |
| David Yashon | William Hunt |
| Columbus, Ohio | |

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 |

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 J. 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 |

Past Secretary-Treasurers

| | |
|-----------------------|---------|
| Francis Murphey | 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 |
| Edwin W. Davis | 1963-65 |
| Robert G. Fisher | 1966-68 |

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, 1970 |
| Mark Hopkins Hotel, San Francisco, and Ambassador Hotel, Los Angeles, California | November 11-15, 1970 |
| 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 |

1970 - 1971

MEMBERSHIP ROSTER

THE AMERICAN ACADEMY OF NEUROLOGICAL SURGERY

| Honorary Members — 3 | Elected |
|--|----------------|
| PERCIVAL BAILEY 731 Lincoln Street Evanston, Illinois 60201 | 1960 |
| 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 — 21 | |
| GEORGE BAKER 200 First Street, S.W. Rochester, Minnesota 55901 | 1940 |
| E. HARRY BOTTERELL Queen's University Faculty of Medicine, Kingston, Ontario, Canada | 1938 |
| HOWARD A. BROWN 2001 Union Street San Francisco, California 94123 | 1939 |
| DONALD F. COBURN 6400 Prospect Avenue, Room 204 Kansas City, Missouri 64132 | 1938 |
| FRANCIS A. ECHLIN 164 E. 74th Street New York, New York 10021 | 1944 |
| ARTHUR ELVIDGE Montreal Neurological Institute 3801 University Street Montreal 2, Quebec, Canada | 1939 |
| THEODORE C. ERICKSON University Hospitals 1300 University Avenue Madison, Wisconsin 53706 | 1940 |

| | |
|---|----------------|
| JOSEPH P. EVANS University of Chicago Clinics 950 E. 59th Street Chicago, Illinois 60637 | Founder |
| JAMES GREENWOOD, JR. 1117 Hermann Professional Building 6410 Fannin Street Houston, Texas 77025 | 1952 |
| WESLEY GUSTAFSON First National Bank Building McAllen, Texas 78501 | 1942 |
| WALLACE B. HAMBY 3001 N.E. 47th Court Fort Lauderdale, Florida 33308 | 1941 |
| JESS HERRMANN P.O. Box 135 Mountain Pine, Arkansas 71956 | 1938 |
| HENRY L. HEYL Dartmouth Medical School Hanover, New Hampshire 03755 | 1951 |
| WILLIAM S. KEITH Toronto Western Medical Building, Suite 309 25 Leonard Avenue Toronto, 130, Ontario, Canada | Founder |
| FRANCIS MURPHEY 20 S. Dudley Street, Suite 101-B Memphis, Tennessee 38103 | Founder |
| J. LAWRENCE POOL 710 W. 168th Street New York, New York 10032 | 1940 |
| STUART N. ROWE 302 Iroquois Building 3600 Forbes Street Pittsburgh, Pennsylvania 15213 | 1938 |
| SAMUEL R. SNODGRASS University of Tex. Medical Branch Galveston, Texas 77550 | 1939 |
| A. EARL WALKER John Hopkins Hospital 601 N. Broadway Baltimore, Maryland 21205 | 1938 |

EXUM WALKER 1938
490 Peachtree Street, NE
Atlanta, Georgia 30308

BARNES WOODHALL 1941
University Medical Center
Durham, North Carolina 27706

Corresponding Members – 11

FERNANDO CABIESES 1966
Clinica Anglo Americana
Apartado 2713
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
Reparto Neurochirurgico
Ospedale Maggiore 37100
Verona, Italy

HANS E. DIEMATH 1970
Prim. Univ.-Doz.
Neurochir. Abt. d. Landersnervenlink,
Salzburg 5,020, Austria

JOHN GILLINGHAM 1962
Boraston House, Ravelson
Edinburg 4, Scotland

KENNETH G. JAMIESON 1970
131 Wickham Terrace
Brisbane, Queensland, Australia 4000

KATSUTOSHI KITAMURA 1970
Kyushu University
Faculty Medicine
Fukuoka, Japan

KRISTIAN KRISTIANSEN 1962
Oslo Kommune
Ullval Sykehus
Oslo, Norway

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

1966

KJELD VAERNET
Rigshospitalets neurokirurgiske afdeling
Tagensvej 18, 2200
Copenhagen, N., Denmark

Active Members - 81

| | | |
|---|--|------|
| EBEN ALEXANDER, JR. Bowman Gray School of Medicine Winston-Salem, No. Carolina 27103 | BETTY 1941 Georgia Avenue Winston-Salem, No. Carolina 27104 | 1950 |
| JAMES R. ATKINSON 302 W. Thomas Road Phoenix, Arizona 85013 | LONA 5806 East Lewis Ave. Scottsdale, Arizona 85257 | 1970 |
| H. THOMAS BALLANTINE, JR. Massachusetts General Hospital Boston, Massachusetts 02114 | ELIZABETH 30 Embankment Road Boston, Massachusetts 02114 | 1951 |
| GILLES BERTRAND Montreal Neurological Institute 3801 University Street Montreal, Quebec, Canada | LOUISE 385 Lethbridge Montreal 16, P.Q. | 1967 |
| EDWIN B. BOLDREY University of California Hospital 3rd Avenue & Parnassus San Francisco, California 94122 | HELEN 924 Hayne Road Hillsborough, California 94010 | 1941 |
| BARTON A. BROWN 2001 Union Street San Francisco, California 94123 | MARTHA 1648-8th Avenue San Francisco, California 94122 | 1968 |
| HOWARD A. BROWN 2001 Union Street San Francisco, California 94123 | DOROTHY 2240 Hyde Street San Francisco, California 94109 | 1939 |
| HARVEY CHENAULT 2370 Nicholasville Road Lexington, Kentucky 40503 | MARGARET 667 Tateswood Road Lexington, Kentucky 40502 | 1949 |
| GALE G. CLARK, Capt. USN MC USN Hospital Oakland, California 94627 | MARIAN 12621 Brookpark Road Oakland, Ca. 94619 | 1970 |
| W. KEMP CLARK 5323 Harry Hines Blvd. Dallas, Texas 75235 | FERN 3909 Euclid Avenue Dallas, Texas 75205 | 1970 |

| | |
|--|--|
| WILLIAM F. COLLINS, JR. Yale University School of Medicine 333 Cedar Street New Haven, Connecticut 06510 | GWEN 1963 403 St. Ronan Street New Haven, Connecticut 06511 |
| JAMES CORRELL Neurological Institute 710 W. 168th Street New York, New York 10032 | CYNTHIA 1966 Algonquin Trail Saddle River, New Jersey 07458 |
| COURTLAND DAVIS, JR. Bowman Gray School of Medicine Winston-Salem, No. Carolina 27103 | MARILYN 1967 921 Goodwood Road Winston-Salem, No. Carolina 27105 |
| EDWARD W. DAVIS Providence Medical Office Bldg. 545 N.E. 47th Avenue Portland, Oregon 97213 | BARBARA 1949 Box 974, Route 3 Troutdale, Oregon 97060 |
| RICHARD L. DeSAUSSURE 20 S. Dudley, Suite 101 Memphis, Tennessee 38103 | PHYLLIS 1962 4290 Heatherwood Lane Memphis, Tennessee 38117 |
| DONALD F. DOHN 2020 E. 93rd Street Cleveland, Ohio 44106 | BETTY 1968 3010 Huntington Road Shaker Heights, Ohio 44120 |
| R. M. PEARDON DONAGHY Mary Fletcher Hospital Burlington, Vermont 05401 | 1970 |
| CHARLES G. DRAKE 111 Waterloo Street, Suite 211 London, Ontario, Canada | RUTH 1958 R.R. 3, Medway Heights London, Ontario, Canada |
| DEAN H. ECHOLS Ochsner Clinic 1514 Jefferson Highway New Orleans, Louisiana 70121 | FRAN Founder 1428 First Street New Orleans, Louisiana 70130 |
| GEORGE EHNI 1531 Hermann Professional Bldg. 6410 Fannin Street Houston, Texas 77025 | VELAIRE (LARRY) 1964 16 Sunset Houston, Texas 77005 |
| WILLIAM H. FEINDEL Montreal Neurological Institute 3801 University Street Montreal 2, Quebec, Canada | FAITH 1959 39 Thornhill Avenue Westmount, P.Q., Canada |
| ROBERT G. FISHER 800 N.E. 13th Street Oklahoma City, Oklahoma 73104 | CONSTANCE 1957 107 Lake Aluma Drive Oklahoma City, Oklahoma 73121 |

| | | |
|---|---|------|
| ELDON L. FOLTZ Division of Neurological Surgery University of Cal. Sch. of Medicine, Irvine, California | CATHERINE 2480 Monaco Drive Laguna Beach, California 92651 | 1960 |
| JOHN D. FRENCH Brain Research Institute, University of Calif. Med. Center Los Angeles, California 90024 | DOROTHY 12841 Sunset Blvd. Los Angeles, California | 1951 |
| LYLE A. FRENCH University of Minnesota Hospitals Minneapolis, Minnesota 55455 | GENE 85 Otis Lane St. Paul, Minnesota 55104 | 1954 |
| JAMES G. GALBRAITH University of Alabama Med. Center 1919 Seventh Avenue, South Birmingham, Alabama 34233 | PEGGY 4227 Altamont Road Birmingham, Alabama 34213 | 1947 |
| SIDNEY GOLDRING Barnes Hospital Plaza Division of Neurosurgery St. Louis, Missouri 63110 | LOIS 11430 Conway Road St. Louis, Missouri 63131 | 1964 |
| PHILIP D. GORDY 1025 Walnut Street Philadelphia, Pennsylvania 19107 | SILVIA 2601 Parkway Philadelphia, Pennsylvania 19130 | 1968 |
| EVERETT G. GRANTHAM 234 E. Gray Street Louisville, Kentucky 40202 | MARY CARMEL 410 Mockingbird Hill Road Louisville, Kentucky 40207 | 1942 |
| JOHN R. GREEN 302 W. Thomas Road Phoenix, Arizona 85013 | GEORGIA 2524 E. Crittendon Lane, Sutton Pl. Phoenix, Arizona 85016 | 1953 |
| HANNIBAL HAMLIN 270 Benefit Street Providence, Rhode Island 02903 | MARGARET 270 Benefit Street Providence, Rhode Island 02903 | 1948 |
| JOHN W. HANBERY Division of Neurosurgery Stanford Medical Center Palo Alto, California 94305 | SHIRLEY 70 Mercedes Lane Atherton, California 94025 | 1959 |
| GEORGE J. HAYES Director of Staff Office Deputy Asst. Sec. of Defense Washington, D.C. 20301 | CATHERINE 1362 Geranium Street, N.W. Washington, D.C. | 1962 |
| E. BRUCE HENDRICK Hospital for Sick Children 555 University Avenue Toronto, Ontario, Canada | GLORIA 63 Leggett Avenue Weston, Ontario, Canada | 1968 |

| | | |
|--|--|---------|
| WILLIAM E. HUNT 410 W. 10th Avenue Columbus, Ohio 43210 | | 1970 |
| ROBERT B. KING Upstate Medical Center 750 E. Adams Street Syracuse, New York 13210 | MOLLY 408 Maple Drive Fayetteville, New York 13066 | 1958 |
| ROBERT S. KNIGHTON Henry Ford Hospital 2799 W. Grand Boulevard Detroit, Michigan 48202 | LOUISE 27486 Lathrup Boulevard Lathrup Village, Michigan 48075 | 1966 |
| THEODORE KURZE U.S.C. School of Medicine 1200 N. State Street Los Angeles, California 90033 | | 1967 |
| RAEBURN C. LLEWELLYN Tulane University 1428 Tulane Avenue New Orleans, Louisiana 70112 | CARMEN 32 Versailles Blvd. New Orleans, Louisiana 70124 | 1963 |
| WILLIAM M. LOUGHEED Medical Arts Building, Suite 430 170 St. George Street Toronto 5, Ontario, Canada | GRACE ELEANOR 67 Ridge Drive Toronto, Ontario, Canada | 1962 |
| HERBERT LOURIE 750 E. Adams Street Syracuse, New York 13210 | BETTY 101 Thomas Road DeWitt, New York 13214 | 1965 |
| JOHN J. LOWREY Straub Clinic 888 S. King Street Honolulu, Hawaii 96813 | CATHERINE (KATY) 2299-B Round Top Drive Honolulu, Hawaii 96822 | |
| ERNEST W. MACK 505 S. Arlington Avenue, Suite 212 Reno, Nevada 89502 | ROBERTA 235 Juniper Hill Road Reno, Nevada 89502 | 1956 |
| GEORGE L. MALTBY 31 Bramhall Street Portland, Maine 04102 | ISABELLA (SIM) Breakwater Farm Cape Elizabeth, Maine | 1942 |
| FRANK MAYFIELD 506 Oak Street Cincinnati, Ohio 45219 | QUEENEE 1220 Rookwood Drive Cincinnati, Ohio 45208 | Founder |
| AUGUSTUS McCRAVEY 1010 E. Third Street Chattanooga, Tennessee 37403 | HELEN 130 N. Crest Road Chattanooga, Tennessee | 1944 |

| | | |
|--|---|---------|
| ROBERT L. McLAURIN Division of Neurosurgery Cincinnati General Hospital Cincinnati, Ohio 45229 | KATHLEEN 2461 Grandin Road Cincinnati, Ohio 45208 | 1955 |
| WILLIAM F. MEACHAM Vanderbilt Hospital Nashville, Tennessee 37203 | ALICE 3513 Woodmont Boulevard Nashville, Tennessee 37215 | 1952 |
| EDMUND J. MORRISSEY 450 Sutter Street, Suite 1504 San Francisco, California 94108 | KATE 2700 Vallejo Street San Francisco, California 94123 | 1941 |
| JOHN F. MULLAN 950 E. 59th Street Chicago, Illinois 60621 | VIVIAN 6911 S. Bennett Avenue Chicago, Illinois 60649 | 1963 |
| BLAINE NASHOLD, JR. Duke University Medical Center Durham, North Carolina 27706 | IRENE 410 E. Forest Hills Boulevard Durham, North Carolina | 1967 |
| FRANK E. NULSEN Division of Neurosurgery University Hospitals of Cleveland Cleveland, Ohio 44106 | GINNY 21301 Shaker Boulevard Shaker Heights, Ohio | 1956 |
| GUY L. ODOM Duke University Medical Center Durham, North Carolina 27706 | MATALAINE 2812 Chelsea Circle Durham, North Carolina | 1946 |
| ROBERT G. OJEMANN Massachusetts General Hospital Boston, Massachusetts 02114 | JEAN 85 Nobscot Road Weston, Massachusetts 02193 | 1968 |
| PHANOR L. PEROT, JR. Medical University of So. Carolina 80 Barre Street, Charleston, So Carolina, 29401 | Elizabeth | 1970 |
| BYRON C. PEVEHOUSE 2001 Union Street San Francisco, California 94123 | MAXINE 135 Mountain Spring Avenue San Francisco, California 94114 | 1964 |
| ROBERT W. PORTER 5901 E. 7th Street Long Beach, California 90804 | AUBREY DEAN 5400 The Toledo Long Beach, California 90803 | 1962 |
| ROBERT PUDENZ 734 Fairmount Avenue Pasadena, California 91105 | MARY RUTH 385 S. Oakland Avenue, 101 Pasadena, California | 1943 |
| JOHN RAAF 833 S.W. 11th Avenue Portland, Oregon 97205 | LORENE 390 S.W. Edgecliff Road Portland, Oregon 97219 | Founder |

| | | |
|--|---|------|
| AIDAN A. RANEY 2010 Wilshire Boulevard, Suite 203 Los Angeles, California 90057 | MARY 125 N. Las Palmas Los Angeles, California 90004 | 1946 |
| JOSEPH RANSOHOFF New York University Med. Center 550 First Avenue New York, New York 10016 | RITA 140 Riverside Drive New York, New York | 1965 |
| THEODORE B. RASMUSSEN Montreal Neurological Institute 3801 University Street Montreal 2, Quebec, Canada | CATHERINE 29 Surrey Drive Montreal 16, Quebec, Canada | 1947 |
| DAVID REYNOLDS 1150 N.W. 14th Street Miami, Florida 33136 | MARJORIE 1701 Espanola Drive Miami, Florida | 1964 |
| R. C. L. ROBERTSON Shamrock Professional Building 2210 Maroneal Boulevard Houston, Texas 77025 | MARJORIE 5472 Lynbrook Drive Houston, Texas | 1946 |
| RICHARD C. SCHNEIDER C5135, Out-Pt. Bldg. University Hospital Ann Arbor, Michigan 48104 | MADELEINE 2110 Hill Street Ann Arbor, Michigan 48104 | 1970 |
| HENRY G. SCHWARTZ Barnes Hospital Plaza St. Louis, Missouri 63110 | REEDIE 2 Briar Oak Lane St. Louis, Missouri 63132 | 1942 |
| WILLIAM B. SCOVILLE 85 Jefferson Street Hartford, Connecticut 06103 | HELENE 27 High Street Farmington, Connecticut | 1944 |
| C. HUNTER SHELDEN 744 Fairmount Avenue Pasadena, California 91105 | ELIZABETH 1345 Bedford Road San Marino, California | 1941 |
| BENNETT M. STEIN Department of Neurosurgery 171 Harrison Avenue Boston, Massachusetts 02111 | DOREEN | 1970 |
| ANTHONY F. SUSEN 3600 Forbes Avenue Pittsburgh, Pennsylvania 15213 | PHYLLIS 3955 Bigelow Blvd. Pittsburgh, Pennsylvania | 1965 |
| HENDRIK J. SVIEN 200 First Street, S.W. Rochester, Minnesota 55901 | NANCY 827 Eighth Street, S.W. Rochester, Minnesota | 1957 |
| HOMER S. SWANSON 1938 Peachtree Road, N.W. Atlanta, Georgia 30309 | LAMYRA 1951 Mt. Paran Road, N.W. Atlanta, Georgia | 1949 |

| | | |
|--|---|-------------|
| WILLIAM H. SWEET Massachusetts General Hospital Boston, Massachusetts 02114 | MARY 35 Chestnut Place Brookline, Massachusetts | 1950 |
| GEORGE T. TINDALL University of Tex. Medical Branch Galveston, Texas 77550 | 2938 Dominique Drive Galveston, Texas | 1968 |
| JOHN TYTUS 1118 Ninth Avenue Seattle, Washington 98101 | VIRGINIA (GINA) 1000 N.W. Northwood Road Seattle, Washington 98177 | 1967 |
| ALFRED UIHLEIN P.O. Box 1082 Rochester, Minnesota 55901 | IONE P.O. Box 1127 Naples, Florida | 1950 |
| ARTHUR A. WARD, JR. Dept. of Neurological Surgery University of Washington Seattle, Washington 98105 | JANET 3922 Belvoir Place, N.E. Seattle, Washington 98105 | 1953 |
| THOMAS A. WEAVER, JR. 146 Wyoming Street Dayton, Ohio 45409 | MARY 868 W. Alexandersville-Bellbrook Dayton, Ohio 45459 | 1943 |
| W. KEASLEY WELCH Children's Hospital Med. Center 300 Longwood Avenue Boston, Massachusetts 02115 | ELIZABETH 744 Dexter Street Denver, Colorado 80220 | 1957 |
| BENJAMIN B. WHITCOMB 85 Jefferson Street Hartford, Connecticut 06106 | MARGARET 38 High Farms Road West Hartford, Connecticut 06107 | 1947 |
| CHARLES B. WILSON U.C. Medical Center, San Francisco, California 94122 | MARY 215 Round Hill Road Tiburon, California 94920 | 1966 |

Deceased Members

| | | Elected |
|---|---------------------|---------|
| DR. WILLIAM F. BESWICK Buffalo, New York | (Active) 5-12-71 | 1949 |
| DR. SPENCER BRADEN Cleveland, Ohio | (Active) 7-20-69 | Founder |
| DR. F. KEITH BRADFORD Houston, Texas | (Active) 4-15-71 | 1938 |
| DR. WINCHELL McK. CRAIG Rochester, Minnesota | (Honorary) 2-12-60 | 1942 |
| DR. OLAN R. HYNDMAN Iowa City, Iowa | (Senior) 6-23-66 | 1942 |
| SIR GEOFFREY JEFFERSON Manchester, England | (Honorary) 3-22-61 | 1951 |
| DR. DONALD D. MATSON Boston, Massachusetts | (Active) 5-10-69 | 1950 |
| DR. KENNETH G. McKENZIE Toronto, Ontario, Canada | (Honorary) 2-11-64 | 1960 |
| DR. JAMES M. MEREDITH Richmond, Virginia | (Honorary) 12-19-62 | 1946 |
| DR. W. JASON MIXTER Woods Hole, Massachusetts | (Honorary) 3-16-58 | 1951 |
| DR. RUPERT B. RANEY Los Angeles, California | (Active) 11-28-59 | 1939 |
| DR. DAVID L. REEVES Santa Barbara, Calif. | (Senior) 8-14-70 | 1939 |
| DR. O. WILLIAM STEWART Montreal, Quebec, Canada | (Corresponding) | 1948 |
| DR. GLEN SPURLING La Jolla, California | (Honorary) 2-7-68 | 1942 |