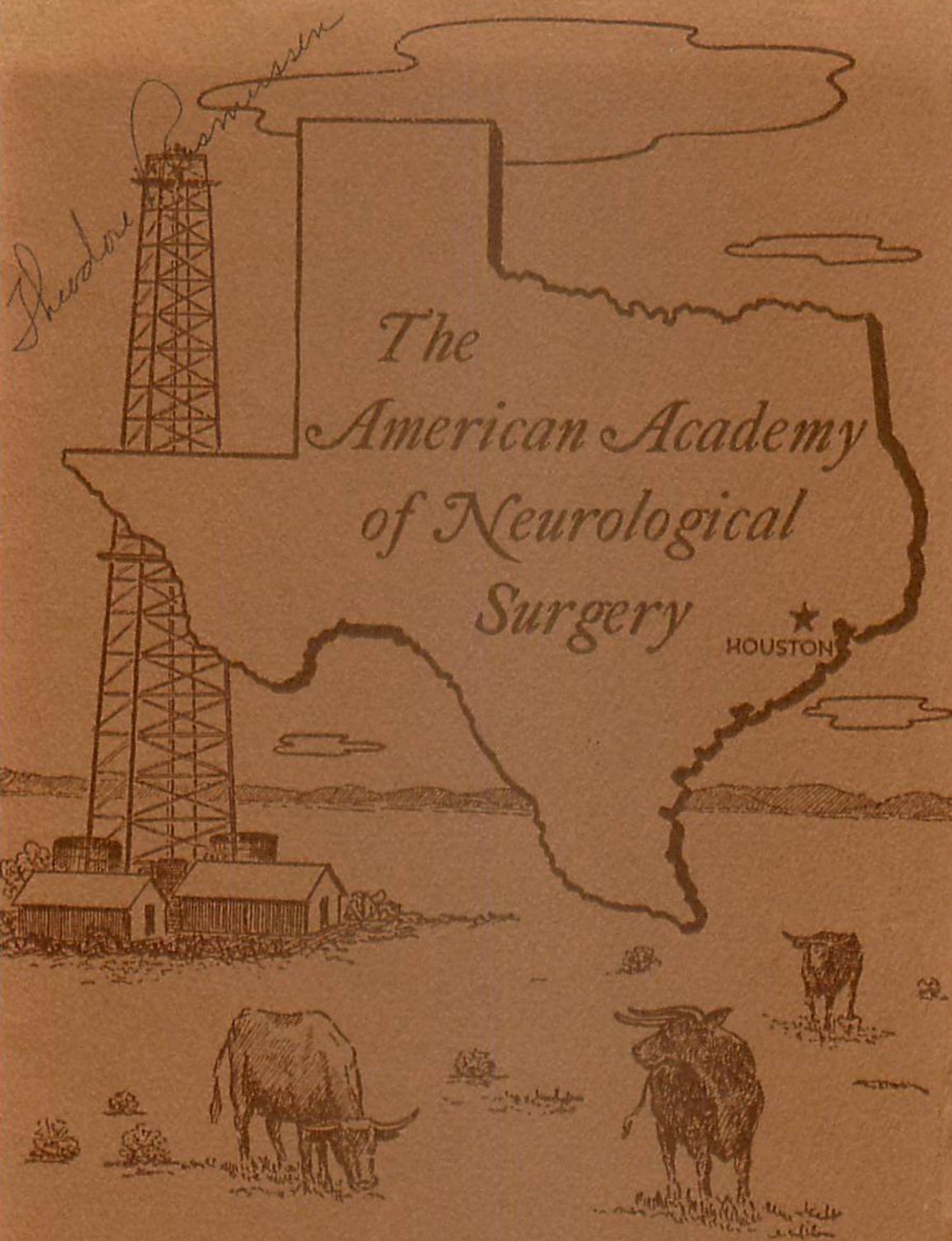
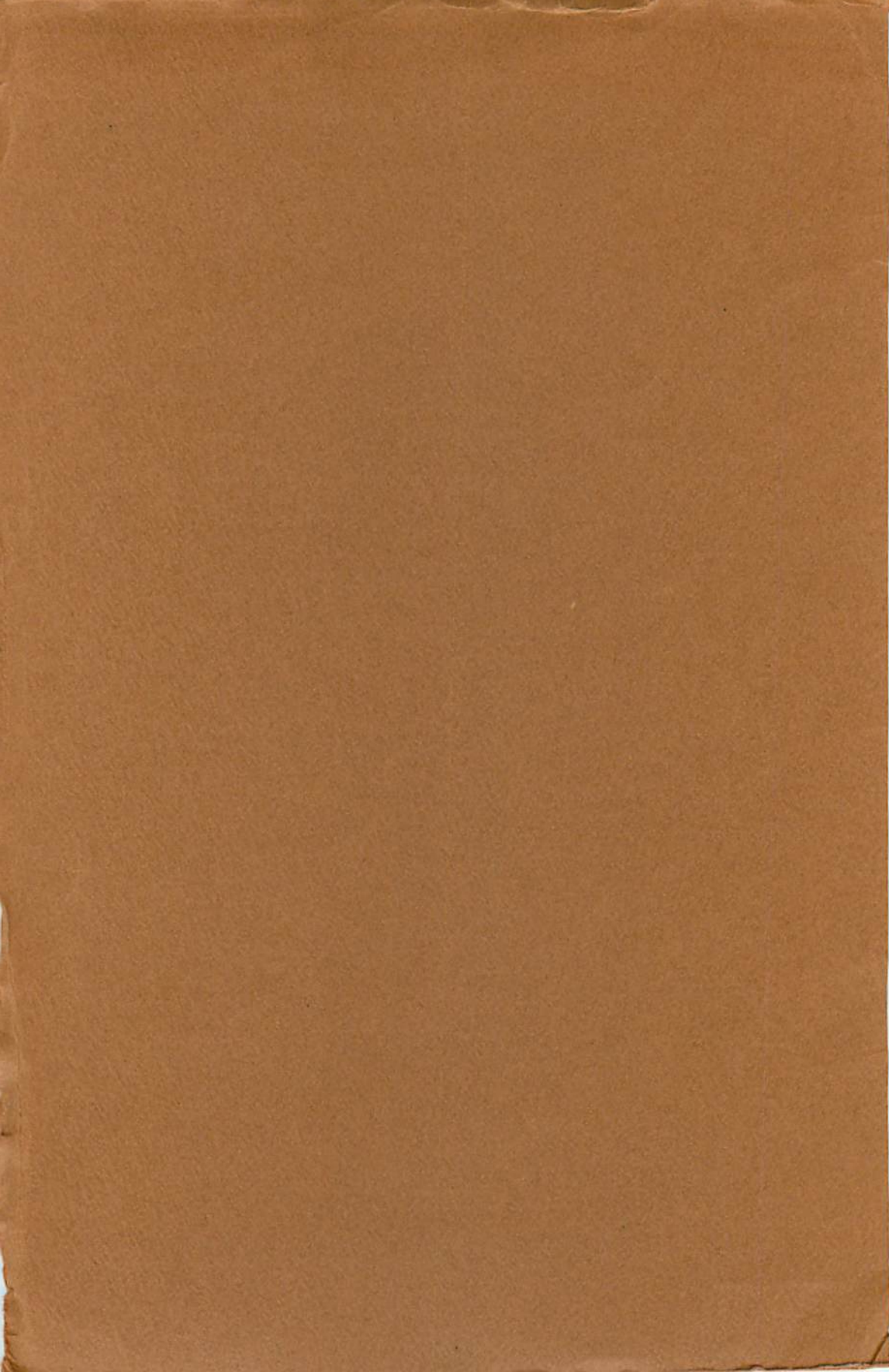




Thirteenth Annual Meeting
Shamrock Hotel  Houston, Texas
October 4, 5, 6, 1951



The American Academy of Neurological Surgery

Thirteenth Annual Meeting



SHAMROCK HOTEL
HOUSTON, TEXAS

October 4, 5, 6, 1951

Headquarters: Ming Room, Third Floor



Hosts:

Dr. Samuel R. Snodgrass

Dr. Keith Bradford

Dr. R. C. L. Robertson

WEDNESDAY, OCTOBER 3, 1951

VENETIAN ROOM

REGISTRATION

THURSDAY, OCTOBER 4, 1951

GRECIAN ROOM

9:00 A.M. REGISTRATION

Scientific Meeting

SAMUEL SNODGRASS, M.D., *Presiding*

9:30 A.M. (1) Experimental Compressive Lesions of the Spinal Cord. 30 minutes

DONALD DUNCAN, Ph.D., Professor and Chairman of Department of Anatomy, University of Texas.

10:00 A.M. (2) Moving Pictures of Human Glia in Vitro. 30 minutes

CHARLES M. POMERAT, Ph.D., Professor of Cytology, University of Texas.

10:30 A.M. (3) Massive Doses of Vitamin B₁₂ in the Treatment of Neuralgic Pain. 10 minutes

WILLIAM S. FIELDS, M.D., Professor of Neurology, Baylor University.

10:40 A.M. (4) Neurological-Physiological Mechanism of Biot's and Other Periodic Breathing. 30 minutes

HEBBEL E. HOFF, B.A., B.S., M.A., Ph.D., M.D.

BENJAMIN F. HAMBLETON, Professor of Physiology.

CARLYLE G. BRECKENRIDGE, A.B., N.S., M.D., Associate Professor of Physiology, Baylor University.

11:10 A.M. (5) The Use of Scintillation Counter and Radio Active Di-Io do-Fluorescein in the Localization of Recurrent Brain Tumors. 30 minutes

MOSES ASHKENAZY, B.S., M.D., M.S., Assistant Professor of Clinical Surgery (Neurosurgery).

HEBRERT C. ALLEN, JR., B.M., M.D., Assistant Professor of Medicine, Baylor University.

11:40 A.M. DISCUSSION OF PAPERS, 1-5.

12:30 P.M. LUNCHEON IN THE SHAMROCK ROOM.

Scientific Meeting

GRECIAN ROOM

HUNTER SHELLEN, M.D., *Presiding*

- 2:00 P.M. (6) Some Autonomic Responses in Paraplegia. *15 minutes*
WILLIAM KENDRICK,* M.D., ALBIN JOUSSE,* M.D., JOHN SCOTT,*
M.D., and HARRY BOTTERELL, M.D., Toronto.
- 2:15 P.M. (7) The Utilization of Total Spinal Anesthesia *10 minutes*
in Craniotomy.
HOMER SWANSON, M.D., Atlanta.
- 2:25 P.M. (8) Clinical Difficulties Encountered in Cranial *15 minutes*
Angiography.
EDWIN BOLDREY, M.D., EARL R. MILLER,* M.D., and JOHN
KENDRICK,* M.D., San Francisco.
- 2:40 P.M. (9) Chronic Subdural Hematoma with Marked *15 minutes*
Erosion of Overlying Skull Roentgenologically Demon-
strated.
JOHN M. MEREDITH, M.D., Richmond.
- 2:55 P.M. (10) Tantalum Mesh in the Repair of Congenital *5 minutes*
Skull and Spine Bony Defects in Children.
WILLIAM B. SCOVILLE, M.D., ROBERT L. McLaurin, M.D., and
BENJAMIN B. WHITCOMB, M.D., Hartford.
- 3:00 P.M. DISCUSSION OF PAPERS, 6-10.
FRANK MAYFIELD, M.D., and FRANCIS MURPHEY, M.D.
- 3:30 P.M. BUSINESS MEETING. Members Only.
- 6:00 P.M. TO 7:30 P.M. COCKTAILS IN CASTILIAN ROOM.
Members and Official Guests.
- 7:30 P.M. DINNER IN PUBLIC DINING ROOM (Emerald Room
or Shamrock Room).

FRIDAY, OCTOBER 5, 1951

Scientific Meeting

GRECIAN ROOM

JOSEPH EVANS, M.D., *Presiding*

- 9:00 A.M. (11) Form and Function of the Visual System. *40 minutes*
DONALD J. LYLE,* M.D., Professor of Ophthalmology, Medical
College of the University of Cincinnati.

* By Invitation.

- 9:40 A.M. (12) Visual Collaterals to the Activating System in the Brain Stem of Monkeys. *15 minutes*
 JACK FRENCH,* M.D., TED MAGOUN,* M.D., and RUPERT RANEY, M.D., Los Angeles.
- 9:55 A.M. (13) The Neurosurgical Management of Optic Nerve Gliomata. *15 minutes*
 THEODORE C. ERICKSON, M.D., Madison.
- 10:10 A.M. (14) Intracranial Chordoma Simulating Aneurysm in the Region of the Internal Carotid Artery. *10 minutes*
 GEORGE F. SAGER,* M.D., and GEORGE L. MALTBY, M.D., Portland.
- 10:20 A.M. (15) The Value of an Early Neurosurgical Opinion in all Patients Complaining of Unilateral Blindness. *15 minutes*
 ALFRED UHLEIN, M.D., and ROBERT D. WEYAND,* M.D., Rochester.
- 10:35 A.M. (16) Treatment of Cystic and Semi-Cystic Tumors Involving the Hypophysis. *15 minutes*
 O. HIRSCH,* M.D., Boston, and HANNIBAL HAMLIN, M.D., Providence.
- 10:50 A.M. DISCUSSION OF PAPERS, 11-16.
 JOSEPH EVANS, M.D., and SPENCER BRADEN, M.D.
- 11:00 A.M. (17) Surgical Treatment of Postural Exophthalmos. *15 minutes*
 A. EARL WALKER, M.D., Baltimore.
- 11:15 A.M. (18) Unilateral Exophthalmos in Childhood. *15 minutes*
 DONALD D. MATSON, M.D., Boston.
- 11:30 A.M. DISCUSSION OF PAPERS, 17-18.
 HUNTER SHELDEN, M.D., and DAVID L. REEVES, M.D.
- 12:30 P.M. LUNCHEON IN THE CASTILIAN ROOM.

Scientific Meeting

GRECIAN ROOM

KEITH BRADFORD, M.D., *Presiding*

- 2:00 P.M. (19) Neurosurgery of Infancy and Childhood: Experiences Past and Present. *20 minutes*
 GEORGE S. BAKER, M.D., Rochester.
- 2:20 P.M. (20) Cerebral Abscess in Association with Congenital Heart Disease. *15 minutes*
 JAMES G. GALBRAITH, M.D., Birmingham.

* By Invitation.

2:35 P.M. (21) Increased Intracranial Pressure Complicating Aureomycin Therapy. 10 minutes

DONALD D. MATSON, M.D., Boston.

2:45 P.M. DISCUSSION OF PAPERS, 19-21.

WALLACE B. HAMBY, M.D.

3:00 P.M. (22) Intracranial Tumors in Childhood. 15 minutes

GUY L. ODOM, M.D., COURTLAND H. DAVIS, JR.,* M.D., and
BARNES WOODHALL, M.D., Durham.

3:15 P.M. (23) Suggestions on Diagnosis and Treatment of Cerebellar Astrocytomas Based on Long Term Follow-up. 15 minutes

WILLIAM H. SWEET, M.D., and VERNON MARK,* M.D., Boston.

3:30 P.M. (24) Congenital Tumors of the Spinal Cord. 15 minutes

HENRY G. SCHWARTZ, M.D., Saint Louis.

3:45 P.M. DISCUSSION OF PAPERS, 22-24.

DEAN ECHOLS, M.D., and THOMAS A. WEAVER, M.D.

4:15 P.M. BUSINESS MEETING.

6:00 P.M. TO 7:30 P.M. COCKTAILS IN THE CASTILIAN ROOM.

7:30 P.M. ANNUAL BANQUET IN THE GRECIAN ROOM
(Dress Optional). Members and Official Guests.

TOASTMASTER—ARTHUR ELVIDGE, M.D.

PRESIDENTIAL ADDRESS—WALLACE B. HAMBY, M.D.

SATURDAY, OCTOBER 6, 1951

Scientific Meeting

GRECIAN ROOM

R. C. L. ROBERTSON, M.D., *Presiding*

9:30 A.M. (25) Anesthesia in Pediatric Neurosurgery. 10 minutes

BARNES WOODHALL, M.D., Durham.

9:40 A.M. (26) Analysis and Follow-up Study of 530 Cases of Spina Bifida and Cranium Bifidum. 15 minutes

R. G. FISHER,* M.D., Hanover, and ALFRED UHLEIN, M.D., Rochester.

9:55 A.M. DISCUSSION OF PAPERS, 25 and 26.

WILLIAM S. KEITH, M.D., and ARTHUR ELVIDGE, M.D.

10:10 A.M. (27) Aneurysm of the Great Vein of Galen. Report of Two Cases. 10 minutes

THEODORE B. RASMUSSEN, M.D., Chicago.

* By Invitation.

10:20 A.M. (28) Benign Subtentorial Cyst Causing Obstructive Hydrocephalus. 10 minutes

EBEN ALEXANDER, M.D., Winston-Salem.

10:30 A.M. General Discussion of Surgical Treatment of Hydrocephalus and Papers, 27 and 28.

JOHN RAAF, M.D.

EXHIBITS

MING ROOM

1. Intracranial Neoplasms, Primary and Metastatic.

BELA HALPERT, M.D., and WILLIAM S. FIELDS, M.D., Veterans Administration Hospital and Baylor University College of Medicine, Houston, Texas.

2. 110 Operated Cervical Ruptured Discs.

Selective Cortical Undercutting—A New Method of Fractional Lobotomy.

Research Project of Undercutting of the Medial-Cingulate Gyrus Surface (Brodmann's area 24 and 32).

Research Project of Uncotomy; Medial Temporal Lobotomy, and Orbito-temporal Lobotomy.

WILLIAM B. SCOVILLE, M.D., and BENJAMIN B. WHITCOMB, M.D.

[GOLF PRIVILEGES ARE AVAILABLE AT THE RIVER OAKS COUNTRY CLUB]

Program of The Ladies' Auxiliary of the American Academy of Neurological Surgery

PRESIDENT—MRS. ALTA RANEY

THURSDAY, OCTOBER 4, 1951

11:00 A.M. REGISTRATION AND BUSINESS MEETING.

Ming Room

6:00 P.M. COCKTAILS IN THE CASTILIAN ROOM.

(Members and Official Guests)

7:30 P.M. DINNER IN PUBLIC DINING ROOM.

(Emerald or Shamrock Room)

FRIDAY, OCTOBER 5, 1951

12:00 N. LUNCHEON AND FASHION SHOW.

Sky Terrace, Sakowitz Brothers.

Hostesses: MRS. MARGARET SNODGRASS, MRS. MARJORIE ROBERTSON, MRS. MARGARET BRADFORD.

6:00 P.M. COCKTAILS IN THE CASTILIAN ROOM.

7:30 P.M. ANNUAL BANQUET IN GRECIAN ROOM.

(Dress Optional)—Members and Official Guests.

SATURDAY, OCTOBER 6, 1951

ON TO GALVESTON.

FISHING TRIP OUT OF FREEPORT.

[GOLF PRIVILEGES ARE AVAILABLE AT THE RIVER OAKS COUNTRY CLUB]

1950-1951

THE AMERICAN ACADEMY OF NEUROLOGICAL SURGERY

OFFICERS

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Vice-President, HENRY G. SCHWARTZ

Secretary and Treasurer, THEODORE RASMUSSEN

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2. Dr. R. Glen Spurling, 405 Heyburn Bldg., Louisville 2, Kentucky.

EMERITUS MEMBER

1. Dr. Olan R. Hyndman, 621 First National Bldg., Davenport, Iowa.

ACTIVE MEMBERS

1. Dr. Eben Alexander, Jr., Winston-Salem, North Carolina.
2. Dr. George S. Baker, Dept. of Neurosurgery, Mayo Clinic, Rochester, Minnesota.
3. Dr. William F. Beswick, 140 Linwood Ave., Buffalo 9, New York.
4. Dr. Edwin B. Boldrey, Univ. of Calif. Medical School, San Francisco 22, California.
5. Dr. Edmund H. Botterell, Medical Arts Bldg., 280 Bloor St., W., Toronto 5, Ontario, Canada.
6. Dr. Spencer Braden, 1342 Hanna Bldg., Cleveland, Ohio.
7. Dr. Keith Bradford, 410 Hermann Professional Bldg., 6410 Fannin St., Houston 5, Texas.
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12. Dr. Francis A. Echlin, 555 Park Ave., New York 21, New York.
13. Dr. Dean Echols, 3503 Prytania St., New Orleans, Louisiana.
14. Dr. Arthur Elvidge, 3801 University St., Montreal, Quebec, Canada.
15. Dr. Theodore C. Erickson, 1300 University Ave., Madison 6, Wisconsin.
16. Dr. Joseph P. Evans, Cincinnati General Hospital, Cincinnati 29, Ohio.
17. Dr. James G. Galbraith, 1117 South 22nd St., Birmingham, Alabama.
18. Dr. Everett G. Grantham, 405 Heyburn Bldg., Louisville 2, Kentucky.
19. Dr. Wesley A. Gustafson, 700 North Michigan Ave., Chicago 11, Illinois.
20. Dr. Wallace B. Hamby, 140 Linwood Ave., Buffalo 9, New York.
21. Dr. Hannibal Hamlin, 270 Benefit St., Providence 3, Rhode Island.
22. Dr. Jess D. Herrmann, 525 N. W. 11th St., Oklahoma City 3, Oklahoma.

23. Dr. William S. Keith, 208 West Block, Medical Arts Bldg., Toronto 5, Ontario, Canada.
24. Dr. George L. Maltby, 203 State Street, Portland 3, Maine.
- 25. Dr. Donald D. Matson, 300 Longwood Ave., Boston 15, Massachusetts.
26. Dr. Frank H. Mayfield, 2314 Auburn Ave., Cincinnati 19, Ohio.
27. Dr. Augustus McCravey, Medical Arts Bldg., Chattanooga, Tennessee.
28. Dr. John M. Meredith, 1200 E. Broad Street, Richmond 19, Virginia.
29. Dr. Edmond Morrissey, 330 Medical Bldg., 909 Hyde Street, San Francisco 9, California.
30. Dr. Francis Murphey, Suite 525, Physicians & Surgeons Bldg., Memphis 3, Tennessee.
31. Dr. Guy L. Odom, Duke University, Durham, North Carolina.
32. Dr. J. Lawrence Pool, 710 W. 168th St., New York 32, New York.
33. Dr. Robert Pudenz, 696 E. Colorado St., Pasadena 1, California.
34. Dr. John Raaf, 912 Medical Dental Bldg., Portland 5, Oregon.
35. Dr. Aidan Raney, 1136 W. Sixth St., Los Angeles 17, California.
36. Dr. Rupert Raney, 1136 W. Sixth St., Los Angeles 17, California.
37. Dr. Theodore Rasmussen, The University of Chicago, University Clinics, Chicago 37, Illinois.
38. Dr. David L. Reeves, 316 W. Junipero St., Santa Barbara, California.
39. Dr. R. C. L. Robertson, 411 Hermann Professional Bldg., 6410 Fannin St., Houston 5, Texas.
40. Dr. Stuart N. Rowe, 3700 Fifth Avenue, Pittsburgh, Pennsylvania.
41. Dr. Henry G. Schwartz, Dept. of Surgery, Washington University, St. Louis 10, Missouri.
42. Dr. William B. Scoville, ^{85 Jefferson St.} ~~56 Garden St.~~, Hartford, ⁶ Connecticut.
43. Dr. Hunter Shelden, 696 E. Colorado St., Pasadena 1, California.
44. Dr. Samuel R. Snodgrass, Univ. of Texas Medical Branch, Galveston, Texas, ^{1217 Market St.}
45. Dr. Homer S. Swanson, Emory University Hospital, Emory University, Georgia.
46. Dr. William H. Sweet, Massachusetts General Hospital, Boston 14, Massachusetts.
47. Dr. Alfred Uihlein, Dept. of Neurosurgery, Mayo Clinic, Rochester, Minnesota.
48. Dr. A. Earl Walker, Johns Hopkins Hospital, Baltimore 5, Maryland.
49. Dr. Exum Walker, 133 Doctors Bldg., Atlanta 3, Georgia.
50. Dr. Thomas A. Weaver, Suite 521, Third National Bldg., Dayton 2, Ohio.
51. Dr. Benjamin B. Whitcomb, 85 Jefferson St., Hartford 6, Connecticut.
52. Dr. Barnes Woodhall, Dept. of Surgery, Duke University, Durham, North Carolina.

GUESTS OF ACADEMY—1951

Kenneth Abbott, Columbus, Ohio
Moses Ashkenazy, Houston, Texas
Joe Cluff, Vancouver, B. C.
Donald Duncan, Galveston, Texas
George Ehni, Houston, Texas
John Eisenbeiss, Phoenix, Arizona
Wm. S. Fields, Houston, Texas
Ed Fountain, Texas
Robert Fisher, Hanover, New Hampshire
Carl Graf, Buffalo, New York
John Green, Phoenix, Arizona
James Greenwood, Houston, Texas
Bela Halpert, Houston, Texas
Titus Harris, Galveston, Texas
Marshall Henry, Houston, Texas
Price Heusner, Boston, Massachusetts
Oscar Hirsh, Boston, Massachusetts
Hebbel Hoff, Houston, Texas
Ira Jackson, Galveston, Texas
Randolph Jones, Houston, Texas
Peter Kellaway, Houston, Texas
Bruce Kvernland, San Antonio, Texas
Wm. Meacham, Nashville, Tennessee
Thomas McGuire, Houston, Texas
Wm. McKinney, Fort Worth, Texas
Ralph Munslow, San Antonio, Texas
Charles Neill, Jackson, Mississippi
Claude Pollard, Houston, Texas
Charles M. Pomarat, Galveston, Texas
Wallace Ritchie, St. Paul, Minnesota
Barton Shinnars, Buffalo, New York
Harry Steelman, Washington, D. C.
Frank Turney, Knoxville, Tennessee
Willard Weary, Dallas, Texas
Jack Woolf, Dallas, Texas

NOTES

- ① Duncan - rat cord compressed by experimental implantation of tumor - paralysis occurs & loss of myelin altho axis cylinders still stain well with silver & are packed closely ~~with~~ together - above & below the demyelinated area the myelin is normal - recovery can take place altho cord is reduced to 20% of its normal bulk -
- ② Fields - 1000 microgram (1 mgm) per ampoule - 35 cases of facial pain (26 were trigeminal neuralgia) - daily injections for 10-14 days - 10 had previous alcohol injection - 2 recurrent pain on opposite side after rhizotomy - relief occurred after 4 days - 22 of the 26 got complete relief, 3 marked improvement - longest remission 18 mo. - 3 recurrences 1-8 mo. after the series of injections - 2 were again relieved - burning paresthesia often persisted for a week after relief of the lacerating pain - 8 of atypical facial pain pt. had no relief, 1 temporary relief - Adding 250 mgms ascorbic acid to each daily dose because of the reported synergistic action of ascorbic acid and B12 -
- ④ Hoff -
- ⑤ Ashkenazy - scintillation counter as 100-150 times as sensitive as Geiger Mueller tube - testing time now reduced to $\frac{1}{2}$ hr. - particularly valuable in identifying recurrence of tumor - 50 cases of tumor suspect, accuracy 90% - no errors in recurrent tumors - acute infection can not be differentiated from tumor - dose of dye reduced to $\frac{1}{10}$ that formerly used - $\frac{1}{2}$ millicurie - iodinated serum albumen stays in tumor longer so readings can be made after 1-2 days - furnished by Abbott & Co. -

NOTES

- ⑥ Botterell - sweating, headache, goose flesh, etc. related to distention of a viscus - measure BP, sweating, etc. while bladder is distended - destruction of nerves to bladder by alcohol intraurally destroys this autonomic reflex -
- ⑦ Swanson - new spinal anesthesia to produce total sympathectomy -
 52 yr. ♂ - rt. pontoparietal cisternal aneurysm - supplied by ant. cerebral artery - flaps turned under pentothal - 2 days later reopened under 150 mg procaine + 6 mg. pentocaine, pt. in marked head down position - veins collapsed - BP 0, only slight pulsation of vessels - vessels cauterized & removed in 1 hr - total blood loss 300 cc - pt. awake promptly - developed quadriplegia due to thrombosis of sagittal sinus, 7 days later
- 25 yr. ♂ - frontal aneurysm - done in same fashion - pt. had no postop. neurologic abnormalities -
- ⑧ Boldrey - first 500 angiograms - up to 1950 - 21 percutaneous, remainder cut down - 99 thorotrast, remainder 35% diodrast (except 15 70%) - 3% clinical complications in thorotrast group - (1 death 1 hemiparesis, 1 hyperthermia) -
 70% diodrast - 20% complications (1 death, 2 hemiplegia)
 35% " - percutaneous - 30 cases - 40% complications - (1 death 7 hemiplegia)
 35% diodrast - cut down - 336 cases - 3.4% complications (1 death, tons vertebral artery, 2 disoriented or stuporous, 1 hemianopsia, 6 hemiparesis, 1 status epilepticus) -
 No relation between complications & quantity of diodrast -

NOTES

② Pomerat -

⑨ Meredith - 32 yr. ♂ - weakness of both legs, headache - 3 small separate subdural hematomata - largest had produced skull erosion -

⑩ Seville -

⑪ Lyle -

⑫ French -

⑬ Erickson - 8 cases - 7 showed evidence of von Recklinghausen disease - decompression of optic foramen + incision of the dura was followed by some improvement of vision in some cases - if proptosis is present enucleation is operation of choice -

⑭ Maltby - multiple cranial nerve palsies common in intracranial cordoma -

⑮ Viehlein - 310 cases of unilateral blindness

26% - eyeball lesions

23% - glaucoma

13% - trauma

2% - congenital lesion

35% - lesions of optic nerve

79 cases of syphilis

15 retrobulbar neuritis

meningioma - 32% mortality -

NOTES

⑫ Hamlin - reviewed results in transfrontal operations for cranio-pharyngiomas -

Irish - 383 pituitary tumors - operated 1910-50 - transsphenoidal route
 96 cystic pituitary tumors -
 24 cystic craniopharyngiomas - 19 survivors -

⑬ Walker - eye protrudes when intracranial pressure is raised -
 left eye involved 10 times as often as the rt. - infancy to 60 yr. of age -
 palpebral fissure narrowed during protrusion of the eye ball -
 130 cases in literature -

45 yr. ♂ - 2 year history - left eye proptosed 7 mm on bending down -
 Xray: decrease in density of posterior wall of orbit - angiogram normal -
 Operation - large venous sinus passing thru sup. orbital fissure -
 vein incised, gelfoam inserted + vein sutured + imbricated - cure -

⑭ Matson - 4 mo. ♀ - series of cases of various causes -

⑮ Baker -

⑯ Galbraith - 5-7 % of deaths due to congenital heart disease are due to brain abscess - 3 cases presented -

⑰ Matson - sudden increase in intracranial pressure after on 2-3 days of aureomycin Rx - 15 cases - all responded in 12-24 hr on stopping the drug - LP pressure around 200 -

74 cases - 24% operative mortality -

- (22) Odom - 14% of all brain tumors - most in 14 yr. old age group
- | | | |
|----------|---------------------|-------------------------|
| 22 cases | glioma - hemisphere | } supratentorial tumors |
| 22 " | " - midline | |
| 17 " | craniopharyngioma | |
| 7 " | other | |
- 16 showed calcification

4 cases	porence	} infratentorial tumors
14 "	floor of 4 th ventricle	
41 "	verruca	
24 "	hemisphere	
2 "	angle	

41 medulloblastoma -
30 astrocytoma -

- (23) Sweet - 19 cases in past 10 years - all living & handicaps -
6 were 2 stage procedures -

- (24) Schwartz - 4 dermoid or teratoid lumbar tumors all associated with
congenital dermal sinuses -

- (25) Woodhall - special valve so there is no resistance to expiration

- (26) Fisher - statistical study - only myelomeningocele were
followed by hydrocephalus -

Hydrocephalus

Raaf - Matson procedure done in 8 cases, all died 1-15 mo.
postop -

Handy - 6 cases had Matson procedure, 3 died - 1 case &
steel screw in vertebral body is alive 9 mo. later -

Matson - 38 cases - 28 living, 10 dead (5 due to dehydration,
2 to meningitis - 8 ventriculoenterostomy, 6 living &
2 dead - gross tube that just admits 18 gauge needle
Jackson - 24 peritoneal shunts - 7 died (tube patent at autopsy)

