ABSTRACTS

Note: General Abstracts are listed first in alphabetical order. The Symposia Abstracts are listed after this in presentation order.

The Neurological Illness of Sir William Gowers

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William Gowers (1845-1915) was called the "Father of Clinical Neurology" by McHenry. Gowers' own neurological illness has been mentioned in prior biographies by Scott, Eadie, and Lees, as well as Critchley, but not extensively studied. His chief complaint in 1914 would have been unsteadiness, cognitive change, bilateral lower extremity weakness, and pseudobulbar palsy. Gowers developed sciatica in the 1890s. His trainee Robert Foster Kennedy commented on cognitive changes in 1908, which Compston thought might have been due to injudicious use of opiates by Gowers.

In 1910, Gowers wrote his last three articles with difficulty, and had to resign from practice. In a 1911 letter to Schäfer, Gowers stated that he had primary lateral sclerosis. In 1911, he developed pseudobulbar palsy, and his handwriting deteriorated. A 1912 letter from Gowers to William Osler implied that his intellect was largely intact. In 1913, Osler wrote to Weir Mitchell: "You will be sorry to hear that Gowers is very ill—his own disease, ataxic paraplegia, it looks like, & ascending, so that now there are bulbar symptoms." Gowers described ataxic paraplegia in 1886. In 1913, Gowers was felt to have "motor and sensory paraplegia associated with cortical disease."

He died on May 4, 1915, and the causes of death (certified by Queen Square neurologist James Tayler) were "arteriosclerosis" and "coma." Gowers smoked tobacco, drank alcohol socially, and had no history of stroke or Parkinson disease. The differential diagnosis would include vascular cognitive impairment (suggested by Critchley), primary lateral sclerosis, or ataxic paraplegia. The clinical features make ataxic paraplegia unlikely.

Since Gowers had cognitive decline to some degree, pseudobulbar affect, and a gait disorder, with arteriosclerosis and coma listed as causes of death, vascular cognitive impairment seems mostly likely, unless he had more than one disorder. Diagnostic uncertainty remains as no autopsy was performed.

From Dejerine's service to U.N.O. and Picasso: The incredible Henri Laugier (1888-1973)

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Henri Laugier, fourth successor of Claude Bernard at *La Sorbonne*, was born from a modest family. After medical studies, he stayed with Dejerine at *La Salpêtrière*, before his military service in 1913 until 1919, because of World War I. Laugier served as a front *aide-major* physician, earning several heroism distinctions.

After the war, and perhaps because of it, he left medicine and joined the *La Sorbonne* physiology laboratory under Louis Lapicque, the follower of Nobel Prize Charles Richet. He made important contributions on nervous conduction. With his companion Marie Cuttoli, he built a huge collection of art, stimulated by his close friendship with Picasso, Léger, Ernst, Matisse and many others. Convinced by the necessity to promote research, he became involved with politics and served as cabinet chief at the ministry of "public instruction", becoming intimate friend with Vincent Auriol, the future Republic president.

In the 1930s, he founded the CNRS (*Centre National de la Recherche Scientifique*). With World War II, he had to flee to America, where he launched "France Forever" with the close help of Eleanor Roosevelt. Appointed as a physiology professor in Montreal, he created the Canadian Journal of Physiology. In 1946, he was invited to Lake Success, NY, by Trygve Lie, the first Secretary-General of the newly launched United Nations Organization (UNO), to become Secretary-General-Adjunct for social and cultural affairs. He initiated the Universal Declaration of Human Rights, which would own the Nobel Prize to his compatriot René Cassin. In the 1950s, he went back to France to teach, and he donated his huge art collection to the *Musée d'Art Moderne* in 1969 (over 50 Picasso's were hanging on his apartment walls). Laugier was a perfect XXth century *honnête homme*, and a perfect example of the developing European-American close and fruitful links.

Frank Clifford Rose Memorial Lecture

The tale of three trephines: Surgeons and their surgical-instrument makers in Britain, France, and America in the 19th century.

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Trephines and trepanning date to ancient times, but a "modern" form of instruments seemed codified by the 17th century. This did not preclude efforts to "improve" the trephine in the nineteenth century, however. Surgeons and instrument makers in Britain (Jardine and Savigny), France (Thomson and Charriere), and America (Galt and Otto & Reynders) endeavored to make the trephine safer and more precise. In exploring their interactions, this presentation will show the evolving role of the instrument maker as not only fabricator of tools, but creative design collaborator of surgeons and physicians. The presentation concludes with a survey of the premier museums and collections where one may see such neurosurgical instrumentation.

History of the discovery, physiology, and clinical use of the blink reflex

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Blink reflexes (BRs) were first described by Walker Overend in 1896. Overend noted that" when the skin of the forehead is gently taped with a wooden stethoscope, a twitch of in the lower eyelid of the same side may be observed…severe percussion elicits a simultaneous movement of the opposite lids"…"It is a true skin reflex" and the motor pathway is identical to the conjunctival reflex; the sensory channels lie in the ...supraorbital division of the frontal nerve and its centre is probably located in the midbrain".

In 1901 Daniel J. McCarthy claimed priority for eliciting reflex contraction of the orbicularis oculi by taping the forehead with a percussion hammer. McCarthy stated that the afferent portion of this reflex was through CN V because sectioning sensory root of the Gasserian ganglion abolished the reflex. McCarthy concluded that his supra-orbital reflex was a tendon reflex. Also in 1901 Vladimir Bekterev overlooked Overend's report, and disputed McCarthy's claim for priority. Bekterev concurred with McCarthy that BR was a tendon reflex and lesions of the trigeminal sensory root abolish blink reflexes.

In 1952 Erik Kugelberg electrically stimulated the supraorbital nerve, recorded early latency R1 and the late R2 EMG responses from orbicularis oculi muscles, confirming that the BR is a cutaneous reflex.R1 and R2 are delayed or abolished by lesions in trigeminal nerve, confirming Overend's observations. However synapses for R1 and R2 lie in pons and medulla and not midbrain.

These observations confirm that Walker Overend should be recognized for priority of discovery and accuracy of most of his observations about the BR.

BRs are used currently to monitor function of CN V or VII during acoustic neuroma surgery, predict outcome of Bell's palsy and assess activity of brainstem reticular formation in patients with disorders of attention.

Mark Twain's fascination with phrenology

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Samuel Langhorne Clemens (1835-1910), better known as Mark Twain, is internationally recognized as America's greatest humorist and writer (e.g., *Tom Sawyer*, *Huckleberry Finn, Connecticut Yankee in King Arthur's Court*). Less well known is how interested he was in science, technology, advancing social causes, and exploring questionable fads, including the idea that character could be assessed and guidance given by examining crania. In his *Autobiography*, Twain recalled how itinerant phrenologists would come to Hannibal, where he lived through age 18, to read skulls (always favorably!) for fees. He then copied part of an American phrenology book in his *Notebooks*, after moving to St. Louis. While in London in 1872-73, he had two head readings by Lorenzo Fowler, the first without revealing his identity, and the second, which turned out very differently though only a few months later, after Fowler learned who he was. On returning to the United States, he continued to visit phrenologists, with more head readings in Cincinnati and New York. His observations and experiences were incorporated in his writings: the con-man who made a living lecturing on phrenology in towns along the Mississippi River in *Huckleberry Finn* being a particularly vivid example.

Twain remained interested in character analysis and phrenology to his dying day, even though he seemed convinced that even the most famous phrenologists of his day were using known, obvious, or ambivalent information when reading skulls for a living. In this presentation, Twain's fascination with popular phrenology will be put in historical perspective by looking at how the doctrine was transported from Britain to America; how it made its way into popular culture; and how he was not alone when it came to questioning or exposing it in his literary pieces.

A new explanation for the resignation of Tracy J. Putnam from the Neurological Institute of New York

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In October 1944, the President of the Columbia Presbyterian Medical Center,Charles Cooper, abruptly directed the Executive Director of the Neurological Institute of New York (NI), Tracy Putnam, to resign. Putnam initially refused, but ultimately did resign July 1947. The request for Putnam's resignation has created the speculation that Putnam did something egregious, although unspecified.

However there is new evidence that a different dynamic was actually at work:There was an ongoing struggle between medical center and medical school over continued financing of the NI and neuroscience research. As major NI research grant money expired October 1944, Cooper requested Putnam's resignation. This step was part of Cooper's plan to reduce the size and mission of the NI. Cooper employed the same methods he had used successfully for 18 years as AT&T executive vice president, to merge regional telephone companies and manage streamlined operations. Cooper applied his AT&T management solutions to an academic medicine problem, and neuroscience suffered.

Medical center and medical school archives show, from 1943 through 1948, a struggle over the responsibility for funding neuroscience research and the mission of the NI. Putnam's successful transformation of the NI mission, accomplished between 1939 and 1947, was overshadowed by this struggle of financial responsibility.

The fact that the NI survived and grew in stature is because a subgroup of the board of trustees opposed Cooper's AT&T approach after Putnam's departure. Alerted by Putnam's widely distributed letter of resignation, this subgroup likely blocked Cooper's move to dismantle the NI in fall 1947. Dismantling efforts continued into 1948, but the faculty search committee twice resisted the Dean's proposal to reduce the NI, while the search for Putnam's successor continued. The 1947-48 interventions of five long-term trustees and faculty sustained Putnam's vision of research when the NI was most vulnerable.

Student Travel Award: Has neuroscience ever seen a "revolution"?

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Has neuroscience ever seen a revolution? The question depends on the meaning of "scientific revolution," an infamous term. Let's say that a revolution in some science is a radical reorganization of concepts, methods, and the principles governing the two. On that basis, then, have any revolutions occurred in the history of neuroscience?

I will argue that there has been at least one, though perhaps *only* one: the discovery and elaboration of electricity's role in the nervous system. Prior to this result, the prevailing theory of nerve function involved *animal spirits*. This refined fluid supposedly flowed through the nerves to actuate the brain and muscles. Animal spirits were an old idea, however, predating even Galen. Seventeenth-century giants like Malpighi and Willis made no real additions to the view. Animal spirits were mysterious and unexplained, but no one had any replacement.

This changed when Galvani showed how to use electricity to stimulate nerves and muscles. The shift was abrupt and shocking: electricity—a physical phenomenon with no apparent connection to living systems—was suddenly fundamental to neuroscience. Animal spirits, and their well-developed role in human physiology, were obsolete.

Electricity brought to neuroscience a new host of concepts, problems, and methods. I argue that these changes are sufficient to constitute a revolution. The foundational assumptions about nerve function were radically revised.

Moreover, given the previous dominance of animal spirits, I argue that Galvani's discovery is the only revolution in neuroscience before 1800. I also suggest, perhaps less plausibly, that no other revolution has occurred since then. I hope that this deliberately provocative position spurs reflection on what other events, if any, might be neuroscience's revolutions.

Coma and apparent dead in the 18th century: On drowning people and the fear of being buried alive.

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In the past we published on the fixed and dilated pupil and on coma, phenomena associated chiefly with stroke and trauma. The history of coma has two extraordinary aspects that we did not discuss, notably apparent dead following drowning and the fear of being buried alive, which not only interested physicians, but also lay people and played a role particularly during the late 18th century.

In this century of enlightenment, an increasing interest of lay people in science and medicine was observed. In the meantime physicians obtained access to the porch of death. There was a hope to be able to reanimate life spirits and the discovery of the relation between electricity and nerve action stimulated this hope. Books on comatose persons were published, in particular when the first societies for the resuscitation of drowning people had been established (Amsterdam (1767), England (1774), and Massachusetts (1787)).

About the same time book titles expressed fear on phenomena at the transition of life and death, for example *The uncertainty of the signs of death, and the danger of precipitate interments and dissections...* or *Lettres sur la certitude des signes de la mort* or *Von der Gefahr, lebendig begraben zu werden*. The fear of being buried alive led to curious preventive practices; for instance nailing a wooden pin through the brain or heart, or more commonly the institution of death houses. In this paper I will review Dutch, English, German and French publications on apparent dead, illustrated by case histories and advises that were given to resuscitate drowning people and prevent interment of apparent dead people.

[1] Koehler PJ, Wijdicks EF. Fixed and dilated: the history of a classic pupil abnormality. J Neurosurg 2015;122:453-63.
[2] Koehler PJ, Wijdicks EFM. Historical study of coma: looking back through medical and neurological texts. Brain 2008;131:877-889.

The Early History of Amnesia

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Memory and forgetfulness have been viewed since antiquity from philosophical perspectives portraying physical, emotional and spiritual states of well-being, with numerous discussions and case reports in literature. Conceptualization of memory loss as a pathological clinical phenomenon originated when Sauvages classified "amnesia" as a medical disorder, in 1763. Amnesia was recognized as a weakening or dissolution of memory, according to a taxonomy that ascribed known causes to the disorder. Etiologic factors ranged widely, including neurological disorders of stroke, hemorrhage, and head injury, metabolic dysregulation, venereal diseases, alcohol and substance abuse, toxicity, anoxia, and other brain disorders.

Clinical descriptions of amnesia appeared internationally in medical dictionaries and scientific encyclopedias in the early 19th century. Debate ensued regarding the status of amnesia as an illness or a symptom, but regardless, amnesia was soon recognized as an independent disorder of memory, distinguishable from disorders of global intellect, or of consciousness, or of language. Distinctions of amnesia considered its temporal gradient, duration and natural course, nature of onset, severity or depth of memory loss, course and prognosis. Concepts of retrograde (forgetting knowledge preceding onset) and anterograde (difficulty learning, recalling new information) further defined amnestic memory difficulties. Amnesia as a clinical feature served the development of notions of dissociation of conscious from subconscious recall in hysteria, and differentiation of neurogenically-based from psychogenically-based amnesia became central to understanding post-traumatic states.

Amnesia studied as a disorder of memory remains an avenue to enrich clinical understanding of a condition that continues to be powerfully challenging to this day.

Christopher U.M. Smith Presidential Lecture

Revisting the decorative and historiated initials in the Basel editions of works by Vesalius

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Renaissance anatomist Andreas Vesalius utilized decorative and historiated initials in his works published in Basel: Paraphrasis (1537), Venesection Letter (1539), Fabrica (1543, 1555), Epitome (1543; German edition, 1543), and China Root Letter (1546). The use of these blocks was evaluated across his works and in more than 600 additional works published by the same printers (Winter and Oporinus) from 1536-1560.

Three of 4 historiated initials of the Paraphrasis were common to works published by Winter. The editions of the Fabrica share 4 large historiated initials, but not the large V unique to the 1555 edition, 1 of 18 small historiated initials (the "alternate-L"), and 6 of 21 very small decorative/historiated initials in the index. The large and small initials of the Fabrica, but not the index initials (except the letter A), depict various tasks of an anatomist/surgeon of the 16th century. Some historiated initials from the Fabrica were used in the Epitome (both editions), and the China Root Letter. So far, eleven of the 36 very small index initials from the two editions of the Fabrica, and the small "alternate L" (showing use of an enema), have been traced to works by other authors published prior to 1543. Oporinus rarely used historiated initials from the Fabrica in later works, but the small C (showing preparation of a skeleton) and small D (entering the cranial cavity for brain dissection) were discovered in separate volumes (one each) by other authors in the period 1543-1560.

These results prove that the small initials in the indices of the Fabrica were not commissioned by Vesalius, but were instead existing letters in the printer's stock. In addition, the "alternate-L" was in use prior to 1543, and at least two historiated initials from the Fabrica (1543) were used in later works by others published by Oporinus.

Procedures and complications in late-nineteenth century experimental neuroanatomical research exemplified by articles of Henry Herbert Donaldson (1857-1938).

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Henry Herbert Donaldson (1857-1938) was a leader in neurological research in the United States for several decades beginning about 1890. A detailed account of three of his earliest publications shows the neuroanatomical procedures involved in the study of the relation of brain and intelligence during the late-nineteenth century in America. Two of the papers, published in 1890 and 1891 examined the brain of the blind deaf-mute, Laura Dewy Bridgman and the third, published in 1892, uses the information from the first two to delimit the extent of the visual processing area of the human cortex.

His procedures provide a view of the relative pertinentness, accuracy, and comparability of the various neuroanatomical techniques and measures in use at that time and of Donaldson's implementation of the techniques. Donaldson's brain cutting techniques were much more comparable across studies than were his measurement techniques. The latter could be quite precise, but comparisons across studies were difficult and sometimes impossible because of the lack of standard procedures. Statistical procedures were the least pertinent and effective. His, and the field's, total complement of statistical techniques consisted of mean and range, which severely limited his ability to make complicated assessments. This limitation was not necessarily supplemented by stringent control group comparisons.

Henry Herbert Donaldson and research standardization in America

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Henry Herbert Donaldson (1857-1938) is well-known to be associated with the use of the albino rat as a standard vertebrate, laboratory animal. This recognition is deserved, but must be seen as only a part of a broader attempt to organize his chosen field of neuroanatomy. This broader endeavor can be traced to his first major and independent, experimental research project, a study of the brain of Laura Bridgman conducted in the early 1890s. Information about the nervous system seem unknown or needed correction to allow appropriate comparisons. His entire research and academic career can be seen as an attempt to remedy these limitations by promoting coordination, organization, and standardization.

This emphasis is particularly clear in his association with the Wistar institute from 1905 until his death in 1932. There, research was coordinated to fit an overall research program as well as accommodating the interests and skills of the researchers. Post-doctoral students and temporary, established researchers were integrated into this program. Donaldson and the Wistar Institute extended their coordination nationally by promoting joint research projects with other institutions and, in 1908, by assuming the responsibility of publishing five principal independent anatomical journals which were under editorial control of anatomists and zoologists throughout the United States. Donaldson was on the editorial boards of several journals and active in several national societies. His coordination activities extended internationally by association with the International Association of Academies for Brain Investigation centered in Vienna. There was formal recognition that all the work in America in cooperation with the Central Brain Commission would be communicated through the Institute.

Professor Leonid Smirnov (1889-1955): Making of a Soviet neuropathologist

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Leonid Iosifovich Smirnov was a leading neuropathologist in USSR. He authored several manuals on pathology of CNS tumors and suggested their original classification. Based on his study of pathology of gunshot head injuries during WW2 he created a teaching on traumatic brain disease.

The aim of this presentation is to link his research to his biography, and to demonstrate the impact of ideology on some ideas in pathology. It is based on archival sources (personal files of LI Smirnov at the archive of Academy of Medical Sciences and the NN Burdenko Neurosurgery Institute), unpublished memoires of his pupils and Smirnov's published works.

Leonid Smirnov was born in a provincial town into a family of an Orthodox priest and studied at a religious seminary before switching to natural science and medicine. He graduated from medical faculty of Imperial Moscow University in 1915 and started his work at the university neurological clinic. In 1918 Smirnov's father was executed by communists for "organization of Anti-Soviet uprising". From 1920 to 1925 Smirnov worked at a psychiatry hospital in Kursk combining clinical work and doing autopsies. From 1925 to 1932 he was an anatomist at Kiev psychiatry hospital and from 1932 to 1938 – an anatomist at Psychoneurology Academy in Kharkov and a chair of pathology at II Kharkov Medical Institute. In 1938 Smirnov was invited by NN Burdenko to Moscow as a head of pathology department of the Central Neurosurgery Institute and then became a deputy director of this research institution. In April 1941 Leonid Smirnov joined the Communist party and later on became the party secretary. In his works he tried to approach the problem of classification of tumors from philosophical standpoint quoting Hegel, Engels and Virchow.

Sminov was a pioneer of study CNS tumors in USSR. He researched their histochemisty and antigens. Later on (in 1980s) his claims on different types of medulloblastomas were confirmed by immunochemistry methods.

Filippo Lussana and innervation of taste

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The physiologist Filippo Lussana (1820-1897) in studies emphasising the role of the facial nerve compared with trigeminal nerve on the taste nerves, and the role of the brainstem in digestive processes. In 1862, five publications dealt with the taste nerves. The most important of these was written in 1862.Through various experiments on animals, Lussana was able to demonstrate that the chorda tympani nerve was the taste nerve in the anterior tongue. He found that taste was not suppressed on severing the glossopharyngeal nerves, but was so on severing both ends of the chorda tympani. Severing the lingual nerve, before anastomosis with the chorda, did not modify taste. In humans, pathologies causing total destruction of the trigeminal nerve and the severing of the lingual nerve after anastomosis with the chorda, did not alter taste in the anterior part of the tongue.

In addition, Lussana demonstrated experimentally and physiopathologically that the ability to perceive the quality of tastes was not uniformly distributed throughout the tongue surface. He indicated that bitterness was localised in the back of the tongue, sweetness at the tip, acidity and saltedness at the sides. He also conducted studies on innervation and the digestive system, addressing the relationship between vagus nerves and gastric secretion. He asserted that bilaterally severing the cervical portion of the vagus nerves led to suppression of gastric acid but not pepsin secretion, which was linked to sympathetic innervation. Pepsin secretion was instead suppressed by severing the pneumogastric nerve at subdiaphragmatic level.

Lussana studies on taste innervation contribuited for the improvement of knowledge on neuro-gastronomy mechanisms.

Neurophobias in music

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Neurophobia is a persistent, irrational, intense fear of a specific object, activity, or situation that characterized different musicians such as Robert Schumann and Arnold Schönberg. Some of these fears such as melophobia are associated with neurological diseases as well as epilepsy. We describe some common neurophobias in different composers and their musical pieces.

Agoraphobia is presents in *Rothko Chapel* of the American composer Morton Fedelman and in opera *Sirius* composed by Germany Karlheinz Stockhausen.

Claustrophobia is expressed in *Gavotte in French Suites n 4* by Baroque composer Johann Sebastian Bach and *So What* of the jazz composer Miles Davis.

Eisoptrophobia (fear of one's own reflection) is described in *Selbstportrait mit Reich und Riley (und Chopin ist auch dabei)* by Hungarian György Ligeti; *Self portraits in three colors* in the jazz album entitled *Mingus Ah Um* by Charles Mingus and in pop music from Bob Dylan in his album *Self Portrait*.

Melophobia (fear for music) is present in the instrumental chamber music of Claude Debussy in *Sonata for flute viola and harp* and in *Tarantella* from the first Symphony of John Corigliano.
Triskaidekaphobia (fear of the number 13) is diffuse in popular music with the swing genre by Les Brown in his song *Triskaidekaphobia* from the album *Sentimental Journey*, *Thirteen* appears on the albums *American Recording* and *Unearthed* by Johnny Cash; the *13* from the thirteenth album *Th1rt3en* of American trash metal band Magadeth.

This is a brief list of phobias that are psychological expression (rarely of neurological conditions) of some composers and their music.

Student Travel Award: Cerebral pneumography and the twentieth century localization of brain tumors

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In 1918, the American neurosurgeon Walter Dandy (1886-1946) first described the injection of air into the cerebral ventricles as an aid to clinical diagnostics (Dandy, 1918). By revealing alterations in the shape, size or position of the ventricles on the radiogram, ventriculography provided an invaluable tool to predict the presence and localization of brain tumours. The following year, Dandy introduced a method for the "intraspinous" injection of air, *pneumoencephalography*, which allowed for the radiological visualization of tumor-induced changes of both the ventricular system and the cerebral subarachnoid space (Dandy, 1919). With the invention of ventriculography and pneumoencephalography – jointly referred to as *cerebral pneumography* – Dandy laid the groundwork for subsequent methods to directly or indirectly visualize lesions of the central nervous system with radiopaque substances, including contrast myelography, arterial encephalography and isotope encephalography (Moniz, 1927; Moore, 1948).

The value of cerebral pneumography was, however, not undisputed, as the technique was not avoid of danger and often challenging to interpret. Hence, there was a feeling that to depend on radiography was to renounce oneself as a neurologist, by exposing patients to dangerous procedures, while thorough clinical examination performed by a skillful neurologist, would, in many cases, be sufficient for the diagnosis and localization of brain tumours.
In the present article, we wish to celebrate the centenary of Walter Dandy's inventions of ventriculography and pneumoencephalography, procedures that, despite their dangers and shortcomings, significantly contributed to the diagnosis and localization of brain tumours during the twentieth century.

Autokinesis, motion perception, and the origins of frame of reference: Ptolemy and Ibn al-Haytham.

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Autokinesis is a phenomenon of visual perception where a point of light in an otherwise totally dark room, with no spatial references, appears to move. The point of light is stationary; the perceived motion is an illusion. Initially it was associated with observations of the apparent movement of stars, and regarded as a real physical event (Alexander von Humboldt, 1850). Following its recognition as a subjective experience 175(Schweitzer, 1857; Hoppe 1879, Charpentier 1886, Aubert 1887), *autokinesis* illusion has been the subject of scientific studies since the first decades of the 20th century (Carr, 1910,Adam 1912, Guilford, J. P. Dallenbach, K. M. 1928), The various explanations to account for the phenomenon of *autokinesis* include the absence of a "frame of reference" with the consequent absence of visual (peripheral) cues, as well as eye movements (Gregory & Zangwill, 1963; Royce, et al.1966).

This paper will discuss the origins of the role of "frame of reference" in motion perception in earlier sources, such as Ptolemy's *Optics* (c.140 AD), and in particular, Ibn al-Haytham's comprehensive *Book of Optics* (*Kitāb al-Menāẓir* (1040 AD) in seven books. Ibn al-Haytham (Latin: Alhazen) deals with motion perception and apparent motion under "errors of sight"(illusions) in Book 11. In its Latin translation both in manuscripts (11th c) and in Risner's printed edition (*Opticae Thesaurus* (1571), the work constitutes a fundamental part of the history of visual optics and perception.

The Oliver Sacks Memorial Lecture

Connecting degenerative mythologies: From Meynert's brain psychiatry to Sacks' narrative neurology

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For over 100 years stories about "Alzheimer's disease" have excited scientists, challenged individuals and families, provoked powerful fears and hopes in society, and changed considerably over time. Theodore Meynert and Alois Alzheimer were pioneering 19th century "brain psychiatrists" whose microscopic imaging methodologies replaced moral degeneration with neurodegeneration as a theory of causation for dementia. Meynert's ideas of neural connectivity inspired Wernicke, Freud, eventually Geschwind, and others, but ultimately also led to brain mythologies concerning cortical and subcortical relationships. Alzheimer was skeptical of his boss Emile Kraepelin's claims that he Alzheimer had "discovered" a new disease. Our Hopkins group implicated the "subcortical" Nucleus Basalis of Meynert in the cholinergic dysfunction in a "cortical" dementia, namely Alzheimer's disease and others, like "subcortical" Parkinson's. In modern times, Oliver Sacks demonstrated the power of stories to reimagine neurological illness. Modern brain scientists are using macroscopic neuroimaging techniques, such as PET and MRI, but also in the process creating new mythologies, like neophrenologies. We now expect that heterogenous conditions like Alzheimer's can be understood at a molecular level and eventually cured. But in fact the causes of dementia are more closely tied to what might be called the moral degeneration associated with neoliberalism, i.e. Individual-focused, market fundamentalism. Income inequity, environmental degradation, social injustice, physical insecurity, poor nutrition and other social determinants of health are potentially reversible factors that contribute to dementia. Our concepts of health are too disconnected from both social and natural community. Deeper stories of our relationships to each other and nature can create hope for individuals affected by dementia and in fact our entire species. New relationship and systems thinking enhancing metaphors such as the transdisciplinary concepts associated with forests and trees will be essential to creating bridges to the future based on a healthier understanding of our interconnectivity, neural and otherwise.

The Harvard Criteria for brain death - 50 years on

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On August 5, *JAMA* published "A definition of irreversible coma: Report of the *ad hoc* Committee of the Harvard Medical School's Examination of the Definition of Brain Death." The Committee provided criteria for brain death but also discussed what physicians and family members can decide for the patient.

This was also the era of burgeoning—haphazardly successful—transplantations and ambitious transplant surgeons. Before 1968, most US institutions practiced cadaveric or living-donor kidney transplantation. When transplantation expanded to living, catastrophically brain-injured donors, these two pathways—continuation of care versus using neurologically dead donors for organ donation— increasingly overlapped.

Whether the Harvard criteria changed practice is not known. Neurosurgeons may still have used the following to declare brain death: irretrievable injury (in the pre-CT era, confirmed with cerebral angiogram or EEG); unresponsiveness; fixed, dilated pupils; respiratory arrest followed by mechanical ventilation; and additional—but variable—documentation of other brainstem reflexes.

The waning importance of the Harvard criteria was expected. However, a recent court case raised the question of which criteria (AAN or Harvard) were standard. Reminiscent of the time before widespread acceptance of the non-functioning brainstem as the point of no return, the judge could not square the presence of EEG activity with death.

The Harvard criteria became a blueprint for determining death by detailed neurologic evaluation. Now, 50 years later, we can celebrate this landmark publication with admiration for its insight, simplicity, and courage to broach the topic.

Franken Flicks and two brains

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In 1818, the novel Frankenstein, or The Modern Prometheus by Mary Shelley was published. The significance of Shelley's work has been recognized as illustrative of the moral responsibility of scientists, abuse of science, limits of experimentation and principles of bioethics in general. Nearly a century later, its publication inspired five films (1910-1948), including one comedy, which were soon followed by cycle of parodies, horror, and slasher-genre films. Most memorable is James Whale's Frankenstein (1931), with a new (and lasting) narrative as well as a new Universal Studios monster. In the film, the brain taken from a criminal was inserted in the skull after circumferential craniotomy (leaving a flat top). During a medical lecture scene in the film, macroscopically obvious anatomical differences from normal were pointed out, and the abnormalities in the frontal lobe gyri suggested lack of inhibition and impulsivity. James Whale's classic depiction of Frankenstein established the idea that structural brain abnormalities were linked to monstrous, murderous behavior. To celebrate the bicentennial of the novel, further insight in the early cinematic portrayal of Frankenstein and its connection with brain anomalies is provided.

A history of psychiatry in Malaysia (1898-1973)

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The Lunacy Act adopted in 1890 obliged local authorities to maintain institutions for the mentally ill in England and Wales. It was also implemented in British colonies including Malacca peninsula. In 1898 an old prison in Kuala Lumpur was converted to an asylum. "The Mental Hospital of Singapore" for 1,800 patients was established in 1904. The main mental institution, "Federal Lunatic Asylum" was completed in 1911 at Tanjung Rambutan, Perak. It provided occupational therapy and farming for the inmates.

In 1928, the institution was renamed "Central Mental Hospital", with 280 beds focusing on medical care. In the interwar period (1920s-1930s) three mental institutions were established (in Johor, Sabah and Sarawak). After World War II, WHO sent to Malaya consultant psychiatrists (in 1954 and 1960) which lead to revamp and opening of more clinics and wards in hospitals. Since declaration of independence of Federation of Malaya in 1957, there has been gradual move toward decentralized community based care which led to development of small psychiatric clinics in general and district hospitals.

By 1970s, "Central Mental Hospital" changed its name to Hospital Bahagia (happiness hospital) to provide a more positive image towards psychiatry treatment. With initiative of Dr. Selby, a neurosurgeon from USA, clinical departments of neurology, psychiatry and neurosurgery were organized within the Tunku Abdul Rahman Institute of Neurosciences in Kuala Lumpur 1973. This was the beginning of academic psychiatry in Malaysia

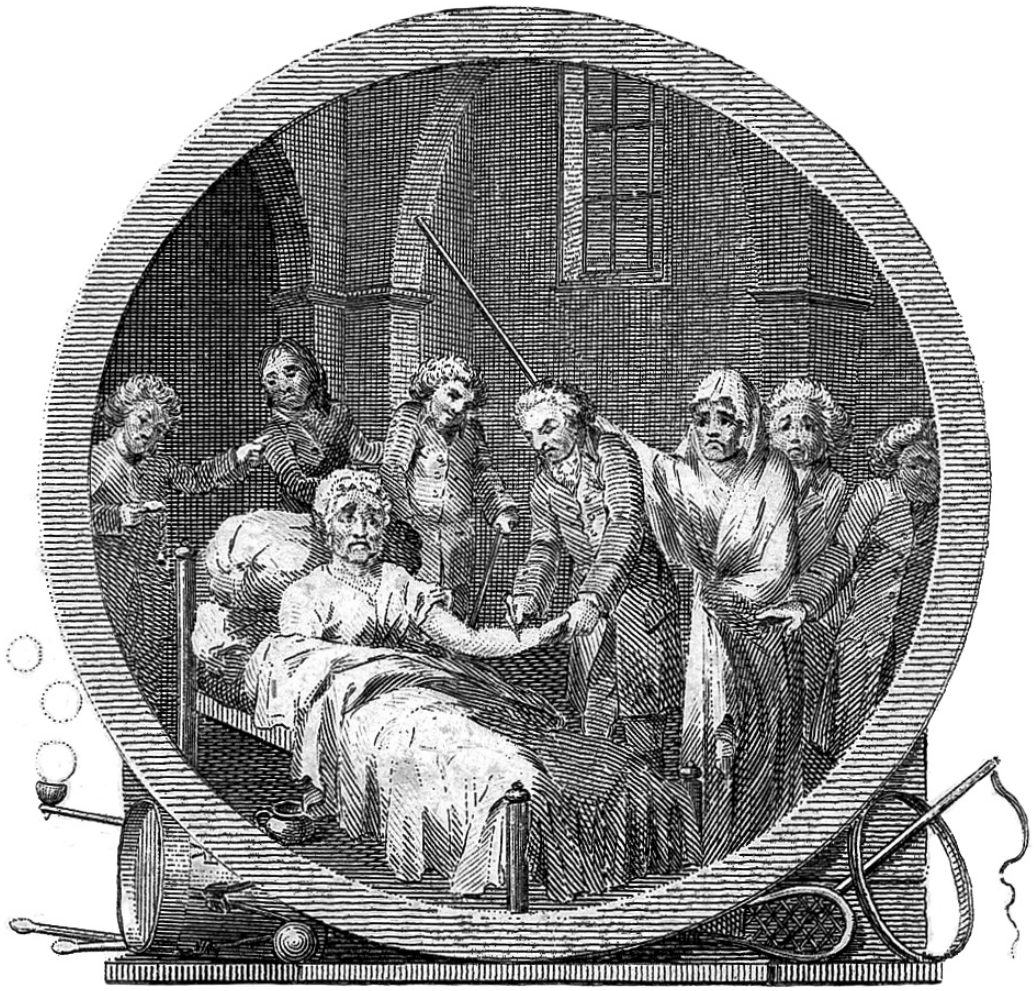
To conclude, development of psychiatry in Malaysia is a case study of westernization of traditional medicine (Malay, Indian and Chinese) in the 20th century. It clearly shows the impact of political agenda on the development of psychiatry care.

SYMPOSIUM: Instruments in the history of the clinical neurosciences

Dedicated to James M. Edmonson, PhD

Organizer: Douglas J. Lanska MD MS MSPH FAAN

Note: For James Edmonson's Frank Clifford Rose Memorial Lecture, please see the General Abstracts.



Medical artefacts can tell tales. The story behind a little box of instruments in the historic collection of the Royal Australasian College of Physicians

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The Royal Australasian College of Physicians (RACP), formed in 1938, has a very special history of medicine library and historic collection. In addition to over 30,000 books there are manuscripts and diaries, photographs and pamphlets, papers and documents that relate to the most influential medical events in the past 80 years in Australia and New Zealand. There is also a collection of historic medical instruments.

Sadly, many of the instruments sit on the shelves and we know little of their personal stories. Who owned this tool? When was it used? When was it discarded? Some of these artefacts can tell tales.

There is one little black case, a box containing a set of ophthalmic instruments. Using a series of deductive reasoning it is possible to place this box to Edinburgh around 1860s and it is likely to have belonged to Argyll Robertson (1837-1909).

This paper will explore how this box came to be in Sydney; its extraordinary journey and the clues that the little box gives up to tell its own story.

Terrible Tractoration!! Haygarth's assessment of Perkins' patent metallic "Tractors" using trials of a sham therapy

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In 1796, Connecticut physician Elisha Perkins patented "metallick Tractors"—two pointed instruments of brass and iron—for "removing pains by metallic points." They were rapidly and widely disseminated using testimonials and aggressive marketing tactics. Factors contributing to the initially favorable results included a strong placebo effect, biased observation, and biased reporting. A placebo effect was augmented by the novelty of the method, and by the confidence and assurances of the practitioner. Factors facilitating rapid and wide dissemination included quasi-theoretical explanations of efficacy based on then-current experiments of Galvani and others, endorsement by prominent individuals (physicians, politicians, and clergy), aggressive marketing practices, publicity, the simplicity of the devices, ease of application (allowing nonmedical personnel to use them), and lack of significant adverse effects.

Abandonment of this therapy was prompted by application of blinded placebo-controlled trials using sham devices. Under the organizing influence of John Haygarth, clinical trials were conducted in London, Bath, Bristol, and Hull from 1799 to 1801. These included single-blind evaluations of sham instruments (e.g, constructed of wood and painted to resemble real Tractors) on people and horses. In people, the sham Tractors produced identical results to those reported by Perkins with Tractors. Despite Perkins' claim that the Tractors worked on horses (supposedly disproving the notion that "imagination" accounted for the reported success of the Tractors), the investigators found no benefit in animals. Despite counterarguments and further testimonials by the Perkinists, popular interest in the Tractors faded and the Tractors were eventually abandoned and considered in retrospect to have been a popular fad of a useless therapy

The circumstances of this long-abandoned therapy remain relevant, because the methods employed in its dissemination have been replayed numerous times with other purported wonder treatments that were subsequently shown to be at best misrepresented and at worst entirely ineffective or even harmful.

Visualization of the voice: Charting the 19th century development of the laryngoscope

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The source of the human voice is obscured from direct view by the tongue and epiglottis. With the development of the laryngoscope in the 1860s, clinicians were presented with a novel view of the vocal folds and their action in speech. The laryngoscope aided the diagnosis of voice disorders previously determine solely on changes in sound. Previously, the limited understanding of how movement of the vocal folds led to normal vocalization and defects of voice had been gained through anatomical dissection or experimentation with dogs. The laryngoscope provided the opportunity to view the dynamic movements in living speakers for the first time. This materially contributed to the understanding of vocal fold physiology, delineation of new symptoms, development of a more comprehensive nosology of diseases of the throat, and delivery of new drug, electrical, and surgical treatments.

Histories of laryngology typically recount the foundational efforts of Ludwig Türck (1810-1868) and Johann Czermak (1828-1873) in developing this new clinical tool, and its deployment in understanding the movements of the vocal folds is represented as fundamentally arising from the work of clinicians in Prussia and Austria. However, there is strong evidence of the simultaneous development of the laryngoscope in several different countries including Britain and the USA.

This paper will consider the evolution of elaborated understanding of diseases of the vocal folds and the underlying physiology of voice which were enabled by the introduction of the laryngoscope to the clinic. The objective is to detail the significance of the novel visualization it afforded, and to trace its impact on the understanding of the movements of the vocal folds.

The incorporation of the ophthalmoscope into clinical practice in Britain and the colonies

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Herman von Helmholtz (1821-1924) published the description of his *Augenspiegel* (eye-mirror) in 1851. The ophthalmoscope became a popular tool with oculists and physicians. When Thomas Allbutt (1836-1925), a well-known British physician, published his text *On the use of the ophthalmoscope in diseases of the nervous system and of the kidney; also in certain general disorders",* in 1871, he hinted that it was more popular with 'our Continental neighbours'. Two influential British physicians were very important in promoting the use of the ophthalmoscope amongst British neurologists and ophthalmologists. John Hughlings Jackson (1835-1911) joined the staff of the Royal Ophthalmic Hospital as early as 1859 and later reported that he learnt to use the ophthalmoscope in 1863. He published many papers on its use in various conditions, and maintained that an ophthalmoscopic examination should never be omitted in a case of 'severe and continued headache'.

William Gowers (1845-1915) took up his appointment at the National Hospital for the Paralysed and Epileptic, Queen Square in 1870. He published his very popular *A manual and atlas of medical ophthalmoscopy,* in 1879 and promoted its incorporation into a routine neurological examination.

In 1858, James Rudall (1828-1907), LSA FRCS (Eng) set sail for Port Phillip Bay. He kept a diary of his journey and for the first few months of his arrival in Victoria. In his journal, he records using an ophthalmoscope in 1858. This is the first record of its use in Australia. Rudall published a paper in the *Australian Medical Journal*, "On examination of the eye by means of the ophthalmoscope" in 1861. Ironically, he was involved in an inquiry in 1877 when a patient claimed he had been inadequately examined by Rundell because ophthalmoscopy had not been used.

It is perhaps surprising that the ophthalmoscope found its way to Australia so early in its development. However, Australian medical practitioners, although geographically isolated have embraced technological advances very quickly. Many great medical discoveries were reproduced in remarkably short time (e.g. anaesthetics, radiology) in this colony.

The application of Duchenne's trocar to the pioneering studies of neuromuscular disorders in the 19th century

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Guillaume Benjamin Amand Duchenne (Duchenne de Boulogne) was one of the founders of clinical neurology and his name has been eponymically linked to the most common form of muscular dystrophy, originally referred to by Duchenne as pseudo-hypertrophic or myosclerotic muscle paralysis. At that time, the etiology of this disorder was unclear, and for a long time it was suspected to have a neurogenic cause. Because Duchenne had difficulty procuring autopsy material for pathological studies, he invented a novel instrument: *l'emporte-pièce histologique* ("Duchenne's trocar" or "histological harpoon"). Following Duchenne's design and instructions, a Parisian surgical-instrument company, Charrière, constructed the first instrument. In 1865, Jean Jules Charrière provided the technical specifications with a user's guide. Duchenne later also described the technical details and operational instructions.

Duchenne had no formal training or expertise in pathology, and asked other physicians, especially Jean-Martin Charcot, to assist him with histopathological analysis of muscle samples. The innovative needle technique enabled physicians to analyze the spectrum of pathological changes, and study the progression of the myodegenerative process, at varying stages of disease. Such examinations were essential to determine the myogenic etiology of pseudo-hypertrophic muscle paralysis.

By 1867, American neurologist William Alexander Hammond used Duchenne's trocar to study muscle pathology in cases of "organic infantile paralysis" (poliomyelitis). Hammond also performed a needle muscle biopsy in one of the earliest reported cases of Duchenne dystrophy in 1871. Hammond's colleague, William Pepper, used Duchenne's trocar to perform a muscle biopsy in a patient with probable Becker muscular dystrophy.

With improvement in anesthesia, development of sterile surgical techniques, and advent of antibiotics, open muscles biopsies largely replaced needle biopsies. However, since the 1960s there has been a worldwide revival of the needle muscle-biopsy technique. The invention of Duchenne's trocar was instrumental in the development of both clinical myology and muscle pathology.

The development and evolution of "cerebral thermometry": A 19th-century approach to cerebral localization and neurological diagnosis.

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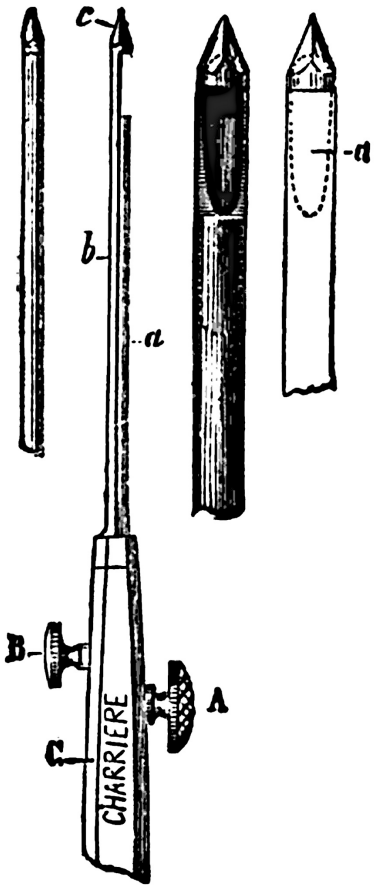
Surface thermometers were developed in the latter half of the 19th century by Seguin and others. From the 1850s through the 1880s, collaborations between physicians, research scientists, and instrument makers produced clear improvements in the technology to measure cranial surface temperatures, with development of self-registering mercury surface thermometers resistant to pressure and little influenced by ambient temperature, apparatus for recording cranial surface temperatures from multiple stations simultaneously, and development of thermoelectric apparatus. Beginning in the 1860s Albers in Bonn, Germany, and Lombard at Harvard and later in England systematically investigated surface temperatures on the head using surface thermometers and thermoelectric apparatus; they demonstrated that head temperatures were variable over time and across individuals and were not clearly influenced by thinking or muscular contraction but were influenced by ambient air temperature. In 1877 Broca, already famous for his contributions to the cerebral localization of non-fluent aphasia, presented the first clinical observations on cranial surface temperatures: in two cases, cranial surface temperatures were *decreased* over a middle cerebral artery infarction, and *increased* in surrounding areas because of "compensatory hyperaemia." As Broca made apparent in a later report in 1879, he had used a "thermometric crown," an apparatus consisting of 6 (or sometimes 8) large-reservoir mercury thermometers strapped against the head. Following Broca's report, American neurologists Gray (1878, 1879), Mills (1878, 1879), and Eskridge (1883) reported cases in which cranial surface temperatures were *increased* over a superficial brain tumor or abscess. Despite promising anecdotal reports, contemporaries recognized significant technical and practical problems limited its accuracy, reliability, and clinical utility. Advocates never demonstrated that the technology provided marginal benefit to the medical history and physical examination. The technique fell out of fashion before 1900, though some early advocates promoted it into the early 20th century. It was ultimately replaced by more effective technologies for cerebral localization and neurological diagnosis.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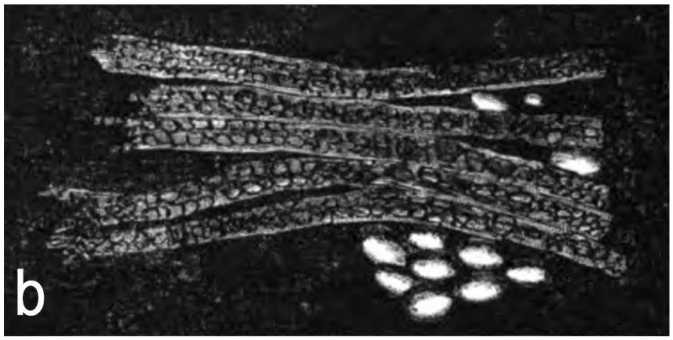
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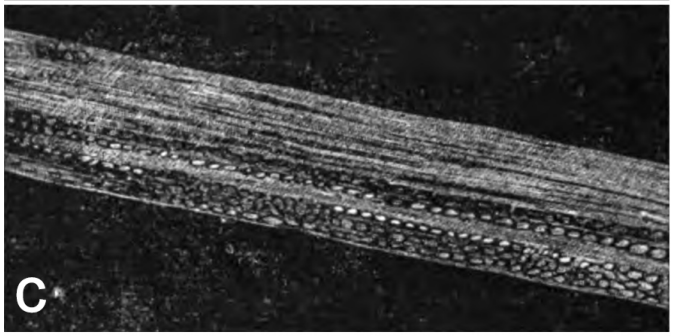
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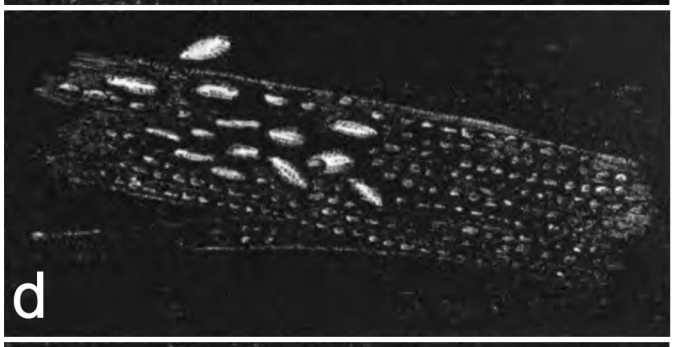
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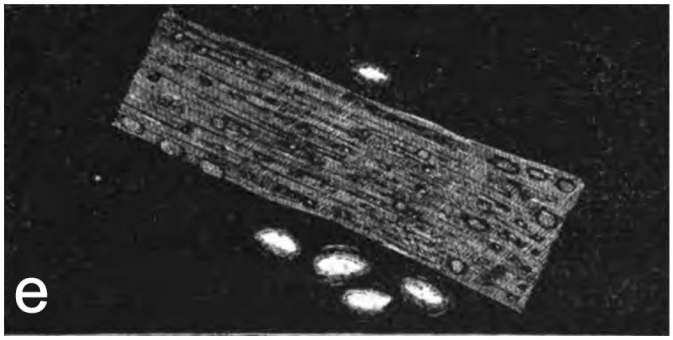
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SYMPOSIUM: The Founding of the American Academy of Neurology

Dedicated to Robert B. Daroff, MD, FAAN

Organizer: Douglas J. Lanska MD MS MSPH FAAN

Symposium: The Founding of the American Academy of Neurology

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"The Four Horsemen" was the nickname given to the four neurologists—Abraham Bert ("Abe") Baker, MD, PhD, Francis Michael ("Frank") Forster, MD, Russell Nelson ("Russ") DeJong, MD, and Adolph Louis ("Ady") Sahs, MD—who were most instrumental in founding and developing the American Academy of Neurology (AAN) beginning around 1948.

This symposium collates and summarizes the accounts of the Four Horsemen and other early leaders concerning the founding of the AAN as presented particularly through oral histories, speeches, and correspondence. The Four Horsemen participated in oral histories in 1982. Subsequently, Forster, the last surviving member of this group, provided videotaped and written documentation of the founding of the AAN in multiple forums in the period from 1982 to 1999, much of which has not been previously available. Prior histories of the founding of the AAN have relied on complementary material, including Baker's correspondence in the Archives of the AAN.

Baker was the primary organizational leader behind the founding of the AAN as an inclusive neurological academy in 1948. At that time, most practicing neurologists and all neurologists in training were excluded from the academically oriented and restrictive ANA. Stimulated by entreaties from one of his own residents, Joseph A. Resch (1914-2009), Baker conceptualized the AAN as an organization that would include members from the beginning of residency to emeritus status, and would provide a greater array of educational opportunities than was previously available. Baker proposed the founding of the AAN in a letter to selected colleagues in 1947, and then spearheaded the background work to create the organization.

Baker recruited supportive colleagues who were willing and able to help create and develop the organization. A four-man core group soon developed—Baker, DeJong, Forster, and Sahs—that proved to be the backbone of the foundling organization. They were soon lauded with the sobriquet of "The Four Horsemen."

The backgrounds and personalities of the Four Horsemen differed, but this diversity only strengthened their effectiveness. Baker was a bold and often bull-headed and argumentative visionary, while Sahs was polite and meticulous, DeJong was soft-spoken and studious, and Forster was jovial and gregarious with a fondness for anecdotes.

The recurring collective organizational efforts at founding and developing the AAN over more than three decades produced a tremendous camaraderie between the Four Horsemen and their respective wives, such that Forster coined a collective nickname for the entire group: "The Four Horsemen and Their Nags"

The organizational meeting in 1948 and its aftermath

At an organizational meeting at the Stevens Hotel (shortly thereafter renamed the Conrad Hilton Hotel) in Chicago in 1948, the 52 charter members, chaired by Baker, formally approved the formation of the AAN but could not agree on the constitution. Baker turned to the last agenda item, the election of officers. Because Baker had been the principle organizational leader from the very beginning, it was simply expected that he would be elected President. Instead, through some parliamentary maneuvering Walter Freeman, the lobotomist, was elected as the first president of the AAN, much to the surprise and consternation of the founders. Baker and his supporters were profoundly frustrated and disappointed at being outmaneuvered, and carefully weighed their options, even considering disbanding the organization and starting over. This proved to be unnecessary, though, when Brown discovered that Freeman had not paid his $5 dues: Freeman was therefore ineligible to hold office. The subsequent election of officers was conducted by mail ballot after the Chicago meeting; this time the election of officers achieved the desired result and Baker was elected president.

The relationship of the AAN and the ANA

The intention of founding the AAN was not to compete with or subvert the American Neurological Association (ANA), but rather to offer an inclusive professional organization for *all* neurologists, including those who otherwise had no professional neurological organization that they could join. Nevertheless, from the very beginning, the Four Horsemen recognized that antipathy or overt antagonism might "arise between the patrician ANA and the plebeian AAN," and indeed some older members of the ANA openly opposed the formation of the AAN. To address the growing animosity, neurologist and neuroanatomist Alphonse R. Vonderahe proposed an influential House-Senate formulation of the AAN-ANA relationship, both as a supporting rationale for the existence of the AAN, and as a conceptual model for the functional relationship between the two organizations. Specifically, Vonderahe suggested the comparison of the U.S. neurological societies to the U.S. Congress: "The ANA is the Senate, the senior and prestigious body[, whereas] the Academy is the House of Representatives for it is truly representative of all American Neurology. Because of its inclusiveness, the upstart AAN soon became the dominant neurological organization in the United States and eventually in the world.

The Four Horsemen (and their Nags): Recollections of the founding of the American Academy of Neurology

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A.B. Baker was the primary organizational leader behind the founding of the AAN as an inclusive neurological academy in 1948. At that time, most practicing neurologists and all neurologists-in-training were excluded from the academically oriented and restrictive American Neurological Association (ANA). Stimulated by entreaties from his resident, Joseph Resch, Baker conceptualized the AAN as an organization that would include members from the beginning of residency to emeritus status, and would provide more educational opportunities than previously available.

Baker recruited supportive colleagues who were willing and able to help create and develop the organization. A four-man core group soon developed—Baker, DeJong, Forster, and Sahs—that proved to be the backbone of the foundling organization. They were soon lauded with the sobriquet of "The Four Horsemen." The recurring collective organizational efforts at founding and developing the AAN over more than three decades produced tremendous camaraderie between the Horsemen and their respective wives, such that Forster coined the collective nickname: "The Four Horsemen and Their Nags."

At the organizational meeting in Chicago, Walter Freeman, the lobotomist, was unexpectedly elected as the first President of the AAN, but was disqualified, having not paid his dues. The subsequent election of officers by mail ballot achieved the desired result and Baker was elected President.

The AAN founders did not intend to compete with or subvert the ANA, but rather sought an inclusive professional organization for *all* neurologists, including those who otherwise had no professional neurological organization that they could join. Nevertheless, from the very beginning, the Four Horsemen recognized that antipathy or overt antagonism might arise, and indeed some older members of the ANA openly opposed the formation of the AAN. Nevertheless, because of its inclusiveness, the upstart AAN soon became the dominant neurological organization in the United States and eventually in the world.

Abe Baker: visionary and organizational leader of the American Academy of Neurology

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American neurologist and neuropathologist Abraham Bert ("Abe") Baker (1908-1988) was instrumental in founding the American Academy of Neurology and served as a catalyst for the emergence of neurology as a strong independent medical discipline in the United States in the second half of the twentieth century.

In the late 1940s, after World War II, Baker began agitating for the formation of a new neurological society. In a letter to selected colleagues in 1947, Baker proposed the founding of the AAN as an inclusive neurological academy. At that time, most practicing neurologists and all neurologists in training were excluded from the academically oriented and restrictive American Neurological Association. Baker's vision was for the Academy to include members from the beginning of their residency training until the end of their careers, and to provide a greater opportunities for continuing medical education than were previously available. With the assistance of a small group of like-minded colleagues, Baker spearheaded the background work to create the AAN. At an organizational meeting in Chicago in 1948, the 52 charter members, chaired by Baker, formally approved the Academy's formation. Despite a procedural problem in the election of officers at the organizational meeting, Baker was subsequently elected as the first President of the AAN through a mailed ballot. Baker served as the first president of the Academy from 1948 to 1951. Baker's leadership was also essential in developing continuing medical education for neurologists at a national level.

Baker was instrumental in garnering support for the National Institute of Neurological Diseases and Blindness, which was founded in 1950 and later evolved into the National Institute of Neurological Disorders and Stroke, and in garnering federal financial support for neurology training programs.

Russell DeJong: "The most scholarly neurologist in the Academy"

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Russell Nelson DeJong (1907-1990) became Professor and Chair of the Department of Neurology at the University of Michigan in 1950. A prolific author with over 200 publications, DeJong wrote on virtually all areas of Neurology. DeJong's classic monograph, *The Neurologic Examination* (1950), grew into an encyclopedic volume from lectures he gave to junior and senior medical students; DeJong saw it through four editions. DeJong was one of the founders of the American Academy of Neurology (AAN), serving as its vice president from 1961 to 1963, and as the first Editor-in-Chief of its journal, *Neurology*. Abraham Baker, the driving force behind the founding of the AAN considered DeJong "the most scholarly neurologist in the Academy." DeJong was also President of the American Neurological Association, President of the American Board of Psychiatry and Neurology, President of the American Epilepsy Society, and Chairman of the Scientific Advisory Board of the National Multiple Sclerosis.

Note: This lecture was originally planned to be delivered by Stephen Reich from the University of Maryland School of Medicine, Baltimore, Maryland. Due to unforeseen circumstances, Dr. Reich was unable to participate or to submit a presentation, so the Symposium organizer, Dr. Lanska, wrote an abstract and contributed his own presentation on Russell DeJong.

Adolph Sahs: A neurologist who could take on still another job

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Adolph Louis Sahs (1906-1986) became Chair of the Department of Neurology at the University of Iowa in 1948, and retired in 1974. Through his academic neurology organizational skills, coordination of multicenter research on subarachnoid hemorrhage, and education of over 50 neurologists, he helped bring the department to national and international prominence.
Sahs was one of the founders of the American Academy of Neurology. He served as president of the American Academy of Neurology, the American Neurological Association, and the American Board of Psychiatry and Neurology. Sahs was "generally known as a man who could take on still another job in either the local or the national interest or in the interest of the specialty itself."

Francis Forster, the last Horseman: A career in academic neurology

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American neurologist and epileptologist Francis M. Forster (1912-2006) was the last survivor of the "Four Horsemen," a nickname given to the four neurologists – Forster, Abe Baker, Russell DeJong, and Adolph Sahs – who were most instrumental in founding the American Academy of Neurology under Baker's leadership in 1948.

Forster completed his residency in neurology on the Harvard Neurological Unit at Boston City Hospital under Tracy Jackson Putnam and H. Houston Merritt, and trained in psychiatry at the University of Pennsylvania. After residency, Forster was a Rockefeller Research Fellow in physiology under John Farquhar Fulton and Leslie Frederick Nims at Yale University School of Medicine. Forster was soon hired as an Assistant Professor of Neurology by Bernard Alpers at Jefferson Medical College in Philadelphia. Here he developed a lasting interest in reflex epilepsy. His later positions included Professor and Chair of Neurology (and later Dean) at Georgetown University, and then Professor and Chair of Neurology at the University of Wisconsin.

Forster was a consulting physician for many high-profile patients, including President Dwight Eisenhower, President Quirino and Archbishop Reyes of the Philippines, Provisional President Lonardi of Argentina, and Cardinal Albert Meyer of Chicago. Forster was also an expert witness for the prosecution in the trial of Jack Ruby, who killed Lee Harvey Oswald. Forster's greatest legacy, though, was as a teacher: during Forster's career as chairman of two robust academic neurology departments, he trained more than 100 residents, at least 17 of whom went on to become chairmen of neurology departments in the United States, Europe, Asia, and South America.

In 2005, the American Academy of Neurology duly recognized Forster's leadership in neurology over the course of his career by establishing the Francis M. Forster Leadership Fund to support young investigators conducting clinical research.

The Four Horsemen and the American Board of Psychiatry and Neurology (ABPN)

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Following the rise of specialties in medicine in the late 19th and early 20th century, a need to regulate specialization (training, examination, and certification) was felt in most countries and steps were made in several countries in the 1920s and 1930s, including Germany and the USA. The emancipation of neurology as a separate specialism occurred rather late, as was demonstrated at the special conference on the position of neurology during the First International Neurological Congress (Berne, Switzerland, 1931), and despite the call for independent neurology, regulation for the specialism in the USA was organized in cooperation with the psychiatrists.

The ABPN was founded in 1934, reflecting a relatively early regulation of specialties, second only to Germany, and much earlier than for instance in France and England. During the first years, directors of the ABPN were nominated by the founding organizations (American Psychiatry Association, APA, American Neurological Association, ANA, and the Section of Nervous and Mental Diseases of the American Medical Association, AMA). Following its foundation in 1948, the American Academy of Neurology (AAN), was able to influence the ABPN through the ANA council, to which they had been invited, as well as by the AMA Section. All of the Four Horsemen (Abraham B Baker, Russel N DeJong, Francis M Forster, Adolph L Sahs) have been directors of the ABPN in the period 1951-1967. In this article their influence on the policy, the relationship with the psychiatrist group, and particularly examination practices is discussed.

Pearce Bailey: The "Fifth Horseman" and the National Institute of Neurological Diseases and Blindness (NINDB)

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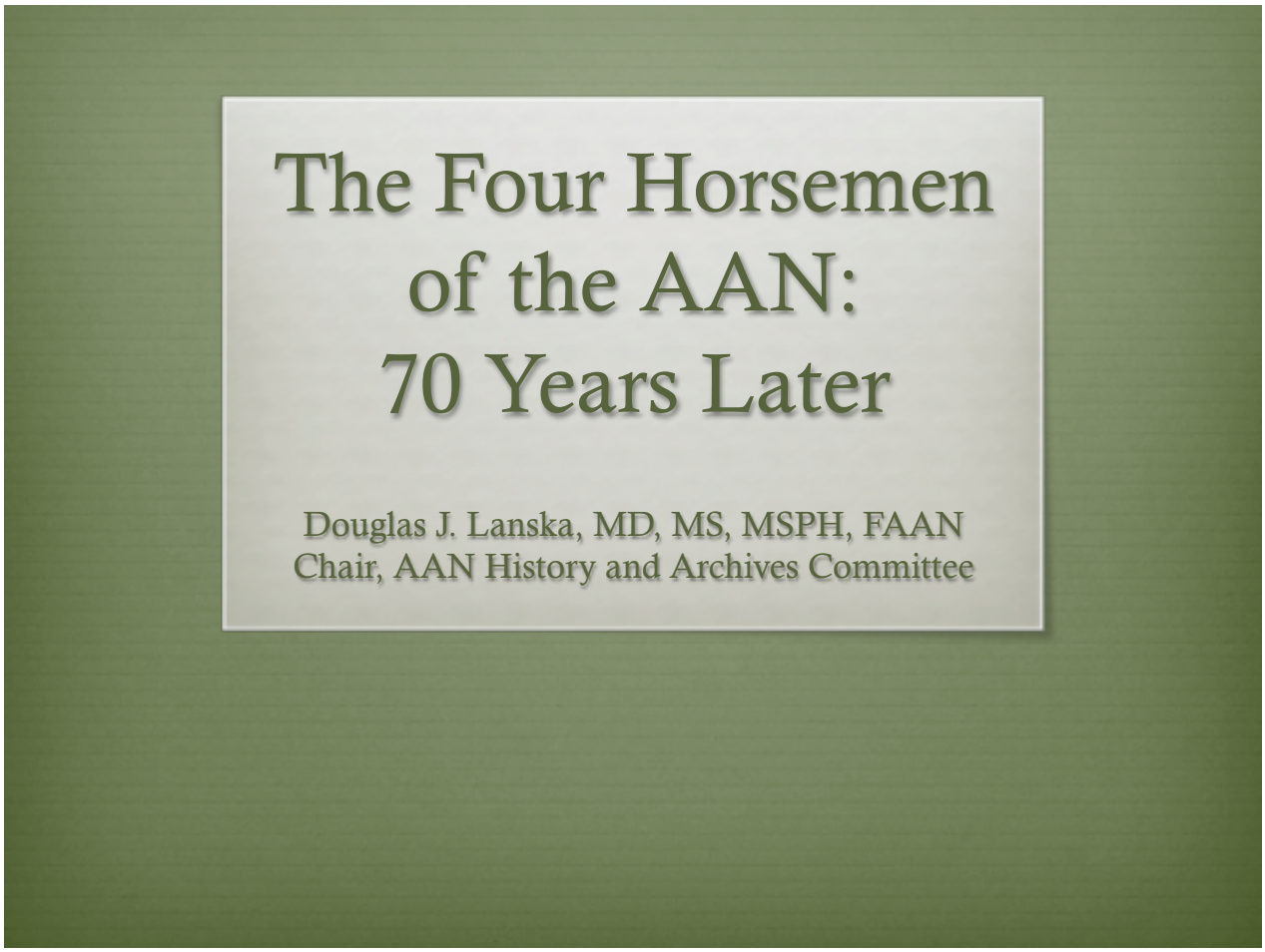
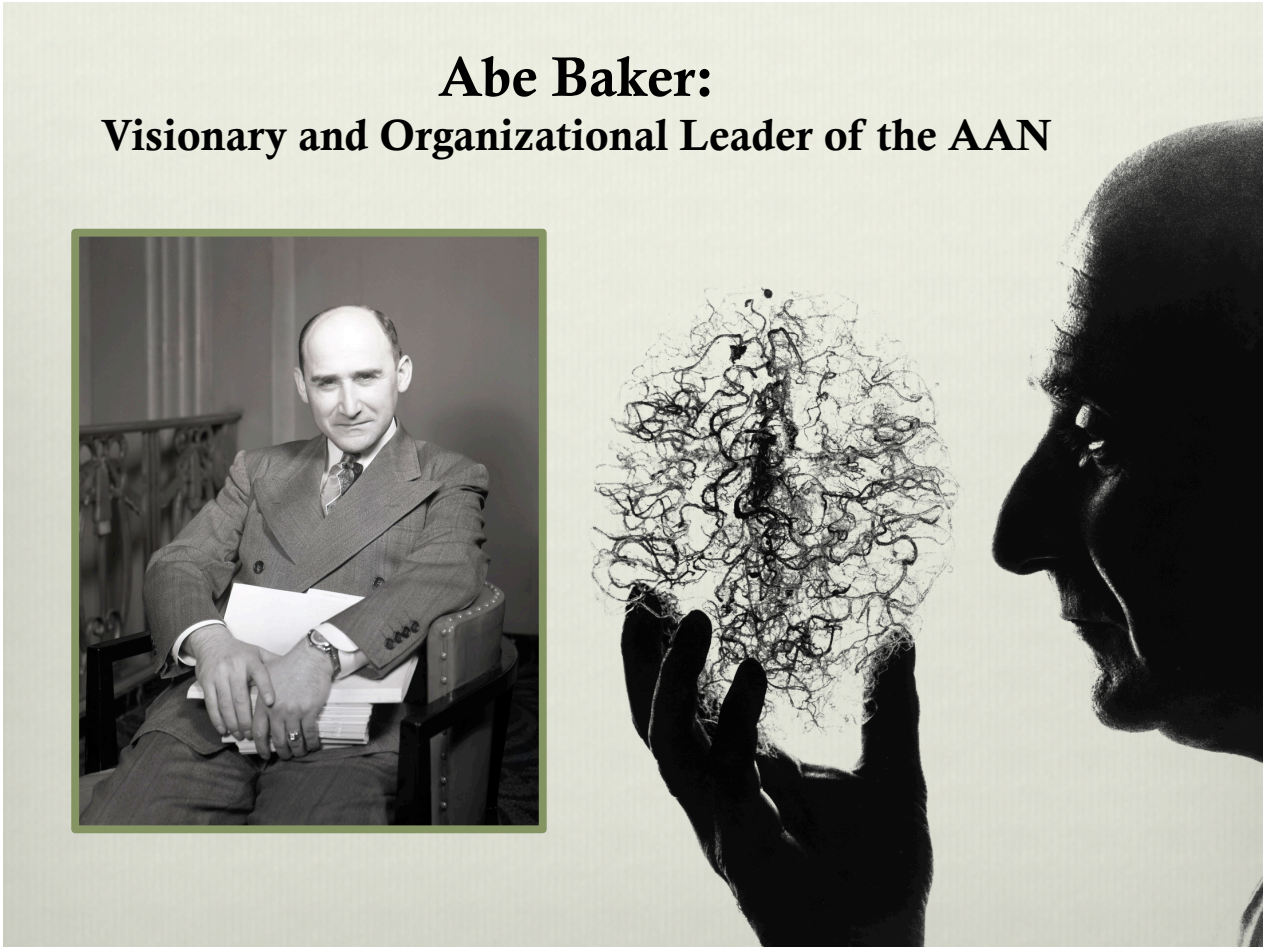
Pearce Bailey (1902-1976) had an active career focused on the growth and development of neurology as a specialty in the post-World War II era. The son of a neurologist by the same name, he was one of the founding members of the American Academy of Neurology (AAN), and in 1951 became its second president. That same year, he became the first director of the National Institute for Neurologic Diseases and Blindness (NINDB, now the National Institute of Neurologic Disorders and Stroke) in 1951. Known as an excellent politician, his role at the NINDB helped progress the AAN in its early days. Conversely, prominent neurologists in the AAN, especially Dr. A.B. Baker, helped shape the NINDB as early advisors for the institute. Bailey changed roles in 1959 to become the director of the NINDB International Research Program. He would spend the rest of his career helping further international neurology, including co-founding the World Federation of Neurology with Ludo van Bogaert in 1957. Bailey retired in 1971, perhaps best encapsulated by Dr. Baker when he called him "…one of the smartest politicians that ever came to Washington."



Speech given at Presidential Plenary Session of the 70th annual meeting of the American Academy of Neurology, on April 22, 2018.

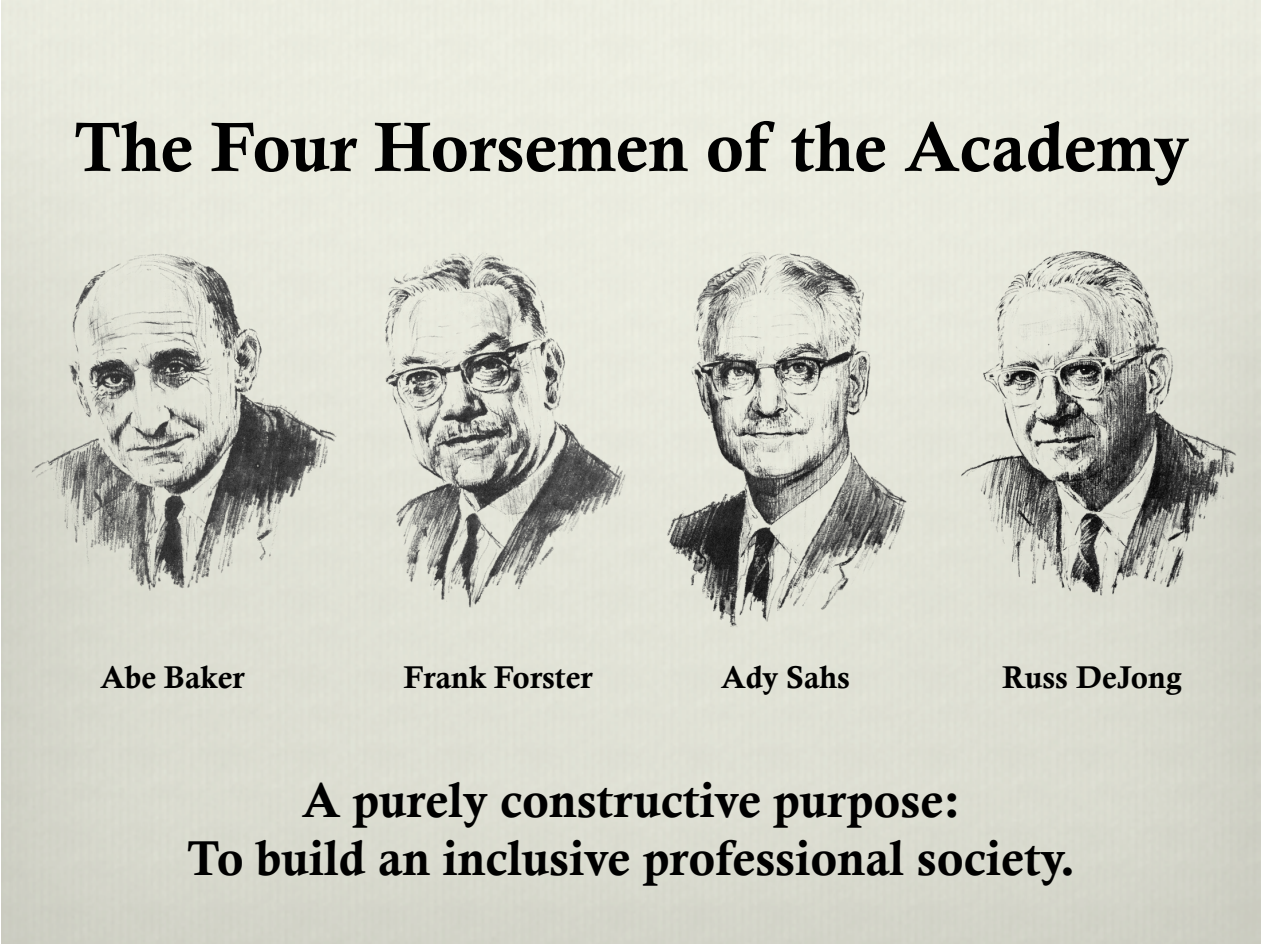
Dear Colleagues:

On the 70th anniversary of the American Academy of Neurology, it is appropriate to review the origins of this illustrious organization.



Abe Baker—a tough and determined academic neurologist from Minnesota—was the primary organizational leader behind the founding of the American Academy of Neurology as an inclusive neurological academy in 1948. At that time, most practicing neurologists and all neurologists in training were excluded from the academically oriented and restrictive American Neurological Association.

Stimulated by entreaties from one of his own residents, Baker conceptualized the AAN as an inclusive professional society that would accept ***all*** neurologists—of whatever age and level of training, from the beginning of residency to emeritus status—and that would provide a greater array of educational opportunities than was previously available.

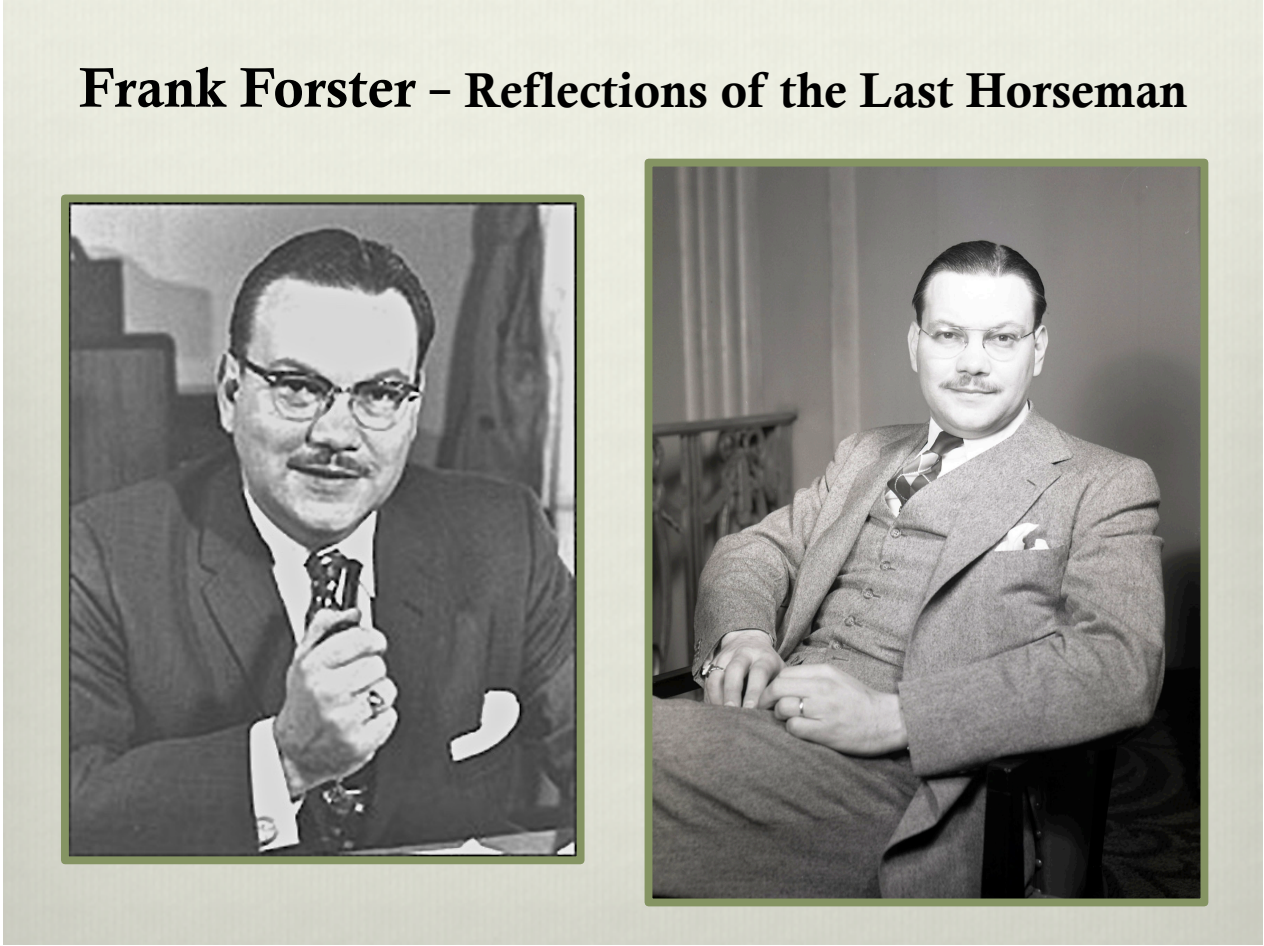


Baker recruited supportive colleagues who were willing and able to help create and develop the organization.

"The Four Horsemen" was the nickname given to the four neurologists—Baker, Frank Forster, Russ DeJong, and Ady Sahs—who were most instrumental in founding and developing the American Academy of Neurology. Forster later humorously expanded the epithet to "The Four Horsemen *and their Nags*" to reflect the cohesion of the founders and their wives.

The core group—the Four Horsemen—had differing backgrounds and personalities, but this diversity only strengthened their effectiveness. Baker was a bold and often bull-headed and argumentative visionary, while Sahs was polite and meticulous, DeJong soft-spoken and studious, and Forster jovial and gregarious with a fondness for anecdotes.

Their intention was not to compete with or subvert the American Neurological Association, but rather to offer an inclusive professional organization for *all* neurologists, including those who otherwise had no professional neurological organization that they could join.



In 1982, the Four Horsemen were interviewed at the National Institutes of Health in Bethesda, Maryland as part of the 34th annual meeting of the AAN.

Baker died on January 18, 1988 in a Minneapolis nursing home from advancing Alzheimer's disease. Sahs had died just 13 months before that. So with two of the Horsemen gone, in September 1988, Bob Daroff, then Editor-in-Chief of *Neurology* and a member of the AAN Executive Board, tried to arrange a second oral history interview of the surviving Horsemen—Forster and DeJong—to review the history of the AAN.

The oral history was planned for July 1989, but was then postponed, because Forster's wife had recent knee surgery. However, just two month later, DeJong called Forster to tell him that his own wife had developed Alzheimer's disease and was living in a group home, and that DeJong himself was no longer living independently, but was instead living with his daughter.

As Forster sadly wrote to Daroff later that night,

> How painful it is to write this letter to you, my friend. Two of the Four Horsemen are gone. And [Russ's wife] Madge is the first of "the Nags" to become incapacitated! And with the same problems as Abe Baker! …
>
> Old age is when the world crumbles down around you. There are so many funerals to attend. So many prayers for the dead to say. So many sorrows to suffer. … It is hard—so hard to have news like this.
>
> With more than a few tears [I] will say "Amen. Kismet. So Be It. God Bless Us All—and American Neurology." …

A year later, DeJong too was gone, leaving Forster as the sole surviving Horseman.

Forster's last reflection

A decade after the aborted interview of 1989, Forster once again looked back on the accomplishments of the Four Horsemen and proudly noted that, "The AAN pioneered postgraduate education, developed sections to include the basic sciences, and ultimately became the largest neurologic society in the world."

These neurologic pioneers laid the groundwork for an invigorated, well-trained, scientifically based specialty of neurology, one that has benefitted the lives of millions of patients in this country and around the world. The AAN, its members, and the public owe them a great debt of gratitude.