Historical Vignette

A tribute to Dr. A. Earl Walker

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Doctor Walker died on January 1, 1995, at the age of 87 years. His contributions to neuroscience and neurosurgery are presented and discussed, together with his impact on national and international organizations of neurosurgery. A short account of his background and professional career is given, with emphasis on his 25 years at The Johns Hopkins Hospital as Chief of Neurosurgery.

KEY WORDS • epilepsy • cerebral death • thalamus • stereotaxy • historical vignette • Johns Hopkins Hospital

Doctor A. Earl Walker departed from this world on January 1, 1995. Neurosurgery lost one of the outstanding representatives of our discipline. While traveling through Arizona by car, sitting beside his wife who was driving and talking to him, he was suddenly overtaken by weakness and lightheadedness. A few seconds later he was dead. As he did everything in his life, he made his exit with discipline and elegance. Dr. Walker would have been 88 years old in March 1995 (Fig. 1).

Greatness is an attribute that has to stand the test of history, yet some towering individuals have been accorded the laurels of “greatness” in their lifetimes. Even in the ultracompetitive atmosphere of academic rivalry, Earl Walker was such a man. He was surely one of the great contributors to modern medicine. Equally well known in this country and abroad, Dr. Walker’s early work was done during an era of rapidly expanding neuroscience. He made lasting contributions to neuroanatomy, neuropathology, electroencephalography, clinical neurosurgery, and of course to basic clinical and laboratory research in the field of epilepsy.

As is often the case with individuals of outstanding achievement, Dr. Walker was held in awe by many, and sometimes considered difficult to approach. However, those of us who worked with him knew and appreciated the time and patience he gave to discussion of individual problems. He was never in a hurry, never left a day’s work unfinished, and always left a clean, neat desk as he left his small office, usually during the late evening hours.

Dr. Walker taught by example. He would never ask an associate to perform a task he was not ready and able to do himself. He believed strongly in self-education and self-maturation. To this end he continuously challenged his students to examine their thinking process critically, giving unqualified credit to creative efforts and hard work. His professional integrity, intellectual creativity, and relentless pursuit of excellence deeply impressed all those who had the opportunity to work with him and set personal and professional standards that we could never forget. Dr. Walker was one of the few Renaissance men in clinical neuroscience. His lifetime curiosity about how the brain works and his scholarly disciplines played an active role in designing exciting experimental protocols. In the early 1950s when I first came to Johns Hopkins Hospital, Dr. Walker headed an international brigade in the departmental laboratories: Dr. G. F. Poggio from Italy, Dr. Ribstein from France, Dr. R. Poblete from Chile, and myself, the Hungarian newcomer. We had great help and support from our American colleague, Dr. Curtis Marshall, who was chief of the electroencephalograph laboratory at the time.

In the experimental laboratory, Dr. Walker was always there, encouraging us through the long and often tedious experiments as we studied the propagation of penicillin-induced cortical epileptogenic foci through the labyrinth of the cortical and subcortical interconnections. It was a challenging concept. We all got excited about the work and there was indeed an unforgettable feverish atmosphere in the laboratories with a feeling of genuine, excited, and optimistic exaltation. We all felt that we were doing something unusually interesting, something that would reveal the inner mechanism of brain function. We were working in an era when intracellular recording had just been initiated and microphysiology was still in its beginning. We could not help but be excited about the concept that certain neuronal conglomerates, a critical
mass of active neurons, could initiate impulses that would travel along a predestined pathway within the cortical and subcortical areas. However, the work in the experimental laboratory was very tedious business. We were conducting our experiments in the era before computers. We applied ourselves to the tasks twice a week with actual experiments, we spent two days a week with the analysis of the experimental material, and the other two days we worked on the instrumentation. I will never forget that Dr. Walker was there in the departmental library at 4:30 a.m. every Tuesday and Friday for nearly 18 months, going over the histological slides, identifying the site of the multiple concentric electrodes, and correlating those with the electroencephalographic findings. The preliminary results of those experiments seemed to indicate that there are indeed preferential pathways from the frontal cortex to the putamen, from the parietal cortex to the globus pallidus, and from the temporal cortex to the hippocampus and amygdala.

These preferential pathways were clearly responsible for the maintenance of the artificially induced epileptic activities leading, in many cases, to a generalization according to a prefixed structural involvement of the cortical and subcortical areas, respectively. This is a concept that is currently experiencing a rebirth.

Dr. Walker’s lifetime dedication to the investigation of the problems of epilepsy in the laboratory and in the clinical setting can be summarized as follows. The investigative work in the early days related to the recording of the superficial and deep seizure activity of patients being considered for surgical resection of epileptic foci. The aluminum cream model gave a reliable seizure preparation for the experimental study of chronic focal epilepsy in the monkey. For the investigation of acute focal epilepsy, the penicillin model, which was developed by Dr. Walker, was more satisfactory. Using these models, Dr. Walker embarked upon a program to determine the propagation of the epileptic seizures from various cortical areas and subcortical nuclei into the efferent motor pathways. These studies were conducted in collaboration with various Fellows, including myself, and resulted in the publication of many important papers.

To localize the site and spread of the epileptogenic discharge, various metrazol activations were used so that the clinical seizure might be studied electroencephalographically and observed clinically. On the basis of these laboratory investigations, a clinical program to study and treat human focal epilepsy surgically was established. Some 26 papers, a number of which I cite below, on the localization of the epileptic focus, the characteristics of the discharge, the surgical technique, and the clinical results were published in national and international journals.

When it became apparent that many of the patients whose epilepsy was not controlled by medication had seizures originating in the temporal lobe, especially in or around the inferomedial gyri, amygdala and hippocampus, which could be relieved by partial temporal lobectomy, both animal and clinical programs were initiated. In chronic monkey preparations, the clinical manifestations and electroencephalographic characteristics were published in several extensive papers.

The long-term results of the various forms of surgical therapy have been assessed over a period of 45 years. Based on a follow up of many years, certain complications unrelated to epilepsy and previously little emphasized have been identified. After a unilateral temporal resection, a few patients developed an annoying amnesia for immediate events, which might persist for years. Although these patients were able to read, write, converse, and describe events of the remote past, after temporal lobectomy they were unable to recall events that occurred even minutes previously. Many patients with temporal lobe epilepsy have a marked global hyposexual; after a successful temporal lobectomy relieving their seizures, these patients developed a sexual recrudescence, even a hypersexuality at times, a few weeks after the operation. Several papers have been published describing the findings and significance of this unexpected occurrence.

To help the reader understand the man behind these achievements, let me give a short summary of his professional life. Dr. Walker was born in Winnipeg, Manitoba and received his medical degree from the University of Alberta. He developed a deep interest in the central nervous system in the early stages of his medical training. After a year of internship in Toronto, in 1931 he joined the residency training program in neurology and neurosurgery...
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at the University of Chicago. Dr. Walker chose the surgical approach to the problems of the central nervous system as the best possible avenue to explore challenging questions related to organizational patterns within the brain.

At the time Dr. Walker began his training in neurosurgery, it had just come of age as a discipline. From the beginning of his career, he recognized the importance of integrated and collaborative research within the neurosciences. He had the good fortune to begin work in a scientific area in which the specialties of neuropathology, electroencephalography, and clinical neurophysiology emerged as independent disciplines. Under the guidance of such outstanding men as Percival Bailey, Roy Grinker, and Stephen PolyaK, he assimilated exciting discoveries in new fields and became one of the young leaders in the new generation of neurosurgeons who applied experimental findings of the neurological sciences to clinical neurosurgery.

Dr. Walker left the University of Chicago to accept a Rockefeller Fellowship, which allowed him to study at Yale University, Amsterdam, and Brussels. Later he returned to the University of Chicago as an instructor in neurological surgery. Within a decade he became a full professor.

During his formative years at the University of Chicago, his publications covered basic problems in neuroanatomy, neuropathology, and clinical neurosurgery. His monograph, The Primate Thalamus,65 published in 1938, made contributions basic to the understanding of this particular area of the brain. With keen skill, he applied the scientifically controlled findings of his laboratory work to clinical neurosurgery, contributing to our understanding of the organization of the spinothalamic tract.3,42,67,68 He introduced mesencephalic tractotomy66 and pedunculotomy45–47,92 and described in scholarly fashion clinical entities including congenital dermal sinuses,78 congenital aplasia of the foramen of Magendie35,48 cerebellar hemangiomas and hemangioblastomas,59,62 and the physiology of concussion.86

During the early years of World War II, he was declared “essential” and conducted a research project at the University of Chicago on the effects of penicillin on the central nervous system. The results of this study were published as a monograph, Penicillin in Neurology, in 1946,81 this being the first comprehensive study of the effects of the drug on the central nervous system.

As chief of neurology and neurosurgery services at the Cushing General Hospital in Framingham, Massachusetts during World War II, he became interested in the problem of posttraumatic epilepsy. A small monograph, Post-Traumatic Epilepsy,62 outlined most of the basic principles of this complex disorder. The cases studied in the Cushing General Hospital were followed periodically over 40 years.64,91 These studies made possible a detailed analysis of the natural history of head injury and posttraumatic epilepsy.56,79

After the death of Dr. Walter Dandy, Dr. Walker accepted the professorship in neurological surgery at The Johns Hopkins Medical Institutions in 1947. During his tenure at this hospital, he established an outstanding resident training program in neurosurgery with strong emphasis on research and medical scholarship. In 1951 he published, in collaboration with his associates and residents, A History of Neurological Surgery,54 his scientific interest returned in those years to problems with experimental epilepsy, which I have already covered. In addition to his innovative and creative research, and his enduring contribution to neurological sciences, Dr. Walker also made outstanding contributions as a teacher. Gifted young men from many countries came to study with him in Baltimore, and he stimulated them to develop their talents within the growing and expanding field of neurosurgery. He traveled throughout the world as a teacher and consultant dedicated to improving and disseminating neurosurgical ideas and techniques. He accepted visiting professorships to many lands, including Great Britain, Chile, Argentina, Australia, and Japan, to name only a few.

Articles and monographs on paragonimiasis,21 Tentorial Herniation,13 and on head wounds in World War II31 were followed by contributions to the understanding of such modern techniques as the cerebral scintiscan,1 the use of ultrasound,38–41,502 and the possibilities of telecoagulation with induction heat in stereotactic surgery.7,76 Faithful to his training and background, Dr. Walker established the electroencephalographic laboratory at The Johns Hopkins Hospital, and maintained an active neuropsychological laboratory,36,77 which was expanded in the early 1960s to include histochemistry85 and enzyme chemistry of the central nervous system. He established the first neurometric laboratory in the country. He encouraged the development of neuroradiology,2,3,8,17,20,71 and the active participation of psychiatric disciplines and behavioral sciences in the management of complex neurosurgical problems. His scholarly analysis of cerebral death resulted in various papers81,89 and a monograph45 with Japanese and Russian translations.

He made valuable contributions to clinical and pathological studies of brain tumors,2 both in adults and children. Original observations on Ménière’s disease, congenital abnormalities of the spinal cord, cerebral aneurysms,71,77 carotid-cavernous fistulas,3 and hemispherectomies27 are testimoies to Dr. Walker’s wide range of interests.

His contributions to stereotactic surgical principles were well documented in the Stereotaxy of the Human Brain,34 edited by Dr. G. Schaltenbrand and Dr. Walker.

Dr. Walker is honored by the professional community in this country and by many foreign countries. He participated in the founding of the World Federation of Neurological Societies58 and served as president of this organization. He organized superbly the Fourth World Congress of Neurological Surgery in 1969 in New York City. He was one of the few individuals who was president of the American Association of Neurological Surgery, the American Association of Neurology, and the American Electroencephalographic Society almost at the same time. He was president of the American Academy of Neurosurgery and the Society of Neurological Surgeons. He was elected an honorary member of the British, French, German, Japanese, Canadian, Scandinavian, Russian, Italian, Greek, and Australian Neurosurgical Societies.

Let me say finally that since I started my career at Hopkins 40 years ago, there has been such rapid progress in technology, with machines providing diagnostic certainty in place of our personal clinical evaluations, that I
am grateful for the privilege of having witnessed the neurological examinations of Dr. Walker, which were both informative and an aesthetic delight to watch. I was part of his surgical team and had the pleasant experience of admiring his masterful skill.

It was Hopkins’ loss that Dr. Walker left us back in 1972. However, no such thing as retirement existed in Dr. Walker’s vocabulary. During the next 20 years he produced more than do many active department heads in their entire professional lives. He found an appropriate platform at the University of New Mexico, where he continued to make significant contributions to research on cerebral death, amnesia, stereotactic surgery, experimental epilepsy, intracranial pressure monitoring, and stroke. Just 3 years ago I invited him to a symposium on memory that we organized at Hopkins. His scholarly contribution was a historical overview of “lapses of memory” from antiquity to modern times.

Few people at Hopkins have been greater international ambassadors. I remember that in 1983 at the European Neurosurgical Congress in Brussels he was still introduced as “Dr. Walker from Hopkins.” With his particular grace and modesty he corrected his colleague by saying he had left Hopkins 10 years earlier and was actually from Albuquerque!

Following in the footsteps of Cushing, the “Great Pioneer,” and Dandy, the intuitive “Master Surgeon,” Dr. Walker established at Hopkins a truly academic program in neurosurgery, bringing together the exciting new disciplines that form neuroscience and becoming a role model of the “Neuroscientist-Surgeon.”

His legacy of professional excellence is contained in his more than 400 publications; his organizational talent will be remembered in many lands in Asia, South America, Europe and Africa; the impact of his integrity and intellectual honesty will remain with all of us who had the privilege to work with him. He was a great man, and will be difficult to follow!

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