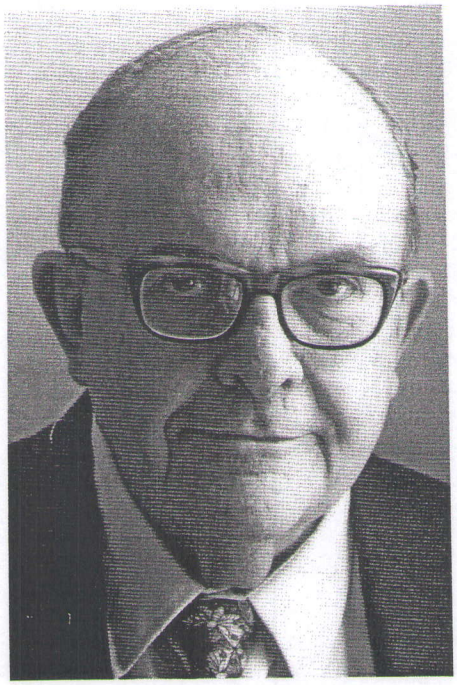
Obituary

William Henry Oldendorf—A Tribute



"Bill's mind was Einstein's universe, finite, but boundless. Always reaching into spheres you wouldn't imagine." These are the words of L. Jolyon West, MD, Chairman of Psychiatry at UCLA. Bill died from the complications of heart disease on December 14, 1992. The scientific community has been well aware of his prodigious research and fundamental observations in blood-brain barrier mechanisms, cerebral metabolism, and perhaps most importantly, the principles of computed tomography.

I first met Bill in 1959, when I was a resident in internal medicine at the Wadsworth VA–UCLA Medical Center rotating through his neurology service. He was immediately likeable, friendly and extremely amusing. His ability to apply techniques from one field to another was uncanny. The idea that formed the basis for his original work on the CT scan came from an engineer who was working on a project to develop an automated apparatus for rejecting frostbitten oranges using shadow radiography to reveal dehydrated segments. Projecting from this scan and rejection technique, Bill proposed scanning the head by a transmitted beam of X-rays, thereby being able to reconstruct the radiodensity pattern of a plane through the head.

In 1961, he published a seminal article regarding his experimental model, which was deceptively simple but incorporated the fundamental concepts and hardware implementation that are present in modern computed tomographic scanners. The apparatus was crude and largely constructed from junk box parts, among which was a train flat car and track confiscated from his son's collection. At the cost of $1,700, he applied for a patent thinking that this would generate industrial interest in implementing his concept. This patent was awarded in 1963. A letter from one of the world's major X-ray manufacturers ended: "Even if it could be made to work as you suggest, we cannot imagine a significant market for such an expensive apparatus which would do nothing but make a radiographic cross-section of a head"! "Faced with this reaction," Bill said, "I turned my attention to other scientific work and heard nothing further about the concept until 1972."

Although none of us recognized the import of his simple experiment, we were all amazed at the genius that went into its construction. In 1974, he was awarded the first Ziedses des Plantes Medal by the German Society of Neuroradiology and the Medical Physics Society of Wurzburg in recognition of his pioneering study. In 1975, he was awarded the prestigious Albert and Mary Lasker Award "for his original concept of the principles which demonstrated the feasibility of computerized tomographic scanning." Rosalind Yalow, a Nobel laureate in physiology and medicine in 1977, went on to nominate Oldendorf for the prize and was upset that he did not get it. In the journal *Science*, January 1980, vol 207, page 31, William J. Broad wrote a "Riddle of the Nobel Debate." It was felt that politics in Stockholm may have forced a would-be laureate off the CT scanner ticket.

His interest in this field was precipitated by a distaste for the invasive procedures that he did as a clinical neurologist. Like most of us, he found that these traumatic, tedious tests provided only limited and indirect information about the brain and he knew there had to be something better. In 1959, he taught me to do my first carotid angiogram. When bright red blood spurted from the needle after one stick, he said, "You got it, Dad." (He called a lot of people Dad, no matter what their age was.) When I injected the dye, of course, it turned out to be a vertebral angiogram.

West tells the story of how excited Bill was about a gadget to fix rat brains instantly at death for an accurate picture of brain function just prior to death. He called this an "instant microwave." He was truly the Thomas Edison of neurology, creating new and better gadgets. After he won the Lasker Award, I asked Bill if people treated him differently and he said, "Yes, they call me Bill instead of Bob." Once, prior to giving his well-known lecture on basic MRI, he handed his carousel to the projectionist, who promptly dropped it, mixing all the slides. The projectionist was horrified, but Bill said, "Oh, just put them in any way, it will be all right." He went on to give one of the best lectures on this subject he had ever given.

Bill authored 250 scientific publications including 3 textbooks. He was on several editorial boards and was a Fellow of the American Academy of Arts and Sciences and many other organizations. In 1992, he was the first neurologist in the 20th century to be elected to the National Academy of Sciences.

He was the youngest of four children, graduating from high school at age 15. He finished Union College in 3 years and attended Albany Medical School. While in high school, he developed an interest in telescopes and, according to his sister Dorothy Brown, had one on the sidewalk in front of his house to study the stars. His friend Harry Judge, who attended Union College and Albany Medical School with Bill, said, "Everybody found him warm, friendly, and fun and no one, at first, realized how bright he really was. He was very modest and always laughed at himself and had a gorgeous sense of humor."

In a letter to the editor of this journal in the first issue, Bill was asked, "What will be the next imaging modality after MRI?" His answer was "clairvoyance." He was the first president of the American Society of Neuroimaging and really was the rock upon which this organization and this journal has developed. He argued, rightfully, to change the name from Society for Computerized Tomography to the American Society of Neuroimaging, knowing that other technologies would be inevitable.

Bill leaves his wife and colleague Stella, three sons, two sisters, and three grandchildren. We all wish them to know that it was a privilege to have known and worked with him. These words reflect only faintly the affection and admiration in which he is held.

Jack O. Greenberg, MD

Editor's Note

Ours is an era given to oftentimes excessive and inappropriate superlatives. Bill Oldendorf was a genius, for any era. Bereft of words sufficient to mark his passing, let me quote those of William Shakespeare (Julius Caesar; Five: V—Antony on the death of Brutus):

His life was gentle, and the elements
So mix'd in him that Nature might stand up
And say to all the world, "This was a man!"

Abstracts

Single-photon emission computed tomography for localization of epileptogenic focus in patients with intractable complex partial seizures. Markand ON, Shen W, Park HM, et al. Epilepsy Res Suppl 1992;5: 121–126

The authors obtained interictal and ictal HIPDM-SPECT brain scans in 38 patients who eventually underwent temporal lobectomy for treatment of medically intractable complex partial seizures. Interictal studies revealed decreased regional cerebral perfusion (rCP) in the temporal lobe corresponding to the eventual site of surgery in 76% of patients. Similarly, ictal studies demonstrated increased rCP in 91% of patients. Of the 33 patients who had both interictal and ictal SPECT studies, 23 (70%) showed increased rCP in the ictal state and decreased rCP in the interictal state in the same temporal lobe, which was subsequently removed. The SPECT scans were particularly helpful in providing confirmatory evidence of localization and in deciding to undertake temporal lobectomy in 16 patients whose electroencephalographic studies had provided less secure localization.

Quantitative magnetic resonance imaging in temporal lobe epilepsy: relationship to neuropathology and neuropsychological function. Lencz T, McCarthy G, Bronen RA, et al. Ann Neurol 1992;31:629–637

The authors obtained the MRIs of 25 patients with medically refractory epilepsy of temporal lobe origin (12 patients on the left, 13 on the right) and 14 right-handed controls. The hippocampi and temporal lobes were traced by computer on successive coronal images and the resulting measurements of area were tallied for each region. In controls the left and right hippocampi were symmetrical, but in the patients the hippocampus was smaller on the side of the seizure focus. Moreover, the left-to-right hippocampal ratio significantly differentiated the controls from the patients. The left temporal lobe was significantly smaller than the right in controls. The epileptic patients' temporal lobes were smaller on the side of the seizure focus. MRI hippocampal measurements were compared to hippocampal neuronal densities obtained postoperatively. Significant correlations were obtained between the ratio (ipsilateral to focus and contralateral to focus) of MRI hippocampal measurements and neuronal densities in all hippocampal subfields except CA2. Before surgery, patients were administered the Wechsler Memory Scale and the verbal Selective Reminding Test. Significant correlations existed between MRI measurements of the left hippocampus and the Wechsler logical memory percent retention scores, and also between the left temporal lobe measurements and the verbal Selective Reminding Test scores for patients with seizure foci in the left temporal lobe.

Functional neuroimaging strategy in temporal lobe epilepsy: a comparative study of 18FDG-PET and 99mTc-HMPAO–SPECT. Ryvlin P, Philippon B, Cinotti L, et al. Ann Neurol 1992;31:650–656

The authors performed 99mTc-HMPAO–SPECT and 18FDG-PET in 20 epileptic patients with a well-lateralized temporal electroencephalographic focus, normal CT scan, and brain MRI that is either normal (n = 10) or showing nonspecific changes in the epileptogenic temporal lobe (n = 10). In patients with a normal MRI, PET exhibited focal hypometabolism in 80%, whereas SPECT showed corresponding hypoperfusion in only 20%. In patients with an abnormal MRI, PET and SPECT yielded 100% and 90% sensitivity, respectively. The metabolic and regional cerebral blood flow disturbances were topographically concordant with electroencephalographic and MRI findings in all these patients. Only patients with a large and pronounced hypometabolism on PET images exhibited hypoperfusion on SPECT. Spatial resolution appeared to be the critical factor responsible for the higher sensitivity of PET. However, this superiority of PET did not prove clinically useful in patients whose SPECT was abnormal, particularly when brain MRI showed nonspecific changes in the epileptogenic temporal lobe.

