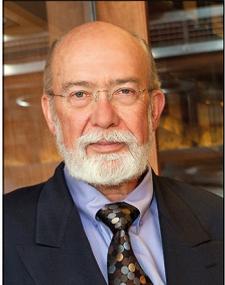




## Profile

### How far away the cornfield. Dennis Spencer's journey



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**Epilepsy and the Functional Anatomy of the Human Brain**

Penfield W, Jasper HH  
Boston: Little, Brown; 1954

For more on the **Cushing Center**  
see <https://library.medicine.yale.edu/cushingcenter>

Bedford, Iowa. Small-town stuff among the unending corn and wheat; fields separated by dirt tracks on a grid system. The wind blows here; nothing to stop it except for a few lines of trees here and there, waiting for the next tornado. But with a circular horizon comes a big sky, and everyone gets to see the sun go the whole 180, full east to full west. Folks farm here mostly, or do things wrapped up with the land in one way or another. They don't usually become professors of neurosurgery at Yale. But three miles south of Bedford, a boy was born who did. It was April 1, 1945; maybe they should have called it No-Fools day.

Dennis Spencer became a full professor of neurosurgery at Yale University (New Haven, CT) in 1985, and has been one ever since. Of course, it wasn't easy: 12 years working upwards from Assistant to Associate Professor, Chief of Neurosurgery, and finally, endowed Harvey and Kate Cushing Professor of Yale University's Department of Neurosurgery. In 1977, with Peter Williamson and Susan Soloway (whom he later married), he laid the stones of what would become the Yale Comprehensive Epilepsy Center, and changed how we do surgery for patients with intractable temporal lobe epilepsy. "Full resection of the temporal lobe was the standard operation until then", he'll tell you, "but when we began to develop our epilepsy surgery programme, we made electrodes that we implanted in the brain to study where the damage was. The seizures seemed to originate mostly in the hippocampus and amygdala, and only infrequently in the cortex. So, I began removing only the former. Why take out of part of the brain that you don't have to?" There have been variations on this procedure since then, but at many hospitals it's essentially what neurosurgeons still do.

What was that? "We made electrodes"? Well, Dennis was always a kind of an inventor. At the age of 13, he tried to build an EEG amplifier in the barn with his father (though they didn't have enough circuitry to finish), and in the late 1950s—the Sputnik days—he spent his time making rockets. Later he got more serious; remember the Spencer Probe depth electrode? That was his. And at the age of 73, he's still going. "We need to make up for how technologically far-behind we are in medicine. If we borrow from the military and industry and apply it to medicine, we might make the world of difference in patients' lives. It's why we are now trying to make our electrodes wireless. Imagine implanting them, and leaving them for three months to collect data wirelessly on a patient's seizures. That would help us so much in deciding on treatment."

It takes imagination to figure out what you can do with resected hippocampi. Dennis, of course, had plenty of both, and eventually a team to help him. His people put his removed tissues to work, first studying them immunohistochemically, then by slice electrophysiology. No one had done it before. In later years, he looked at brain chemistry, using MRI to position depth electrodes accurately while simultaneously using an attached microdialysis membrane to examine the contents of the CSF. It was award-winning work. And he's still not done. "Employing frozen samples from 90 patients we are now using new technologies to look at the metabolomics of the brain under different conditions".

Now, some would say that's high talk for a boy who rode a horse to a country school—the same one his father and grandfather went to. "We were 12 kids of all ages in a single schoolroom; we never really did know what grade we were in. The school had no basement, so when a tornado came by, Miss Wainright would take us outside and we'd lay in the ditch next to the road. If you are just below ground level you are safe, or so they say. Once I peeked out at this tornado swishing around a house; it picked up a barn, and it just exploded."

But it doesn't matter where your school is. Once you open it, a book says the same in Bedford as in New Haven. Dennis opened one that changed his life in Des Moines: *Penfield and Jasper's Epilepsy and the Functional Anatomy of the Brain*. "I was blown away by the audacity of the operations and the electrical stimulation used to localise function". Not bad for a 13 year-old kid on his first trip to a city—and a bookstore. He bought that book, along with the one that showed how to make that EEG amplifier, for eight bucks.

Nowadays, he gets to spend a little more. "In recent years, I've raised resources to install the Cushing Center in our medical library. It's centred around Harvey Cushing who, between 1905 and 1932, invented modern neurosurgery and reduced the associated mortality from 80% to 8%. The centre works around his three loves, and has 10 000 glass photos of his patients, 500 jars of their brains, and 47 000 books on science and medicine from the incunabula to 1900." It's Dennis' pride and joy.

Yes, he's travelled a long, long way from that country school. In Yale, they probably have a proper tornado basement, but it takes people from all kinds of places, even a farm outside Bedford, to fill it with professors.

Adrian Burton