

FEATURE

The study of anatomy has always been a milestone in a med student's career at Pitt—in terms of how they see medicine, their instructors, their future patients, and themselves. (SHOWN HERE: Students used colored pencils to trace neural pathways during Tryphena Humphrey's legendary neuroanatomy classes.)

THE GREAT EQUALIZER

HOW TO TEACH ANATOMY
 BY JENELLE PIFER
 ANATOMY NOTES COURTESY
 JAMES BONESSI (MD '56)

It was with resolve and optimism that, in the spring of 1923, Davenport Hooker set out to change the way medical students learned anatomy. He was a domineering man, a PhD gross anatomist with vast knowledge, unyielding expectations, and a speaking voice that fell on first-years' ears like cannon fire.

(His excessive volume, students said, was the result of his training as an artillery officer during World War I.)

Hooker was 36 and just four years prior had become the youngest chair of any anatomy department in the country. His idea for remaking the subject at the University of Pittsburgh was bold, but not entirely new. In fact, the notion had been circulating through the minds of the anatomy staff for years: Was it possible to teach the anatomical subjects—gross anatomy, microscopic anatomy, gross neuroanatomy, embryology, and organs of the senses—not as five courses that inevitably overlapped, but as one course, seamless and comprehensive?

In those days, Hooker was a giant in the University of Pittsburgh School of Medicine. He'd arrived at Pitt in 1914 as assistant professor of histology and neurology after a brief stint teaching anatomy at Yale, his alma mater. By 1919, he was appointed professor and chair in the Department of Anatomy, posts he held firmly for the next 37 years.

A small man, Hooker had blue eyes, sandy hair, and a dramatic manner. He would sit on the balcony in the anatomy lab and watch his students (he knew them all by name) dissect cadavers below. They worked four to a table, and a good number of them, mostly men, chewed tobacco to mask the room's odor.

in biological research. He spent summers in college recording the behavior of newly hatched loggerhead turtles in Florida. As a graduate student, he studied the development of embryonic frog hearts. (He noted, to his great interest, that the animal's heart not only begins to beat before being reached by the nerve fibers, but also continues to develop normally, though still unconnected to the nervous system.) This early interest in nerve-muscle relationships would later inform his life's greatest pursuit, a series of groundbreaking reflex studies at the University of Pittsburgh.

But in the spring of 1923, seated in his top-floor office in the medical school, Hooker percolated about a new and better way to teach his students anatomy—one that would also challenge his staff and train its most junior members.

"The best way to learn a subject," he wrote, "is to bear the responsibility for teaching it to others."

The correlated course in anatomy was to



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Davenport Hooker led the department for 37 years and fundamentally altered the way Pitt students learned anatomy.

they would spend another 66 hours learning the anatomy of the nervous system.

Hooker did not gloat over the boldness, newness, or inherent advantages he saw in such a course. Instead, he wrote, "This type

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Hooker's insistence on time and punctuality earned him the nickname "Hurry-up Hooker" among students. "The medical student who arrived late for an eight o'clock lecture arose earlier thereafter," wrote Tryphena Humphrey, an MD/PhD colleague of Hooker's and eventually a professor of neuroanatomy in his department. "There was no tolerance of the lazy or dishonest student, but every effort to aid those in scholastic, financial, or other trouble. No one knows how many students Dr. Hooker helped at critical times in their lives, with encouragement, sound advice, a justly administered scolding or financial aid," Humphrey wrote in a profile of the doctor.

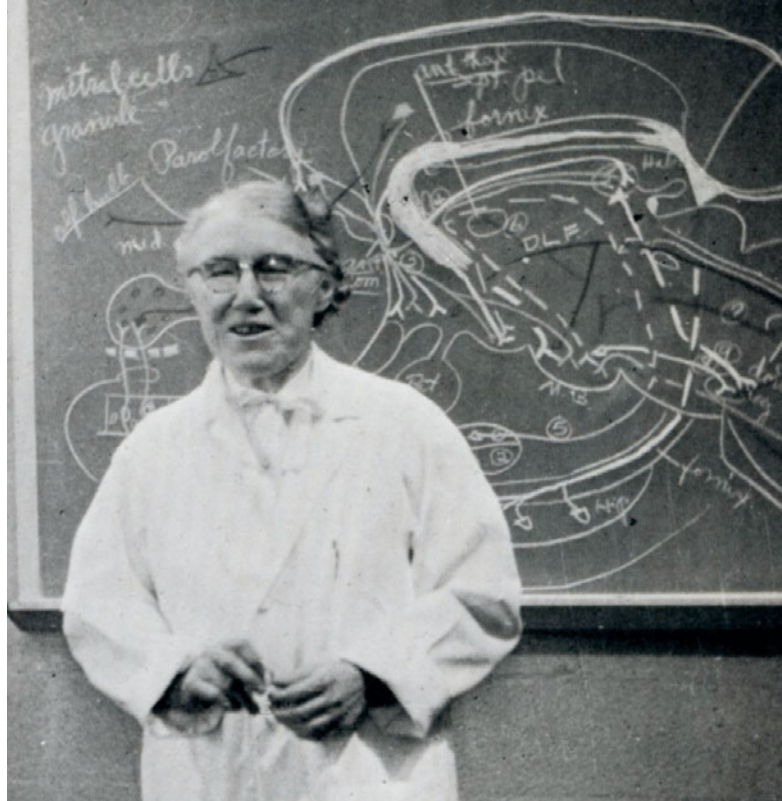
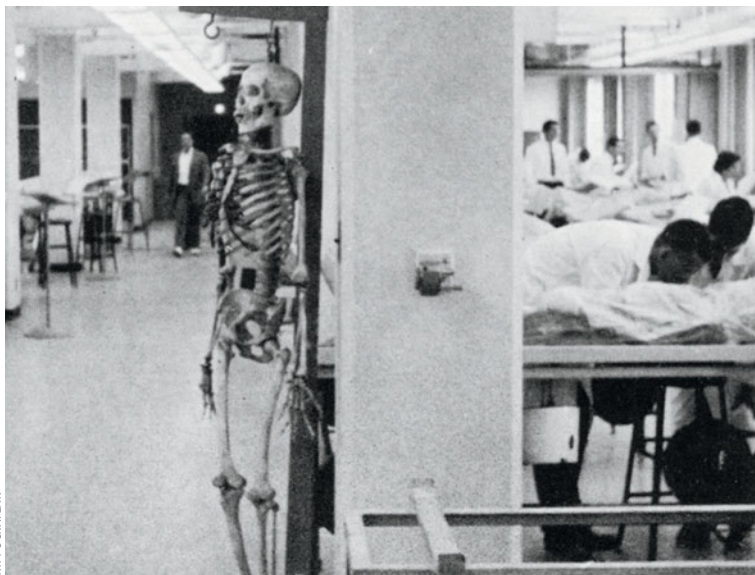
At age 17, Hooker developed an interest

be offered for the first time in the fall of 1924. "The purpose of the course is to give the student a more comprehensive and closely knit knowledge of the structure and development of the human body than was possible with the older method," Hooker wrote in notes on the course. It was to occupy 704 class hours during the first year. As students dissected a cadaver—from the head and neck to the thorax, abdomen, pelvis, and extremities—they would encounter new organs and systems, studying at once gross anatomy, cell anatomy, and embryology. ("It was difficult teaching for the anatomy staff since each instructor found it essential to be prepared on all three phases of anatomy rather than only one," Humphrey wrote.) Students hopped back and forth between the anatomy lab and microscopy lab, towing pieces of tissue or organs recently harvested for study. During the second year,

of course is merely a means to an end. As a method it is valuable, but it is nothing more."

Still, the methodical doctor could not mask his growing anticipation that, in this way, he might be able to teach his students more, in less time.

At the beginning of the school year, Hooker would issue his students a warning, says Perry Engstrom (MD '47), a former student later hired to teach in the department. "He would say, 'There are medical schools where they accept 200 students into a class with the idea that 100 of them are going to graduate. The University of Pittsburgh is different. In our class there are 86 students. We expect every one of you is going to graduate, and we're going to see to it that you do.'" Engstrom says it was a threat, in a way, but the kind that a well-respected



ABOVE: During Hooker's correlated course, first-year students spent several hundreds of hours in the anatomy lab. **RIGHT:** Using a piece of colored chalk in each hand, Humphrey made intricate drawings of the brain and spinal cord.

father might give a son.

Hooker's department was described by the American Association of Anatomists as "a harmonious one in which to work." Prior to the construction of Scaife Hall, the medical school occupied Pennsylvania Hall, a modest building on top of Cardiac Hill where a residence hall of the same name now stands. Students and professors would trudge upwards using a stairway carved into the steep hillside. At lunchtime, it was a nuisance to head down the hill into Oakland and back up again, says Engstrom. So Hooker hosted brown-bag lunches for his staff in the anatomy library. "We'd sit around a table upstairs and have lunch, talking about events of the day, what was going on in the medical school, and what students were having problems," Engstrom says. "Hooker was so sharp. He'd say so-and-so needed some special attention and ask if one of us would look after him and bring him up to date." To these lunches Hooker invited professors, junior instructors, and administrative staff alike. "Everybody came with a brown bag. Your rank had nothing to do with it," says Macy Levine (MD '43B), who worked in Hooker's lab as a student.

It was these interactions that lent an undercurrent of approachability to the giant. Colleagues trusted him and went to him with problems. Hooker and his senior staff would consider each issue with "cautious, careful scrutiny" and then incisively implement a solution, Humphrey wrote. It was clear "the final decision was his," she says, "but the evidence received careful thought, not lip service."

In the summer of 1925, after the first correlated class concluded, Hooker was quick to admit that the program was not without its flaws. "The results of our experience with this type of course have been interesting and in some respects unforeseen," he wrote in "The Teaching of Anatomy as a Correlated Course," an article published in *Methods and Problems of Medical Education* in 1930. Several early blunders in planning led to discouraging results and slow progress among students. These errors were later rectified, however, and students demonstrated a more lasting and thorough comprehension of anatomy than ever before. What they lacked, though, was the same intimate knowledge of the details of structure. "The reader is left to judge which is the more important: a genuine working knowledge of the body, or a rather facile (and, we believe, temporary) grasp of relatively unrelated details," Hooker wrote. "We prefer the former."

To his surprise, Hooker was also forced to note no time had been saved. In considering this truth, the staff agreed it requires as much mental effort for a student to grasp correlation as to study each component separately.

On the whole, however, Hooker and his team determined the experiment was a success. In the coming years, several other anatomy departments attempted a similar teaching method, but "none so satisfactorily or for so long," wrote Humphrey. The correlated course would continue to be taught at Pitt for the next 28 years.

For the success of the course Hooker felt indebted to two colleagues: J.S. Nicholas,

a PhD who worked with him for five years at Pitt and later returned to Yale to become director and chair of the Osborn Zoological Laboratory, and John C. Donaldson, an MD whom he had met in high school. Early and long-lasting friendships formed between Hooker and both men.

Donaldson and Hooker had become reacquainted at Yale when Donaldson was a senior and Hooker, then serving as an instructor of anatomy, was helping teach a course in which he found his former high school classmate. Upon becoming chair at Pitt in 1921, Hooker promptly invited Donaldson to join his staff. One of Hooker's original hires, Donaldson was among the first at Pitt who taught students anatomy by making them see it.

A tall, quirky man, Donaldson was well liked by students. His office contained a large bookshelf of classic literature—specimens he readily lent out to those who dropped by, says Levine, who often took him up on the offer.

During his evenings at home, the doctor would gather cloth, wire, tubing, and clay and assemble anatomical models of the human body. One display demonstrated how the small intestine rotates during embryological development. "The intestine starts out as a straight tube but then develops rapidly and becomes 25 feet long. He showed how it coiled without tangling and knotting itself.

"It was amazing," says Engstrom. "You'd read about it in a book, and then you'd see his model the next day in class. He'd show you how it happens. My gosh, the book made sense after you saw the model." After class the doctor would make these tools available for

students to use. “He’d put his hand on yours so you could do the twisting and moving of the model to get the pieces into place. He’d be right there helping you,” Engstrom says.

Later in life, Donaldson developed a moderate stoop but could still be seen jogging a few steps in the lecture hall (in his youth he was a track man), demonstrating how a reflex signal travels the pathway of a nerve.

Another beloved professor, Jacob Priman, would join the University in 1948. A native of Latvia, Priman arrived in Pittsburgh after treating refugees and displaced people in Germany. His English was poor at first, but it was no matter for anatomical terms were universal. Priman received emeritus status at the University and continued teaching into his 70s.

A correlated course in anatomy required a certain muddling of the department’s hierarchy, which is why, Hooker wrote, “The instructional staff must be willing to cooperate wholeheartedly in the project.” It was vital, he said, that each member act as chief in some parts and assistant in others, according to their specialties. This made even the chair merely a helper at times, Humphrey wrote, “a

among their favorites. (She received two Golden Apple awards for her teaching.)

Using both hands, Humphrey would create intricate drawings of neural pathways on the blackboard and lecture at the same time. “We all carried a box of pencils—just like a first- or second-grader,” says Engstrom. “You had to. Otherwise, you put 150 lines on a piece of paper, and you can’t sort them out. They cross and run parallel.”

“There were very few [projectors] at this time,” says Robert E. Lee (MD ’56), “and her lectures were unique. She was ambidextrous. God help [you] if you dropped the pencil you were drawing with. By the time you found it on the floor, she had switched to another

LEFT: Jacob Priman, a native of Latvia, joined the faculty in 1948 after serving as a physician for the displaced in post-WW2 Germany. RIGHT: John Donaldson was Hooker’s right-hand man and a favorite among students for his colorful, interactive models, which he made by hand from clay and wire.

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procedure only possible in a truly democratic department.”

The course plan also offered, for a certain span of the year, a staff member respite from teaching. It was Hooker’s firm belief that an academic department has three functions: the teaching of students, the training of staff, and research. For the lattermost, the course offered continuous time for thoughtful study, and soon, to the chairman’s great fortune, a colleague worthy of his partnership in the lab would join the University.

Tryphena Humphrey, neuroanatomist and the Hooker chronicler quoted above, arrived at the University of Pittsburgh in 1939. Among friends and colleagues she was known as “Trap.” Among students, “Ma.” A short-statured woman, Humphrey came to class armed with a box of colored chalk. Though students scrambled to keep up with Humphrey, her lectures were

color,” he says.

While Humphrey was still completing her doctorate at the University of Michigan (she studied under Elizabeth Crosby, a PhD neuroanatomist who later became her life partner and won the National Medal of Science), Hooker purchased a 35-mm motion picture camera. Having gained the trust and permission of the obstetricians at Magee-Womens Hospital, Hooker was able to observe therapeutically aborted fetuses removed by Caesarian section. Upon stimulating the skin, he recorded the degree of reflex development, and in January of 1933, created the first films ever made of human fetal movement. Humphrey saw great importance in the study and later joined Hooker for what she called “the momentous task” of documenting how reflexes form.

The records created, involving more than 135 fetuses and 20 premature infants, amounted to the most extensive investigation

of human fetal behavior ever made, according to Humphrey.

Humphrey continued her research until late in life, by which time her glasses had grown thick after she’d spent decades peering into microscopes. She published numerous studies on the patterns of spinal nerve formation in embryos while at Pitt and traveled the world

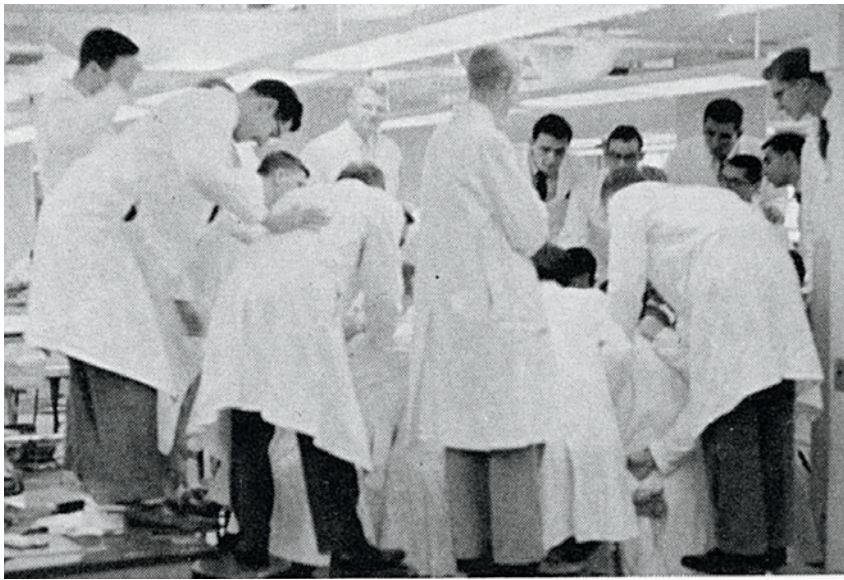
giving lectures. Colleagues noted her affection for the phrase: “Happy to meet, sorry to part, happy to meet again” during these whirlwind years. She left Pitt to become professor of anatomy at the University of Alabama at Birmingham in 1963. She died eight years later.

By the mid-1950s, Hooker was preparing to retire, and pressure was mounting within the department. An explosion in medical knowledge had begun (the double-helical structure of DNA had been discovered just years prior), and the devotion, by then, of more than 800 hours to the study of anatomy seemed to some on staff overblown, Barbara I. Paull wrote in her book, *A Century of Medical Excellence*.

In 1956, a new chair of the department was selected—Albert Lansing, a renowned scientist and PhD who used chemistry and electron microscopes to study cellular aging. The school soon changed the department’s name

LEFT: HIPPOCRATEAN, RIGHT: NATIONAL LIBRARY OF MEDICINE





LEFT: Students gather in the anatomy lab (1957-58). Dissection has long been considered one of the best ways to learn gross anatomy. RIGHT: Humphrey was known by students as “Ma” and earned two Golden Apple awards for her teaching.

to Anatomy and Cell Biology to reflect an increased emphasis on teaching at the molecular level. This name would shift a number of times before the word “anatomy” would be dropped entirely. The anatomical subjects were again compartmentalized, and the course in gross anatomy landed within the jurisdiction of the present-day Department of Neurobiology.

Throughout the country, first-year medical education evolved to cover ever more subjects in less depth. As knowledge expanded in areas like genetics, pharmacology, and molecular biology, new curricula were added that pinched the time allotted for each course.

With the recent explosion of knowledge in the basic sciences, Pitt’s faculty have rethought how to best incorporate the “pure” sciences into the curriculum. In their fourth year, Pitt students now revisit the basic sciences, selecting from a panel of integrated life sciences courses. First-year gross anatomy, now taught in approximately 150 hours, emphasizes radiological imaging and a clinical approach.

“We want students early on to be able to apply basic principles to clinical scenarios,” says Cynthia Lance-Jones, associate professor of neurobiology and lecturer for medical embryology. “That means overtly showing them how to do it from day one.” Students now interact with patients in class and meet in groups to discuss assigned cases.

“There is something magical about taking gross anatomy when students first start medical school,” says Lance-Jones, who also coordinates the first-year basic science core. “It means being a doctor to them. And there’s an element of that that extends to how they view the people who are teaching it.”

The course continues to be “the great equalizer,” notes Jack Schumann, a PhD and Pitt’s current director of anatomy. “We have people who come with PhDs in biochemistry or PhDs in literature. None of the students have had any gross anatomy. It puts them on a level playing field.”

When Lance-Jones arrived at Pitt in 1983, Nick Cauna, an MD/ScD anatomist and embryologist, headed the anatomy program. He, too, created models and drawings on the blackboard. (Like Humphrey, he was ambidextrous.)

“To watch him lecture was unbelievable,” she says. “When I first started, I tried to draw things on the board, and I would literally go to class ahead of time. With dotted lines, I would label it left to right to make sure I didn’t mess it up.

“This was a tradition. I bet [the anatomy instructors] all did it, and none of us can do anything like that now.”

On Schumann’s first day at Pitt, he walked into Cauna’s office to find the man partially concealed behind a giant model of the human head. “So, you are the new anatomist?” Cauna said, “I am the very old anatomist.” He promptly broke into a wide smile and shook Schumann’s hand.

With Cauna’s 1983 departure, traditions of handmade models and black-board drawings came to a close, but a fondness for such customs was not lost. Before Cauna left Pitt he provided materials for a museum in the back room of Pitt’s anatomy lab. There, dissections are enclosed in cases, and his colorful-plaster models of the trigeminal nerve and embryonic development remain

on display. Every year professors still lug certain structures out for lectures, because as Schumann has noted, in bold, near the top of his syllabus, ANATOMY IS A VISUAL SCIENCE.

Following his retirement from Pitt in 1956, Hooker lived and worked in New Haven, Conn., where a space was made available for him in the Osborn Zoological Laboratory. There, he hung a colored print of Rembrandt’s “The Anatomy Lesson of Dr. Nicolaes Tulp” and continued ruminating over the fetal films he’d made at Pitt. Although he made extensive progress during these years, Hooker was not able to complete a comprehensive account of the study before his death in 1965. Nevertheless, the research yielded more than 40 scholarly publications. Hooker’s work was written about in *TIME* and occupied three full pages in the 1947 *Encyclopedia Britannica*. His findings were printed widely in textbooks, and his films were made available to scientists interested in expanding the work.

“Those who were privileged to work closely with him are more conscientious research workers and better teachers because of this association,” Humphrey wrote of her colleague after his death. “Likewise the medical students who passed through his hands ... have become more valuable physicians and more honorable and tolerant men and women because of his influence.”

During Hooker’s last year at the University, the alumni association had his portrait painted. One former student, George Fetterman, MD ’30 (who later joined the faculty), recalled it hanging outside an elevator near the anatomy lab and the chairman’s former office. Every time Fetterman got off that department elevator, he was met by the master’s careful gaze. ■