The late Robert Egan, MD '50, considered one of the fathers of modern mammography, claimed America's peculiar attitudes toward breasts in the middle of the 20th century hampered advancements in cancer research, diagnosis, and care.

HOW A PITT ALUM REFUSED TO LET MAMMOGRAPHY BE IGNORED | BY REBECCA SKLOOT

TABOO ORGAN

A woman with inoperable breast cancer stood before a group of medical students, residents, and professors, her breasts so large and dense that no current technique could tell them how big or deep her tumor really was. This was in the spring of 1956, at the University of Texas M. D. Anderson Cancer Center in Houston. As the woman stood there, Gilbert Fletcher, the head of radiation oncology, looked toward Robert Egan, a radiology resident who had received his MD from the University of Pittsburgh in 1950.

You're a diagnostic radiologist now, he told Egan. *Why don't you figure out how to get X rays of breasts like these so we can know what we're dealing with?*

Egan said nothing, but his curiosity was piqued, especially because a visiting fellow, Jean Pierre Batani, from Paris's Curie Foundation, was at the meeting with a breast X ray showing white flecks indicating cancer. Batani suggested that the technology might be helpful in cases such as the patient under discussion. However, as a radiation therapist, he had no knowledge of the technical factors employed. The technique, in the

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The "Egan technique" allowed doctors to detect calcification in breast tissue. Above, Robert Egan with a patient in 1973.

few places it had been performed, was often far from polished. The images were likely to be fuzzy and grainy, and the balance of radiation level and voltage wasn't right. When the X ray did produce something telling, as in the French example, no one was able to replicate it. Fletcher wanted Egan to find the right technique and make this tool a reality. Egan, who would become known as one of the fathers of modern mammography, obliged, setting off with no idea where to start.

Fletcher had picked a man with the temperament and persistence to rise to the challenge. As Egan reached school age in the 1920s, his mother shuttled him off to first grade in a one-room schoolhouse in their small Arkansas town. He came home a few hours later announcing that school was boring. The alphabet didn't hold the interest of the young boy who'd already learned to read. So he stayed home through all of first grade, refusing to go until school had something to teach him. The first day of second grade, he gave it another shot, but it didn't last: still too boring. It wasn't until the third grade that Egan deemed school worthy, and once he arrived, his teacher bumped him to fifth grade. The impatient student finished college at 19, then became a metallurgical engineer and went to work in a Pittsburgh steel mill. Camped in front of a scalding laboratory furnace for 24 to 36 hours at a time, tinkering with temperatures to find the precise settings needed for specific batches of steel, Egan refined the art of trial and error. And after he walked away from his conversation in the hallway with Fletcher that big Texas spring day, he would rely on his well-honed art once again.

Though X rays were first used on breasts in 1913, mammography hadn't grabbed the attention of the medical field because it was not yet a reliable tool. There were no precise images or techniques for technicians to replicate, and many thought it would never prove useful. Instead of pursuing radiology, others developed techniques like transillumination, which amounted to doctors pressing bright lights to their patients' breasts as they stood in pitch black closets, hoping tumors would alter the beam of light as it passed through the tissue. But the technique was less than effective and risked charring skin—this was in a day that women already shied away from breast examinations.

Egan set out to develop a technology he knew nothing about, in an era when breasts were considered taboo. Americans' attitudes toward the organs were steeped in paradox. Though movie fans were swarming to the cinema to see their favorite voluptuous Hollywood icons, and "sweater girls" were turning heads, many women blanched at the idea of doctors discussing or touching their breasts. Likewise husbands and fathers cringed at the thought of men examining the breasts of their wives and daughters.

"That was part of our culture back then," says Gerald Dodd, emeritus professor and chair of radiology at the University of Texas M. D. Anderson Cancer Center. "You didn't talk about breasts, and women weren't comfortable bringing problems to their doctor's attention because they were afraid it would lead to an examination, which most didn't want."

Egan was known to grumble about men making breasts taboo while glorifying their importance for sexuality and beauty. When he started out, few others were developing technologies for improving breast health. Jacob Gershon-Cohen of Albert Einstein Medical Center, in Philadelphia, Pennsylvania, was another path-setter in clinical mammography who'd run into his own roadblocks. And, of course, Pitt gave rise to at least one other breast cancer pioneer: As Egan set out on his quest for

better breast imaging techniques, Bernard Fisher, MD '46, now a Distinguished Service Professor at Pitt, began his research here that led to the discovery that lumpectomies combined with radiation therapy were as effective as mastectomies for many patients.

Egan wasn't deterred by the unpopularity of his endeavor, though he described himself as "hidden away" with his X-ray equipment, adjusting radiation levels, power, and film type. He developed methodical strategies for testing each possible variable as he x-rayed everything from paper clips to talcum powder, attempting to find the perfect settings and film.

After countless tries, Egan found the ultimate film—one he likely used in his steel mill days. It was an industrial product used for x-raying metal joints in pipelines. He also found the optimal X-ray settings. The voltage had to be high enough to penetrate a soft tissue like the breast, but much lower than that used to penetrate something as dense as bone. And the flow of electrons running through the machine had to be set high enough to get proper radiographic exposures.

Egan used inanimate objects as well as human subjects to find the perfect positioning of the breast by trying everything from compressing the breasts to "floating" them in liquid. Soon, his technique amazed colleagues by pinpointing cancers so undeveloped they were otherwise undetectable. But instead of being greeted with encouragement and acceptance, Egan met a wall of resistance from physicians and surgeons around the country who taunted him; some even called him the "titty man," as they snickered at his work.

He refused to give up. Egan packed his wife and daughters into his dark blue 1950s Ford sedan, filled the leg room in the back seat with clothes and food, and headed across Texas to teach other doctors what he knew about mammography. While their wives cooked and children played, Egan and the local doctors headed to clinics equipped with X-ray machines. He taught them to examine breasts properly and spent countless hours testing and critiquing doctors and technicians on all aspects of mammography: film technique, positioning, radiation dose, the works. Slowly, experience made them into believers. Physicians began requesting mammograms for their patients; and on three different occasions, shortly after doctors learned the "Egan technique," they discovered breast cancer in their own wives.

Egan was not one to let escape any opportunity to sell his approach. Ed White, who was chief of surgery at M. D. Anderson, grew convinced after repeated impromptu conferences with the adamant radiologist. White would sit on a wooden bench in his surgical scrubs, smoking, with his head propped in his hands, as he and Egan discussed breast cancer and diagnosis. Later, in front of thousands of radiologists at a meeting of the American College of Radiology, White became a key ally for mammography by testifying that Egan's mammograms repeatedly found breast cancers that were otherwise undetectable.

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Egan's career took him from Texas, to the Methodist Hospital of Indiana, in Indianapolis, to Emory University in Atlanta, Georgia. At Emory, he set up a recurring two-week education program open to doctors and technicians from around the world. This program marked the beginning of widespread teachings on the art of mammography.

"People in South America and France were working in mammography," says Dodd. "Some were very serious, but they never captured the imagination of the medical field as a whole. Mammography was a neglected procedure until Egan lit a fire under everyone. There were ups and downs, but eventually other physicians started catching the fever. . . . They got their inspiration from his work because it backed up what he said and made mammography a reality."

Each morning, as the fog hung low over the lake behind his house, Egan awoke at 6 a.m., dragging two of his daughters out of bed and onto the lake, where he spent the first hours of every day waterskiing and preparing for the challenges ahead. Once the boat was docked, Egan would head off to work, refreshed and ready to train others in the art of mammography. His work took him around the globe four times as he spread his technique from country to country. Years of persuasion and teaching slowly paid off as mammography became a household word.

After being recognized with honorary memberships in medical societies, including the New York Academy of Sciences, and receiving awards from the likes of the American Cancer Society, Egan—who died this February at the age of 80—spent his retirement years in his Atlanta home where countless researchers learned the secrets of mammography (and waterskiing). It was also where he learned to communicate through a machine he and his daughters called the "typie talkie." Egan lost his ability to speak when he suffered a stroke after radiation therapy damaged his circulatory system. A few years ago, when cancer began spotting his arms, neck, and head, Egan and his doctors acknowledged that years spent alongside X-ray machines had taken their toll. As he tried technique after technique, Egan was protected only by a lead gown that left his arms, head, and neck exposed to radiation. But he had no regrets, and was determined not to let his condition slow him down too much. In fact, he was known to leave the typie talkie inside to work in his yard, cutting down a tree or two if needed.

"Egan was the man who developed a smooth-riding automobile compared to a Model T," Dodd says with a chuckle. "He put mammography on the map and made it an intelligible, reproducible study. In short, he was the father of modern mammography." ■