Milton Zaret, an "Early Prophet" of Microwave Hazards, Dies at 91

U.S. Military Sought To Discredit His Theory of Microwave Cataracts

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Milton Zaret, an ophthalmologist who was one of the first to warn about long-term health hazards of microwave radiation, died on May 29. He was 91.

"Dr. Zaret was an extraordinary pioneer who showed that microwaves have a profound effect on the eye," said Paul Brodeur, who chronicled Zaret's career in *The New Yorker* more than 35 years ago and in his subsequent 1977 book, *The Zapping of America*. Brodeur called Zaret an "early prophet" of the biological hazards of microwaves.

In the late 1950's, when Zaret began his research on the effects of microwave energy on the eyes, the main sources of exposure were civilian and military radars. Physical therapists used diathermy machines to deliver microwave heat to tissues deep inside the body. Microwave ovens were just beginning to catch on and cell phones were still a long way off in the future.

Zaret was the first medical doctor to testify in Congress on the hazards of microwaves. On March 9, 1973, he told a hearing convened by then Senator John Tunney of California:

> "There is a clear, present and ever-increasing danger to the entire population of our country from exposure to the entire non-ionizing portion of the electromagnetic spectrum. The dangers cannot be overstated because most non-ionizing radiation injuries occur covertly, usually do not become manifest until after latent periods of years, and when they do become manifest, the effects are seldom recognized."

Zaret posited the existence of microwave cataracts, which, unlike most others, are first visible in the capsule of the eye, the elastic

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membrane that surrounds the lens. Microwave cataracts, Zaret maintained, usually begin to develop on the back surface — posterior capsule— of the lens and can be caused by chronic, low-level exposures, not just acute high-level exposures.

Zaret was one of the first to put forward the concept that microwaves can have non-thermal effects, a controversy that remains unsettled and which continues today.

Zaret did research for the U.S. Air Force, Army, and Navy. His findings showing deleterious effects at levels below the then current safety standards were seen as threatening to the operation of their radar and electronic warfare systems. Zaret ultimately lost all his military contracts, one by one.

But the military did not end there. Efforts were made to discredit Zaret's work and put him out of business altogether. Zaret's ophthalmology practice allowed him to continue to be active in the microwave arena for decades longer, albeit more as a commentator and expert witness than as a researcher.

Immediately following Zaret at the Tunney Senate hearing, Sol Michaelson of the University of Rochester was called to testify. Michaelson was representing the Association of Home Appliance Manufacturers, which was concerned that Zaret's talk of damage to the eyes might undermine the growing sales of microwave ovens. He disputed Zaret's findings and cited an epidemiological study by Col. Budd Appleton of the Walter Reed Army Medical Center published in 1972, which concluded that chronic exposure to microwaves did not cause cataracts in humans.

The following year, Appleton took direct aim at Zaret's theories. In a commentary published in the *Journal of the American Medical Association*, Appleton wrote "There is no clinical or experimental evidence that lens damage due to microwaves energy is morphologically different from lens abnormalities from other causes," he wrote. Appleton did not cite a single reference to support his argument, not even his own 1972 paper, nor did he mention Zaret by name.

Years later, Allan Frey, an independent researcher well known for being the first to document the microwave hearing effect and for being the first to show that microwaves can cause leakage through the blood-brain barrier, took a close look at the Appleton study. He judged it to be deeply flawed. Frey pointed out that not only had some of Appleton's "exposed" population likely been *un*exposed to microwaves but also that some of his "controls" *had been* exposed. Both flaws would obscure any microwave effect. Even so, Frey found that Appleton's results showed a statistically significant deleterious effect of microwave radiation on the eye. Frey could only conclude that Appleton had failed to do any statistical analysis of his own raw data. (There is no analysis of any kind in the original paper.)

Frey was disturbed by the implications of what he had found. Here's part of what he wrote in the *Journal of Microwave Power* in 1985:

> "The fact that the flaws in [Appleton's] study were not previously reported and discussed raises legitimate questions about what is happening to the scientific process in the area of microwave bioeffects research. [Appleton's] study has been quoted over and over again as supposedly scientific evidence supporting the contention that exposure to microwave radiation is not dangerous. It is the uncritical acceptance of 'negative' biological studies of non-ionizing radiation, such as this, as well as misquotation and misrepresentation in the scientific literature, that have contributed to the distortion of science in the area of research."

When contacted after news of Zaret's death became known, Frey said that some members of the microwave community had tried to block his paper from being published because it might undermine the widely held view that Zaret was wrong.

"Once Appleton put his paper in a prominent journal *[Archives of Ophthalmology],* that was the end of it," Frey told us. "No one believed Zaret."Appleton and other members of the military had effectively "killed any possibility that anyone would follow-up Zaret's work." Frey called Appleton's actions "unethical and immoral." Frey stressed that Appleton never challenged his statistical analysis. A surrogate did file an objection. Frey said that he was denied the opportunity to reply in print.

Appleton died in 1999. At that time his microwave study continued to hold sway. His obituary writer, a fellow ophthalmologist, noted that the 1972 cataract study "remains unrefuted."

Leo Birenbaum, a professor emeritus at Polytechnic Institute of NYU in New York City and a colleague of Zaret's, believes that Zaret's critics strived to "mock, denigrate and discredit" him. "My impression is that no one cared whether Zaret was right or wrong. They just wanted to make sure that no one could establish that low-level microwaves could cause any harm," he said in an interview. Birenbaum was the first author of Zaret's 1969 paper on the effects of microwaves on the eye.

Today, Zaret's research findings remain neither verified nor refuted. As historian Nicholas Steneck wrote in his 1984 book, *The Microwave Debate,* no one has ever done the necessary study:

> "Claims are frequently made that other physicians have looked at some of Zaret's patients and been unable to see the so-called capsular and incipient capsular cataracts. Such checks have never been run under controlled conditions and the results have not been published. The negative results simply circulate as folklore among those who are convinced that Zaret is wrong."

Today, that's as true as it was 25 years ago. Reached in Ann Arbor where he is now a professor emeritus of history at the University of Michigan, Steneck said, "Back then, the military did little more than to try to discredit critics of the status quo."

The military considered Zaret "to be a real danger" to its use of microwaves in all its various weapon systems, according to Frey.

So did the still fledgling microwave oven industry.

As it happened, the day before the Tunney Senate hearing, Consumers Union, publisher of *Consumer Reports,* had cautioned the public not to buy a microwave oven in light of the largely unknown health effects of microwaves.

In an exchange that is not too different from today's ongoing dispute over whether children should be discouraged from using cell phones, Senator Tunney asked Zaret whether he agreed with a March 1973 article in *House and Garden* which stated that microwave ovens are "great fun for children." Zaret shot back: "I would not let my children play with them," adding, "I don't think we should outlaw or ban ovens but I think what we should do is make known to people who are buying them what the risk is that they are running, the full disclosure of risk."

Milton Zaret, Allan Frey, Budd Appleton, Nicholas Steneck, Leo Birenbaum, Paul Brodeur, cataracts, Consumers Union,

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