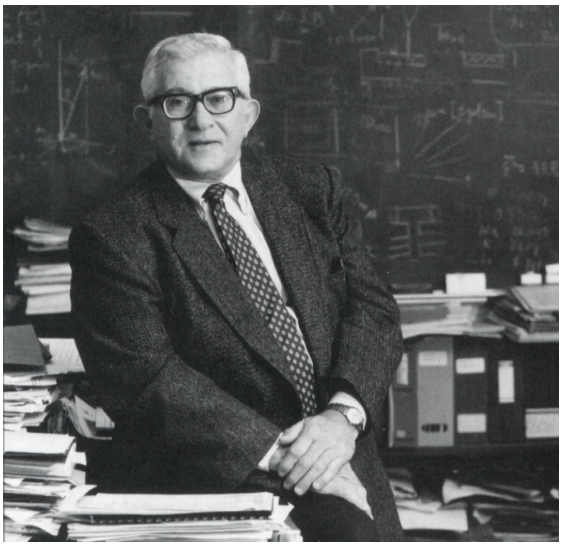
Hiding in Plain Sight
Neglected Low-Level EM Effects

A Reminiscence on the Occasion of Abe Liboff's 90th Birthday

August 27, 2017
Last updated January 12, 2023



Abe Liboff in his office at Oakland University in 1989

Today is Abe Liboff's 90th birthday. Liboff is a physicist —he was the chairman of the physics department at Oakland University in Rochester, Michigan, for many years, and, before that, a professor at NYU. He used to be a coeditor of the journal, *Electromagnetic Biology and Medicine.*

As long as I have known him, Liboff has been asking questions about the world he sees all around. When possible, he runs experiments to test out his ideas. He continues to have a lively correspondence with those who share his interests in electromagnetic field effects, especially the role of the Earth's magnetic field. Liboff is finishing up a book on the topic to be published next year.

Search

Microwave News The Web

Return to Main Article Archive

VIEW ARTICLES BY YEAR

2026 Articles
2025 Articles
2024 Articles
2023 Articles
2022 Articles
2021 Articles
2020 Articles
2019 Articles
2018 Articles
2017 Articles
2016 Articles
2015 Articles
2014 Articles
2013 Articles
2012 Articles
2011 Articles
2010 Articles
2009 Articles
2008 Articles
2007 Articles
2006 Articles
2005 Articles
2004 Articles

Help Support
Microwave News

Back in 1984 when I first got to know him, Liboff had recently completed a two-year fellowship at the Naval Medical Research Institute in Bethesda, Maryland. He was back at Oakland but continued to collaborate with a psychologist at NMRI, John Thomas, who was doing research for the New York Power Line Project (NYPLP) run by David Carpenter.

Liboff's work at NMRI led to two startling experimental findings. One, which was published in *Science,* showed that relatively weak magnetic fields interfered with DNA synthesis. The results raised questions about the safety of power lines, as well as a submarine communication antenna the Navy was testing in his home state of Michigan. (Project ELF, as it was known, became operational in 1989.)

As important as the DNA finding was, there was something else: The experiment challenged the physicists' model of EMF interactions. Liboff had scanned a swath of magnetic field frequencies (from 15 Hz to 4 kHz) and they all triggered a similar effect. According to theory, the fields induced currents in cell tissues and these would go up and down with changes in frequency. But Liboff had seen a flat response, strongly suggesting that currents were not involved. Physics could offer no explanation for what had happened to the DNA —only that it had nothing do with heating. Some kind of non-thermal effect was at work.

"If indeed chromosome replication is affected," he wrote in *Science,* "This would constitute a new type of mutational force."

Liboff's other breakthrough came in the experiment Thomas was running at NMRI for the NYPLP. It showed observable changes in the behavior in animals exposed to very specific combinations of static magnetic fields (like the Earth's natural field) and time-varying fields (like those from power lines and the Navy antenna).

Here again, the applied fields were very weak and the physics as well as the biology ran counter to the prevailing thermal dogma. Liboff's hypothesis is formally known as ion cyclotron resonance (ICR). It initially evolved following exchanges with Carl Blackman of the Environmental Protection Agency and would remain the focus of Liboff's research for the next 30 years.

A "Stunning Demonstration"

The NY project sent a two-man team, Mike Marron and Elliot Postow, to visit Thomas's lab. Marron was with the Office of Naval Research and Postow was with the Naval Medical R&D Command. Both would later become members of the senior staff at the National Institutes of Health.

In his report, Marron called the response of the rats to the combined fields "stunning." He then added, "Even more startling than the experimental results themselves is the rationale these investigators used to design [the] experiment," referring to Liboff's ICR hypothesis. (Read Marron's October 1984 site visit report here; and the November 1984 *Microwave News* article on the experiment here.)

That the experimental results fit the ICR model "would seem to be more than coincidence," Marron concluded, "How much more remains to be seen."

At the time, Thomas told me that this was "one of the most interesting developments to come along in a long time."

The Navy expressed interest in following up and asked Liboff to prepare a proposal. But, just as he was about to submit one, the Navy called to say it was no longer interested. The program closed down, and Thomas was taken off EMFs and assigned to cold weather research.

The Navy has a long history of suppressing research that could conflict with its core mission. Its decision on ICR could well have reflected the fact that Project ELF was seen as central to the command and control of the Navy's nuclear weapons. Yet, in an exchange of e-mails last week, Marron pointed out that, at that time, the Navy lost the lead on EM research to the Air Force, which let the ICR work slide. Indeed, it would become apparent that the Air Force was more interested in developing EM weapons than investigating side effects and mechanisms of interaction. The Air Force later built a ray gun that uses millimeter waves to inflict painful burns; the system is called "active denial."

Thomas and Liboff submitted their animal behavior paper to *Science*. But this time the peer reviewers rejected it. "They considered the whole thing absurd," Liboff told me recently. Nevertheless, the work has been replicated "widely," he said. The Thomas-Liboff ICR paper was published in *Bioelectromagnetics* in 1986.

Zhadin Sees Effect with Magnetic Fields Below 1 mG

When I called him to go over some of this old history, Liboff was more interested in talking about experiments that had been carried out in Mikhail Zhadin's lab in Pushchino, not far from Moscow. In the late 1990s, Zhadin showed effects consistent with the ICR hypothesis at minuscule magnetic field levels —down to 20nT or 0.2mG. (Yes, a fraction of a milligauss.) Zhadin died in 2015 at the age of 80.

"It's fantastic work," Liboff told me. "It's been replicated in three different labs, notably at the University of Turin, he said. "Yet, there's no appreciation of Zhadin's work."

Frank Barnes, a distinguished professor emeritus at the University of Colorado in Boulder, is a coauthor of a key 1998 paper by Zhadin. Still Barnes is more ambivalent than Liboff. "I have never been quite comfortable with the theory or felt I understood what was going on," he told me recently. But, he said, "It's worth looking at Zhadin's results again," in light of the replication in Italy.

Liboff continues to stress the importance of experimental data. What is observed in the lab, he maintains, has more significance than what the theory and equations show. "We may not have an explanation for everything we see in the lab," he said, "but that has

not stopped the application of ICR to a host of medical problems — such as, repairing broken bones and, more recently, damaged heart muscles."

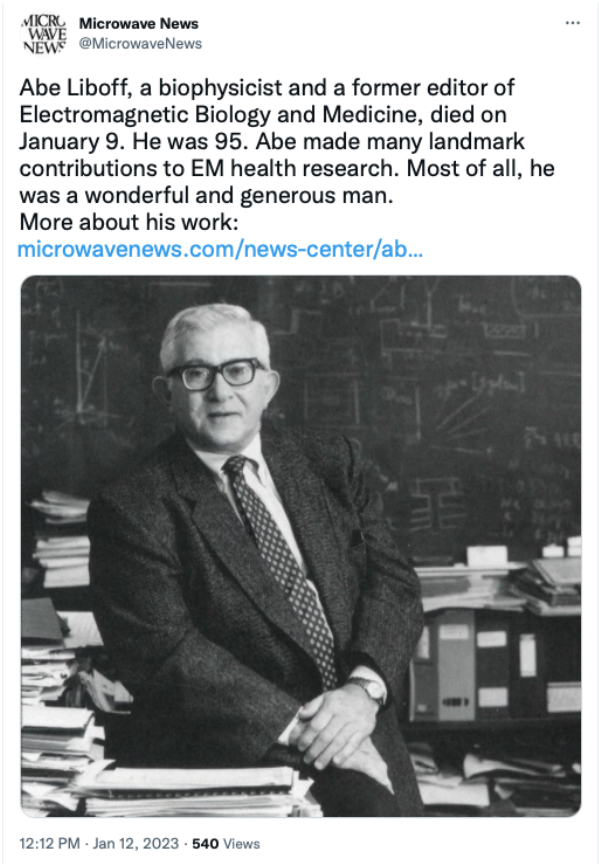
"Even more exciting," Liboff continued, "Ultraweak ICR magnetic fields have been shown to alter the structure of water."

Clearly, even at 90, Liboff is nowhere near done yet.

Oxford University Press will publish Liboff's book, Biological Effects of the Earth's Magnetic Field, *in 2018.*

LIboff Dies at 95

January 12, 2023



Abe Liboff, Frank Barnes, Mikhail Zhadin, Carl Blackman, Michael Marron, Elliot Postow, David Carpenter, nonthermal effects, cyclotron resonance,

© Copyright Microwave News 2003-2026. All Rights Reserved.