IN MEMORIAM
James Frazer (1928-2007)

An Innovative Biophysicist Who Pioneered in the Use of Electromagnetic Radiation

by Ned Rosinsky, M.D.

James Frazer, an innovative scientist in the fields of biology and electromagnetic radiation, and a member of the Scientific Advisory Board of *21st Century Science & Technology,* died Aug. 3 in San Antonio.

Jim was an energetic and enthusiastic collaborator of Lyndon LaRouche, starting in the formative stages of the biological sciences work of the Fusion Energy Foundation (FEF). This collaboration began in the early 1980s, when he was recommended to the FEF as one of the best people to talk to about the then new science of Nuclear Magnetic Resonance or NMR (now called Magnetic Resonance Imaging or MRI). Frazer participated in several dozen informal seminars with LaRouche and the FEF, here and in Europe, and he served on the advisory board of *Fusion* magazine, and its successor, *21st Century.*

Frazer's scientific interests were broad. His educational background included training in electrical engineering, and he received his Ph.D. in basic medical sciences from New York Upstate Medical Center School of Medicine. He served in the U.S. Navy Medical Service Corps and subsequently devoted his life to scientific research, training students, and advocating for reform in national science policy.

He had a strong interest in investigating living processes by using spectroscopy, the measurement of absorbed and emitted electromagnetic radiation which characterizes the resonant properties of the process. He worked on the spectral properties of such biological entities as enzymes, DNA, cellular water, cell membranes, and glycoprotein molecules attached to the surface of cell membranes. From these spectroscopic investigations, he developed dynamic concepts of living processes based on the harmonic relations of their characteristic resonances.

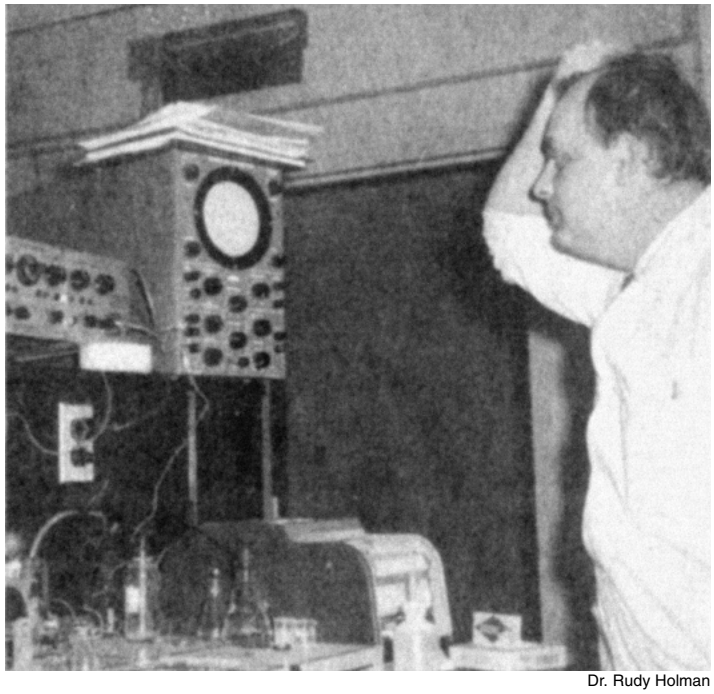
For example, Frazer was able to distinguish varying degrees of malignancy among several similar lines of cancer cells, based on the resonances of the cell membrane glycoprotein structure. These glycoproteins are known to be involved in immune reactions and in the control of cell growth, both of which are abnormal in malignancies.

Similarly, he had a strong interest in the use of nuclear magnetic resonance to characterize the structure of water molecule associations with other cell constituents, such as enzymes and cell membranes, and he did work in using NMR to identify changes in cellular water structure in malignant cells with important implications for diagnosing cancer early.

In the Tradition of Kepler

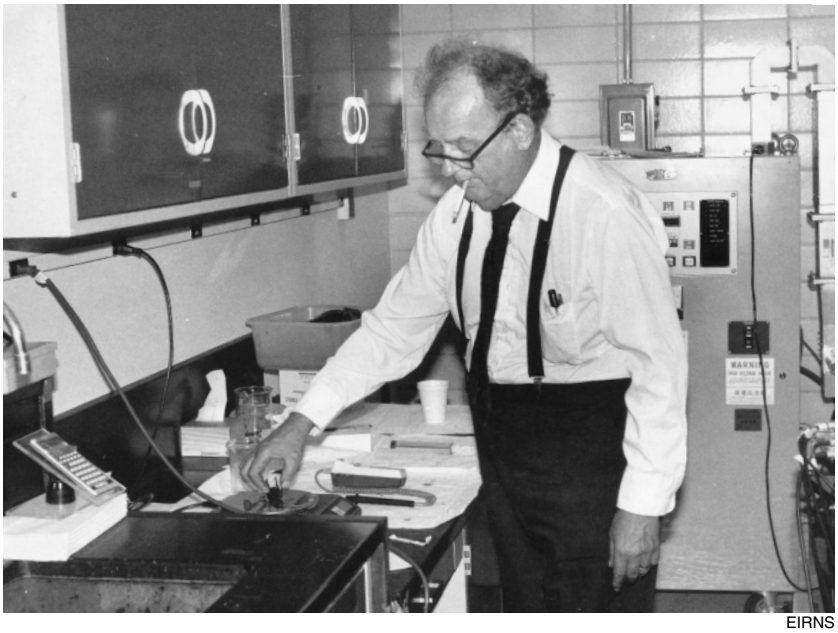
Frazer's interest in the resonant frequencies and harmonic characterization of living processes put him squarely in the tradition of the scientific genius Johannes Kepler. It was Kepler who discovered harmonic relations among the planetary orbits of the Solar System, in which the eccentricity of the orbits correspond to musical interval ratios, and the orbital radii correspond to a nested set of Platonic solids. It is likely that these harmonic relations among the planets represent the footprint of a prior self-organized plasma state of the early Solar System, in which harmonic resonances of the plasma state would form in these patterns, similar to the self-organized plasma processes seen in magnetic confinement high-energy fusion reactor experiments.

Frazer was not only interested in



Dr. Rudy Holman

Frazer as a predoctoral fellow around 1963 at the Upstate Medical Center in Syracuse. He wrote of this photo that he was "puzzled by the discrepancy between hydrogen ion production, measured with the home-built autotitrator (shown), and inorganic phosphorus production while ATP was being hydrolized by a crude renal ion-stimulated ATP-ASE enzyme preparation."



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Jim Frazer in his lab, working on the proof-of-principle electromagnetic radiation experiment to kill grasshoppers.

understanding the living process; he carried his scientific endeavors to the next step, actively intervening into living processes on the basis of his understanding of the harmonic relations. He developed treatments for cancer using directed electromagnetic radiation in the microwave range to kill tumor cells. He invented a process for causing two living cells to fuse into one cell, using electromagnetic radiation, a technique of extreme importance in basic biological research.

During the 1970s and 1980s, Frazer collaborated with the military to assess the possibility that the Soviet Union was developing anti-personnel weapons, based on using electromagnetic radiation tuned to the frequencies that would be maximally absorbed by the entire human body, or by the human head, based on size and electrical impedance properties.

Working with the Fusion Energy Foundation and the LaRouche political movement to combat the deadly locust plague that raged in Africa in the 1980s, Frazer demonstrated in a laboratory the highly nonlinear absorption of electromagnetic radiation by grasshoppers. This was a proof-of-principle study to show the possibility of wiping out a swarm of locusts using a helicopter trailing an antenna which would provide the electromagnetic waves. (This successful work could be used today, as locusts once again threaten crops in Africa and elsewhere.)

Frazer's interest in nonlinear spectroscopy, including the inducing of shock wave propagation, also places him in the tradition of Bernhard Riemann, who wrote the first paper on shock wave production, and continued Kepler's work with his own work on harmonic functions. Frazer's interest in biophysics within this tradition enabled him to quickly recognize the relevance and importance of LaRouche's Riemannian model of the physical economy. He was committed to fighting to change the priorities of research funding to put more effort into these lines of investigation.

Those of us fortunate enough to know Jim personally, and to benefit from his wisdom, recognized that he had a mild demeanor, approached the world with a kind smile, and tolerated adversity without becoming ruffled. But his thought was revolutionary and steadfast, his bearing likened to an iron fist in a velvet glove. We will miss him sorely, and we extend our condolences to his family.