

OBITUARY. Anticipatory by E. Creutz

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Having been persuaded that the person who knew me best should write my obituary, I offer the following probable facts about my life. I do this not to hasten the day when such writing may be more appropriate, but to lessen the deficiencies or excesses that another person unwittingly might provide.

Having entered life during a snowstorm on January 23, 1913, in Beaver Dam, Wisconsin, I learned to respect Nature's ways of showing her power. My father was a high school history teacher, and my mother had taught general science before giving birth to my older brothers, John and Jim.

I felt something was missing by not having a sister, and I strongly recommended to my mother that she provide us with one, by whatever the appropriate process was. She obliged, and in 1916 my sister, Edith, was born.

Our family must have been a quite satisfactory one, for I have pleasant memories of outdoor picnics in our back yard, of working in our vegetable garden, and of much game playing and being read to by my mother.

Since I felt at least partly responsible for the existence of Edith, whose presence I had negotiated, she and I became very close, and surely lived in a land of mutual imagination. I remember no quarrels with her, and if there were such they must have been of very short duration. We would spin out tales of fantastic lands and imaginary beings. She was my best friend and confidante.

In 1916 we moved to Eau Claire, where my father taught at the Normal School, a sort of training ground for new teachers, and I recall several whom I helped to educate in kindergarten and first grade.

In 1920 we moved to Monroe, where my father became superintendent of schools. We continued vegetable gardening and story telling, and finally acquired a Model T Ford automobile. This was a great challenge to my father, who rebuilt it several times each year. This required very few tools or expert knowledge, since cars were then made to be easily repaired. Memorable is the occasion when, after a weekend of rebuilding, he tried to back out of the garage, and found that reverse was forward, and vice versa. This required a second session of rebuilding to invert the problem.

I played in the Monroe high school band and played left guard on the high school football team. A group of us organized a dance orchestra, called Rosie's Ragadors, in which I played tenor banjo. This continued until our faculty sponsor, a personable young single woman, became pregnant.

We moved to Janesville in 1927. I joined the band again, and played left guard in football once more. I also played tympani in the high school orchestra.

My interest in science and particularly in photography developed. I experimented with nearly all the processes of color photography known at that time. I worked out a new process, using ordinary black and white printing paper and coloring with heavy metal salts. This experience interested me in chemistry. Our considerable outdoor life in gardening and

camping made me want to learn some biology. And the post-glacial landscape of southern Wisconsin intrigued me with geology.

After I graduated from Janesville High School in 1929 I was fortunate to find a job as bookkeeper in a bank. This lasted for three years, by which time my brother John, who had graduated from the University of Wisconsin, insisted that I go to college. Since I did not know what to study, he said, "Well, since you are interested in science, take physics and that will help you in any field of science."

He was right, of course, so I studied physics and never escaped.

My father died in 1935 when I was a junior in college. There was no money, so I was most fortunate to get a part-time job taking care of the physics laboratory equipment. I also got a dishwashing and shortorder cook job to pay for my meals. But the best news was when the physics department at the University of Wisconsin offered me a job teaching physics labs when I was a senior in 1936. I learned to operate a lathe and do a bit of glassblowing, and felt a great appreciation to the physics staff who had so much helped me. Particularly I thank Ragnar Rollefson, whose sister, Lela, I later married; Julian Mack, who gave me a minor research project when I was a freshman; Eugene Wigner, who inspired me for many years; and Gregory Breit, who paid me for tutoring his son in calculus.

Nuclear physics was rapidly ascending as the new physics in the 1930's, and I did a senior thesis on isotope separation and a Ph.D. thesis on proton scattering from lithium. Ray Herb, who built the first "very high energy" proton accelerator (up to 4 million electron volts) helped me enormously in this work, and Breit was my sponsor.

Before I received my Ph.D. I married Lela Rollefson, a mathematics major who had four scientist brothers. I am sure that her background thus helped to alleviate the stress of being married to a physicist.

In 1939 I was invited to Princeton University to help operate their cyclotron. This was immediately after the discovery of the fission of uranium by two German scientists, Hahn and Strassmann.

On my third day in Princeton I was invited to give a short report on my thesis work. There were usually two or three speakers at these "Journal Club" meetings. This time the speakers were Niels Bohr, Albert Einstein, and Ed Creutz. To be on the same program with these two giants of scientific accomplishments was breathtaking. Just before the meeting began, my sponsor, Delsasso, asked me, "Say, Creutz, have you met Einstein yet?" I had not. Delsasso took me over to where Einstein was sitting in sweatshirt and tennis shoes, and said, "Professor Einstein, this is Creutz who has come to work on our cyclotron." The great man held out his hand, which seemed as big as a dinner plate, and said in an accented voice, "I'm glad to meet you, Dr. Creutz." I managed to wheeze out, "I'm glad to meet you, too, Dr. Einstein."

Life went on, but not in quite the same old way. Bohr had brought to the meeting the details of the discovery of the fission of uranium, an entirely unexpected development in physics.

A number of scientists throughout the world who had access to cyclotrons to produce the necessary neutrons to cause fission immediately went to work to study this new phenomenon.

I built an ionization chamber and a linear amplifier, using the materials available at that time. These included radio vacuum tubes, coffee cans, and motorcycle storage batteries. And sure enough, the incredibly large energy pulses from fission showed up on the oscilloscope.

Things moved very rapidly from then on. Working under Eugene Wigner's constant guidance, I assembled two tons of very pure graphite, heated it to 1800 degrees Fahrenheit, and measured the nuclear properties of lumps of uranium oxide when bombarded by neutrons, as affected by the geometry and temperature.

A good fraction of the scientists working on uranium assembled in Chicago in 1942 at the "Metallurgical Laboratory," the code name for that part of the uranium project.

I changed my research efforts from nuclear physics to the study of various engineering requirements for nuclear chain reactors. Still under the close guidance of Wigner, I worked on properties of and fabrication methods for uranium and beryllium metals, and various mechanical and heat transfer problems. In all of this work, David Gurinsky was an essential contributor.

When the success of the reactors seemed assured, my wife and I moved to Los Alamos in late 1944.

The first major event for me at Los Alamos was the birth of my son, Michael.

Obstetricians were lacking, nurses were not expecting childbirths, the doctor was expert in radiation, and the hospital was an army barracks. But all went well.

Another memorable event at Los Alamos was the presentation of Handel's "Messiah" by a group of laboratory staff. I was to play tympani. We could borrow two tympani from the Santa Fe High School. But we needed three. So we built one, using an atomic bomb casing for the main structure.

After the war, I was offered the opportunity to join the physics department of the Carnegie Institute of Technology in Pittsburgh. Frederick Seitz, head of the department, made every opportunity for me, resulting in our construction of a large cyclotron, producing protons of 440 million electron volts energy. Our group, assembled primarily from coworkers Jack Fox and Roger Sutton from Princeton, and others from the war days, succeeded in designing and building a machine with a magnet weighing 1500 tons, large, but using 1000 tons less steel than its nearest competitor. Essential to this work and our entire cyclotron program was Martyn Foss, who had been essential to the work at Chicago and Los Alamos, and who later received his Ph.D. at Carnegie.

In 1947 my second son, Carl, was born. Although I do not remember attempting any career influence on my two sons, they both became productive scientists later, Michael at Brookhaven National Laboratory, and Carl at the University of Virginia.

After several years of pleasurable work at Carnegie, during which I became Director of the Nuclear Research Center and Head of the Department of Physics, I was asked by Fred

de Hoffmann, whom I had known at Los Alamos, to join him in establishing a new venture for General Dynamics Corporation: a new division to be dedicated to scientific research and development in nuclear energy. The year, 1955, seemed right for the commercial development of nuclear energy. We designed and built a laboratory in San Diego. We called our new enterprise General Atomic. At the dedication ceremony, Niels Bohr was our keynote speaker.

My daughter, Ann Jo, was born in Pittsburgh shortly before I left Carnegie. My children attended schools in Rancho Santa Fe, California, where my wife was active in, and for a time president of, the PTA.

In California we served as hosts for extended periods to two young South Pacific people, Noni Toth from Tahiti, and Amataga Luamanuvae from Western Samoa. Both returned to their native countries, to establish their own families. I believe they benefited from their experiences with us as we did with them.

At General Atomic, I became Vice President for Research and Development. Some of the company's accomplishments include the invention and production of the Triga research reactor, the most widely used in the world, and the prototype high temperature gas cooled power reactor, the most thermally efficient reactor yet constructed. In addition a major program of research in controlled fusion was initiated.

In 1970 I left California to become Assistant Director for Research at the National Science Foundation in Washington, D.C. This was a stimulating experience, and one in which I felt I could return some service to our federal government's program in science, from which I had benefited considerably for many years.

A great tragedy came to me two years later when my wife died of cancer. My three children were establishing themselves and I knew they would be worthy memorials to Lela. I have not been disappointed in this. All have married and created good families. My two sons have become productive scientists. My daughter, Ann Jo, has developed a career working with veterinarian establishments and teaching [Received an M.A. in Special Education in 2008]. I was pleased when she married a nuclear submariner, David Cosgrove, who went into the nuclear power industry. Collectively my offspring are raising my five grandchildren and two subsequent great-grandchildren [updated to 2009].

The period after Lela's death was a very turbulent one for me. By my greatest good fortune two-and-one-half years later I married Elisabeth Cordle, who worked for the National Science Board. She shared many of my deepest interests, and together we developed new ones. A favorite is the finding and photographing of wild orchids. She has sharp eyes and can locate them where few others can.

In 1977 my Presidential appointment with the National Science Foundation terminated and we moved to Honolulu, where I became Director of the Bishop Museum. This is a remarkable institution, specializing in the cultural and natural history of Hawaii, primarily, but including most of the South Pacific. This provided a new set of circumstances for me, and my Washington experience, working in a support role with scientists of all kinds, was invaluable to me. During my tenure we approximately doubled our budget, and secured funding for two major new buildings. A notable accomplishment was the writing

and publication by the staff, led by Seymour Sohmer, of the two volume “Manual of the Flowering Plants of Hawaii.” After leaving the Museum in 1987, my wife and I returned to California, where we enjoy the climate and camping in the desert, but like to vacation in the midwest, where there are more wild orchids.