



Charles C. Lauritsen

A tribute by

William A. Fowler

I was one of Charles Lauritsen's first graduate students, and I speak for all of us for whom he was *the Professor*. One of the most precious relationships in the whole of scientific life is that between the graduate student and the professor who supervises his doctoral research. Those of us who were Charles Lauritsen's students had the opportunity to savor this relationship to the fullest extent. With his students Charlie was magnificent. He taught us everything from how to run a lathe to how to design and build electroscopes, ion sources, cloud chambers, magnetic spectrometers, electrostatic analyzers, and high voltage accelerators. But most of all he taught us how to do experiments—in simple, direct, elegant ways.

It was always the case that Charlie saw through to the heart of any problem. Whereas most of us tend to overdesign apparatus and to use redundant procedures in our experiments, Charlie delighted in designing inexpensive and simple devices which would make the experiment and its theoretical interpretation as straightforward as possible. He delighted too in convincing us in his logical manner that his suggestions were the right ones. When agreement had been reached, he got perhaps his greatest satisfaction in going to the lathe and turning out the most difficult parts and pieces himself. But withal he always taught us why he did thus and so, and we learned, inso-

far as we were able, something of his marvelous insight into how to *do* physics, as he so frequently expressed it.

Charlie was primarily an experimentalist, but it was his close personal relationship with theorists which broadened and deepened the experiences of his students. This continued throughout his lifetime, but it was especially true before World War II when what we now call classical nuclear physics was in its golden age. It was truly golden for all of us in Kellogg, because first of all there was Charlie Lauritsen, one of the great men in the field along with Rutherford and Cockcroft and Lawrence and Tuve, but also there were his two friends Richard Tolman and Robert Oppenheimer.

They were giants—all three in their different ways—but all three were truly great men. It was exciting and even awe-inspiring to listen to their discussions about our experiments and what the experimental results meant in terms of the nuclear theory of that time. Tolman and Oppenheimer were delighted with the discoveries in nuclear physics which came out of Charlie's laboratory—the discovery of resonance in proton-induced reactions; the first production of high-energy gamma rays, neutrons, and radioactivity with accelerators; the discovery of the "mirror" nuclei; and the proof of the annihilation of positrons, among many other firsts.

What we did not know at the time was that Oppenheimer was laying the foundations for a good part of our present understanding of the nucleus; what we *did* know was that he and Tolman were keenly interested in our results and that Charlie was guiding our efforts in a manner which was significant and important to the theorists.

I have used the word "guiding" advisedly. Charlie never gave any consideration to being designated the director of the Kellogg Radiation Laboratory. He did not direct, he guided. This was very important to him, and it made all the difference in the world to us in our growth and development into independent scientists. It is true that in those early days we called Charlie the "boss," but this was in the same admiring yet somewhat irreverent spirit that we called Robert A. Millikan the "chief."

Charlie guided us as individual students with keen insight into our capabilities and potentialities, but in a much broader sense he guided the entire effort of Kellogg into the most active and promising branches of physics. He was never afraid of change. He started with Millikan in the field of cold emission but soon went independently into the development of high voltage x-ray tubes for research both in physics and medicine. He became a Fellow of the American College of Radiology, one of the first of his many honors. It was quite natural that he was able to adapt his high voltage tubes to positive ion acceleration when nuclear physics, as we know it now, broke on the scene in 1932. Charlie pioneered in the elucidation of the excited states of the light nuclei and of the interaction of protons, deuterons, and alpha particles with these nuclei. In 1939 Hans Bethe pointed out that the carbon and nitrogen reactions which we were studying in the laboratory were of crucial importance in the generation of energy in stars. There was nothing he could do about it at the time, for World War II soon involved him and all of us in defense work on proximity

fuses, rockets, and atomic ordnance. But with the end of the war Charlie made a most difficult decision regarding the future direction of research in Kellogg. Rather than guiding us into high-energy nuclear physics he encouraged us to continue our prewar efforts in low-energy nuclear physics and to emphasize the applications in astronomy and astrophysics. To accomplish this he arranged a series of meetings between astronomers and nuclear physicists with Ike Bowen who had just then become the new director of the Mt. Wilson Observatory. Thus he started a unique program in nuclear astrophysics which has been so rewarding for all of us since that time.

With all of this, Charlie was more to us than just our professor. He influenced our entire lives. We were in many ways a high-spirited crew with strong loyalties to and strong identification with Kellogg—Charlie's laboratory. We worked hard and we played hard. We were proud of our capacities, intellectual and otherwise. Very early Charlie started the Friday evening seminars which still bear the indelible mark of the Kellogg spirit. After the seminar we always went to Charlie's home for refreshments and argumentative discussions of physics, medicine, and philosophy. Sigrid Lauritsen was always there to make us feel at home. Frequently her medical collaborators in radiology joined us, and Stewart Harrison from the clinical group then operating in Kellogg was often there. Tommy Lauritsen played the piano, and Charlie sometimes accompanied on the violin. At other times Charlie sang and taught us the wonderful songs of Carl Michael Bellman in Danish.

And so our professor was more than just our mentor in the laboratory; he was confessor and confidant, and he introduced us to a rich world outside of physics and science. I suppose the simplest way to put it was that for many of us he was a second father. We were his sons; and as his sons we came to love and admire him very much—for he was a very great man.

Charles C. Lauritsen, professor of physics, emeritus, died April 13 at the age of 76. A member of the Caltech faculty for 43 years, Dr. Lauritsen was a pioneer in nuclear physics, rocket research, and radiation therapy for the treatment of cancer. He directed research in Caltech's Sloan and Kellogg Laboratories for over 30 years. William A. Fowler delivered this tribute at a memorial service for Dr. Lauritsen on the Caltech campus on April 29.