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THOMAS LAURITSEN

1915—1973

A Biographical Memoir by

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Biographical Memoir

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THOMAS LAURITSEN

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BY WILLIAM A. FOWLER and FAY AJZENBERG-SELOVE

THOMAS LAURITSEN, a distinguished nuclear physicist, was born in Copenhagen, Denmark and he died in Pasadena, California after a forty-one-year association with the California Institute of Technology—as an undergraduate student (B.S. 1936), as a graduate student (Ph.D. 1939), and as a member of the faculty.

He was the son of another distinguished nuclear physicist and member of the National Academy of Sciences, Charles Christian Lauritsen (1892–1968)[1] and of Dr. Sigrid (Henriksen) Lauritsen, a radiologist, and he was married to Margaret (Solum) Lauritsen in 1946. He is survived also by two children, Eric Lauritsen and Dr. Margaret Ann Lauritsen Press, and by two grandchildren, Christina Lauritsen and Sara Press.

As a student at the California Institute of Technology, Tom Lauritsen participated in the buildup of the experimental facilities of C. C. Lauritsen's laboratory, which was one of the frontier nuclear physics laboratories in the 1930s. From his father, Tom learned the delight of designing and

[1] Charles Christian Lauritsen, In: *Biographical Memoirs of the National Academy of Sciences*, vol. 46, pp. 221–39 (Washington, D.C.: The National Academy of Sciences, 1975).

of building, with his own hands, clever devices that would make possible increasingly sophisticated answers to important physics questions. He learned how to improvise when his original design failed to work out, and he learned to build devices that did the job for which they were intended effectively and efficiently. The pressurized electrostatic accelerator he built with his father and one of us (WAF) operated continuously and productively from 1939 until 1979, except during the war years.

For relaxation Tom joined the other graduate students after the traditional Kellogg seminar on Friday nights. They repaired to the home of Tom's father and mother as self-constituted members of the Kellogg Light Conversation and Heavy Drinking Society. Tom played the piano and his father played the violin. The favorite songs were by Carl Michael Bellman, the eighteenth-century Swedish poet-musician.

In 1939, Tom Lauritsen went to Blegdamsvej 17, Copenhagen (later the Niels Bohr Institut), as a Rockefeller Foundation Fellow. There he built a duplicate of the Kellogg accelerator, and he participated in fission studies with Niels Bohr, J. K. Boggild, and K. J. Brostrom. The German invasion of Denmark led to his return to the United States in December 1940 with his Danish first wife, Else Chievitz (1921–1944), on a ship that brought many European refugees to our shores (including one of his later coworkers, Fay Ajzenberg-Selove). Tom Lauritsen's collaboration with the Bohr Institut, and his warm friendship with Aage and Niels Bohr, continued throughout his life; he returned to Denmark in 1952–1953 as a Fulbright lecturer and in 1963–1964 as an NSF Postdoctoral Senior Research Fellow.

Aage Bohr, at the Thomas Lauritsen Memorial Service at Caltech on November 1, 1973 stated that,

This was a most successful arrangement. Tommy brought along his great insight and experience concerning the latest experimental techniques that he had helped to develop here at Caltech, in addition, of course, to his own inventiveness. (He initiated the construction of a pressurized Van de Graaff.) The work that he accomplished during his stay and the momentum that he imparted to our whole group launched our Institute on a line of development that has continued to be of basic significance for nuclear research in Denmark.

Aage Bohr also recounted that,

Tommy would, of course, always be at the center of activity. Whether in the laboratory or at a party, life around him would have a special quality because of his inexhaustible vitality and wit and his ability to transmit to his surroundings the feeling of joy and exuberance. At the parties, the level of excitement could soar to quite considerable heights, egged on by singing and dancing, and Tommy would perform many wondrous acts. Once he contended that he could pull the table cloth with one mighty jerk, leaving glasses and tableware intact; the vividness of his description and the convincing manner of his approach succeeded in holding everybody in a kind of horrified suspense, although, of course, he never actually performed the deed. Indeed, behind his joking and pranks was his tremendous self-discipline. One simply cannot imagine that he would ever say or do something that would hurt anybody.

Thomas Lauritsen was elected a Fellow of the Royal Danish Academy of Sciences and Letters in 1965. He was subsequently elected to the National Academy of Sciences in 1969.

During the World War II years, the Kellogg team set up one of the prime centers of scientific and technological work for the U.S. Navy. Tom, and the other members of the Kellogg group (C. C. Lauritsen, William A. Fowler, and others) were involved in the development of the proximity fuse and in the design and construction of solid-fuel rockets. More than half a million rockets were delivered to the Navy; until the last year of the war every rocket that was shot by the

U.S. Navy was made in Pasadena. Tom Lauritsen was also engaged in work at Los Alamos in 1945 on nonnuclear components of atomic weapons. Tom Lauritsen was awarded the Naval Ordinance Development Award by the Department of the Navy in 1945, and the President's Certificate of Merit in 1948 for "outstanding contributions to the war effort."

After the war, Tom Lauritsen, together with C. C. Lauritsen and William A. Fowler and several younger colleagues, established the Kellogg Radiation Laboratory as a world famous center for important work in basic nuclear physics and in nuclear astrophysics. The exhilarating, intense scientific work was complemented on many evenings (and nights) by continued interactions between faculty, students and outside visitors, most often at Tom and Margie's house over pots of spaghetti and cases of beer, accompanied by old and new Scandinavian drinking songs. The closeness of faculty, students, and visitors at Kellogg have made it a unique, and a uniquely influential institution in nuclear physics and in nuclear astrophysics. All of this was primarily due to Tom Lauritsen's unpretentious leadership, his planning, and his close and direct connection with all the experimental work in the laboratory.

Tom Lauritsen's principal research interest was in the nuclear spectroscopy of the light nuclei, particularly in areas of importance to astrophysics, and he was involved in several of the seminal experiments in that field. Perhaps his greatest contribution to nuclear physics was in creating the critical reviews "Energy Levels of Light Nuclei" (see bibliography, 1948 onward). He collaborated on these at first with William A. Fowler, W. F. Hornyak, C. C. Lauritsen, and P. Morrison, and later with Fay Ajzenberg-Selove. His encyclopedic knowledge of the field, his intellectual honesty, his common sense, and his enthusiasm made these reviews respected and

used throughout the world, and the main corridor of the Kellogg Laboratory was a gallery of the latest drawings of the level structure of the light nuclei, annotated instantly by Tom as new information came to his attention, occasionally with unprintable asides.

At the same time, Tom Lauritsen was involved in many governmental advisory activities to DOD, ARPA, IDA, AEC (now DOE), and NSF. All who served with him on any of these numerous committees can testify to his sensibleness, to the extent to which he did his "homework," and to the thoughtfulness of his remarks. He was one of the founders and the sixth chairman of the Division of Nuclear Physics of the American Physical Society, to whose Council he was also elected for a four-year period. Together with D. A. Bromley and H. Feshbach, he was among a small group of people whose advice in the late 1960s and early 1970s helped guide the federal agencies in their support of basic nuclear physics. He also represented U.S. nuclear physics as a member of the Commission on Nuclear Physics of IUPAP (1963–1972).

In an article in the journal *Engineering and Science* in 1973, T. Tombrello has written,

> His Caltech colleagues will remember Tommy's contributions to a wide variety of faculty, ad hoc, and departmental committees. He had the unique gift of being able to look at a situation as if from outside, and thus always had a clearer understanding of the implications of a decision. His membership was prized not only because of his wisdom, but also because of his intrinsic humanity.

At the Memorial Service on November 1, 1973, President-Emeritus of Caltech, Lee DuBridge, said,

> I, myself, will never forget Tommy as a devoted citizen of the Caltech community and the wondrous service he gave to the Institute itself. One of his colleagues stated his abilities here as follows: "He was always a champion of the Institute, what it stands for, and the policies required to meet its goals; intrepid, forthright, shedding light, dissipating heat—all

done with wit and kindly manner." Because of this, he was in continual demand to serve on important Institute committees and other activities . . . . I multiplied the number of regular committees he served on by the number of years he served on each one, and I find that he gave fifty-two committee years of service to major Institute problems—and all with the same wisdom, insight, and good humor. And not only did he serve as a great citizen of Caltech, but he served a national community of physics in many ways. He was on at least a dozen important science advisory committees throughout the country, advisory to such institutions as the Brookhaven Laboratory, Oak Ridge Laboratory, the Argonne Laboratory, the National Science Foundation, and many others. I think two of his most important activities recently (and these are recent ones) were his chairmanship of the Nuclear Physics Division of the American Physical Society in 1972 and the important Physics Survey Committee of the National Academy of Sciences.

Tom Lauritsen was a superb teacher, caring of his students, meticulous in preparing his lectures, and delightfully witty. He stressed the fundamentals and the excitement and fun of physics. One of the undergraduates kept a record of some of his classroom remarks. He was teaching atomic physics and one day said, "Today will be a little like a classical physics course—like giving you a drink from a fire hose." Another quote: "Physicists aren't all that smart. One generally looks to experiments to get a hint." And still another quote. There was a huge crash in the room behind the Physics Lecture Hall. Dr. Lauritsen muttered, "That's next week's demonstration." And the one the undergraduate liked best of all: "What I told you here was not lies, just the wrong language." Robert Leighton at the Memorial Service recalled the time when a few of Tom's students:

. . . hissed at one of his witty remarks; and he happened to find himself standing behind the lecture bench with a hand on a faucet or a gas cock of some kind. And in a sudden inspiration he turned it on and hissed back at them ten times louder—because it happened to be compressed air. He confided later it might just as well have been water. But Tom's humor and wit were not simply a medium of communication. He was not simply

funny. He was a very deep person, and his lectures communicated not just a superficial, momentary understanding but a deep appreciation for the structure and philosophy of physics, the way of thinking that a physicist uses to understand things.

Tom Lauritsen was also deeply involved with students through the Physics Club, whose usual meeting place was his home. Robert Leighton, at the Memorial Service, said,

I'm sure that those sessions made as much, and perhaps more, impression on the students as did the more formal classes. At these physics 'bull sessions,' one could find out why physics might be a subject worth devoting one's life to. And the amazing facts that could emerge from the speaker or from the discussion undoubtedly had their positive effects on the faculty who were usually present there also. Tom contributed many things to teaching physics at Caltech, some of these in collaboration with his faculty colleagues, as with the Feynman course and its evolution, and others as his own personal effort.

Tom polished and developed the senior-year course in modern physics into a very popular and substantial course, and this led eventually to his revision of what had long been the principal textbook in the field: Richtmyer and Kennard, which became Richtmyer, Kennard, and Lauritsen.

Tom Lauritsen was basically an experimentalist and a teacher. His own views were expressed succinctly in an interview with Barry Richman and Charles Weiner of the Center for the History of Physics on February 16, 1967:

On the other hand, I think an experimentalist and a teacher take a slightly different point of view about the importance of model work or of approximations, to put it in another sense. I think that discovering new fundamental facts of nature, new basic principles, is obviously the most rewarding business that there can be. But discovering new ways of explaining what we already understand in a vague sort of way is, I think, also a very important enterprise. I think Niels Bohr probably was the man who in my mind most epitomized this point of view. Niels Bohr was in the forefront of a great many dramatic developments in physics. He was certainly the first to understand in any deep way many of the new things—

the quantum mechanics, fission, the liquid drop model, many many things about physics he had the insight to understand.

But more than that, he devoted his whole life to making these things understandable. It was not enough to Bohr that he understood something. He also must make it understandable. He was led sometimes to almost ludicrous situations. I was very much a "yes boy" when Bohr had me under his wing. I think he distrusted me. He would try to convince me of something, and I would say, "Yes, I'm convinced," and he would take me and shake me and say, "No, but are you really convinced?"

Tom then added,

I think many people would also place a great deal of emphasis on the usefulness of the field (of nuclear physics) in teaching. I think it's an excellent place to train graduate students. A lot of our students have gone into quite different fields and they have done very well. I think the kind of training that they get in nuclear physics is a very broad one and a very useful one; but I don't think that that's the real excuse for being in the business or for encouraging students to go into the business. If it isn't fun, then it isn't worth doing.

Thomas Lauritsen was an excellent scientist; he was a man of integrity, responsibility, decency and gentle wit.

The Lauritsen Library at Kellogg Radiation Laboratory and the yearly Lauritsen Lectures at California Institute of Technology honor C. C. and T. Lauritsen.

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