Arthur L. Schawlow

I was born in Mount Vernon, New York, U.S.A. on May 5, 1921. My father had come from Europe a decade earlier. He left his home in Riga to study electrical engineering at Darmstadt, but arrived too late for the beginning of the term. Therefore, he went on to visit his brother in New York, and never returned either to Europe or to electrical engineering. My mother was a Canadian and, at her urging, the family moved to Toronto in 1924. I attended public schools there, Winchester elementary school, the Normal Model School attached to the teacher's college, and Vaughan Road Collegiate Institute (high school).

As a boy, I was always interested in scientific things, electrical, mechanical or astronomical, and read nearly everything that the library could provide on these subjects. I intended to try to go to the University of Toronto to study radio engineering, and my parents encouraged me. Unfortunately my high school years, 1932 to 1937, were in the deepest part of the great economic depression. My father's salary as one of the many agents for a large insurance company could not cover the cost of a college education for my sister, Rosemary, and me. Indeed, at that time few high school graduates continued their education. Only three or four out of our high school class of sixty or so students were able to go to a university.

There were, at that time, no scholarships in engineering, but we were both fortunate enough to win scholarships in the faculty of Arts of the University of Toronto. My sister's was for English literature, and mine was for mathematics and physics. Physics seemed pretty close to radio engineering, and so that was what I pursued. It now seems to me to have been a most fortunate chance, for I do not have the patience with design details that an engineer must have. Physics has given me a chance to concentrate on concepts and methods, and I have enjoyed it greatly.

With jobs as scarce as they were in those years, we had to have some occupation in mind to justify college studies. A scientific career was something that few of us even dreamed possible, and nearly all of the entering class expected to teach high school mathematics or physics. However, before we graduated in 1941 Canada was at war, and all of us were involved in some

way. I taught classes to armed service personnel at the University of Toronto until 1944, and then worked on microwave antenna development at a radar factory.

In 1945, graduate studies could resume, and I returned to the University. It was by then badly depleted in staff and equipment by the effects of the depression and the war, but it did have a long tradition in optical spectroscopy. There were two highly creative physics professors working on spectroscopy, Malcolm F. Crawford and Harry L. Welsh. I took courses from both of them, and did my thesis research with Crawford. It was a very rewarding experience, for he gave the students good problems and the freedom to learn by making our own mistakes. Moreover, he was always willing to discuss physics, and even to speculate about where future advances might be found.

A Carbide and Carbon Chemicals postdoctoral fellowship took me to Columbia University to work with Charles H. Townes. What a marvelous place Columbia was then, under I.I. Rabi's leadership! There were no less than eight future Nobel laureates in the physics department during my two years there. Working with Charles Townes was particularly stimulating. Not only was he the leader in research on microwave spectroscopy, but he was extraordinarily effective in getting the best from his students and colleagues. He would listen carefully to the confused beginnings of an idea, and join in developing whatever was worthwhile in it, without ever dominating the discussions. Best of all, he introduced me to his youngest sister, Aurelia, who became my wife in 1951.

From 1951 to 1961, I was a physicist at Bell Telephone Laboratories. There my research was mostly on superconductivity, with some studies of nuclear quadrupole resonance. On weekends I worked with Charles Townes on our book Microwave Spectroscopy, which had been started while I was at Columbia and was published in 1955. In 1957 and 1958, while mainly still continuing experiments on superconductivity, I worked with Charles Townes to see what would be needed to extend the principles of the maser to much shorter wavelengths, to make an optical maser or, as it is now known, a laser. Thereupon, I began work on optical properties and spectra of solids which might be relevant to laser materials, and then on lasers.

Since 1961, I have been a professor of physics at Stanford University and was chairman of the department of physics from 1966 to 1970. In 1978 I was appointed J.G. Jackson and C.J. Wood Professor of Physics. At Stanford, it has been a pleasure to do physics with an outstanding group of graduate students, occasional postdoctoral research associates and visitors. Most especially the interaction with Professor Theodor W. Hansch has been continually delightful and stimulating. Our technicians, Frans Alkemade and Kenneth Sherwin have been invaluable in constructing apparatus and keeping it in operation. My secretary for the past nineteen years, Mrs. Fred – a Jurian, provides whatever order that can be found amidst the chaos of my office. Much of the time, my thoughts are stimulated there by the sounds of traditional jazz from my large record collection.

My wife is a musician, a mezzo soprano and choral conductor. We have a son, Arthur Keith, and two daughters, Helen Aurelia and Edith Ellen. Helen has studied French literature at Stanford, the Sorbonne, and at the University of California in Berkeley, and is now on the staff of Stanford University. Edith graduated from Stanford this year with a major in psychology.

I retired from teaching and became Professor Emeritus in 1991. My wife died in an automobile accident in May, 1991. My daughter Helen is now Assistant Professor of French at the University of Wisconsin. From Helen and her sister Edith, I now have four grandchildren.

Professor Schawlow died in Palo Alto, California on April 28, 1999.

Other Awards
Stuart Ballantine Medal (1962)
Thomas Young Medal and Prize (1963)
Morris N. Liebmann Memorial Prize (1964)
California Scientist of the Year (1973)
Frederick Ives Medal (1976)
Marconi International Fellowship (1977)

Honorary doctorates from University of Ghent, Belgium (1968), University of Toronto, Canada (1970), University of Bradford, England (1970). Honorary professor, East China Normal University, Shanghai (1979).

Member, U.S. National Academy of Sciences
Fellow, American Academy of Arts and Sciences
President, Optical Society of America (1975)
President, American Physical Society (1981)
Arthur Schawlow Medal, Laser Institute of America (1982)
U.S. National Medal of Science (1991)
Honorary doctorates from University of Alabama, U.S.A. (1984), Trinity College, Dublin, Ireland (1986), University of Lund, Sweden (1988)