20 February 1984

To: Joan Bromberg
APS Laser History Project

From: Tony Siegman
Stanford University

Re: Another Minor Note on Laser History (re Russell Targ and pre-He-Ne Lasers)

During the early 1960's, in the course of consulting with the quite active laser group at Sylvania Electronic Products in Mountain View, California (later to become Sylvania Electro-Optics Organization, now part of GTE Sylvania) -- a group which included at various times Burt McMurtry, one of my PhD students, later to become a very successful venture capitalist; Kenneth Oshman, who did a PhD in lasers with S. E. Harris, and then went on to become one of the founders and president of the spectacularly successful Rolm Corporation; and a number of other active workers and Stanford graduate students in the laser field at that time -- I had occasion to work with a laser physicist there named Russell Targ.

Targ had done some graduate work in quantum electronics in the Physics Department at Columbia, and then had worked at Sperry Gyroscope (I think these locations are correct -- I'm a bit hazy on exact details here; but at least he had definitely been in the New York area, and knew a number of the early figures in the laser field there, including Paul Rabinowitz, LaTourette, and others).

[To add a few other basically irrelevant asides, Targ's wife Joan was the sister of the eccentric chess genius Bobby Fisher (Fischer?); and Targ himself had had a lifelong interest in psychic phenomena, including a period during his student days spent in England investigating mediums and spiritualists. Targ later left the laser field and joined with Hal Puthoff, a Stanford laser PhD under Dick Pantell, and co-author with Pantell of a quantum electronics textbook, to set up a widely publicized research program in psychic phenomena at SRI, including research on Yuri Geller's spoon-bending, and their own technique of "remote viewing". I am now somewhat at odds with Targ concerning this, because I consider their "research" in this area to be, though sincere, painfully naive, foolish and gullible; and have said so on a number of occasions.]

In any event, in the course of one of our technical conversations concerning gas lasers, Targ once remarked to me that in some of the early spectroscopic literature on the emission spectrum of the helium-neon system (I took this to mean in the 1920's or 30's, long before the laser), there can be found observations of the 3.39 micron line of neon with intensities much larger and/or linewidths much narrower than is explicable by any ordinary spectroscopic arguments.

The technical point here is that the 3.39 transition in a helium-neon discharge is easily inverted and gives enormously large laser gains under a quite wide range of discharge conditions; and so the implication is that laser action may well have occurred with some strength during these spectroscopic studies, and the output laser radiation may even have been observed, without the experimenters being aware of the significance of what they were observing.

I never followed up on this conversation, and cannot give any more details; but it might be very much worthwhile interviewing Targ both concerning this possible predecessor to the laser, and concerning his own early experiences and acquaintances in the field. (Targ's home address, as of 1982, was 1010 Harriet, Palo Alto, 415-326-5271 or 415-326-5975. I'm unsure of his professional activities, but believe he may no longer be at SRI).

— AES

BIOGRAPHY

Anthony E. Siegman

Anthony E. Siegman, Professor of Electrical Engineering and (by courtesy) of Applied Physics, and Director of the Edward L. Ginzton Laboratory at Stanford University, has done extensive research in quantum electronics and lasers. He is the inventor of the unstable optical resonator widely used in high power lasers, and the author of two books and more than 100 technical papers. He is a Fellow of the Institute of Electrical and Electronics Engineers (IEEE), Optical Society of America, American Physical Society, and American Association for the Advancement of Science, and in 1973 was elected to the National Academy of Engineering.

Professor Siegman was born in Detroit on November 23, 1931. He received the A.B. *summa cum laude* from Harvard College in 1952, and the M.S. in Applied Physics from the University of California at Los Angeles in 1954 under the Hughes Aircraft Company Cooperative Plan. In 1957 he received the Ph.D. in Electrical Engineering from Stanford University. Since then he has been on the faculty at Stanford, where he directs a research program in lasers and their applications. During Spring 1965 he served as Visiting Professor of Applied Physics at Harvard University, and in 1969-70 worked at the IBM Research Laboratory in Zurich under a Guggenheim Fellowship. In November 1981 Professor Siegman was invited to be the Lecturer for the Annual Benjamin W. Lee Memorial Lectures on Physics, in Seoul, Korea.

Dr. Siegman has made contributions to the fields of microwave electronics, parametric devices, microwave masers, and lasers and their applications, and has written *Microwave Solid-State Masers* (McGraw-Hill, 1964) and *An Introduction to Lasers and Masers* (McGraw-Hill, 1970), and co-edited *Laser Devices and Applications* (IEEE Press, 1973). He holds four patents on microwave and optical devices and lasers. He was Program Chairman for the 1966 International Quantum Electronics Conference and Conference Chairman of the 1968 IQEC. He has served as consultant to numerous industrial and government laboratories, and is currently a member of the Air Force Scientific Advisory Board.

He is a member of the American Association of University Professors, Phi Beta Kappa and Sigma Xi. In 1972 together with D.J. Kuizenga he received the W.R.G. Baker Award of the IEEE for the best paper published in any IEEE Transactions during 1971, and in 1977 he received the J.J. Ebers Award of the Institute of Electrical and Electronics Engineers. In 1980 he received the R.W. Wood Prize of the Optical Society of America for the invention of the unstable optical resonator.

Februry 1983

LASER HISTORY PROJECT

Preliminary Survey of Unpublished Materials

Unpublished materials --- correspondence, memoranda, research proposals, laboratory notebooks, photographs, and other such items --- constitute a vital source of evidence for history. Locating such materials and assuring their preservation are major goals of the Laser History Project. We would therefore appreciate any information that you can give us at this time to provide some sense of the kind and magnitude of the collections to which you will be able to direct us.

NAME A. E. Siegman

INSTITUTION(S) where materials were created, starting with the most important (please include institutional sub-unit):

Edward L. Ginzton Laboratory, Stanford University, Stanford, Ca 94305

LOCATION(S) of these materials now, starting with the most important collection (please be as specific as possible):

As above

DESCRIPTION

Kind of Material (e.g., correspondence, laboratory notes, diaries, computerized data, etc.)	Amount (in cubic ft/m, linear ft/m)	Dates (covered by bulk)
laboratory notes	1 cubic ft	

ARCHIVAL DISPOSITION Have arrangements been made for depositing these materials in an archives or other appropriate facility and, if so, where?

No X Yes _____

ARTIFACTS What instruments or devices do you have that you would be willing to contribute to a museum or an exhibit on the history of lasers?

List of Publications

ANTHONY E. SIEGMAN

Stanford University

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