

IN PRAISE OF SPLENDID COLLABORATORS

Remarks Made By
Lowell L. Wood, Jr.

In Accepting
The 1981 Ernest O. Lawrence Award In National Security
Forrestal Building, Washington, D.C.
24 February 1982 At 3:30 PM

Secretary Edwards, Director Trivelpiece, Dr. Kane, and friends:

I am most grateful for the honor which you do me, the more so as it recognizes a number of distinct endeavors on the part of many excellent people in which I have been privileged to have some part, though often a rather small one. I would like to briefly commend them to you.

No one is his own creation, and only a complete fool will pretend that he is little more than a vessel into which others have generously decanted portions of their knowledge and wisdom.

The basic capacity for receiving and retaining the knowledge and wisdom with which others may gift us is mostly fixed before we are born, and most of what little post-natal mental plasticity we possess is molded for us before we are conscious of its significance. In both these respects, I am the creature of my highly unusual parents, Helen and Lowell Wood, who not only provided my genome but a life-space during my childhood and youth which can only be described as extraordinary. For their loving care, painstaking education and subsequent multifaceted support, I will be forever grateful. Whatever I may become, the better parts of it will be largely due to them.

There have been a number of others who contributed in major ways to what I have become. Professor Kenneth Trueblood started me down the path toward basic physics as a college freshman, and my unique friend George Chapline, along with Professors David Saxon and Dan Kivelson, gave this initial motion strong impetus later during my undergraduate education. Professor Willard Libby—known to his long-time friends as “Wild Bill” for very good reasons—posed a problem to me as a mathematically quite naive sophomore whose solving locked in a fascination for powerful digital computing systems. He then proceeded to instill in me a unique approach to the conduct of scientific research from which I’ve yet to recover, both as an impressionable undergraduate and later on as his graduate student, when I might have been expected to know better.

Bill Libby also introduced me to his friend Professor Edward Teller who, along with Professor Richard Feynman, compellingly taught me most of the smattering of physics which I ever knew—not just what physics was, in a fashion best described as enthralling, but how to do it both easily and well, capabilities which they wore like personalized garments. If the lucidity—even eloquence—of instruction which their utter mastery of physics conferred hadn’t made this field so much fun to learn and so easy to do, my low threshold for boredom would have surely caused me to wander on to something else.

Teller also lured me to the Livermore Laboratory and then kept me there with a set of tricks as disreputable as they were successful. His more-than-sufficient atonement for such behavior has been unswervingly loyal friendship, uniquely effective intellectual, moral and political support, and wise criticism when required—which is frequently. I've used his fishing-for-men techniques many times since with comparably devastating effectiveness. I can only hope to do as well by those whose interest I ensnare, for unlike Teller, I'm remarkably unproductive without a generous supply of the most able—and most patient—of collaborators. I would like to mention to you just that small fraction who have worked with me on those topics cited in the award presented today.

The late Harry Sahlin not only was a most generous host during my initial period at the Lab in the later sixties, but also taught me much of the theory and practice of quantum mechanics—that most mystical of physical sciences—and piqued my interest in some of the more exotic portions of the Lab's national security programs.

As part of the latter, he introduced me to John Nuckolls, a recipient of the Lawrence Prize a dozen years ago, who became my teacher in all aspects of the pulsed generation of nuclear energy and its applications—an area in which he was preeminent—and then my collaborator in the proposals which were involved with the commencement of the national program in inertial confinement fusion.

George Zimmerman, who came to the Lab when these proposals were still struggling into existence, contributed crucially to their elaboration and credibility with his truly extraordinary gifts for physical modelling with computers, quickly outmoding the crude tools which I had fashioned for early studies.

George Chapline also arrived at Livermore during the same, most memorable summer of 1969, and we soon commenced a collaboration aimed at realizing shared boyhood dreams involving short wavelength lasers which was a pleasant one, to say the least; it incidentally provided yet another instance of the two ancient adages that 'The truly fortunate among men are those who continue to pursue the dreams of their youth all of their lives' and 'The main difference between men and boys is the cost of their toys.'

Tom Weaver and Rod Hyde arrived at the Lab during the summers of 1971 and 1972, respectively, and commenced the first of many collaborative efforts with me in basic and applied astrophysics, ranging from computer-centered inquiries as to how stars die explosively through the designing fusion power plants for electricity generation and for few decade-duration travel to the nearest stars and on to solution of a famous problem handed down to us from Teller, Fermi and von Neumann. If I did nothing else in my Livermore career than arouse the interest of these two in the efforts which they've already undertaken with such spectacular results, I would have ample cause to be pleased with this aspect of my professional life.

In 1975, Curt Widdoes and Tom McWilliams came to the Lab for a summer's exploration of how the revolutionary advances in microelectronics might be used to greatly advance really large-scale digital computing; to somewhat more of their surprise than mine, they stayed to found and lead to technical greatness the S-1 advanced computer project, with a measure of daring exceeded only by those of their ability and hard work.

Very soon after that, Norris Keeler, who had given me a small group within the Lab's organization while serving as head of Teller's Physics Department, went to Washington, and

from there asked Jack Marling, who was already distinguished for his ground-breaking successes in laser isotope separation, and myself to create a new widget which would make laser communication to forward-based strategic platforms much more feasible and reliable, a challenge which led to a substantial advance in the technical foundations in this area. As Director of Navy Technology, Norris also provided the crucial early support for S-1 work, as well as for Andrew Weisberg's highly innovative effort in military robotics.

During that same vintage year of 1975, Peter Hagelstein came to Livermore for a summer's inquiry with me into the technical prospects for realizing very short wavelength lasers in a laboratory environment, and stayed to create a means for computer-modelling a portion of physical reality which stands together with Zimmerman's earlier, differently oriented work in a class completely by themselves. Retrospectively, the unprecedentedly great power of these two sets of physical modelling tools, exercised in tandem by Hagelstein, Weaver and myself, might well have given rise to rational expectations that they would quickly become 'the means to mighty ends'— even if Peter hadn't also been an fabulously prolific inventor of schemes for attaining short wavelength laser action.

With men such as these, one can work for years without a break, in joy and productivity unending. For the unusually supportive institutional setting of our work, I am especially grateful to John Anderson, Roger Batzel, Carl Haussmann and Roy Woodruff, four most apt stewards of the National trust.

The substantial scales of many of the endeavors on which my friends and I have worked implies the existence of significant resource streams feeding into them, often for long periods. The high-risk nature of every development with which I've been involved makes support of such work by the bureaucratic program management community—whose members traditionally advance through the avoidance of mistakes—a quite chancy matter, at best. It is therefore not surprising—at least in retrospect—that absolutely vital support for each and every one of these endeavors has come from the fraction of the Washington community which routinely take large chances—the elected politicians and senior members of their staffs.

It seems likely that most, if not all, of the undertakings for which this award is being made would have died in infancy without support consciously and repeatedly extended at high risk of failure and embarrassment from Capitol Hill, most particularly from the House Armed Services community. To these courageous and far-sighted people, to their like-minded colleagues in the Senate Armed Services area, and to the similarly supportive Members and senior staff of the House and Senate Appropriations communities, my co-workers and I at Livermore continue to be profoundly grateful—they have been our collaborators in the work which you have recognized today in the most literal sense of the word. This deepest of appreciation extends in full measure to the rare bureaucrat and the extraordinary military officer who have risked with us, so that uncommon technical advances of the National interest might be realized.

The past is prologue. My defense-minded colleagues and I presently are more numerous, more capable and more dedicated—in a word, stronger—in the all the pertinent areas than at essentially any time in the past. The current primary focus of our work—the elaboration of the third generation of nuclear explosives, involving the full application of these most awesome

of weapons to purely and intrinsically defensive applications—clearly is an endeavor to which all men of good will can subscribe without reservation.

The schizophrenic perceptions of geopolitical reality which presently threaten the sanity of the Western polity undeniably originate in the growing terror induced by ever more starkly superior means of mass murder falling into the hands of totalitarians whose ruthlessness is as chronic as it is self-evident. This untenable situation appears amenable to a technical fix with third generation nuclear weaponry, moreover rather quickly so. Thus, the removal of the Damoclean sword from over the head of Western civilization, the supplanting of a truly mad era of international affairs by one in which every free man and nation can sleep at night, physically secure and ethically serene, is presently the goal toward which we work with great pride and utter determination.

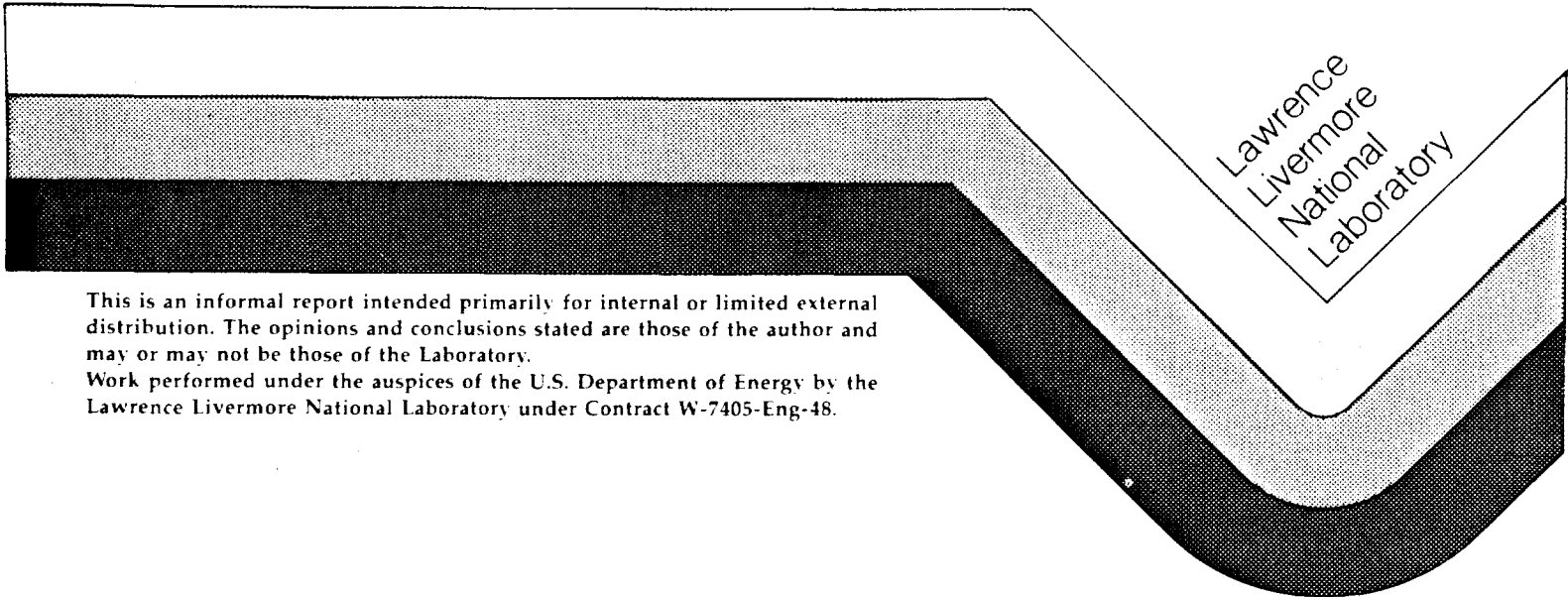
With your continued support, with only a little more time, with steadfastness by all, the 'long night' of which Churchill spoke when the West was last reeling under totalitarian blows will soon end, and the human race will 'enter the broad, sunlit uplands' which he promised on that occasion to 'the brave and the true.'

For myself and on behalf of my splendid collaborators, thank you once again.

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23 February 1982



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This is an informal report intended primarily for internal or limited external distribution. The opinions and conclusions stated are those of the author and may or may not be those of the Laboratory.
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