

## D. Allan Bromley, President-Elect

Joseph Weneser

In the fall 1979 election, D. Allan Bromley was chosen president-elect of the AAAS. I have been asked to tell you something of his work, style, and outlook. He is a noted nuclear physicist who holds the Henry Ford II Professorship of Physics at Yale University, where he teaches and carries on an active research program. He is one of the statesmen of science, who has given much of his time and administrative skill to the committees and organizations through which the science enterprise governs itself and speaks to our government. His industrial activities span an interesting range of the applications of technology and knowledge. Not least of all, he is a lucid and skillful speaker who frequently addresses public forums on topics of science and technology. If Allan Bromley appears from this description to be a very busy man, then I have correctly pictured him to you.

He was born in the farm country of northern Ontario, Canada, in 1926. It was typical of that time and that area that an education in the three R's was stressed and that verbal skills were acquired as a by-product of industrious reading of the Bible and the classics. A prize essay on the moral structure of society earned Allan an award that made possible his studies at Queens University in Kingston, Ontario. Whether acquired through this early training or through a benign heredity, his ability to express himself easily, coherently, and lucidly is a formidable asset for a spokesman of science.

After graduating from Queens University in Ontario with the degrees of Bachelor of Science and Master of Science, Bromley went to the University of Rochester, where he earned his Ph.D. in 1952 with a thesis in nuclear physics. He spent several years on the faculty at Rochester before returning to Canada, to the Chalk River Laboratory. There, Bromley and his co-workers installed the first of the new tandem electrostatic ac-

celerators. Working with it, they began to investigate, in addition to experiments with light nuclei, how sizable amounts of nuclear matter interact with one another. Using beams of energetic nuclei (heavy ions), they demonstrated that there were unexpected but simple modes of motion in the peripheral collisions between compound nuclear systems.

Bromley was one of the pioneers of the field of heavy-ion nuclear physics, and in the early days of that subject—the late 1950's and early 1960's—he presented with missionary enthusiasm the many scientific opportunities that it offered. These include establishment of the basic modes of interaction of massive nuclei and the physical laws that characterize them—how they exchange energy, momentum, and mass. By using the large amounts of momentum carried into heavy-ion interactions, one could explore the domain of high angular momentum—an interesting and important part of the nuclear world that could be glimpsed from afar but could not otherwise be entered with laboratory experiments. Equally important was the possibility of breaking out of the narrow range of nuclear species to which nature had

confined us, for heavy ions were the key to creating in the laboratory the full range of nuclear species. A host of technological applications provided additional allure.

But before these scientific advances could be achieved, new and more powerful electrostatic accelerators and cyclotrons had to be designed and built. Bromley's was a vigorous and convincing voice in making the case for these machines so that funding would be available. In the 1960's and 1970's the heavy-ion capabilities of the United States and of the world took a sizable step forward, and the scientific results that followed have made this investment a profitable one. The promise of this field is still bright, and the case for further investment compelling.

In 1960 Bromley left Canada to become director of research at the Heavy Ion Laboratory at Yale. While working with the Yale linear accelerator, he began a collaboration with the High Voltage Engineering Corporation to design an electrostatic accelerator with a significantly increased energy capability. The first of these accelerators, the Emperor Tandem Van de Graaff, provides the experimental beams for Yale's Wright Nuclear Structure Laboratory, one of this country's major academic nuclear physics centers. Bromley founded the Wright Laboratory in 1966 and has been its director since then, while also serving as chairman of Yale's Physics Department from 1970 to 1977. In addition, he is an enthusiastic teacher who continues to give graduate and undergraduate courses, and more than 25 students have obtained advanced degrees with him over the years.

I must turn now to another important area in which Bromley is active—in the organization, government, and justification of physics. In 1969 the National Academy of Sciences and the National Research Council, in response to the needs of a number of government agencies and the President's science adviser, undertook a survey of the physics research enterprise in the United States. The final product, the report entitled *Perspectives in Physics*, is now well known. Carrying out the survey and producing the report required a prodigious effort, taking several years and involving some 200 eminent physicists to a greater or lesser degree. As chairman of the central Physics Survey Committee, Bromley was very much the heart and soul—and frequently the brawn as well—of all aspects of the work and especially of the formulation of the project.

The stimulus for this survey was a



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need to understand the status, opportunities, and problems of physics in the United States in 1969. In the preceding decade physics, and U.S. science in general, had a strong growth period. Then the outlook changed, and as the 1970's approached physicists faced steadily increasing competition for available federal support. Therefore, the committee took on the task of developing contingency alternatives to ensure the most effective use of the available support. It did so, not in the conventional manner of recommending specific funding levels, but by delineating "the scientific, and to some extent the social, consequences of several different rates of funding increase or decline for each subdiscipline" of physics. Unfortunately, the succeeding years saw effective declines in funding levels, and the need for agonizing choices between conflicting priorities was upon the physics community. The survey report provided an important step in forming the patterns of analysis and the modes of decision within that community—or more accurately, the several communities that represent the major subdisciplines of physics.

Out of the many things the committee accomplished, I find particularly interesting that it "attempted to place physics in perspective in U.S. society," to assess the contributions of physics and physicists, and to examine how the transference of discoveries made in the research enterprise could be improved. The first step alone—a survey of the practical applications that had become important parts of our technology, our medical usage, our food production, or other aspects of our lives—was an enormous undertaking. It could only be done in small part, but even the listing of the more spectacular and obvious cases was heartening and exciting. Whether evaluated in terms of lives saved, or the

impossible dream made tangible, or, more crassly, money earned or saved in the economy, the spin-offs and applications justified the research program—even if one were to put aside the fundamental gain in knowledge of the nature of the physical world. To explore fully the dynamics of the interaction between pure research and its useful applications was beyond the charge of the survey, but it was a theme to which Bromley would return over the next years.

The survey report has served to give both government officials and scientists a balanced statement of what is at stake in the competition between dollars and scientific opportunities. Bromley took an important role and became a frequent traveler to Washington to explain the nuances of the survey results to the funding agencies, to the office of the President's science adviser, to congressional staffs, and at congressional hearings. Many of us who took part in the survey feel strongly that better and easier communication with Washington and with the public is an absolute necessity for the health of both science and public decisions involving the uses of science. Allan Bromley is among the scientists who are convinced that they have an active responsibility and cannot remain as spectators.

In more recent years, Bromley has had several major commitments in addition to his continuing activities at Yale. He has been chairman of the U.S. National Committee of the International Union of Pure and Applied Physics since 1971 and has served on a number of committees reporting to the Defense Department and the Agency for International Development. In 1975 he was elected vice president of the International Union of Pure and Applied Physics and still holds that office. He is a member of the Joint Committee on Cooperation between the U.S.

Department of Energy and the U.S.S.R. State Committee on Peaceful Uses of Atomic Energy in the area of fundamental research; he is also a member of the Joint Working Group on Science Policy between the U.S. National Academy of Sciences and the National Science Foundation and the U.S.S.R. Academy of Sciences and State Committee on Science and Technology. He has served on national advisory committees on the support of science in both Canada and West Germany. He headed the formal U.S. delegation of nuclear scientists that visited the People's Republic of China in May and June 1979.

Bromley is a consultant to the Argonne, Berkeley, Brookhaven, and Oak Ridge National Laboratories, to GTE, IBM, Union Carbide, and several other major industrial organizations. He is an associate editor of six international scientific journals and serves on the boards of directors of several major companies.

Nevertheless, the many enterprises in which Allan is involved leave time and space for family life and enjoyment. He and his wife, Pat, who works with the New Haven Colony Historical Society, live in one of the New Haven suburbs. Their son David is completing his doctorate in many-particle physics at Stanford, and their daughter Lynn is an assistant treasurer at the Chase Manhattan Bank in New York City. Allan is an avid audio fan, a photographer, and an enthusiastic hockey player.

When I telephoned Allan to congratulate him on his selection as president-elect of AAAS, he ended the conversation with "I'll be calling on you for some things that will need doing." My guess is that he will be calling on all of us; given the nature of our times, there will be a great many things that the scientists of AAAS could and should be doing.