state & society

John Davis likely to succeed Daddario

Emilio Q. Daddario, chairman of the Subcommittee on Science, Research and Development of the House Science and Astronautics Committee, is leaving Congress this fall to run for Governor of Connecticut. The ranking Democrat on the Subcommittee, and the man in line to succeed Daddario as chairman, is John W. Davis of Georgia. In the last few years the Subcommittee has played a leading role in science matters, and Daddario as its chairman has become the leading Congressional spokesman and champion of science.

Davis has been a member of the Subcommittee since he first came to Congress in 1960. He is now Chairman of the Subcommittee on the National Bureau of Standards, and is also a member of the Subcommittee on Advanced Research and Technology.

A lawyer and former judge, the 54-year-old Davis is also an amateur astronomer and a private pilot. Today he keeps a Link trainer next to his Congressional office, for sharpening his pilot skills at odd moments.

He believes that the current Congressional reluctance to provide more money for US science stems from overall pressures for economy and not from any consensus that science does not merit more support. In discussing a number of current issues with PHYSICS TODAY, Davis noted that basic research is always a tempting target for Congressional budget cutters. Also he suggests that science has suffered unfairly, but significantly, from public and Congressional reaction against military and space expenditures. In the long run, however, Davis thinks that "science's place in the Gross National Product is well assured, regardless of temporary ups and downs."

The Science, Research and Development Subcommittee held hearings in July and August on the need for a national science policy. Davis does not expect immediate legislative results from the hearings, but he believes that Congress will eventually take a major role in shaping US science policy. He foresees moves both in the legislative and executive branches, to centralize Federal support of science research and education, perhaps along the lines of the National Institutes of Research and Advanced Study (NIRAS) proposed by the Subcommittee last April (PHYSICS TODAY, August, page 49). Although science funding centralization may come slowly, Davis believes that government mechanisms for technology assessment will be established in the next year or two.

Davis opposes "Section 203"-type restrictions on Defense-supported research. But he believes Congress will apply them again in this fiscal year. An expanded NSF role in Federal science support is to be hoped for, yet, his conversations with scientists in the last few months have led Davis to oppose restrictions on mission-agency support of basic research.

Presidential Science Adviser DuBridge has not been "frozen out" or "ignored," says Davis. He would like to see DuBridge and his office speak with a stronger voice within the Administration. But, given current pressures for economy, Davis believes that DuBridge is doing an effective job.

American scientists, in Davis's opinion, have so far done fairly well in explaining the need for basic research support to Congress and the public. He hopes that science can attain a still broader base of understanding and sup-

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WILLIAM GRAHAM

DAVIS

Branscomb talks of NBS after his first year

The job of the National Bureau of Standards is to "promote the strength of the nation's science and technology and their effective application for public benefit," according to NBS Director Lewis M. Branscomb. This means, among other things, that the Bureau can be "a very exciting place for physicists." Branscomb, a 44-year-old atomic and astrophysicist who this month completes his first year as Director, reflected on these and other topics in a wide-ranging interview with PHYSICS TODAY.

The Bureau has a total staff of just over 4000. Of these about 700 are in Boulder, Colorado, and almost all the rest are at the Bureau's four-year-old, 560-acre facility in Gaithersburg, Maryland, just outside Washington. Of the professional staff of 1500, about a third are physicists, and chemists and engineers make up another third. The staff is growing at about five per cent per year, with little change in the distribution among technical specialities.

NBS operates with an annual budget of $77 million. About 60% of this is appropriated by Congress directly. Most of the rest comes from other agencies for which the Bureau carries out R&D and other tasks.

The spectrum of activities at the Bureau ranges, as Branscomb puts it, "from sophisticated scientific research—often in the science of measurement, which is our basic job—right down to the question of how measurements are used in a practical way in everyday life, or in the market place." Branscomb notes that physics and other sciences depend fundamentally on the adequacy

BRANSCOMB

of measurement systems. "The extension of measurement capability is automatically an extension of exploratory research capability," which involves, for example, the Bureau's work in characterizing atomic and molecular properties.

Length, mass and time. Branscomb hopes that research now going on at the Bureau will lead to still more accurate definitions of the physical units of length, mass and time. NBS physicists are investigating highly stabilized lasers with a reproducible precision of the order of 1 part in 10^{12} in wavelength; two of them produce a beat frequency below 100 Hz. This work could lead to a more accurate definition of the meter than the present standard, which is based on the wavelength of a krypton line.

Also, such lasers, operating in the visible or near-infrared, hold the prospect of a direct measurement in wavelength units of the cesium atomic beam frequency now used to define the second. In principle this would permit dropping the definition of either length or time, if the speed of light were assigned an arbitrary value. "And a little farther down the road," in Branscomb's view, "is the possibility of eliminating the kilogram as a mass standard and replacing it with an atomic mass, if we can relate the atomic-mass scale to macroscopic masses in the way we think is possible."

The Bureau is experimenting in several cities with the transmission of time standards by encoding certain color television lines of the three major networks. "Already, if you happen to live in Washington or Denver and if you have the right electronics, you can decode a set of dots between the pictures and read out the time standard to an accuracy of a microsecond or better, which is a thousand times better than you could do from an uncorrected signal from WWV."

Practical aspects. The Bureau now works directly with agencies in all 50 states to ensure accurate weights and measures in commercial use. For the Department of Transportation, the Bureau is assessing and developing test methods to help the Government enforce standards for such safety items as seat belts, brakes and tires.

Fire research at the Bureau is aimed at reducing dangers in buildings and flammable fabrics. Branscomb believes that fire-related work in physics and chemistry could lead, for example, to new scientific contributions toward reducing the flammability of fabrics.

Building research at the Bureau is partly supported by the Department of Housing and Urban Development. Branscomb hopes that work in progress will make it possible to replace the present confusing array of local building-design codes with a uniform national performance code for use by states and municipalities. Current NBS efforts aim to "view a house as a home," and the new code would protect the public while still allowing for innovations in acoustics, lighting, and other areas. Branscomb sees the Bureau as performing "a systems study" on the whole question of building codes.

Another systems study at NBS deals with advantages and disadvantages of a US switch—or partial switch—to the metric system. "We're investigating the costs and potential commercial advantages of various ways of changing to metric usage. But probably the ultimate decision will depend on more or less subjective factors, such as enhancing international communications and making it easier to exchange goods and technology," Branscomb says. The Bureau's metric study will result in a major report to Congress next summer.

The Bureau is responsible for the technical aspects of work aimed at making automatic data processing in the Government more effective and, if possible, cheaper. Bureau scientists and engineers are trying to develop standards to evaluate computer-system performance, and to standardize software so that the Government can use its computer hardware most effectively. Among other things this involves developing components to help interface different types of computer equipment.

Not surprisingly, the Bureau is taking on new research in pollution. Noise pollution studies involve not only the physics of sound generation, propagation and absorption, but also the psychophysics of how noise affects people.

In discussing air pollution, Branscomb observed that some of the measurement techniques now in everyday use depend on "various 19th-century devices with serious problems of validity." Very few optical methods for monitoring pollution have been carried to the point of practical daily use. The Bureau has launched a high-priority effort, "Project MAQ" (Measurements for Air Quality), to evaluate and improve air-pollution measurement methods. This work especially involves physics in the measurement of particulates, which Branscomb considers at least as serious a pollutant as gases. He hopes that work in laser scattering and other areas will eventually lead to devices that are much more reliable for air-pollution monitoring than is possible now.

The broad role of NBS, Branscomb believes, helps to fill a relatively neglected "middle-ground" that lies between basic science on the one hand and most technological applications on the other. He thinks that the *de facto* US science policy that has evolved since World War II has resulted in the Government's concentrating on the problem of supporting basic research, chiefly in a university or educational context. At the same time, the Government has exploited technology for defense, space, atomic energy and other needs. But Branscomb believes that we have failed to recognize the need for "investments to increase the efficiency, utility, and overall wisdom of the process by which research results are applied to important problems." He thinks that much valuable applied science has been lost, and that recent R&D funding cuts have aggravated the problem. This is chiefly because the mission agencies, obliged to cut back their budgets, have cut out work that seemed to them "peripheral." Thus in Branscomb's view, the AEC for example, has cut back potentially very valuable research in atomic physics and chemistry in an attempt to preserve its primary investment in nuclear physics.

Branscomb believes that in the next decade new emphasis will have to be given to developing scientific concepts and methods for making wise decisions about the use of technology. This contrasts with the emphasis since World War II on "using science only as a source of technology."

He thinks the NSF and the mission agencies can effectively collaborate to make sure that "in the course of developing scientific knowledge we develop it in a way that will lead to truly useful applications." The NSF, he believes, may have underestimated in former years the potentially valuable applica-

tions of basic solid-state, plasma, atomic and molecular physics.

Although regretting current cuts in R&D funding by the Government, he considers that basic research is actually receiving more emphasis than before in the competition for funds. On this score he cites Administration statements and budget requests, and the favorable handling—compared with R&D in the mission agencies—of the fiscal-year 1971 NSF budget by Congress. —JBP

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port in the future. He claims that scientists, although justifiably concerned with money cuts, often overlook the extent to which Congressmen, necessarily concerned with their own re-election, must respond to pressures for economy and the demands of their constituents. In his own district he has no group of constituents who would benefit directly from increased Congressional support of basic scientific research. However, he did realize that scientific "spill-over," as he termed it, from such research would be of value not only to his district but "to my state, my region, the country as a whole."

Over the last decade, Davis says, the work of the Science and Astronautics Committee has shifted from aerospace issues toward various science-policy questions. He expects this trend to continue. Davis believes that his committee homework has given him "a liberal education" in science matters, and that he has probably spent more time studying science questions in Congress than he spent in studying law in Georgia. —JBP

Total R&D spending is level; federal support declines

US spending for basic and applied research and engineering will be about $27 300 million this year, compared to $26 300 million in 1969, according to the National Science Foundation. This apparent gain is almost entirely due to increased R&D spending by industry. But if allowance is made for inflation, the total R&D growth rate in the last five years is negligible, and Federal funding has slightly declined. These and other data are contained in *National Patterns of R&D Resources, 1953–70* (available from the Government Printing Office).

Sandweiss and Cork head AEC high-energy physics subpanels

Two subpanels have been added to the High-Energy Physics Advisory Panel of the Atomic Energy Commission, which is headed by Victor F. Weisskopf of MIT. The subpanel on future patterns of high-energy physics research is headed by Jack Sandweiss of Yale University and is studying the changing character of particle physics in view of the advent of large-scale accelerators and in view of prospects for limited financial support. Bruce Cork of Argonne National Laboratory is chairman of the subpanel on accelerator technology. This subpanel plans to advise the AEC division of research on multi-GeV accelerator developments that should be more fully supported and to study the cost and time scale of the next generation of high-energy accelerators. Both chairmen would welcome the advice and the opinion of anyone who has an interest in these problems.

in brief

The General Advisory Committee of the Atomic Energy Commission is soliciting nominations until the end of October for the 1971 Ernest Orlando Lawrence Memorial Award. Eligible individuals must be US citizens and born on or after 1 July 1925.

American Science Manpower, 1968, is the final report of the 1968 National Register of Scientific and Technical Personnel. Copies of the 277-page report are available at $2.00 from the Superintendent of Documents.

In this fiscal year, NSF plans to allocate $300 000 for 30 interdisciplinary postdoctoral fellowships to be awarded to new doctoral-degree holders.

the physics community

Texas project enlists PhD's as high-school teachers, advisers

In response to the tightening job market for new PhD's, a new approach has been started titled "Texas Project in Science Education," which plans to place PhD's as instructors in high schools and as regional science and mathematics advisers. The advisers would have a university affiliation and would teach in-service courses to high-school teachers on a regional basis.

Originated by Robert B. Clark and F. W. de Wette of the University of Texas, Austin, after the Chicago meeting of the American Physical Society in January, the project already lists 12 employers with available positions, with salaries varying from $7000 to $9500 for 10 months. Over 50 applicants were interviewed during the APS Washington meeting and recently several of the school districts have received 10 to 20 applications from PhD's.

Clark said that "the university affiliation ... was found to be the most attractive feature by the applicants and it invoked considerable enthusiasm." For the regional program, the "affiliation of the advisers would allow the in-service courses to be offered on a credit basis." Salaries would be paid by local or regional authorities, but university-research groups are being encouraged to support each adviser's and teacher's part-time research.

The National Science Foundation has said that the adviser program can be supported under its Cooperative College-School Science Program. The NSF is also presently considering the possibility of supporting the part-time research. For further information contact Clark at the University of Texas.

D. W. J. Shea new SPS director; Tendam heads honor society

Dion W. J. Shea is the new director of the Society of Physics Students and Donald Tendam has become president of Sigma Pi Sigma, the SPS honor society. They succeed Cecil G. Shugart and Marsh W. White, respectively.

Shea, who received his PhD from the University of Colorado in 1968, taught at Creighton University before becoming a postdoctoral research associate at the Environmental Science Services Administration laboratory in Boulder, Colo., in late 1968. He assumed his new position as of 1 July when Shugart left to become head of the physics department at Northeast Louisiana State College. Shugart became director in 1968 when SPS was formed from the union of AIP student sections and Sigma Pi Sigma. Since then, SPS chapters have become active in over half of the colleges offering physics majors, and Sigma Pi Sigma now has more than 200 chapters. Shugart will continue working with the SPS as the elected representative of the Southeast on the national council.

The new president of Sigma Pi