

announced Hayes's appointment a day before Rappaport, who was out of town, could inform his staff.

Hayes's appointment was unusual in more than one respect. At 34, he is the youngest director of a national laboratory. Hayes is also perhaps the only director of a national laboratory who does not have a high level of formal education in the field of research conducted at his laboratory. Hayes was an undergraduate at Stanford University and did some graduate work in law and business there as well, but has no formal training in science or engineering. He has been active as a solar advocate for several years, however. In addition to his activities at the Solar Lobby, he has served on the DOE's Energy Research Advisory Board, is the author of *Rays of Hope*, which focusses on the transition to a post-petroleum world, and in 1978 won the DOE's first award for outstanding public service.

Some SERI scientists take Hayes's appointment as a further indication of the much-feared politicization of the Institute, which they attribute to the highly political nature of solar energy in general. Hayes's appointment, however, is being applauded in other quarters, and most SERI employees appear ready to lend full support to their new director. —MEJ

DOE group recommends 53% budget hike for laser fusion

An Ad Hoc Experts Review Group headed by John S. Foster Jr has advised the Department of Energy to proceed cautiously with construction of Nova, the expansion of the Shiva neodymium-glass laser at the Lawrence Livermore Laboratory, and to increase the department's laser-fusion budget by 53% in the next fiscal year.

Nova. Last year a different group, also under Foster's chairmanship, studied the entire DOE fusion program and advocated that funding for Nova be delayed until present facilities and experiments demonstrate the predicted performance (PHYSICS TODAY, September 1978, page 85). That study looked at Nova only from a fusion energy production standpoint, according to Solomon Buchsbaum, executive vice-president at Bell Labs, who was a member of last year's group, whereas the present study incorporates military considerations as well.

The primary recommendation of the report, the body of which will be classified (presumably because of its discussion of the military uses of laser fusion) is that construction of the first phase of Nova be started immediately. DOE acted on that recommendation even before the Foster committee's final report had been completed; construction of Nova I began 14 May. In this first phase, costing \$137 million, a new target chamber and laser facility will be built adjacent to the Shiva laser. At present Shiva can produce 15 kilojoules in a 1-nanosec pulse. Com-



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pletion of the first phase of Nova is scheduled for late 1982. Nova I will typically produce a 3-nanosec pulse containing 120 kJ. In the second phase of Nova, the glass in the Shiva laser will be replaced with a new Nova glass, probably made of fluorophosphate, and the output of the new laser arms will be directed into the Nova target chamber. A decision on the second phase of Nova is expected in about two years. In the meantime, the Foster committee recommended that no action be taken that would either jeopardize or ensure construction of Nova II.

At a briefing before the DOE's Energy Research Advisory Board, Foster, a vice president at TRW, Inc, admitted that the committee had its doubts about the Nova experiment. "It is quite likely," he said, "that we would not go beyond Nova I... without changing technology..." Buchsbaum, chairman of ERAB, asked Foster if it were true that "the technology that underlies Nova is known to be ultimately inadequate to do the job," because Nova uses a glass laser, which is "intrinsically inefficient" from a power production point of view. Foster agreed that from a power production point of view with present solids this is true, but commented that "from the weapons point of view at, say, a megajoule, using a pulse once or twice a day or once every few minutes, the glass is perfectly acceptable from the point of view of performance and economics." According to Foster, the program that the committee recommended to DOE was optimized from both the weapons and the civilian power points of view.

Other programs. Though originally charged with examining only the Nova proposal, the Foster committee found it necessary to comment on some general aspects of DOE's inertial-confinement fusion program. The committee recommended that the Fiscal Year 1981 budget for inertial-confinement fusion, excluding

Nova construction, be increased to \$200 million, with an additional \$25 million set aside for Nova construction. This represents an increase of 53% over the 1980 level of \$130 million. Included in this increase must be an expanded physics research program to complement the already large machine construction now going on, the committee said.

"A critical part of the inertial-confinement fusion program is the comparison of the various ways of driving the pellets to determine which one, because of its combination of coupling efficiencies and cost, would be the system of choice," Foster told PHYSICS TODAY. Foster told ERAB that DOE should begin technological development of short-wavelength lasers, perhaps krypton fluoride (0.25-micron wavelength), and should further develop other high-energy drivers, with emphasis on heavy-ion beams. "And third," he said, "we would like to look at the pulse power systems, condenser banks with discharge nets that can generate a very intense proton beam. The requirement is to bunch the particle in order to have a short pulse, transport the beam several meters to the target and focus the beam to a small size."

"In general," Foster summarized, "there was no technological problem which we could identify that we couldn't find some kind of plausible, practical solution to. Now that is kind of exciting."

—MEJ

Congress debates Federal patent policy reform

For years critics of the Federal government's patent policy have complained that the government generally retains the rights to inventions and discoveries made under government-sponsored research even though it allocates neither the financial resources nor the expertise to develop them into marketable products. A Senate bill expected to go to markup this month in the Judiciary Committee addresses this problem as it relates to small businesses and universities. ("Markup" is the last stage of committee consideration of the bill before it goes to the full Senate for debate.) Though not the first bill of this type proposed in recent years (an earlier version of the bill was introduced in the Senate last year and never acted upon), S414 appears to have an exceptionally broad base of support. Introduced by Birch Bayh (D-Ind.) and Robert Dole (R-Kans.), the bill's 28 sponsors are almost evenly divided between Democrats and Republicans, and constitute what one committee staffer termed, "a good philosophical mix."

By retaining the rights to inventions, say the bill's supporters, the government removes much of the incentive for industry to develop and market those inven-

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tions. "Particularly vulnerable," said Bayh in introducing the bill, "are small businesses, which lack the financial resources and market power to engage in the development process of Government-supported inventions without the protection of short-term exclusive rights." Through its noncompetitive licensing policy the Federal government also gives foreign industry an undue advantage, Bayh argued. "American research is made available to foreign and domestic firms alike," he said. Bayh also spoke of the importance of Federal patent policy in controlling the flow of technology from the government's R&D programs to the commercial sector and the consumer.

The bill provides that each nonprofit organization (including universities, but excluding government-owned research facilities) and small business receiving Federal subsidies for R&D have the option of retaining title to inventions, except in "exceptional circumstances." In such circumstances, the decision of a funding agency to retain title to an invention would be reviewed by the Comptroller General. The Federal government would receive title to any invention not reported to it "within a reasonable time," or when the inventor does not intend to file for patent rights. To ensure that the aim of the bill is being met, the funding agency would have the right to require periodic progress reports from the inventor on the utilization of the invention. In addition, the bill requires that nonprofit organizations receive the approval of the Federal funding agency before assigning invention rights to a third party. S414 also contains a provision for the government to be repaid all or part of the money it spent in support of the work in question.

Three key senators have, at the time of this writing, not yet announced their positions on the bill. Edward Kennedy

(D-Mass.), the chairman of the Senate Judiciary Committee, has not spoken on either side of the bill, and his position is expected to carry a good deal of influence, both in the Committee and on the floor. Russell Long (D-La.) and Gaylord Nelson (D-Wisc.) headed the opposition to a similar patent-reform bill in the Senate two years ago, so S414 supporters are anxiously awaiting their pronouncements. Nelson, who heads the Senate Select Committee on Small Business, may look favorably on the bill's preferential treatment of small businesses.

An identical bill has been introduced in the House of Representatives, but action there has been delayed pending the long-awaited results of the domestic policy review on industrial innovation, which may include recommendations for Federal patent policy reform. A report of a domestic policy review industrial advisory subcommittee concluded that the goal of stimulating industrial development of technology could be achieved either by assigning the title to an invention to the contractor, as S414 does, or by requiring a greater government effort to market inventions of which it is the owner. Hearings on the House bill are tentatively being planned for this fall. —MEJ

US signs four scientific agreements with Chinese

The US and the People's Republic of China signed four agreements in May that call for exchanges of scientific and technological information and personnel between the two countries. The accords are intended to increase cooperation in precision measurements and standards of length, weight, temperature, time, frequency and electrical characteristics, analytical chemistry, materials research, applied mathematics and other topics. Signed on behalf of the US by Secretary of Commerce Juanita Kreps, National

Oceanic and Atmospheric Administration head Richard Frank and Assistant Secretary for Science and Technology Jordan Baruch, the agreements are protocols to the basic compact initialed by Presidential Science Adviser Frank Press and Deputy Premier Fang Yi in January (PHYSICS TODAY, May, page 113).

According to one of the agreements, China will send scientists to work in National Bureau of Standards laboratories for periods ranging from six months to two years.

The major source of the information sent to China by the US (under the agreement) will be the Commerce Department's National Technical Information Service at Springfield, Va.

Science museum offers exhibit-design program

A study program on the design and fabrication of interactive museum exhibits is being offered by the Exploratorium, a science and perception museum located in San Francisco. The program is open to academic faculty members and museum technicians interested in organizing centers like the Exploratorium on campus or in their communities. The internships, which will last from two to five weeks, will stress the techniques of planning and construction of exhibits and the associated graphic and written materials. Those intending to apply should have ideas for possible projects at their own institutions. For information on enrollment and financial assistance, contact Robert J. Semper, The Exploratorium, 3601 Lyon Street, San Francisco, California 94123.

in brief

Jerome Allan Smith recently took over the position of Technical Director of the Office of Naval Research. He is now responsible for the direction and management of basic research in the Navy. Smith was formerly a professor in the department of mechanical and aerospace engineering at Princeton University.

The Ford Foundation is funding a major study comparing coal with other energy options available to the US over the next 20 years. The study, to be conducted by a group of 20 scientists and scholars, is to be financed by a \$600 000 grant to Resources for the Future. Director of the study is Hans H. Landsberg, co-director of the RFF Center for Energy Policy Research.

Bennett Miller has been named program director of the DOE office of solar, geothermal, electric and storage systems after serving for one year as acting director. □

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