

fiscal 1985, observing that only the applied-physics section makes the effort sound like good science. He said that the description of confinement systems, development technology and planning sounds suspiciously like programs aimed "explicitly toward the

definition, construction and operation of large reactor-like machines." This is a goal the Administration does not include in its current plan.

The message from the White House was not lost on Congress when the DOE budget came up for approval. —IG

Vogt panel endorses SURA accelerator

Room 542 at the National Science Foundation was jammed all afternoon of 24 September for another episode in a long-running drama that has acquired the title "The Saga of SURA." The latest act was played in front of physicists from universities, laboratories and professional societies, aides to members of Congress and officials of government agencies who crowded into the narrow conference room to hear the report of a subcommittee of the Nuclear Science Advisory Committee. NSAC had been asked by President Reagan's science adviser, George A. Keyworth II, to reexamine the scientific merit of its recommendation to build a cw electron accelerator with an energy range of 0.5 to 4 GeV. The machine became an object of controversy 20 months ago, when NSAC advised the Department of Energy to select the proposal for it submitted by Southeastern Universities Research Association over concepts advanced by other groups—namely Argonne, Bates Laboratory at MIT, National Bureau of Standards and University of Illinois (PHYSICS TODAY, July 1983, page 57).

A crucial act took place last June when Congress appropriated \$3.5 million of \$5 million that DOE requested for R&D and engineering design studies for the continuous-electron-beam accelerator facility, or CEBAF, as SURA calls the machine, but agreed "to defer, without prejudice," any construction funds in fiscal 1985. According to Congressional staffers and DOE officials, the reasons for this were scientific and technical, involving questions about the energy range and importance of CEBAF. In cutting the CEBAF request for fiscal 1985, Congress expressed concern about the priorities of the nuclear science community for future facilities, as given in NSAC's most recent *Long-Range Plan for Nuclear Science* (PHYSICS TODAY, September, page 55). By calling on NSAC to review CEBAF again, Keyworth, DOE and SURA hoped to end the uncertainty once and for all.

Before the subcommittee delivered its conclusions, chairman Erich Vogt of the University of British Columbia explained that the considerations governing the CEBAF issues were "somewhat broader than a simple yes-or-no decision." The group, which included

NSAC chairman John Schiffer of Argonne, Gordon Baym of the University of Illinois, D. Allan Bromley of Yale, Glennys Farrar of Rutgers, Steven Koonin of Caltech, John Negele of MIT, Ingo Sick of the University of Basel and Dirk Walecka of Stanford, worked from about mid-July to mid-September "coupled," said Vogt, "with VAX computers." In the end, the subcommittee reached unanimous agreement on the need for cw electron beams. But "after considerable and lively discussion," Vogt observed, "only a majority supported 4 GeV as the right energy reach."

Kinematic flexibility. The precise energy range of the machine similarly perplexed two previous NSAC groups—the Subcommittee on Electromagnetic Interactions headed by Peter Barnes of Carnegie-Mellon University in 1982 and the Panel on Electron Accelerator Facilities under Bromley's chairmanship in 1983. In its succinct 10-page report, the Vogt subcommittee states: "There is no known sharp threshold for new physics above 2 GeV, but one gains kinematic flexibility, which can increase both the rate at which the experiments can be carried out and the information they provide... In assessing the priority to be given the full energy, the subcommittee considered again the list of experiments and the kinematic diagrams the Barnes Panel provided in its report. Doing this, we

found that the physics dealing with nucleons, nucleon resonances and mesons either is or begins to be accessible by 2 GeV. This includes determination of nuclear and nucleon multipole amplitudes, the study of deep-lying hole states, the nucleon spectral function in nuclei, two-body correlation functions through one- and two-nucleon knock-out and the study of pion and delta propagation in the nucleon medium through coincidence experiments..."

"For those of you who came here expecting a bloodbath for electromagnetic physics," said Vogt, "this must be very disappointing." The report emphasizes the unity of nuclear physics, in which electromagnetic studies are essential in addressing a broad range of fundamental open questions in nuclear physics and its interface with quantum chromodynamics. Accordingly, the report hails the 4-GeV CEBAF as the "accelerator of choice," the "first-priority major construction project for nuclear physics.... We view this facility as the major component of a structured electromagnetic research program providing world-leading new capabilities for exploring atomic nuclei, particularly the effects of nucleon substructure." The review of the machine is limited to its physics. The Vogt group was enjoined by Keyworth from commenting on matters of design, technology, cost, site and management.

Complementary components. Though the major part of the report deals with the problems confronted by SURA, the subcommittee could not resist the temptation to restate some conclusions of the NSAC 1983 *Long-Range Plan*. Thus, while the 4-GeV accelerator is "the central component of a structured program of electromagnetic research," the report speaks of "complementary" components of a world-leading approach to nuclear science. These include: building a 1-GeV cw facility that offers high resolution and would be relatively inexpensive; vigorous use of the existing 20-GeV electron beam at SLAC; experimenting with the 900-GeV muon beam (nearing completion at Fermilab), which will permit exploration of nuclei in the realm of asymptotic QCD. Beyond these, the subcommittee calls for a relativistic heavy-ion collider, as did the NSAC 1983 *Long-Range Plan*. Only this time it made sure no reader misunderstood its ranking of priorities.

After the Vogt Report was fully aired, CEBAF director James S. McCarthy heaved a sigh of relief but remained wary. "I've learned to accept the ups and downs of the SURA machine," he said. "Just when I think everything is up, something comes along that changes things. I'm encouraged by the Vogt Report, but I know there's still a long way to go." —IG □

MCCARTHY

