

on non-nuclear energy R&D with equal emphasis on conservation and energy production. HR 13565 has been reported out of subcommittee and is awaiting full committee action before presentation to the House.

The bills discussed above involving FEA, ERDA and R&D funding in general are among many that have been considered, but they appear to have the best chance for enactment. Even so, they have deficiencies, according to Andelin. Holifield's HR 11510 is fragmented in its allocation of energy jurisdiction. Although it provides for the formation of ERDA, it does not cover the R&D functions of NASA and NSF, and no energy policy role would be accorded to ERDA. Both the Jackson and Udall bills do not cover nuclear R&D, and in the event of the creation of ERDA, it is not clear whether the research money authorized under either of these bills would be administered by ERDA or not.

Further energy jurisdictional matters came up as spin-off from the efforts of the House Select Committee on Committees, chaired by Representative Richard Bolling (D-Mo.). One change the committee has recommended is the formation of the House Science and Technology Committee (to replace the House Science and Astronautics Committee), which would pass on all energy R&D matters including nuclear.

The problem of continuity of R&D funding remains, Andelin feels. As long as the Office of Management and Budget has control over R&D purse strings on an annual basis, wide fluctuations in funding are possible. —RAS

New faces at Arizona Optical Sciences Center

The Optical Sciences Center at the University of Arizona has a new image. Peter Franken (University of Michigan) has succeeded Aden Meinel as director of the Center, and Willis E. Lamb Jr (Yale University) will be joining the Center's program in quantum optics during the summer. Lamb will also become a professor in the physics department at the University.

Philip N. Slater has taken over from James A. Eyer, now special assistant to the University's vice-president for research, as associate director of OSC. Meinel, who had directed the Optical Sciences Center since 1963, stepped down in order to spend more time working on new technologies for the direct utilization of solar energy. He also remains active in the Center's massive glass programs.

In addition to Lamb, William Wing (also of Yale), Sol Nudelman (University of Rhode Island) and Harrison Barrett (Raytheon Co., Waltham, Mass.) have accepted joint appoint-



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ments. Nudelman, already at work at the Center, and Barrett, to arrive in the summer, will participate in the medical-optics program. Wing will arrive from Yale, where he and Lamb have collaborated, this summer.

Indicative of the interdisciplinary approach to research at OSC is the large number of staff members holding joint appointments. Out of 27 regular faculty, ten of them also hold positions in the University's departments of astronomy, civil engineering, computer sciences, microbiology, physics, psychology and radiology. "As you can see, we don't go around preaching interdisciplinarianism," Franken told us. "We simply practice it." There are also about a dozen postdocs, around 40 professional and technical people and approximately 90 graduate students doing work there.

The Center designs, evaluates and produces both the large primary optics and the smaller components required to make complete optical systems. "An integral part of our facility," Franken said, "is an eight-story testing tower that would be capable of evaluating a primary up to 248-inch diameter, should you have any loose change about." The biggest thing going now is the construction of optics for the world's first Multiple Mirror Telescope (MMT), comprising six slaved 72-in. primaries. The MMT will have the light gathering capability of a conventional 180-in. instrument, at a substantial saving in total weight, size and cost.

Among the other work going on at the Center, which operates on a \$2.5-million annual budget, the programs in quantum optics and in image manipulation are the most extensive. There are also programs in medical optics, infrared systems, novel methods of optical design, electroreflectance, elec-

tronic structure of solids, optical and surface properties of semiconductors, thin films and solar energy.

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ips for research is 1.3% of its total sales; this total in 1973 was 23 billion guilders (0.35 dollars equals one guilder). For the Eindhoven Research Laboratories the budget is 160 million guilders; a similar amount is spent for all the other European research laboratories combined.

The Eindhoven labs employ 2250 persons, of whom 500 have a master's or PhD. Of the 500, about one-third are physicists. The labs are divided into about 70 groups, organized along lines of scientific disciplines. (A similar organizational structure exists in the research effort at Bell Labs, but generally not for device development, where the work is much more interdisciplinary.) In addition, Volger told us, occasionally an ad hoc project is established, running across the disciplines. The project collaborates with the appropriate people in a division, not only in development, but also in engineering and sometimes even in marketing. Volger emphasized that Philips would never allow its total research activity to be dispersed into project groups.

Within each disciplinary group, there is usually one person who is especially concerned with the external scientific world. This person, sometimes called a "fundamentalist," keeps up to date in the scientific literature, attends more conferences than the others, and then communicates this knowledge to his colleagues.

Pannenberg describes Philips research as having a "push-pull" philosophy, Volger explained. Formerly research had mainly a pushing function, in which researchers came up with their own ideas of what to do. Now the emphasis is more on the pulling function, in which society asks for functions to be fulfilled by industry. However, Volger notes, there is still room for the unexpected. Good ideas are always welcome.

The laboratory has a small group, called "Explorations of the Future," that thinks about long-range possibilities. And recently a series of informal discussions were held among 123 of the research workers, in discussion groups held in people's homes. They issued a report to the management, addressing themselves to what Philips can do with respect to energy problems, pollution problems, and the issues raised by "The Limits to Growth" study sponsored by the Club of Rome.

The labs have about 800 people in the Engineering Department. Me-

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