

we talked with him. He went on to say that the center must be, first of all, a good center for physics. The program with which he is convinced he is achieving the goal has several parts. An academic year is divided into two main sessions, one for research and one for an "extended" course. Shorter courses on different branches of physics last three to twelve weeks. So far the subjects of extended courses have been high energy, plasmas, nuclei, particles and condensed matter (solids and liquids). This summer's symposium, covering the whole spectrum of physics, which drew a population of 320 from 43 countries, including eight Nobel-prize winners, was an advanced review of the contemporary scene with all the specialists hearing about fields different from their own.

—RHE



NEW HEADQUARTERS, provided by city of Trieste at \$1 per year, looks down on Adriatic from a hillside in Miramare, about 6 km north of the middle of Trieste.

Institutional-Grant Bill Supported in House Hearings

An alternative to the project-grant approach to federal support of scientific research is gaining ground in Congress. The House Subcommittee on Science, Research and Development held hearings in July on a bill that would grant \$150 million a year to colleges and universities by formula rather than by project.

The purpose of the bill, HR 875, is to distribute government research money more widely and to ensure that smaller, less endowed schools benefit from federal research programs. Basically the bill would establish a formula that applies geographic, population and academic-incentive criteria to the task of allocating funds.

One third of the money would be given to schools on the basis of advanced degrees. The schools would split up this \$50 million in proportion to the fraction of the total master's and doctor's degrees each school produced in the preceding three years. Degrees in physical, social and biological science, mathematics and engineering would be counted.

One third of the funds would be given to the states in proportion to their share of the total high-school graduates in the country. The states in turn would distribute their share to their colleges and universities on the basis of credit hours offered in the fields mentioned.

The remaining one third would go

directly to schools on the basis of project awards in the previous year from the National Science Foundation, the National Institutes of Health and the Office of Education, with a maximum of \$300 000.

Rep. Emilio Q. Daddario (D-Conn.), chairman of the subcommittee, said, "The momentum we built up in scientific and technological education must not be lost for lack of adequate support." He told the hearings that "we must maintain our high plateaus and elevate our lower ones."

In testimony before the committee, Donald F. Hornig, head of the Office of Science and Technology, pointed out some of the disadvantages of the project grants. They are highly specific and benefit the individual researcher. So while his school benefits indirectly, it can not shift the grant to fields in which it is trying to establish competence. Then, too, project grants can be discontinued with no regard for the welfare of an individual university.

Although he feels that project grants must be the basic mechanism of federal scientific-research support, Hornig sees institutional grants as a necessary supplement to give schools the ability to set and achieve their own goals and insure an equitable distribution of funds to developing schools.

Other leading science and education figures, including Leland Ha-

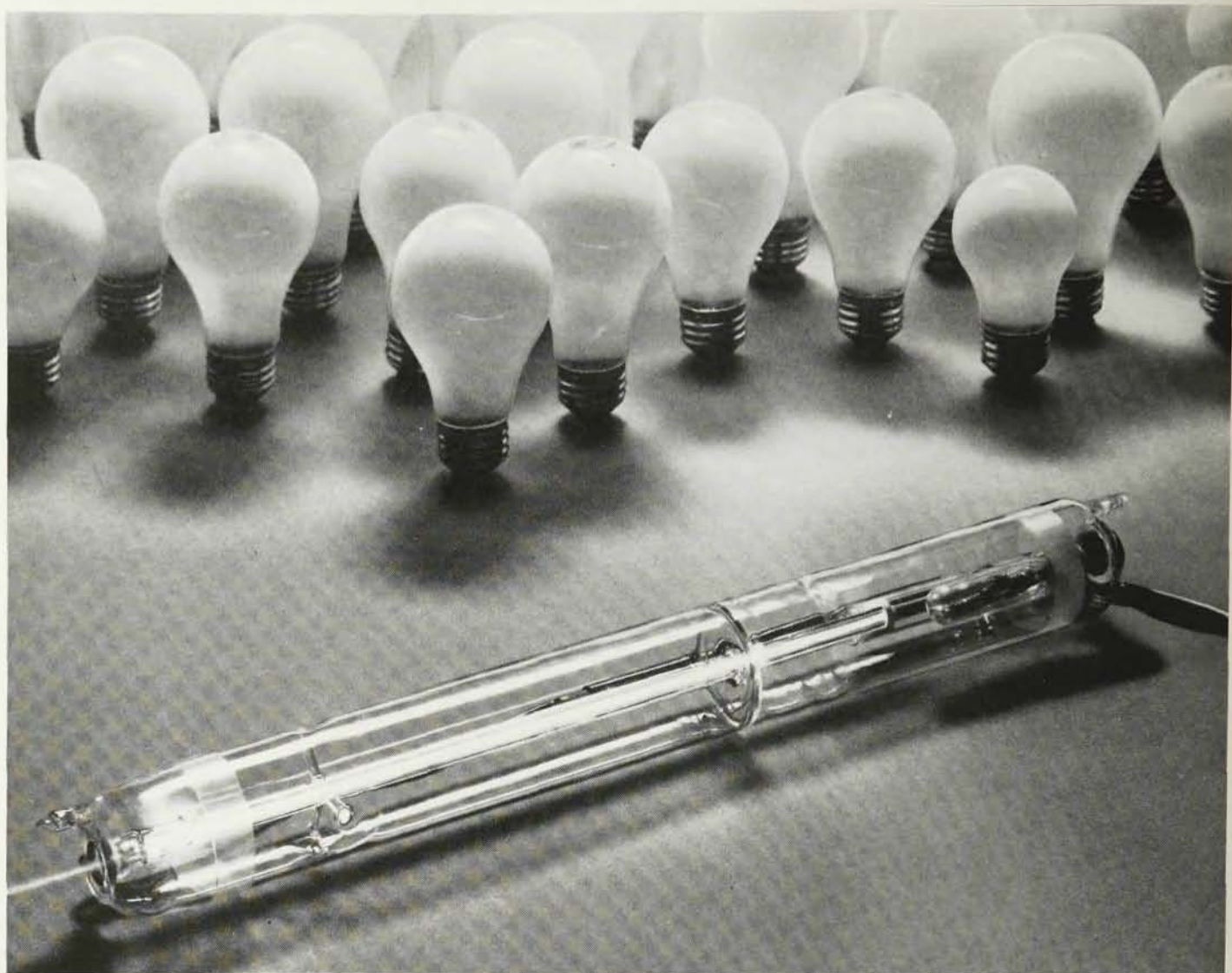
worth, head of the National Science Foundation, also testified in support of some form of institutional-grant system. The big question appears to be the actual provisions of the formula. Haworth questioned whether the proposed formula, because of its provisions whereby funding depends on advanced degrees and previous projects, might not benefit the larger graduate schools anyway. Citing the NSF grant program aimed at establishing centers of excellence, Haworth gave his backing to the concept, if not the method, of HR 875. The bill is not expected to be sent to the full House this late in the year, but a new version will be introduced when Congress convenes next year.

—JJ

AIP Corporate Associates Meet This Month in New York

Corporate Associates of the American Institute of Physics and officers of AIP member societies will gather in New York this month for a two-day annual meeting. An evening session is scheduled for 25 Sept. at the Hotel Roosevelt; the meeting moves to Rockefeller University the next day for a morning session on the frontiers of physics and an afternoon devoted to applications.

On Wednesday evening Frederick A. Seitz will moderate a panel discussion on "Policy Trends and Projections in Science." Weston E. Vivian, for-



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mer US congressman from Michigan, will present "A Congressional View" of policy trends; J. E. Goldman, director of the Ford Motor Co Scientific Laboratory, "An Industrial View" and O. M. Solandt, chairman of the Science Council of Canada, "A Canadian View."

Thursday morning the associates will hear Peter A. Franken on "Are the Laser Frontiers Visible?", Raymond Bowers on "Transmission of Electromagnetic Waves Through Metals," William Fairbank on "Gyroscopic Test in Space of Einstein's General Theory of Relativity" and John R. Platt on "Biophysics of Perception."

In the afternoon Robert Herman will discuss the science of vehicular traffic, Edward A. Mason will report on agro-industrial complexes, and Luis W. Alvarez will detail pyramid exploration. Edward Creutz will preside in the morning and Ralph A. Sawyer in the afternoon. The meeting will include about 150 top executives from industry, as well as academic leaders.

In a concluding session Friday morning at the Hotel Roosevelt, AIP Governing Board members, society officers and AIP staff will discuss institute programs and areas of development.

Physics Enrollments Rise; Percentage Drop Continues

The number of undergraduates majoring in physics rose during the last academic year for the second year in a row, according to a year-end summary by the American Institute of Physics. Many of those who were graduated are expected to be drafted, however; the full impact of the revised draft laws will not be known until classes resume.

At the end of the 1967-68 year, 14 526 juniors and seniors were majoring in physics, an increase of 1189 over the year before. Graduate enrollment, however, had leveled off at 15 305. Ratio of physics student to total enrollments continued to drop. In September 1960 juniors majoring in physics constituted 1.78% of their own freshman classes. In September, 1967, this figure had dropped to 0.94% and was expected to drop to 0.82% this month.

The survey was part of the project for the Analysis of Education and Manpower Data in Physics, of the

AIP Education and Manpower Division. Enrollments were broken down into geographical regions, revealing a continuing concentration of physics study on both coasts. The highest number of physics students, 6242, was found in the Mid-Atlantic region (New York, New Jersey and Pennsylvania). The East-North Central region (Illinois, Indiana, Michigan, Ohio and Wisconsin) tallied 5325 while the Pacific region (California, Oregon, Washington, Alaska and Hawaii) reported 4118.

Summaries of enrollments and degrees granted, including a breakdown of degrees awarded since 1952, are available from Mrs Susanne D. Ellis at AIP.

Oxford Instrument Imports US Business Approach to UK

The Route-128 route to setting up small scientific companies is still a rocky road in England. One physics-based company, the Oxford Instrument Co. Ltd, is helping pave the way and is proving that a few technical people can run a successful business.

Oxford Instrument has after nine years in business managed to attract the necessary venture capital and to offer the variety of wares required for commercial stability. It was a difficult climb to success, but along the way the company won a "Queen's Award for Industry," built the first high-field superconductive magnet outside the US, became the first company to build a quadrupole superconduc-

tive magnet and developed the coldest refrigerator in the world, a cryogenic unit that operates within one tenth of a Kelvin of absolute zero.

It all started in 1959 when Martin Wood, then a research engineer at the Clarendon Laboratory at Oxford University, decided there was a limited but unsatisfied market for high-field iron-free magnets, the kind of magnet needed for research in the big physics laboratories. Such an opportunity was the start of many of today's successful American corporations. With his wife Audrey and Joseph Milligan, a retired Clarendon technician, Wood set up shop in a garden shed. The first financial support was supplied by local bankers more on the basis of personal acquaintance than of rosy business prospects, a far cry from the variety of venture-capital sources that have been available to fledgling scientist-businessmen in the US.

By 1961 the company had a few successful projects behind it but was still more a weekend hobby than a fully commercial company. At this time the development of high-field superconductors in the US pointed to a closely related new technology that promised to become a rapidly expanding international market. So the Woods, making the crucial decision to enter this new market, incorporated the company and set about the problems of growth, still on the basis of short-term financial arrangements. In 1963 the first full-time employee, John Rackstraw, now in charge of all production, arrived and was soon fol-

RESONANCES

The Weston accelerator can proceed on schedule now that Congress has appropriated \$12 074 000 for 1969 and removed the House-passed prohibition on construction this year. With carryover funds of \$2.5 million, Weston has double the \$7.1 million approved earlier by the House.

Planetary exploration is running into financial snags. A report by the National Academy of Sciences urges unmanned missions every time Mars and Venus are favorably positioned and Martian orbiting-landing flights. But the National Aeronautics and Space Administration says it must lower its sights because of budget cuts: The instrumentation for its 1973 Mars landing is "substantially less" than envisioned a few months ago.

US conversion to the metric system will be studied under a bill recently passed by Congress. The US will bring up the rear: Great Britain begins converting in 1975.