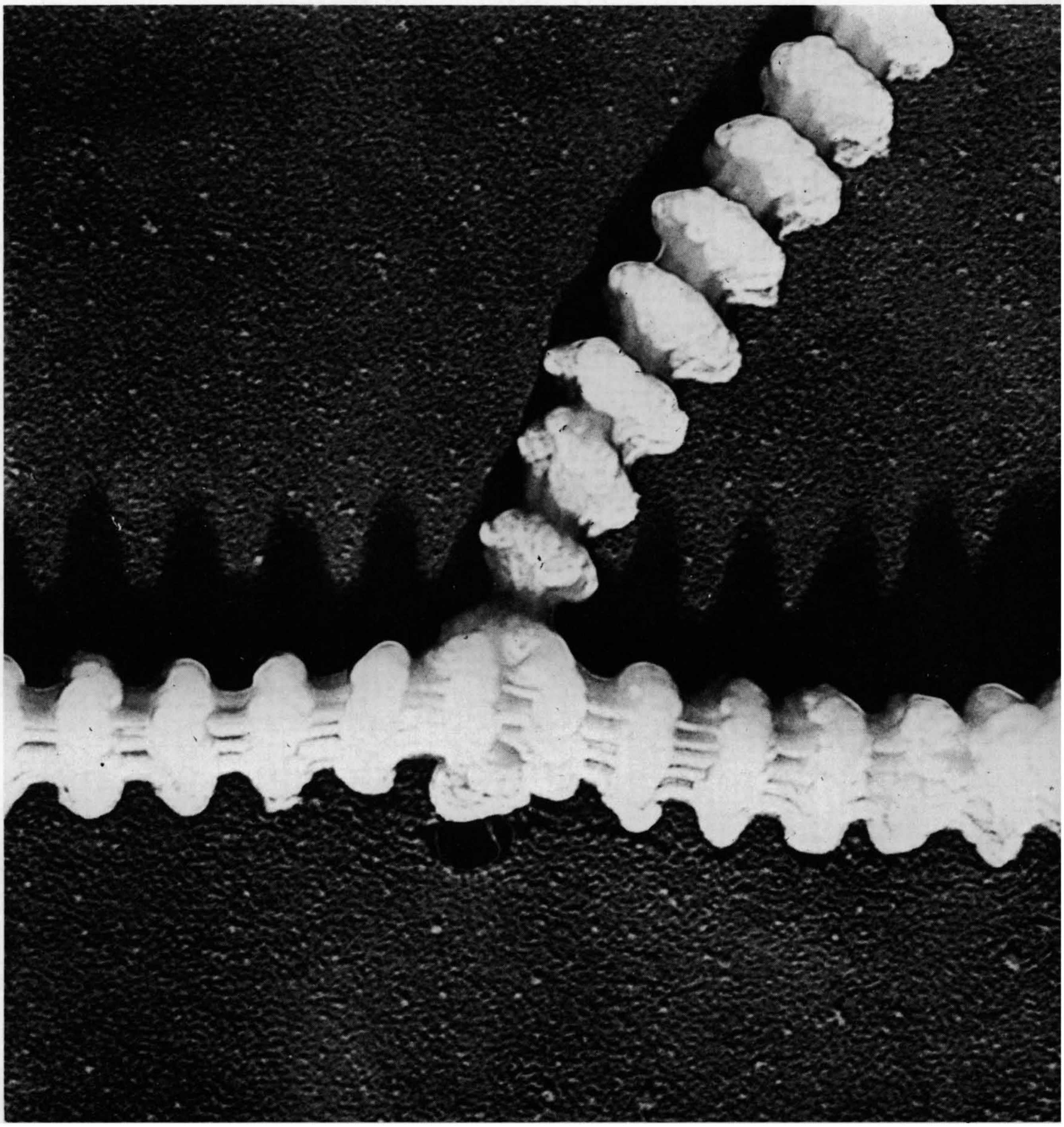
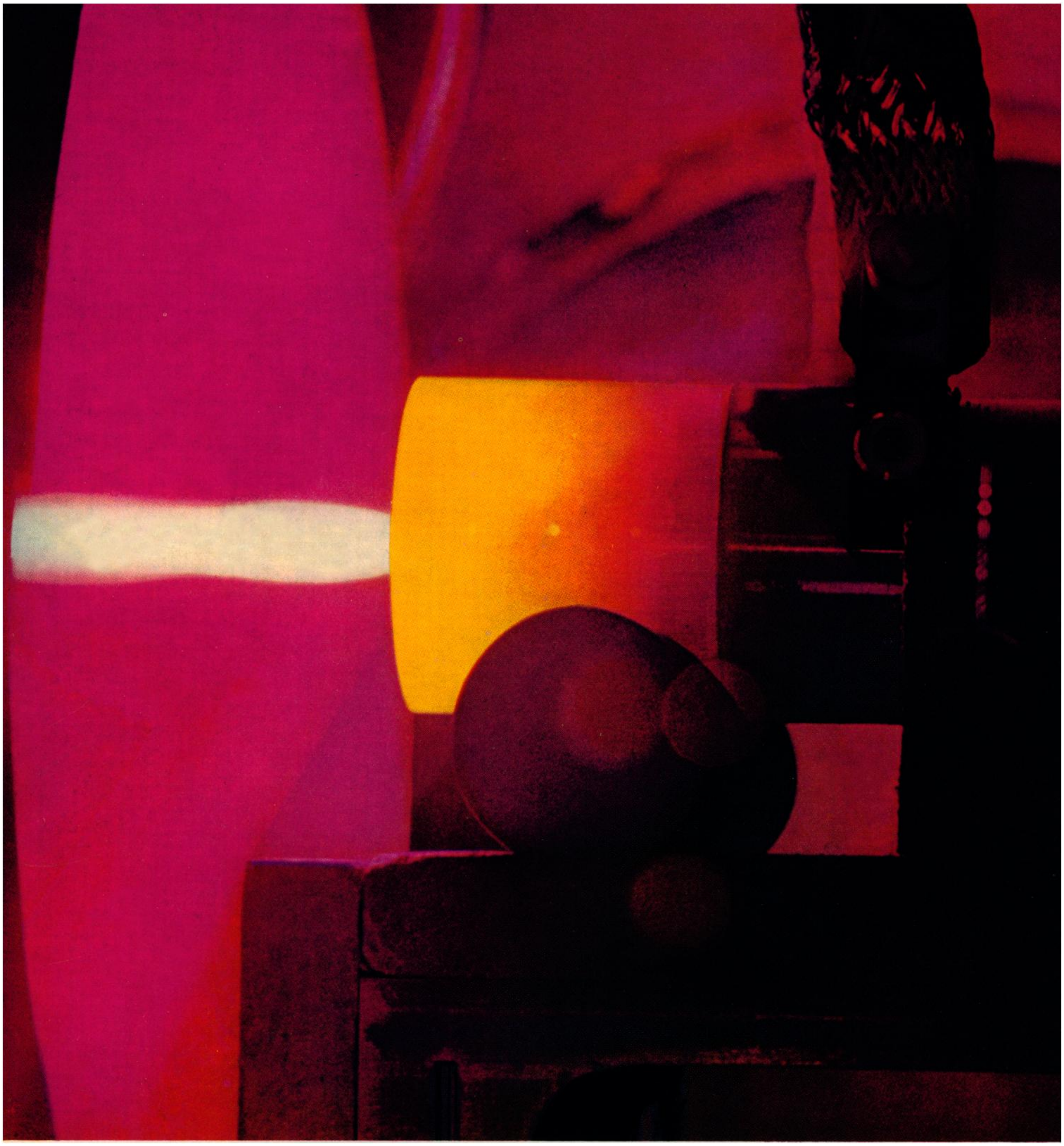
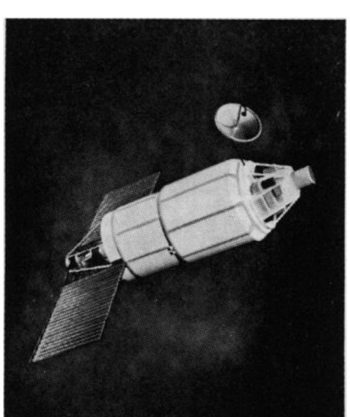
SCIENCE

2 February 1962
Vol. 135, No. 3501

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE







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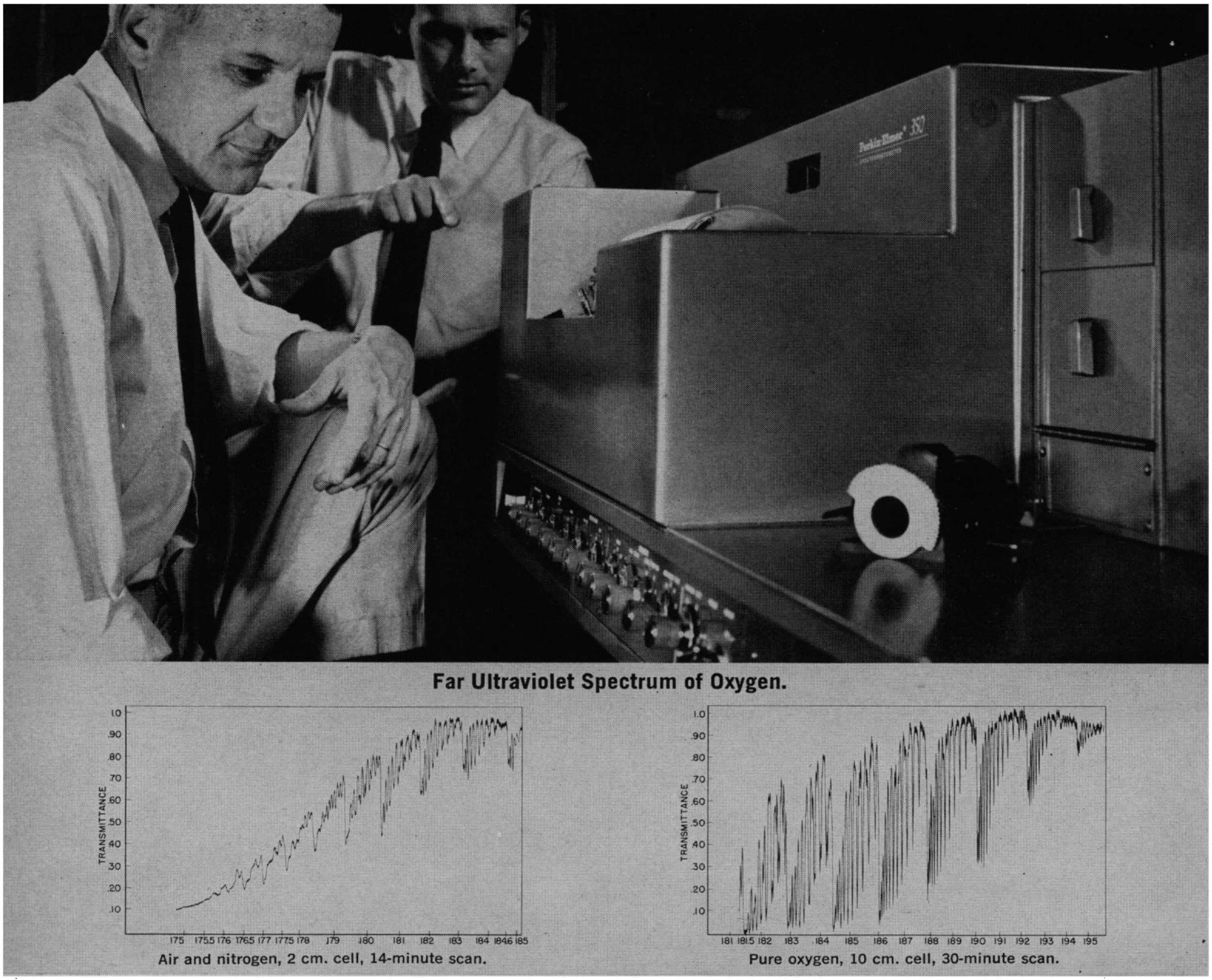

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Perkin-Elmer *Corporation*
NORWALK, CONNECTICUT

2 February 1962, Volume 135, Number 3501

SCIENCE

Cover Two collagen fibers reconstituted from solution in phosphate buffer (*p*H 8.4; ionic strength 0.33*M*) by salting-out with ammonium sulfate, redissolving, and again salting-out for four cycles. Gold-palladium shadowed; about × 43,000. The electron photomicrograph was made at the Eastern Research and Development Division, U.S. Department of Agriculture, Philadelphia, Pa. [Reproduced from L. D. Kahn, R. J. Carroll, L. P. Witnauer, *Biochimica et Biophysica Acta* **50**, 292 (1961)]

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SCIENCE, now combined with THE SCIENTIFIC MONTHLY, is published each Friday by the American Association for the Advancement of Science at National Publishing Company, Washington, D.C. SCIENCE is indexed in the *Reader's Guide to Periodical Literature*.

Editorial correspondence should be addressed to SCIENCE, 1515 Massachusetts Ave., NW, Washington 5, D.C. Manuscripts should be typed with double spacing and submitted in duplicate. The AAAS assumes no responsibility for the safety of manuscripts. Opinions expressed by authors are their own and do not necessarily reflect the opinions of the AAAS or the institutions with which the authors are affiliated. For detailed suggestions on the preparation of manuscripts, see *Science* **125**, 16 (4 Jan. 1957).

Advertising correspondence should be addressed to SCIENCE, Room 1740, 11 West 42 St., New York 36, N.Y.

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Annual subscriptions: $8.50): foreign postage, $1.50; Canadian postage 75¢. Single copies, 35¢. School year subscriptions: 9 months, $7.00; 10 months, $7.50. Cable address: Advancesci, Washington.

A Minimal Program

Today it is no longer a question of whether federal aid should be given to colleges and universities, but rather of how to give aid equitably and of how much to give: it is a question of means and not ends. If support is to be given, how should it be allocated?

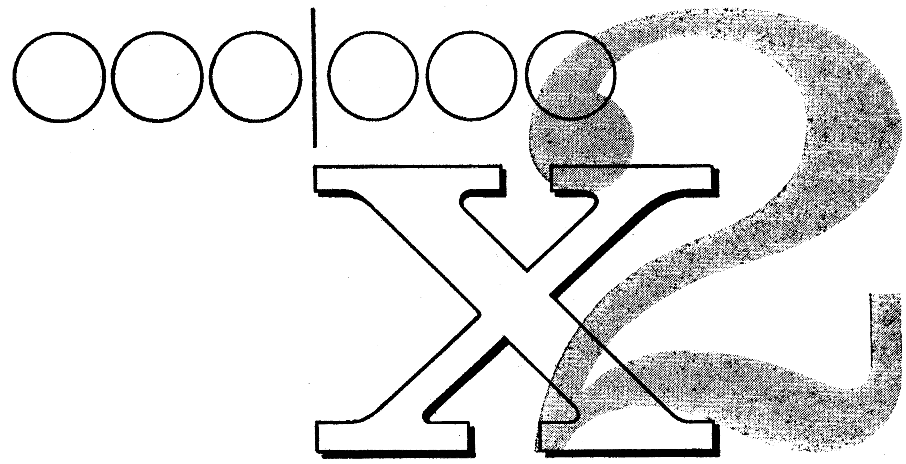
A bill that comes closest to satisfying the diverse interests concerned was reported out by the House Rules Committee last week. This bill (H.R. 8900), which was introduced by Representative Edith Green of Oregon, is known as the College Facilities Administration Act. It has had bipartisan support in the House Education and Labor Committee and in the Rules Committee. It has been strongly endorsed by the American Council on Education, the American Association of Junior Colleges, the Association of American Colleges, the Association of State Universities and Land-Grant Colleges, and the State Universities Association. On 23 January these organizations issued a joint statement in support of the bill: "Congress has before it no more important or potentially helpful legislation in the field of higher education, and there is no other legislative issue on which such unity prevails in higher education."

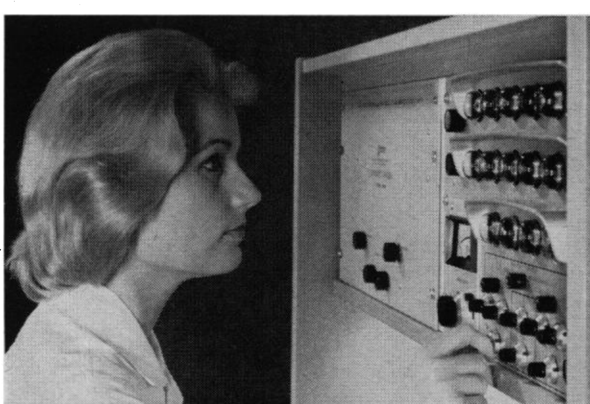
Although some $1.5 billion in low-cost federal loans for revenue-producing college buildings have been dispensed since 1950, no money has been available for undergraduate teaching facilities. In the face of rising enrollments, this is where institutions are feeling the pinch. H.R. 8900 has provisions for both grants and loans for building and equipping academic facilities.

The bill offers $180 million annually for 5-year matching grants to pay for up to one-third of the building costs and $120 million annually for 5-year loans to cover not more than three-fourths of the building costs. Equitable distribution is a knotty problem that can only be met by some kind of formula. The bill provides that half of the grants will be divided among the states in proportion to the number of undergraduates enrolled in accredited institutions in each state and half in proportion to the number of students enrolled in grades 9 through 12. The first provision gives states that already have a large number of students in college a proportionately larger share of the grants, but it is a good pragmatic solution. The second provision to some extent offsets this advantage to the wealthier states by making the grants proportional to the potential college population. The formula for loans is much simpler: no state may receive more than 12.5 percent of the funds, and loans can pay up to three-fourths of the total costs of construction.

The primary aim of H.R. 8900 is to increase the enrollment capacity in higher education for the country as a whole, without regard to whether institutions are public or private, sectarian or nonsectarian. The bill seeks to avoid the touchy issue of separation of church and state by denying grants or loans for construction of any facility for religious instruction. It explicitly prohibits federal control over "the personnel, curriculum, methods of instruction, or administration of any educational institution." The method of administration further guarantees freedom from federal control: although the grant and loan program will be administered by the U.S. Commissioner of Education, state boards will make all allocations on the basis of proposals they will submit to the commissioner.

The College Facilities Administration Act is carefully drawn up to aid the colleges and universities. It is a minimal program with a modest and well-defined aim, and thus should stand a good chance of becoming law—G. DuS.



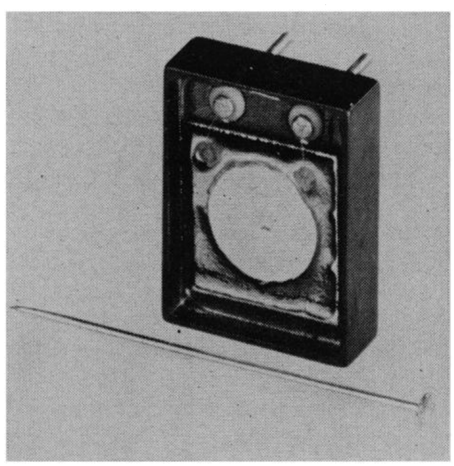


New Products

Servo accelerometer is an electrically constrained force-balance system contained completely in a hermetically sealed cylinder measuring 1 in. in diameter and 2 in. long. Sensitivity to angular and cross-axis acceleration is eliminated by a nonpendulous tangential arm suspension that supports and guides the sensing element. Natural frequency of the servo loop is 500 cy/sec, and total displacement of the seismic mass is less than 0.0001 in. Output from the accelerometer is an electric current proportional to acceleration. The load resistor can be selected to provide any desired voltage sensitivity up to a maximum of ±5 v. The output signal is electrically isolated from case ground. Two models are available, a high-precision model (No. 302) and a ruggedized moderate-cost instrument (model No. 302-2). Specifications of the former are: range, ±15 grav and up to ±100 grav on special order; linearity, 0.01 percent over the entire range; threshold, 10^{-6} grav; null stability, 10^{-3} grav; output signal, 0.2 ma/grav; ambient temperature range −65° to + 160°F; power requirement, 16 volts d-c at 30 ma. A compact regulated power supply (model No. 300), is available. An optional feature is an additional winding on the force coil, electrically isolated from the accelerometer circuitry, which permits introduction of compensating or correcting signals from an external source. Calibration can be accomplished using the earth's gravitational field. The instruments can also be used as remote-indicating electronic levels or as attitude indicators with accuracy and stability to be comparable to a precision bubble level. (Kistler Instrument Corp., Dept. Sci557, 15 Webster St., North Tonawanda, N.Y.)

The information reported here is obtained from manufacturers and from other sources considered to be reliable. Neither Science *nor the writer assumes responsibility for the accuracy of the information. All inquiries concerning items listed should be addressed to the manufacturer. Include the department number in your inquiry.*

Semiconductor nuclear particle detector uses a guard-ring construction to eliminate surface current leakage, thereby reducing noise and improving resolution. Two types are available: the NPSG-25, operating from 25 to 75 volts, for general use as a nuclear-particle detector; and the NPSG-75,



with operating range from 75 to 200 volts, for nuclear-particle spectroscopy. Pulse height is said to be linear with particle energy over a wide range, and response time is in the nanosecond region. (Solid State Radiations Inc., Dept. Sci551, 2261 S. Carmelina, Los Angeles 64, Calif.)

Strain-gage-signal calibrator is said to accommodate any type of resistance transducer. Depression of a push button associated with each module causes automatic balancing and automatic setting of the sensitivity control. The servo system is said to null to ±10 μv. A manual override provides for normal manual balancing and voltage selection. Each module contains an individual floating power supply. The modules can be used with three- to eight-wire input calibration systems and can perform single or double shunt resistance calibration as well as series current calibration. (B & F Instruments, Inc., Dept. Sci537, 3644 N. Lawrence St., Philadelphia 40, Pa.)

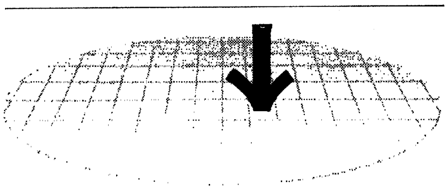
Bidirectional counter indicates true count while going through zero in either direction and thus eliminates the need for external reset to establish a reference. The counter converts electrical input pulses to numeral-tube visual readout and to digital electrical readout. The counter can be preset or reset to any reference number. An optional feature permits reset to a predetermined number after each operation. Counting rate is 45,000 per second; five decades and polarity indication are provided; signal output is up to 100 volts on 53 pins of an electrical connector. (Crane Co., 300 Winona Blvd., Burbank, Calif.)

Frequency meter (model No. 737C) combines a transistorized 10-Mcy/sec counter and a vacuum-tube heterodyne receptacle that accepts various converter plug-in units. Units are available for the ranges: 10 to 100 Mcy/sec, 100 to 220 Mcy/sec, and 100 to 510 Mcy/sec. Time base is of the decade count-down type. Both vertical decade display and in-line numeral-tube display are available. (Computer Measurements Corp., Dept. Sci559, 12970 Bradley Ave., San Fernando, Calif.)

Rubidium frequency standard is said to be accurate to 5 parts in 10^{10} with long-term stability of 2 parts in 10^{10}. The instrument consists of a quartz-crystal oscillator whose frequency is maintained at a subharmonic of the 6834-Mcy/sec hyperfine resonance in the ground state of rubidium-87. Microwave resonance absorption is enhanced by optical pumping. The crystal oscillator frequency is translated to outputs at frequencies 5 Mcy/sec, 1 Mcy/sec, and 100 kcy/sec. All active elements are solid state. Weight of the portable instrument is 30 lb, and volume is 0.83 ft^3. (Clauser Technology Corp., Dept. Sci548, 3510 Torrance Blvd., Torrance, Calif.)

Bearing ratio apparatus can be used either in the laboratory or in the field to evaluate the bearing characteristics of friable soils. The soil or aggregate to be tested is contained in a small cup. A bearing plate is placed on top of the sample and loaded by means of a lever arrangement. The entire apparatus is self-contained. (Soiltest, Inc., Dept. Sci574, 4711 W. North Ave., Chicago 39, Ill.)

JOSHUA STERN
National Bureau of Standards, Washington, D.C.



Letters

Science and Engineering Manpower

Your news article on science and engineering manpower [*Science* **135**, 301 (26 Jan. 1962)], together with the volume of public mail in response to the President's statement at his press conference on 15 January, emphasizes the importance of the studies the President has requested. Despite differences of view over whether or not the drop in engineering enrollments is significant, and despite inadvertent errors, originating in my office (in the statistics included in the press conference statement, the year 1951 should have read 1950 in the listings of graduates in sciences, and engineering enrollments for 1951 should have read 146,000), there is, nevertheless, a growing consensus that major problems may be developing as we move further into the 1960's. As a minimum, there is an urgent need to understand the significance of the many statistics and statements relating to the subject of technical manpower.

We probably need better statistics and, more important, better analyses of what the statistics mean. For example, figures comparing present college enrollments with what they have been during the past decade are badly confused by the post-World War II "bulge." But regardless of any difference over numbers, the simple fact is that it is time for searching study and analysis of our technical manpower—its quality and utilization, as well as its quantity—and its implications for public policy. Similarly, we must make careful assessments of the demands our expanding research and development programs, both public and private, will place on our technical manpower resources. It is precisely such studies that the President now has asked for.

One matter of primary concern in the consideration of technical manpower problems is that of quality. I am convinced that it is necessary to improve the over-all quality of science and engineering education at all levels, to stimulate a high order of advanced training through research, and to make it possible for scientists and engineers to enhance their professional skills and to utilize their talents to the fullest. It is also necessary, in the planning of the government's research and development programs, to give greater emphasis to the effective use of technical manpower. The effective employment of our scientists and engineers is important for the individual as well as for the nation. In my view, far too little attention has been directed toward determining how effectively the national pool of scientific and technical manpower is distributed among industry, government, and universities, or to gaining a better understanding of the technical manpower needs and practices of each of these sectors and of the factors that influence manpower distribution.

It is for these reasons, among others, that there is a need for more study of our human resources for research and development.

JEROME B. WIESNER

The White House, Washington, D.C.

Research in Australia

My associates and I feel that the article "Financing scientific research in Australia" by S. Encel [*Science* **134**, 260 (1961)] presents an inaccurate and unflattering picture of this company's contribution to research. The following facts are provided in the hope that their publication may lead to a more balanced picture.

Encel says: "In 1955 the company embarked on a research program which has involved a capital cost of over £A400,000 ($1 million) to date, and its annual expenditure is now about £A100,000. It employs about 90 scientists, engineers, technicians, and geologists." Later, in commenting on a total estimated industrial research budget of about £A5 million, he says, "Almost all of this is for 'development' rather than 'research'."

The figures in the first quoted passage apply reasonably well to staffing and expenditure at the Central Research Laboratories alone at a time about 2 years ago. However, this is only one facet of research in this company. The Central Research Laboratories were opened in March 1957 to undertake fundamental and long-term research for the steel industry. Prior to that date research was conducted for the individual steel plants, and still is, in even greater volume.

Laboratories at present operated by the company for research purposes include the Central Research Laboratories at Shortland, the Works Research Laboratories at Newcastle and Port Kembla, the Central Mineral Dressing Laboratories at Whyalla, and smaller but important facilities in several subsidiary plants. A modern and well-equipped research laboratory is also maintained in Newcastle by the firm of John Lysaght (Australia) Limited. This is in no way connected with our own organization.

In addition to these installations, which exist purely for research, there are other departments where a good deal of research and investigation are carried on. A new million-dollar control laboratory at the Newcastle Steelworks will undertake many activities normally listed under the research budgets of industrial concerns, quite apart from its responsibilities in control chemistry and metallurgy. The same may be said of new facilities proposed for Port Kembla and Whyalla.

Further, all evaluation and exploration of ore deposits is carried out by the Department of Raw Materials and Exploration, whose expenditure would not have appeared in Encel's listing.

The staff now directly engaged on research is as follows: Central Research Laboratories, Shortland, 117; Works Research Department, Newcastle, 30; Works Research Department, Port Kembla, 25; Central Mineral Dressing Laboratories, Whyalla, 12. The Department of Raw Materials and Exploration employs 40 graduate geologists and other scientists, including field officers.

A total budget for all research and development conducted by the company would be difficult to compute. The current research budget for the Central Research Laboratories alone is very nearly twice the figure Encel has given for the entire industry. The other branches are proportionately financed.

It should also be pointed out that by no means is "almost all" of this expenditure for "development" rather than "research." Four major projects at Shortland now are entirely innovative, and a great deal of fundamental work is done that is either complementary to or independent of these. These laboratories are engaged almost exclusively on "research"; "development" is undertaken by Works teams as the projects progress. A smaller, though important, proportion of the work undertaken by the Works Research laboratories is true research, either independent of or supplementary to developmental function. Much of the developmental work done at the Works laboratories is also innovative; though applied and practical, it calls for scientific rigor and academic competence and makes a real contribution to knowledge in the general sense.

We realize that delays in publication