SCIENCE

22 March 1963
Vol. 139, No. 3560

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SCIENCE

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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

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COVER

Simple atomic generators, developed under the U.S. Atomic Energy Commission's SNAP (Systems for Nuclear Auxiliary Power) program, are now operating from pole to pole in outer space. Producing electricity by direct conversion from the heat of radioisotopes, these devices provide power for satellite radio transmitters in space, automatic weather stations in the Arctic and Antarctic, and navigational beacons. The pattern shown is a closeup view of SNAP-7B, a 60-watt generator that will power a U.S. Coast Guard lighthouse in Chesapeake Bay this summer. Fins on the generator shell are used to dissipate excess heat. See page 1175. [Martin Company]

VICKERS BRIEFS

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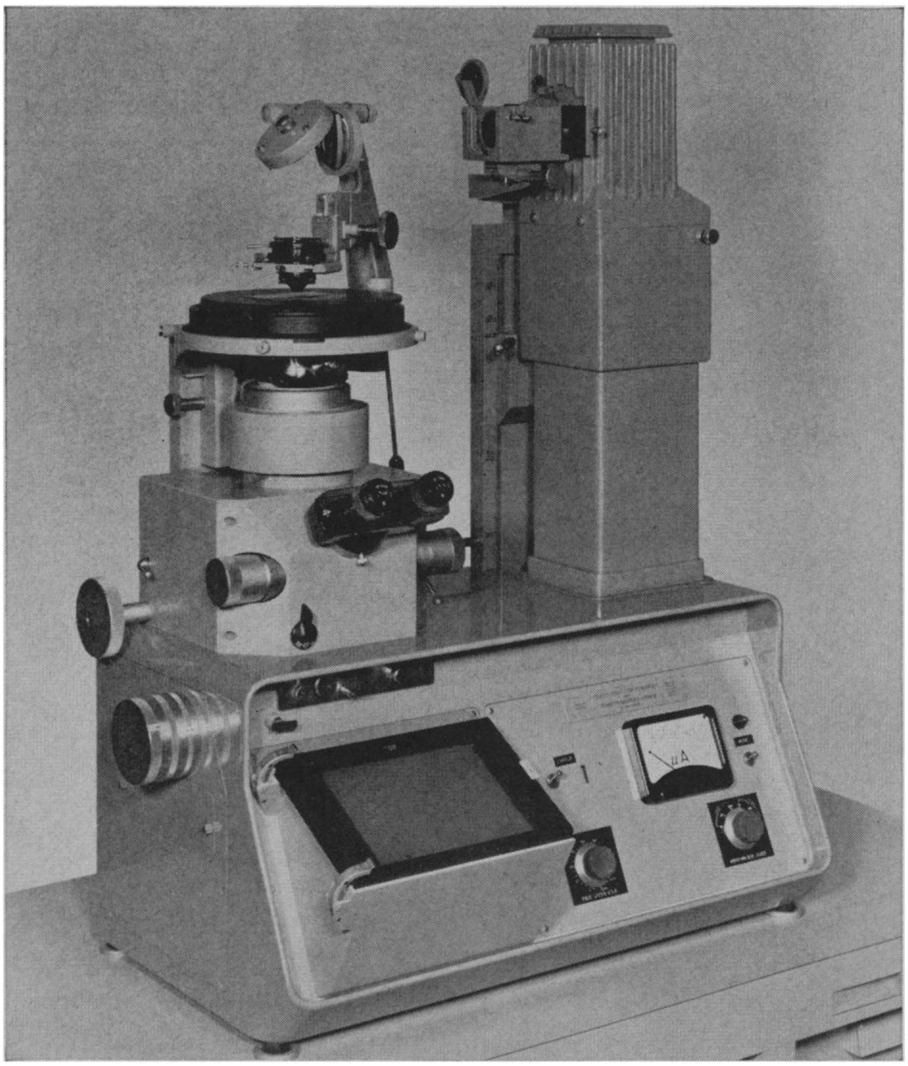

The inverted microscope has been commonly used only for a restricted range of biological techniques—mostly in tissue culture applications. However, the new Vickers "55" Microscope has been designed on the premise that there are positive advantages in an inverted design of the large universal photomicrographic stands which are used for research and for the rapid accumulation of high quality visual and photographic data.

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Fully automatic 35mm photography is obtained by insertion into the optical path of a motorized 35mm cassette, also actuated by the Timer unit. The Light Path Selector Switch allows choice of simultaneous observation and photography or diversion of all light either to the film or the visual eyepieces. A high pressure Xenon light source (6300°K) is supplied as standard, but a mercury vapor lamp can be quickly mounted in its place.

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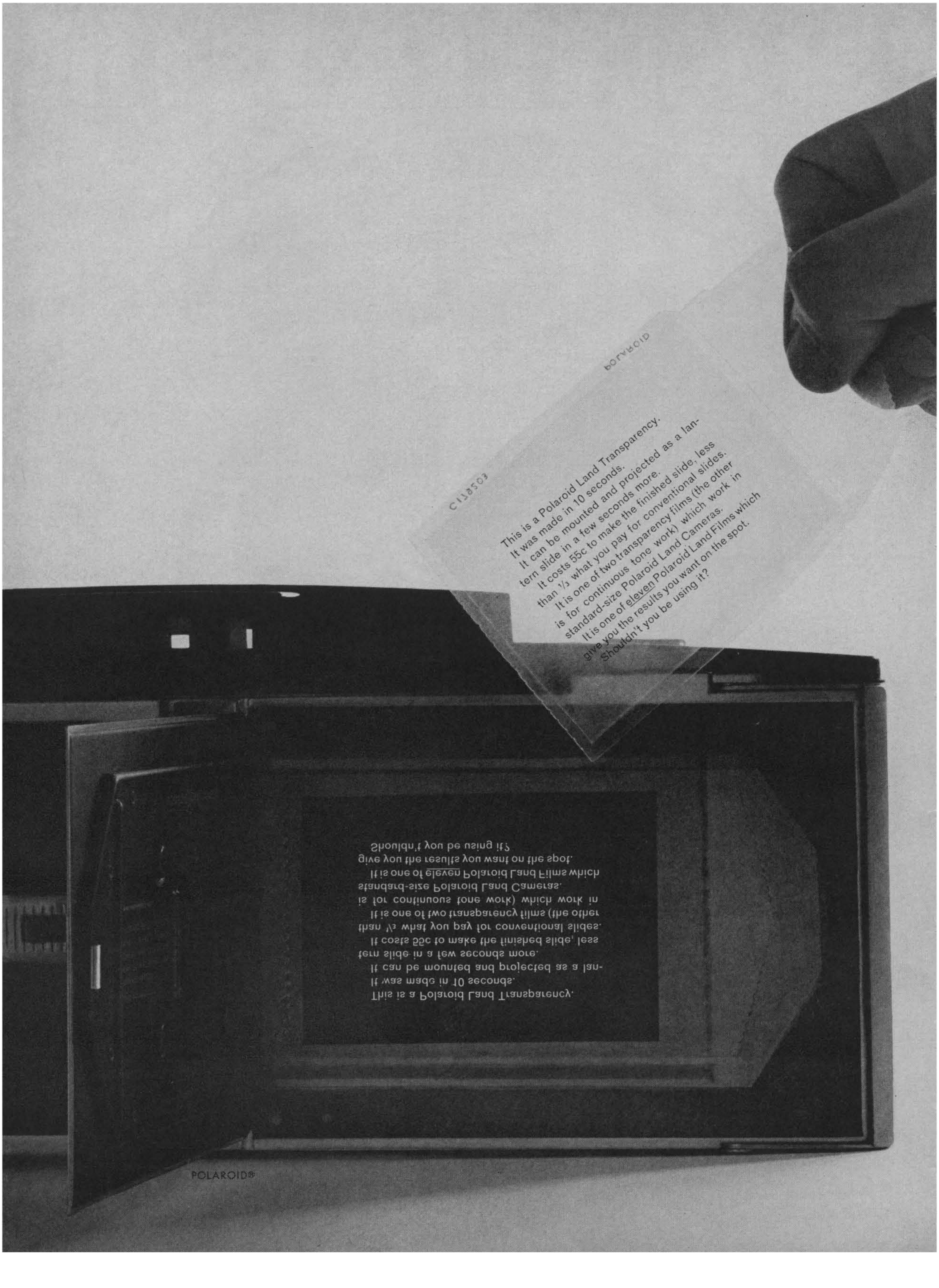
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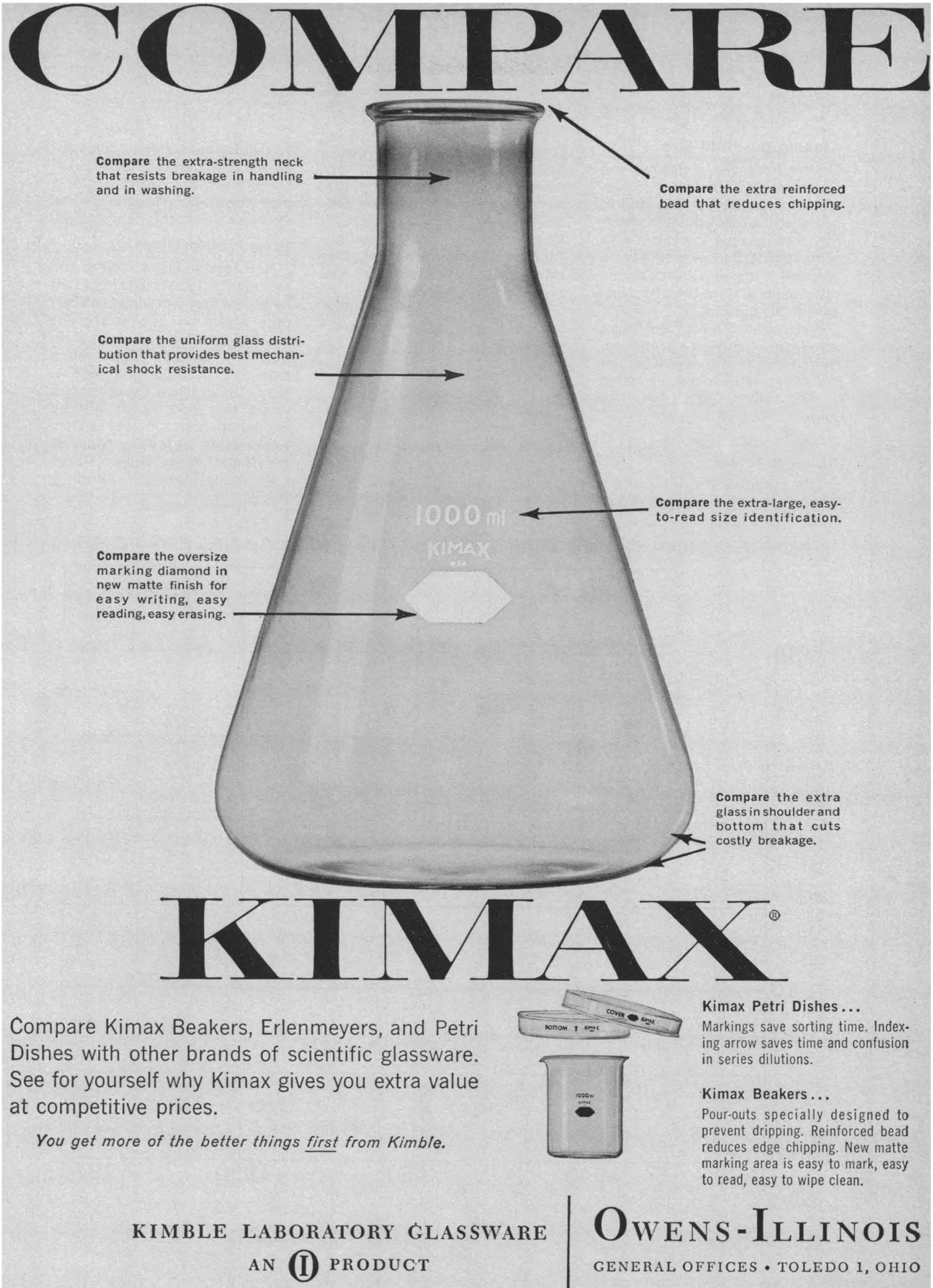
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SCIENCE

Confrontation

The Organization for European Economic Cooperation was established to help coordinate the economic development that Marshall Plan funds were intended to stimulate. One technique used by OEEC has been an annual review of the economic policies of each member country. Now OEEC has become OECD (Organization for Economic Cooperation and Development); Canada and the U.S. have become members; and the technique of the annual review has been extended to periodic examination of the educational policies of each country that are of concern to all member countries. The first educational confrontations were kid-glove affairs, but the second round has started off with a sharper and more penetrating analysis of scientific and engineering education in the U.S. The OECD examiners were Sir John Cockcroft, Churchill College, Oxford; Ingvar Svennilson, University of Stockholm; and A. H. Halsey, Oxford. They visited many U.S. campuses; talked with representatives of government agencies, foundations, and scientific and educational institutions; and read much documentary information concerning education in the U.S. Among the conclusions with which they confronted the U.S. representatives at the hearing recently held in Paris were the following.

High school students have too little instruction in science; too few college students specialize in science and engineering; and too few college graduates in these fields proceed to graduate study.

High school students and their parents have remarkably uncertain, even chaotic, information concerning higher education and how to achieve a good match between college requirements and offerings and student abilities and interests.

There should be more graduate fellowships, for the primary problem in any effort to increase the number of graduate students is lack of financial support, not a shortage of qualified graduates.

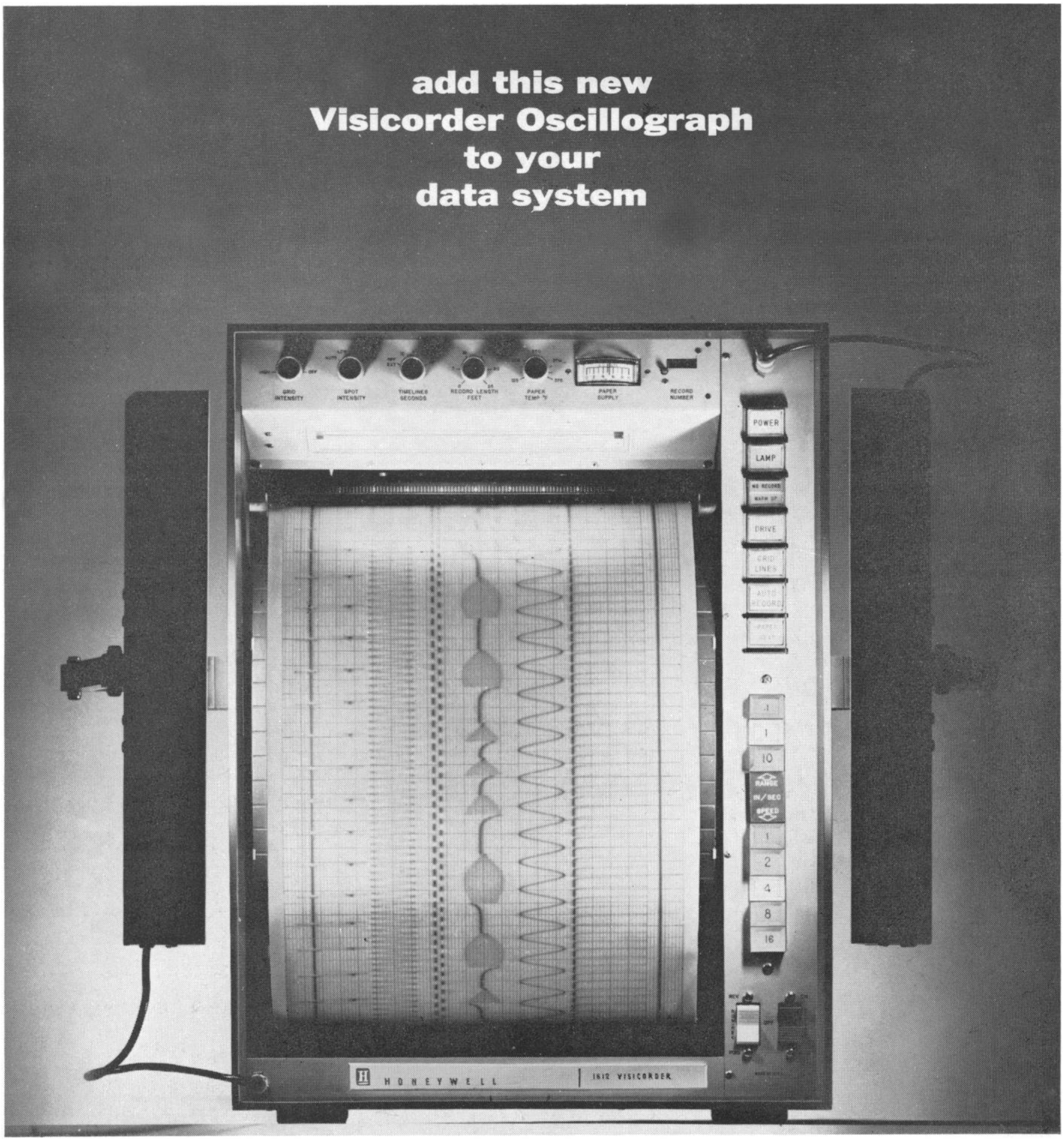
The quality of teaching is declining, especially in liberal arts colleges; federal government policies that have placed great emphasis upon research have contributed strongly to this trend.

Poor teaching, inadequate equipment, and insufficient research opportunities in liberal arts colleges that have good students place serious limitations on the number of future scientists.

Probably the best planning for mass higher education to be found anywhere in the world is the California program which admits any graduate of a California high school to a junior college, the top third of the high school graduates to a state college, and the top eighth to one of the University of California campuses.

Unless we overcome our mistrust of cooperative, national planning and action, higher education in the U.S. will not be able to meet the needs and demands of the next 10 years. If we are to meet these needs we must resolve the "government by stalemate" that results from congressional and congressional-executive differences on educational policy.

These criticisms constitute friendly advice from an international agency that has an effective record of improving economic conditions in its member states and that is dedicated to the proposition that improvements in scientific and technical education are a major means toward this end.—D.W.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"To cultivate every art and science which may tend to advance the interest, honor, dignity, and happiness of a free, independent and virtuous people."

This phrase summarizes the "end and design" of the American Academy of Arts and Sciences according to its Charter, granted by the Legislature of Massachusetts, on 4 May 1780. It is not surprising that such men as John and Samuel Adams, John Hancock, E. A. Holyoke, James Bowdoin, and Robert Treat Paine, even in the midst of the American Revolution, should organize a "public society" for such a purpose. These "men of genius and learning" were prominent in laying the philosophical and practical foundations of the new nation as well as in the development of natural and cultural history, mathematics, astronomy, navigation, meteorology, geography, agriculture, medicine, manufacturing, and commerce. They clearly perceived the vital relation of knowledge and its advancement to the welfare of the state and of all its citizens, individually as well as collectively. During the 19th century, other leaders of thought and action associated with the American Academy included William Barton Rogers, William C. Redfield, Louis Agassiz, Alexander D. Bache, Asa Gray, Joseph Henry, and John Torrey, all active in the founding of the American Association for the Advancement of Science.

The membership of the American Academy today (numbering some 1600 fellows and 250 foreign honorary members) represents, for the culture of the mid-20th century, a similar level and variety of talent. Fellows represent every field of intellectual activity; they come from all parts of the country. Most of the scientific fellows of the Academy are also fellows of the American Association for the Advancement of Science, and many of them today are as active in the Association as their counterparts were in its founding in the 1840's.

Nominations and elections to the Academy are made by its fellows. Statutory provisions specify that members and foreign honorary members shall be chosen from among those "who are eminent for their discoveries or other attainments in any of the Classes." The Classes are designated as follows: class I, mathematical and physical sciences; class II, biological sciences; class III, social arts and sciences; and class IV, humanities.

Almost alone among the learned societies of this or any other country, the American Academy of Arts and Sciences has not become departmentalized. It does not hold separate meetings for the several branches of learning, nor does it publish its proceedings in separate series. The policy of the Academy is based on the conviction that fruitful interaction among the branches of learning and the integration of their total meaning for human understanding and human wisdom, rather than only the advancement of the separate disciplines is the increasingly acute need of our culture.

In a broad sense, the program of the Academy today is to bring together, in conferences and study groups, men from many fields of learning to investigate vital contemporary problems, and to disseminate the results of these investigations through publication. For example, these have included studies or conferences which have resulted in the following publications: *The Sun in the Service of Man; Totalitarianism; Science in the Federal Government; Science and the Modern World View; Evolution and Man's Progress; Myth and Mythmaking*; and *Arms Control, Disarmament, and National Security*. Results from some of these conferences are communicated to a wider audience through *Daedalus*, the quarterly journal of the Academy. Each issue embodies a survey of a particular problem of our civilization. It has a circulation of over 20,000 to leading persons in the arts, sciences, and practical affairs, including several thousand members of the Association.

The Academy continues long-standing programs supporting and rewarding scientific and scholarly research and the creative work of the arts within the already established disciplines. This is done through its several funds for research, awards, and prizes, administered by committees of experts in these various disciplines, and is independent of the pressures of political opinion or immediate practical or financial return.

The "stated meetings" of the Academy are held on the second Wednesday of each month from October to May, inclusive. At these meetings, the fellows and their guests listen to more or less formal "communications," some-

times in fairly specialized fields of learning, but more often of broad and general interest.

Officers elected in May of 1962 for one year were: president, Hudson Hoagland; vice president of class I, Donald H. Menzel; vice president of class II, Frank M. Carpenter; vice president of class III, Francis Keppel; vice president of class IV, Crane Brinton; secretary, John R. Raper; treasurer, Thomas B. Adams; editor, Gerald Holton; and librarian, Walter M. Whitehill.

RALPH W. BURHOE

American Academy of Arts and Sciences, Boston, Massachusetts

Forthcoming Events

April

17–20. American **Astronomical** Soc., meeting, Tucson, Ariz. (P. M. Routly, 265 Fitz Randolph Rd., Princeton, N.J.)

17–20. American **Geophysical** Union, annual, Washington, D.C. (AGU, 1515 Massachusetts Ave., NW, Washington 5, D.C.)

17–20. German Soc. of **Surgery**, 80th meeting, Munich. (E. Derra, Chirurgische Klinik der Medizinischen Akademie, Moorenstr. 5, Düsseldorf, Germany)

17–21. Man, **Technology, and Medicine in Nuclear and Space Age**, 3rd intern. congr., Rome, Italy. (A. J. Shneiderov, 1945 Calvert St., NW, No. 44, Washington 9)

18. Society of **Plastics Engineers**, regional technical conf., Syracuse, N.Y. (R. R. Collis, c/o Joseph Cashier & Co., Inc., 810 E. Water St., Syracuse)

18–20. **Neurosurgery**, 2nd European congr., Rome, Italy. (B. Guidetti, Viale Universita 30, Rome)

18–20. **Stereology**, 1st intern. congr., Vienna, Austria. (Vienna Medical Acad., Alserstrasse 4, Vienna 9)

18–21. Radiology in **Otolaryngology**, intern. symp., Bordeaux, France. (G. Guillen, 45, cours du Marechal Foch, Bordeaux)

20. New Jersey **Acad. of Science**, annual, Glassboro, N.J. (H. L. Silverman, 361 Highland Ave., Newark 4, N.J.)

21–24. **Rare Earth**, conf., Grand Bahama Island. (K. S. Vorres, Dept. of Chemistry, Purdue Univ., Lafayette, Ind.)

21–25. International College of **Surgeons**, North American Federation, annual, Los Angeles, Calif. (W. F. James, 1516 Lake Shore Dr., Chicago 10, Ill.)

22–24. Institute of the **Aerospace** Sciences, Dallas, Tex. (R. R. Dexter, 2 E. 64 St., New York 21)

22–24. American **Oil Chemist** Soc., Toronto, Ont., Canada. (K. F. Mattil, Swift & Co., Packers and Exchange Ave., Chicago 9, Ill.)

22–24. **Biomedical Engineering**, 3rd symp., San Diego, Calif. (J. H. McLeod, Program Committee, 8484 La Jolla Shores Dr., La Jolla, Calif.)

22–25. American **Physical** Soc., Washington, D. C. (K. K. Darrow, APS, Columbia Univ., New York 27)

22–26. **Radioisotopes and Radiation** in Plant and Animal Insect Control, intern. symp., Athens, Greece. (J. H. Kane, Intern. Conferences Branch, Div. of Special Projects, U.S. Atomic Energy Commission, Washington 25)

22–27. American Acad. of **Neurology,** Minneapolis, Minn. (C. A. Kane, 80 E. Concord St., Boston, Mass.)

23–25. Electronic Processes in **Dielectric Liquids,** Durham, England. (Administration Assistant, Inst. of Physics and the Physical Soc., 47 Belgrave Sq., London, S.W.1, England)

24–26. German Soc. of **Hygiene and Microbiology,** Würzburg. (W. Herrmann, Städtischen Krankenanstalten, Robert Koch-Haus, Essen, Germany)

24–26. Institute of **Radio Engineers,** regional conf., San Diego, Calif. (E. Herz, 4444 Mt. Castle Ave., San Diego 17)

24–28. German **Roentgen** Congr., 44th, Baden-Baden, Germany. (H. Lossen, GRC, Universitäts-Strahleninstitut, Langenbeckstr. 1, Mainz, Germany)

25–27. Mississippi **Acad. of Sciences,** University. (C. Q. Sheely, Dept. of Chemistry, Mississippi State College, State College)

25–27. Ohio **Acad. of Science,** Wilberforce. (G. W. Burns, 505 King Ave., Columbus 1, Ohio)

25–27. **Population** Assoc. of America, Philadelphia, Pa. (P. C. Glick, Bureau of the Census, Washington 25)

25–27. West Virginia **Acad. of Science,** Buckhannon. (J. A. Duke, S.J., Dept. of Chemistry, Wheeling College, Wheeling, W. Va.)

25–28. Association of **Clinical Scientists,** Louisville, Ky. (R. P. MacFate, 54 W. Hubbard St., Chicago 10, Ill.)

26–27. American **Mathematical** Society, University Park, N.M. (AMS, 190 Hope St., Providence 6, R.I.)

26–27. American Assoc. of **University Professors,** San Francisco, Calif. (W. P. Fidler, AAUP, 1785 Massachusetts Ave., NW, Washington 6)

26–27. Illinois State **Acad. of Science,** Carbondale. (C. L. Kanatzar, MacMurray College, Jacksonville, Ill.)

26–27. South Dakota **Acad. of Science,** Rapid City. (T. Van Bruggen, State Univ. of South Dakota, Vermillion)

27. American Soc. for **Experimental Pathology,** Atlantic City, N.J. (K. M. Brinkhous, Dept. of Pathology, Univ. of North Carolina, Chapel Hill)

27. Clinical and Diagnostic Aspects of **Enzyme Multiplicity,** colloquium, Ghent, Belgium. (R. J. Wieme, Laboratory of the Medical Clinic, Pasteurdreef 2, Ghent)

27–28. American **Psychosomatic** Soc., 20th, Atlantic City, N.J. (APS, 265 Nassau Rd., Roosevelt, N.Y.)

27–2. American **Ceramic** Soc., Pittsburgh, Pa. (C. S. Pearce, ACS, 4055 N. High St., Columbus 14, Ohio)

28–3. American Assoc. of **Cereal Chemists,** Minneapolis, Minn. (C. L. Brooke, Merck & Co., Rahway, N.J.)

28–29. **Electron Beam Technology,** 5th intern. symp., Boston, Mass. (J. R. Morley, Alloyd Electronics Corp., 35 Cambridge Pkwy., Cambridge 42, Mass.)

29–30. **Combustion** Inst., Western States

Div., San Diego, Calif. (G. S. Bahn, 16902 Bollinger Dr., Pacific Palisades, Calif.)

29–1. International Acad. of **Pathology**, 52nd, Cincinnati, Ohio. (F. K. Mostofi, Armed Forces Inst. of Pathology, Washington 25)

29–2. U.S. Natl. Committee, Intern. **Scientific Radio** Union, annual, Washington, D.C. (Miss J. Hannaum, Natl. Acad. of Sciences, 2101 Constitution Ave., NW, Washington 25)

29–3. Society of **Photographic Scientists and Engineers**, annual, Atlantic City, N.J. (D. L. Castellini, 98 Leland Terrace, New Shrewsbury, N.J.)

May

1–3. American Assoc. for **Contamination Control**, natl., Boston, Mass. (AACC, 6 Beacon St., Suite 626, Boston 8)

1–3. **Polymer** Science and Technology, conf., London, England. (J. N. Radcliffe, Plastics Inst., 6 Mandeville Pl., London, W.1)

1–4. American **Film Festival**, New York, N.Y. (Educational Film Library Assoc., 250 W. 57 St., New York 19)

2–3. **Human Factors in Electronics**, 4th annual symp., Washington, D.C. (F. Chernikoff, U.S. Naval Research Laboratory, Code 5124, Washington 25)

2–4. Kansas **Acad. of Science**, Lawrence. (G. A. Leisman, Dept. of Biology, Kansas State Teachers College, Emporia)

2–4. American **Philosophical** Assoc., Western Div., Columbus, Ohio. (L. E. Hahn, Washington Univ., St. Louis 30, Mo.)

2–4. Virginia **Acad. of Science**, Roanoke. (P. M. Patterson, Hollins College, Hollins College, Va.)

2–5. Council of Long Island **Technical Societies**, exposition of technology and industry, West Hempstead, N.Y. (CLITS, Route 110, Farmingdale, N.Y.)

3. **Astronomy and the Peaceful Uses of Space**, Evanston, Ill. (J. A. Hynek, Astronomy Dept., Northwestern Univ., Evanston)

3–4. Colorado-Wyoming **Acad. of Science**, Fort Collins, Colo. (R. G. Beidleman, Dept. of Zoology, Colorado College, Colorado Springs)

3–4. **Endocrinology**, 2nd intern. congr., London, England. (A. S. Mason, London Hospital, Whitechapel, London, E.1)

3–4. Minnesota **Acad. of Science**, St. Paul. (M. R. Boudrye, 1821 University Ave., St. Paul 4)

3–4. Nebraska **Acad. of Sciences**, Lincoln. (C. B. Schultz, 101 Morrill Hall, Univ. of Nebraska, Lincoln 8)

3–4. North Dakota **Acad. of Science**, Grand Forks. (B. G. Gustafson, University Station, Grand Forks)

3–5. **Protides of the Biological Fluids**, 11th colloquium, Bruges, Belgium. (H. Peeters, St. Jans Hospital, Bruges)

3–5. Wisconsin **Acad. of Sciences, Arts and Letters**, Milwaukee. (T. J. McLaughlin, Univ. of Wisconsin, Milwaukee 11)

5–7. **Biometric** Soc., eastern North American regional, Cambridge, Mass. (J. Cornfield, School of Public Health, Johns Hopkins Univ., Baltimore, Md.)

5–8. American Inst. of **Chemical Engineers**, Buffalo, N.Y. (F. J. Van Antwerpen, American Inst. of Chemical Engineers, 345 E. 47 St., New York, N.Y.)

Letters

Computers and Human Values

In "The man-computer relationship" [*Science* **138**, 873 (1962)] Johnson and Kobler explore an important but, I believe, derivative problem pertaining to the humane and effective use of computers. The basic problem is: What personal and societal values and operating styles will be rewarding and useful in a civilization whose problems and opportunities are defined by very large populations, enormous social complexity, and unprecedented rates of technological change, all existing on a scale such that *only* computers will be able to deal with the conceptual models, the data to be processed, and the real-time requirements for action and decisions.

It is very important to talk about preserving a place for individual preferences and purposes when policy decisions are made, but it may well be that our present ideas about the relations of the individual to society are the products of a rapidly vanishing, loosely coupled social environment in which a wide range of individual variability could be tolerated and indeed encouraged. With growing interdependence of many social processes and the increasing saturation of various environments, whether they be the highway, the schoolroom, the front page, or the department store counter, effective social survival for the group as well as the individual may require different values altogether. Unpleasant as it may be to contemplate, what probably will come to be valued is that which the computer *can* cope with—that is, only certain kinds of solutions to social problems.

Whether or not this will be so remains to be seen. But it simply will not do to believe that, with proper precautions, we will be able to preserve our present system of operating values and priorities. In a world which has to deal with its problems on a statistical basis because the problems are statistical in nature, the intangibles of individual preference and purpose necessarily become different from what they have been.

We must face up to the much deeper and more overwhelming—indeed terrifying—problem of inventing values which somehow will make it satisfying to be a human being living in this new kind of society. They probably won't be values *we* will particularly enjoy, but unless we face this problem we may end up with a society which totally defeats and depresses the individual.

There are many ramifications to this issue. Some are discussed in the pamphlet *Cybernation: The Silent Conquest* (Fund for the Republic, New York), which, while attending more generally to the points elaborated by Johnson and Kobler, tries to place them in the broader context of the implications for democracy of the widespread use of automation and computers.

DONALD N. MICHAEL
Peace Research Institute,
Washington, D.C.

Michael may be right when he states that in our article we explored a "derivative" problem, but we are not so sure. We were not unaware of the broad context in which he places the problem of the humane and effective use of computers, as is evident from many of the references in our article. Yet we see the understanding of the more immediate man-computer relationship as fundamental, and as necessary to the understanding of the broader problem to which Michael refers. Our emphasis allows for specific and concrete research efforts, some of which are under way. Thus, we do not agree that our weakness lies in not facing directly the "basic problem," as stated and elaborated by Michael.

We see in Michael's letter a contradiction: he emphasizes the need for inventing "different values altogether," while, it seems to us, accepting the dominance of a technically determined value system. For him, "the problems are statistical in nature," and "*only* computers" will be able to deal with them. We cannot agree with his definition of the problems and methods of solution. The present dominance and high evaluation of scientific method, of objectivity and quantification, of technical reason, need not continue if it is not good for man. We agree with Stover [C. F. Stover, Los Angeles *Daily Journal* (26 July 1962)] that "the notion that the majesty and the mystery of the human experience . . . can be written into a computer affronts the dignity of man."

Michael offers little hope. He seems to be saying that we are lost, doomed; we say it is not necessarily so. With the scientific-technological revolution of our day has come the growth of a vigorous social science and a concern with society on the part of physical scientists. Specific as well as general problems of technology today almost always include man as part of a mixed system. Knowledgeable persons familiar with problems of cybernation and the social sciences must turn their attention to values and priorities. While it is both easy and unrealistic to pretend that our present system of operating values and priorities should be rigidly upheld, it seems equally easy and unrealistic to assume that we must forthwith adjust ourselves to a society in which values are prescribed by absolute technical dominance.

We are not ready for the pessimism and the extreme compromise Michael offers as our best hope. While his predictions may turn out to be correct, we find ourselves with a future-oriented hopefulness. We may have been fooling ourselves in our implicit insistence that such "human values" as love, brotherhood, freedom, and liberty must be retained because man must live with the potential of achieving dignity. While we may be called conservative in consequence of our belief in these

old values, we are not Luddites. The computers are here to stay, bringing great benefits and difficulties for man. Man has not yet proved that he is able to handle the complex problems of our world. And, as our article emphasizes, we are concerned with man's frailty. But man has strength and vigor. Our age has produced a "revolution of expectations" as well as a scientific-technological revolution. Knowledge has been gained of the influence of technology on the moral order, and of the power of social forces in determining directions in which men and societies move. In this context we, and others, are searching for means by which computers can best be used to supplement human capability without the destruction of those abilities and values which we see as critical for man. Is it not possible that man can learn, that he can make changes in the areas which must be changed, while not losing those values which must not be changed?

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Turtle Grass in the Deep Sea

A deep-sea photograph, recently reproduced in *Science* [**138**, 495 (1962)], shows two "leaves" lying on the floor of the Puerto Rico Trench. These "leaves" are almost certainly the blades of *Thalassia testudinum* König, the common turtle grass of the tropical western Atlantic. This photograph is of more than passing interest because the life of the deep sea is dependent on organic material from land or the shallow seas that border islands and continents. As *Thalassia* is abundant in warm shallow marine waters, it must play a part in supplying the fauna of the deep sea with food. While the blades in the photograph looked rather clean, more often the blades are covered with attached algae, Foraminifera, Bryozoa, and other small sessile organisms.

The amount of *Thalassia* torn loose from the meadows in normal times is low. However, stormy weather or a hurricane can break off many blades, or even uproot entire plants in some situations.

An attempt was made by Thomas and his associates in 1961 to calculate the amount of *Thalassia* torn from the bottom of a bay of known size by hurricane winds. This calculation was based on the average quantity of grass washed ashore from a known area (Biscayne Bay, Florida). However, there was no way to estimate the amount of grass carried out to sea by the storm.

Fortunately, some observations were made on the abundance of displaced plant material. Harvey R. Bullis, Jr., of the U.S. Fish and Wildlife Service, directed an exploratory fishing cruise along the western edge of the Bahama Bank approximately 6 to 8 weeks after hurricane Donna had passed over the area. Shrimp-trawl hauls made by the merchant vessel *Silver Bay* in 100 to 300 fathoms brought up large masses of rotting vegetation, much of which, according to Bullis, appeared to be *Thalassia*.

Inasmuch as the continental slope in tropical areas is often found to be teeming with life, it appears that *Thalassia* must be of some importance in maintaining these populations. In addition, it supplies a suitable habitat for countless numbers of animals in shallow water and provides attachment for vast quantities of algae.

This may seem much ado over two blades of grass, yet it is easy to overlook the contribution of organic material to the deep sea by a shallow-water plant. The influence of hurricanes should not be disregarded, either, for the amount of material washed ashore is probably equaled by the amount carried out and sunk in deep water offshore.

Since *Thalassia*, and a few related sea grasses, in some localities occupy large tracts of shallow-water sea bottom, it seems quite probable that a certain percentage of the energy requirement of West Indian deep sea organisms is met every year by masses of detached sea-grass blades. The amount would vary considerably, depending on weather conditions, but even in relatively calm years it is probably large enough to be of considerable importance.

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Tax Credit for Support of Research

Charles J. Flora [*Science* **138**, 1185 (1962)] has clearly stated the real tragedy of current federal support in the sciences. The National Science Foundation and the National Institutes of Health are to my knowledge the best run of any federal agencies, and the best designed to prevent abuses. However, the system seems to subvert its own purpose, as Flora shows.

Except for projects such as Mohole, oceanographic expeditions, accelerators, and conferences, I think the remedy lies in less direct federal support. One such arrangement would allow direct federal tax credit (up to some predetermined fraction of the individual's tax liability) for contributions to a college or university that are earmarked for research. Such a system would have many advantages over the present one. (i) It would diffuse the funds more widely, thus making them more generally available to scientific personnel in small colleges. (ii) The contributed dollar would have its full value at the institution and would not decrease by 50 percent or more in going through the federal bureaucracy. (iii) College research committees would disburse only the amounts actually needed by an investigator at a given time, as opposed to the current system of awards based on necessarily liberal estimates of possible future need. (iv) The highly trained scientists now involved in bureaucratic activities, review panels, proposal writing, report writing, and so on would be able to return to their scientific pursuits.

I think the end result would be a great saving in public funds, a vast increase in the amount and quality of research accomplished, and an increase in the number of people actually engaged in research.

The additional advantage of providing support for those rare individuals who are so far ahead of other workers in their fields that the "expert" panels can't understand, and will not support, them would be fortuitous, but might provide our nation with that most potent of weapons—original thought and research.

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