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Book Issue

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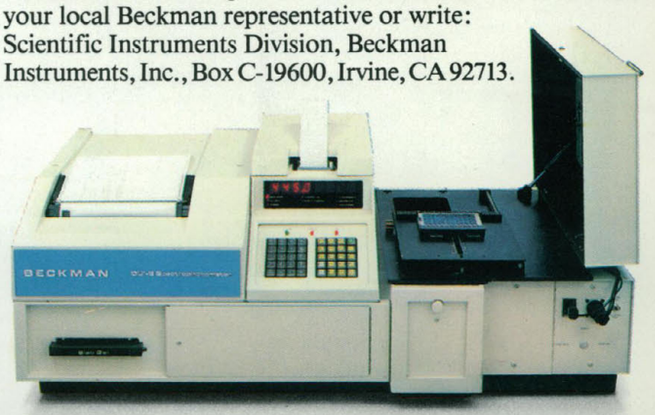
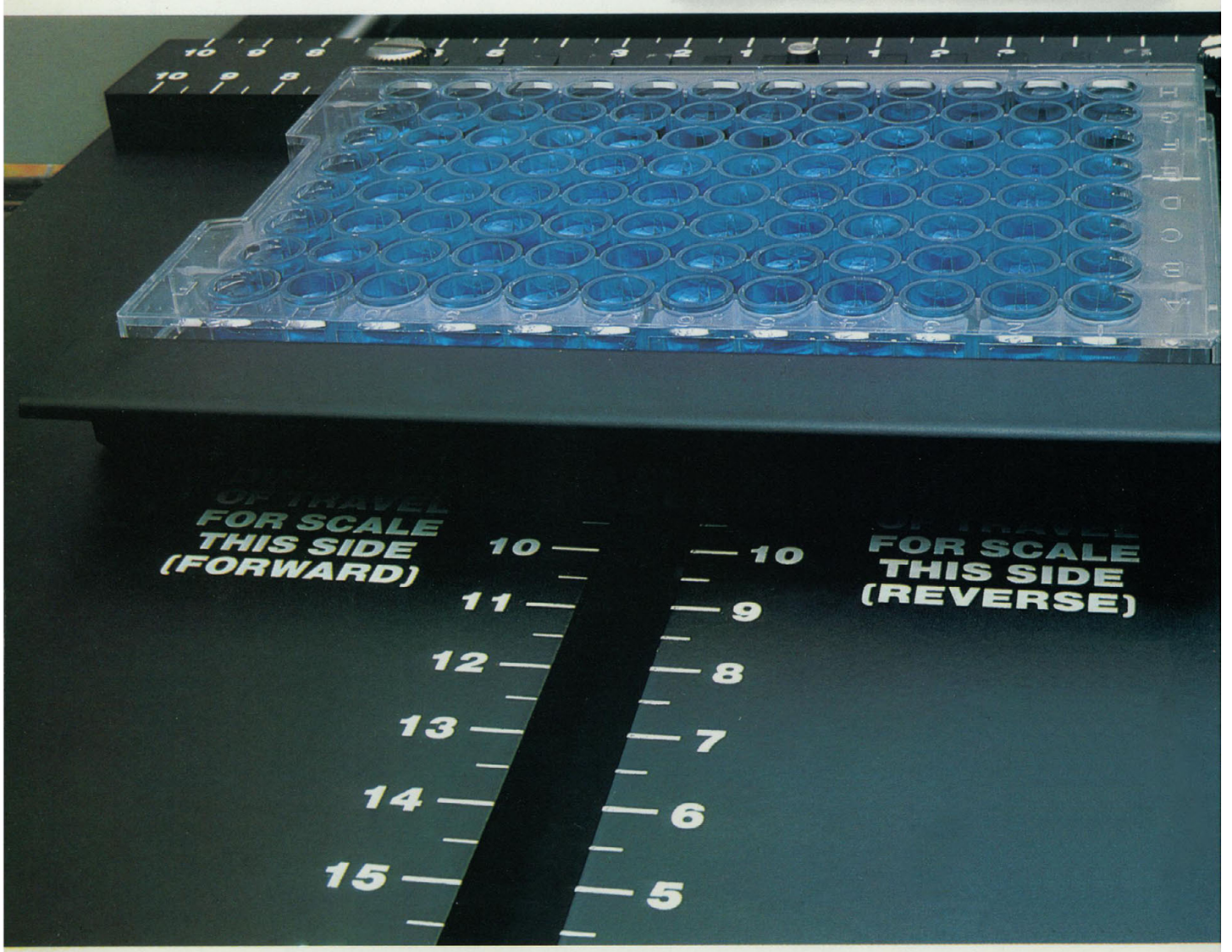
And if you don't already have a DU-8, now you have even more reason to get one. For more information, contact your local Beckman representative or write: Scientific Instruments Division, Beckman Instruments, Inc., Box C-19600, Irvine, CA 92713.





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LEADER IN BIOTECHNOLOGY

ISSN 0036-8075

21 May 1982

Volume 216, No. 4548

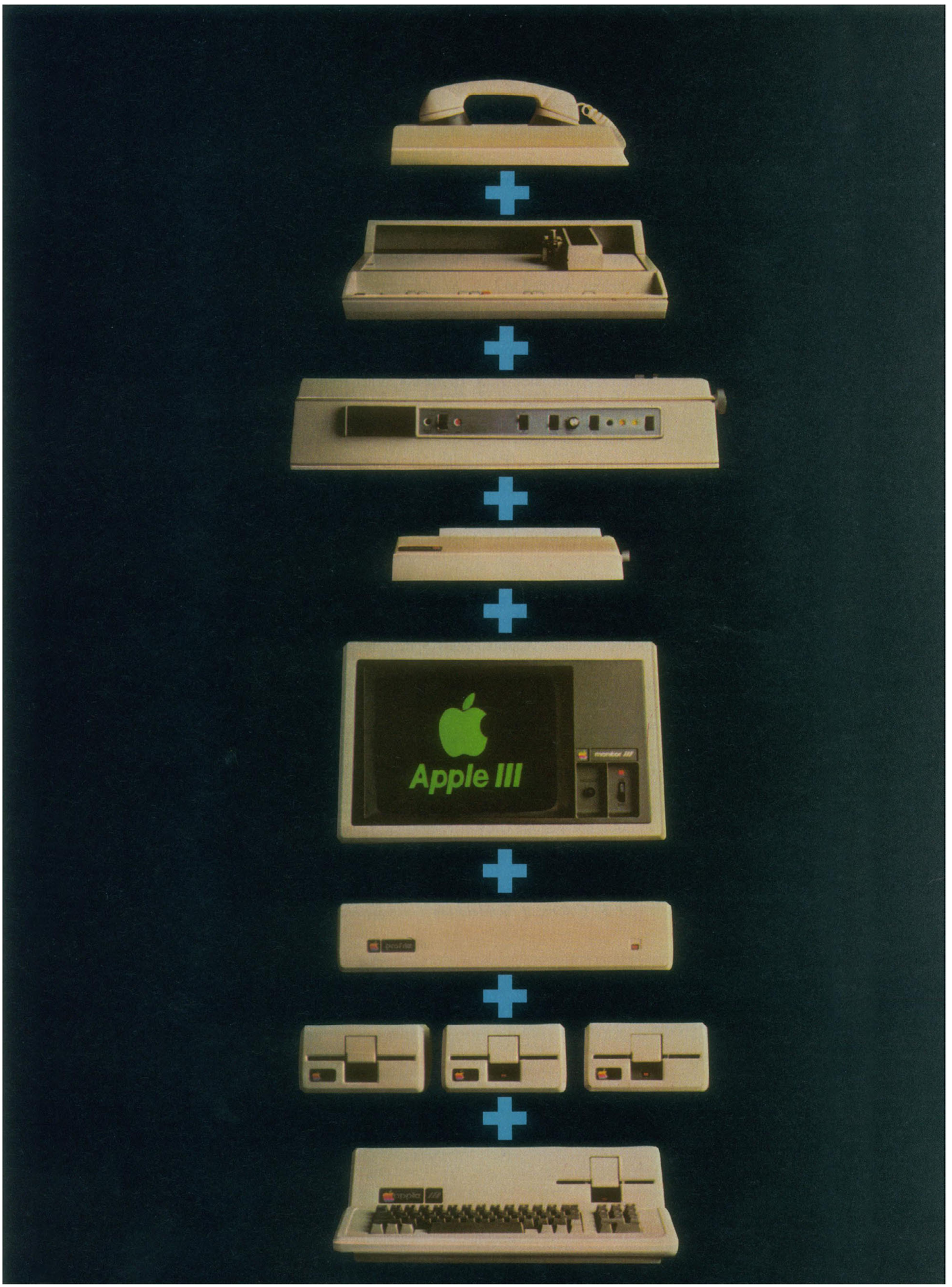
SCIENCE

SCIENCE is published weekly on Friday, except the last week in December, by the American Association for the Advancement of Science, 1515 Massachusetts Avenue, NW, Washington, D.C. 20005. Second-class postage (publication No. 484460) paid at Washington, D.C., and at an additional entry. Now combined with **The Science Monthly**® Copyright © 1982 by the American Association for the Advancement of Science. Domestic individual membership and subscription (51 issues): $48. Domestic institutional subscription (51 issues): $85. Foreign postage extra: Canada $24, other (surface mail) $27, air-surface via Amsterdam $55. First class, airmail, school-year, and student rates on request. Single copies $2.50 ($3 by mail); back issues $3 ($3.50 by mail); classroom rates on request. **Change of address:** allow 6 weeks, giving old and new addresses and seven-digit account number. **Postmaster:** Send Form 3579 to *Science*, 1515 Massachusetts Avenue, NW, Washington, D.C. 20005. *Science* is indexed in the *Reader's Guide to Periodical Literature* and in several specialized indexes.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

COVER

Patent drawing of Robert Fulton's steamboat. "Before Fulton applied for his first patent in 1809, he had turned over machine drawing to others, but they worked very closely under his supervision. . . . This view of the *Steam Boat* was probably an accurate view of the rebuilt boat that had made the 1807 trip to Albany, by now already being called the *Clermont*." [American Society of Mechanical Engineers; reproduced in part in *Emulation and Invention*, reviewed on page 853]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Call 800-538-9696 (in California, call 800-662-9238) for the authorized Apple dealer nearest you, or for information on our National Accounts Program. Write: Apple Computer Inc., Advertising and Promotion Dept., 20525 Mariani Ave., Cupertino, CA 95014. NOTE: Apple Computer does not currently manufacture or distribute color monitors, graphics plotters or telephone modems. Apple is a registered trademark of Apple Computer Inc.

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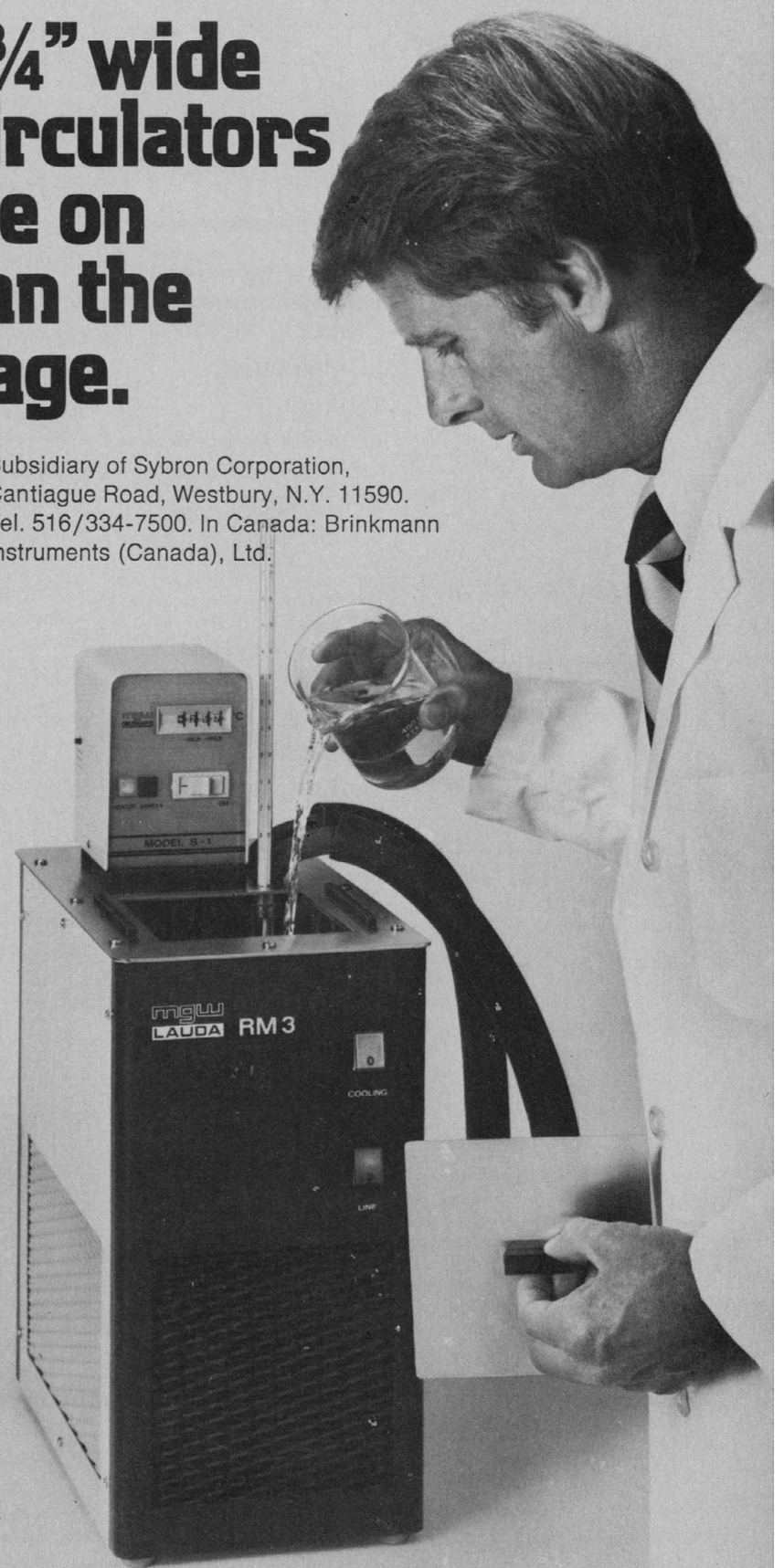
RULE SHOWN ACTUAL SIZE. MEASURE YOUR SPACE WITH THIS PAGE TO SEE IF A LAUDA RM-3 WILL FIT.

Lauda's new 7¾" wide refrigerated circulators need less space on your bench than the width of this page.



You wouldn't think a refrigerated constant temperature circulator could fit into bench space narrower than this page, but it's true. The new Lauda RM-3S and RM-3T are only 7¾ inches wide (and only 15 inches deep).

Despite their space-saving dimensions, these circulators provide all the features of full-size models. That makes them ideal for circulating liquid to jacketed glassware and other instruments (spectrophotometers, chromatography columns, electrophoresis equipment), as well as for applications requiring direct immersion.

Model RM-3S offers the convenience of digital temperature control; a flick of the finger dials in any temperature from —20° to 99.9°C. A platinum resistance sensor insures an accuracy of ±0.01° of the set temperature. A second, less accurate model, RM-3T, is equipped with a single temperature adjustment dial, and the temperature is controlled thermostatically to an accuracy of ±0.2° within the operating range of —20° to 100°C. Both models have 1,000 watt heaters, a 3-liter bath capacity, all stainless steel components contacting liquid, and are supplied with a bath cover and reading thermometer.

For literature on the compact RM-3 and the complete line of Lauda Circulators, write or call: Brinkmann Instruments, Inc., Subsidiary of Sybron Corporation, Cantiague Road, Westbury, N.Y. 11590. Tel. 516/334-7500. In Canada: Brinkmann Instruments (Canada), Ltd.

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For a man aged ▶	25	35	45	25	35	45
For a woman aged	30	40	50	30	40	50
Annual Premium	$129.00	$186.50	$387.00	$258.00	$373.00	$774.00
Cash Dividend	60.50	97.00	198.50	141.00	214.00	417.00
Yearly Net Outlay*	68.50	89.50	188.50	117.00	159.00	357.00
Outlay per $1,000	1.37	1.79	3.77	1.17	1.59	3.57

*Net outlay is annual premium less cash dividend payable at end of policy year, based on continuation of current scale; although dividend amounts cannot be guaranteed or estimated for the future, TIAA has paid dividends every year since 1918.

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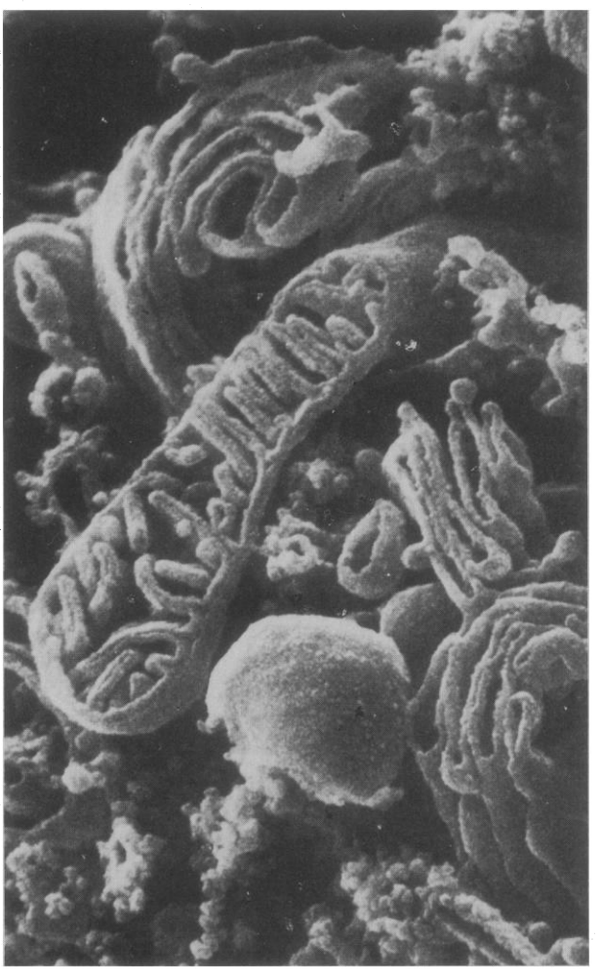
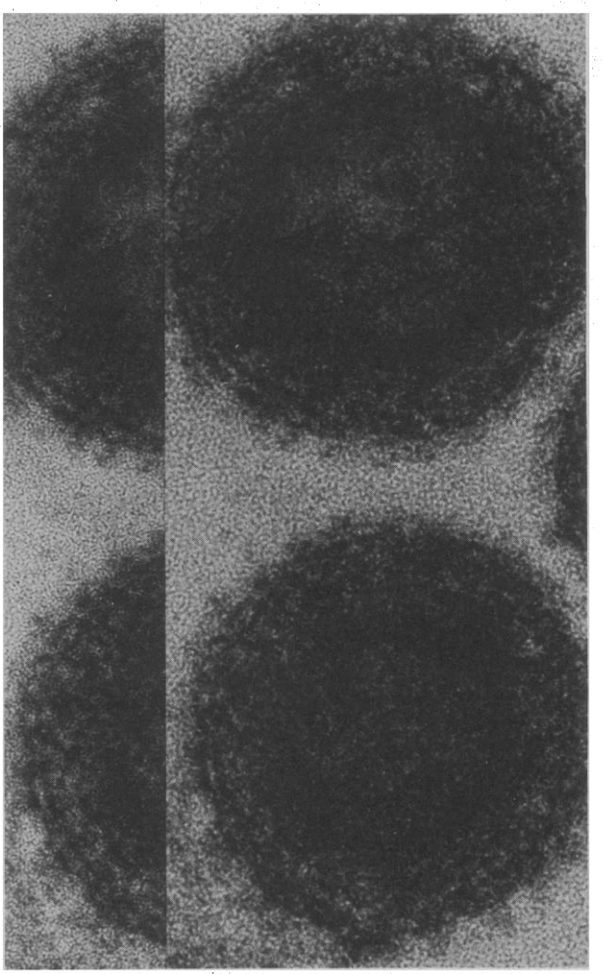
One Picture Is Worth One Thousand Guesses



Specimen: Intracellular structures of Rat Lacrimal Gland
Direct Mag.: X94,000
Photo courtesy of Dr. K. Tanaka, Tottori Univ., Japan



1200 angstroms under focus 2000 angstroms under focus

Sample: Breast cancer virus
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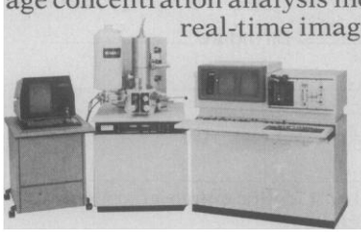

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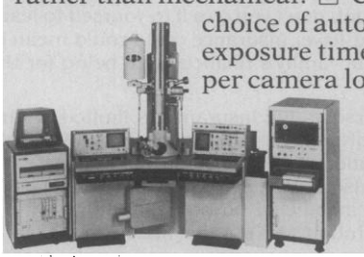

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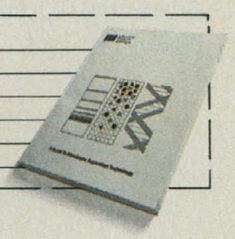

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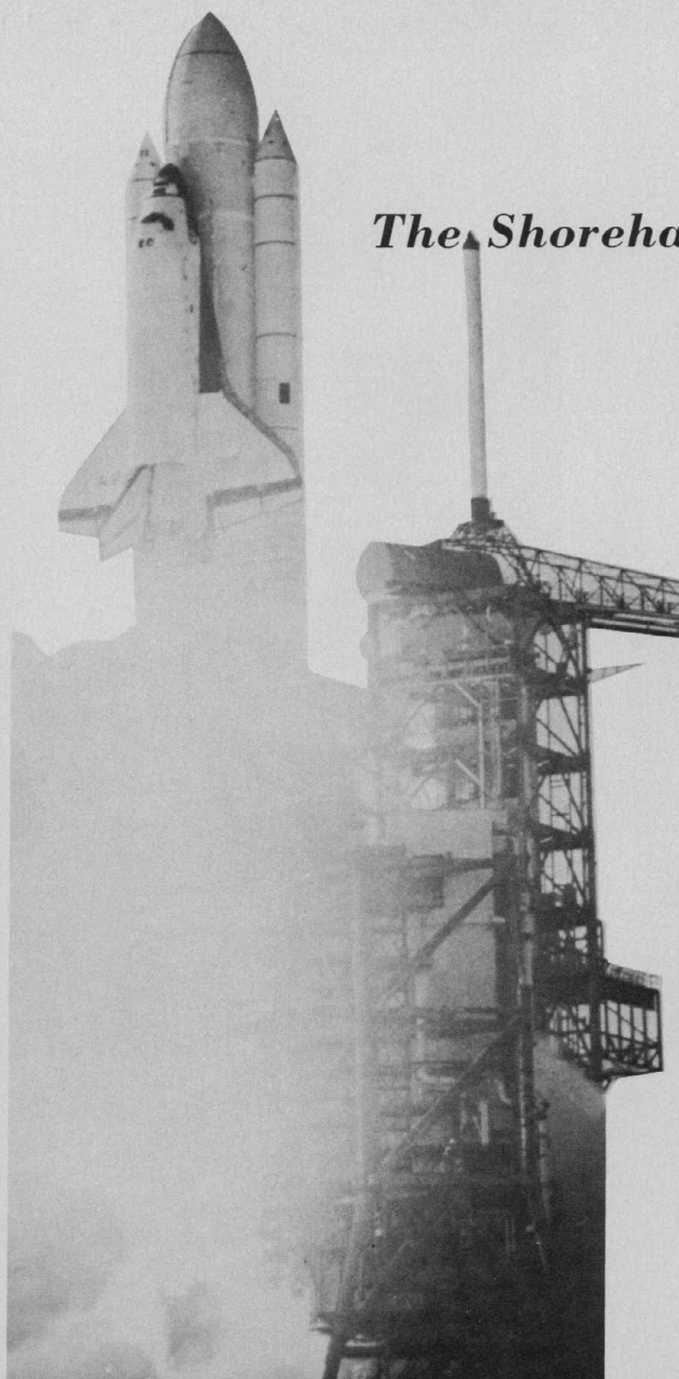
R&D in the FY 1983 Budget: Impact and Challenge

7th Annual AAAS Colloquium on R&D Policy

23–24 June 1982

The Shoreham Hotel, Washington, D.C.



Issues include:

R&D policy and the FY 1983 budget ☐ *the climate for industrial R&D* ☐ *R&D programs of key federal agencies* ☐ *impacts on the scientific and engineering communities*

Participants include leaders from:

OMB, OSTP, and federal agencies ☐ *Congress* ☐ *industry* ☐ *the scientific and engineering communities* ☐

In addition:

Research and Development: AAAS Report VII, *by Willis H. Shapley, Albert H. Teich, and Jill P. Weinberg, will be provided in advance to Colloquium registrants. The* **Report** *covers R&D in the federal budget for FY 1983 and other topics on R&D and public policy. Registrants will also receive the published* **Proceedings** *of the conference.*

For further details, write: R&D Colloquium, AAAS Office of Public Sector Programs, 1776 Massachusetts Avenue, NW, Washington, D.C. 20036.

Sponsored by the AAAS Committee on Science, Engineering, and Public Policy.

To register early, use the Colloquium registration form on the facing page.

7th R&D Colloquium Washington, 23 & 24 June 1982
Advance Registration Form

Wednesday & Thursday, 23 & 24 June, at The Shoreham Hotel, 2500 Calvert St., N.W., Washington, D.C.

Registrant's Name _____
(last name) (first name and initial)

Affiliation _____

Mailing Address _____
(street and number)

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(city) (state and zip) (telephone number)

☐ **Please check here if you need special services due to handicap. We will contact you prior to the meeting.**

Enclosed is a check, purchase order, or credit card information (see below) for:

☐ $125 Full Registration (sessions, three meals, R&D: FY 83 Report, and Proceedings)
☐ $ 70 Partial Registration (sessions, Report, and Proceedings)
☐ $ 35 Student Registration (sessions, Report, and Proceedings; fulltime graduate or undergraduate only)

Separate Meal Tickets (lunches at $17 and dinner at $25; no refund for meals after 21 June)
☐ Lunch on Wednesday, 23rd ☐ Dinner on Wednesday, 23rd ☐ Lunch on Thursday, 24th

Program, badge, meal tickets, and R&D: FY 83 Report will be mailed 12 June. Registrations received after 12 June will be held at the AAAS Registration Desk at The Shoreham Hotel. Reports from previous years (order below) will be sent as soon as possible. Proceedings of '82 Colloquium will be sent as soon as available.

Previous Reports and Proceedings ($5 each book): ☐ R&D: FY 82 ☐ R&D: FY 81 ☐ R&D: FY 80
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Shoreham Hotel Reservation—AAAS Colloquium (23 & 24 June)

(Reservations received after 23 May cannot be guaranteed)

Names and Addresses of All Occupants of Room:

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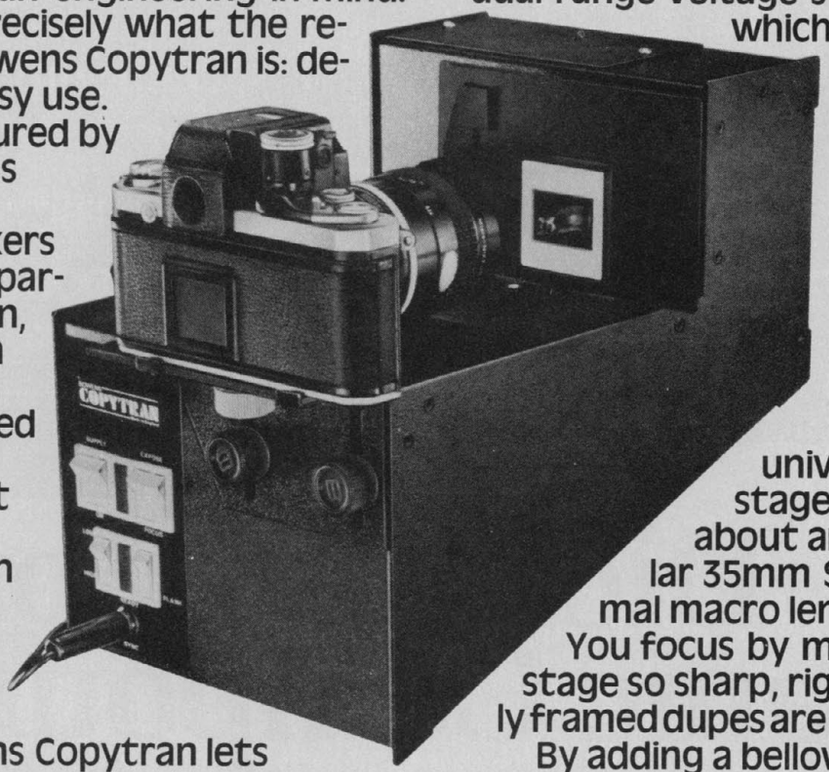

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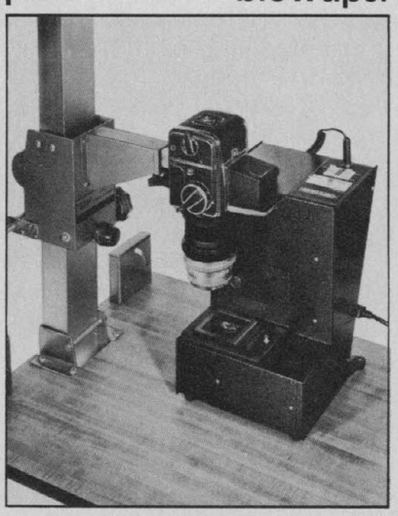

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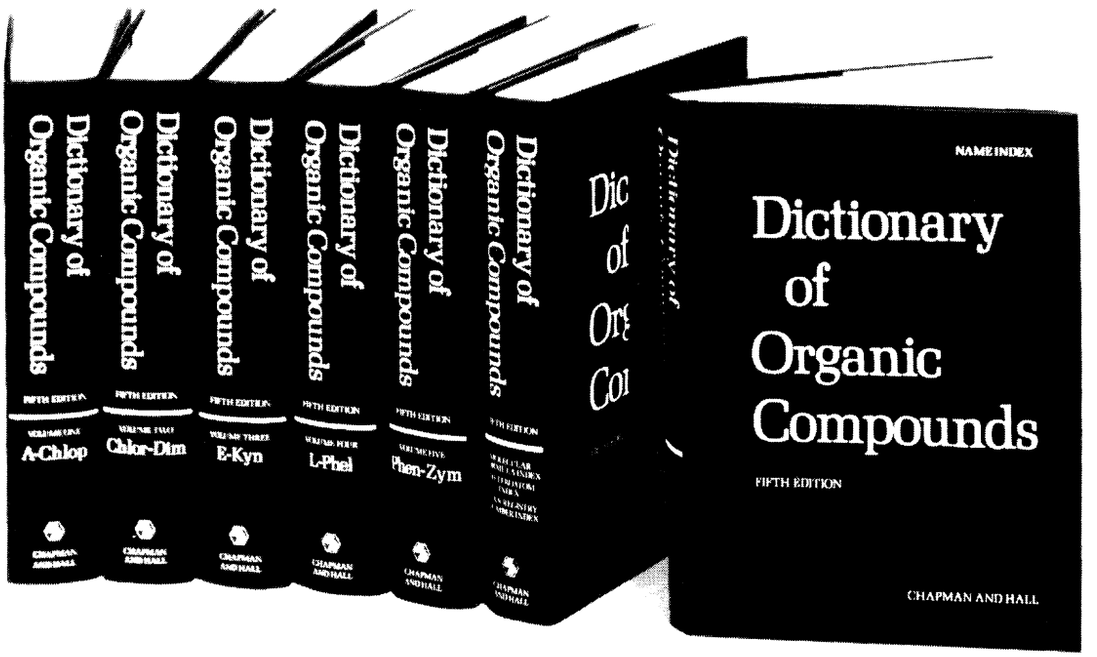

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21 May 1982, Volume 216, Number 4548 **SCIENCE**

Role of Professional Societies in Development

Industrialized countries are that way because of science and its translation into productive technology by engineers. Thus science and engineering are crucial to successful development of less affluent nations. But the record of technology as a tool for development is mixed. Technology transfer has been imperfect. Common complaints are that the engineering and science communities in receiving countries are inadequate to the task at hand, or that those individuals involved in the industrialized countries are not at the forefront of their professions. If development is to be effectively fostered, this must change.

Although structures of scientific and engineering communities vary dramatically between nations and economic systems, their components and framework are essentially disciplinary. The disciplinary societies bestow a large portion of the nonfinancial rewards to professionals in many countries: they publish research papers, award fellowships and prizes, elect leaders, and convene prestigious meetings and conferences. In addition, they set professional standards and provide continuing education. Because the societies are influential and do such things well, it makes sense for them to become involved in development activities. In recent years, a number of U.S. disciplinary societies have taken initiatives. For example, the American Chemical Society has held development-related chemistry workshops in Egypt and India. The American Society for Engineering Education has cooperated with engineering educators from many nations in establishing an international network of organizations. The American Statistical Association has arranged seminars in Latin America in cooperation with local groups and assisted them in forming their own associations.

Leaders of professional societies have noted the importance of attracting the highest quality talent to development tasks. D. Allan Bromley, in his AAAS presidential address on 6 January,* stated that "societies can provide channels for the involvement of some of the most talented scientists and engineers in the development process." That same week M. G. K. Menon, in his Indian Science Congress Association (ISCA) presidential address in Mysore,† emphasized the importance of basic research and a self-reliant base of science and technology in national development. Also noting the need for quality, he stated, "Scientific academies, professional societies and those concerned with the publication of scientific and technical journals have an exceedingly important role to play in setting standards of excellence for scientific research."

The first steps toward focusing societies on development problems on a global scale were taken in New Delhi in December 1980 at a seminar organized by AAAS, ISCA, and the Indian National Science Academy (INSA). Cochaired by A. K. Sharma and Kenneth Boulding, respectively ISCA president and AAAS board chairman at that time, the seminar included over 100 leaders from disciplinary, federative, and related institutions from about 40 countries around the world. The participants documented prior activities of the societies in furthering development and identified the capabilities of the societies in this respect. Considering the broad spectrum of participants, the report on the seminar‡ is a unique thesaurus of what societies can do and how they may become involved, and its recommendations lay the groundwork for future action.

A Continuing Committee on the Role of Scientific and Engineering Societies in Development has been formed to coordinate and guide this effort, and regional meetings are planned to examine the general principles in the context of regional conditions and problems. Thus the scientific and engineering societies have an opportunity to influence the development process in its most sensitive area: the quality of the people involved. The challenge should be met.—J. THOMAS RATCHFORD, *Associate Executive Officer, AAAS*

**Science*, 26 February 1982, p. 1041. †*Science Today*, February 1982, p. 9. ‡*Report on the Global Seminar on the Role of Scientific & Engineering Societies in Development* (INSA, New Delhi, 1981).

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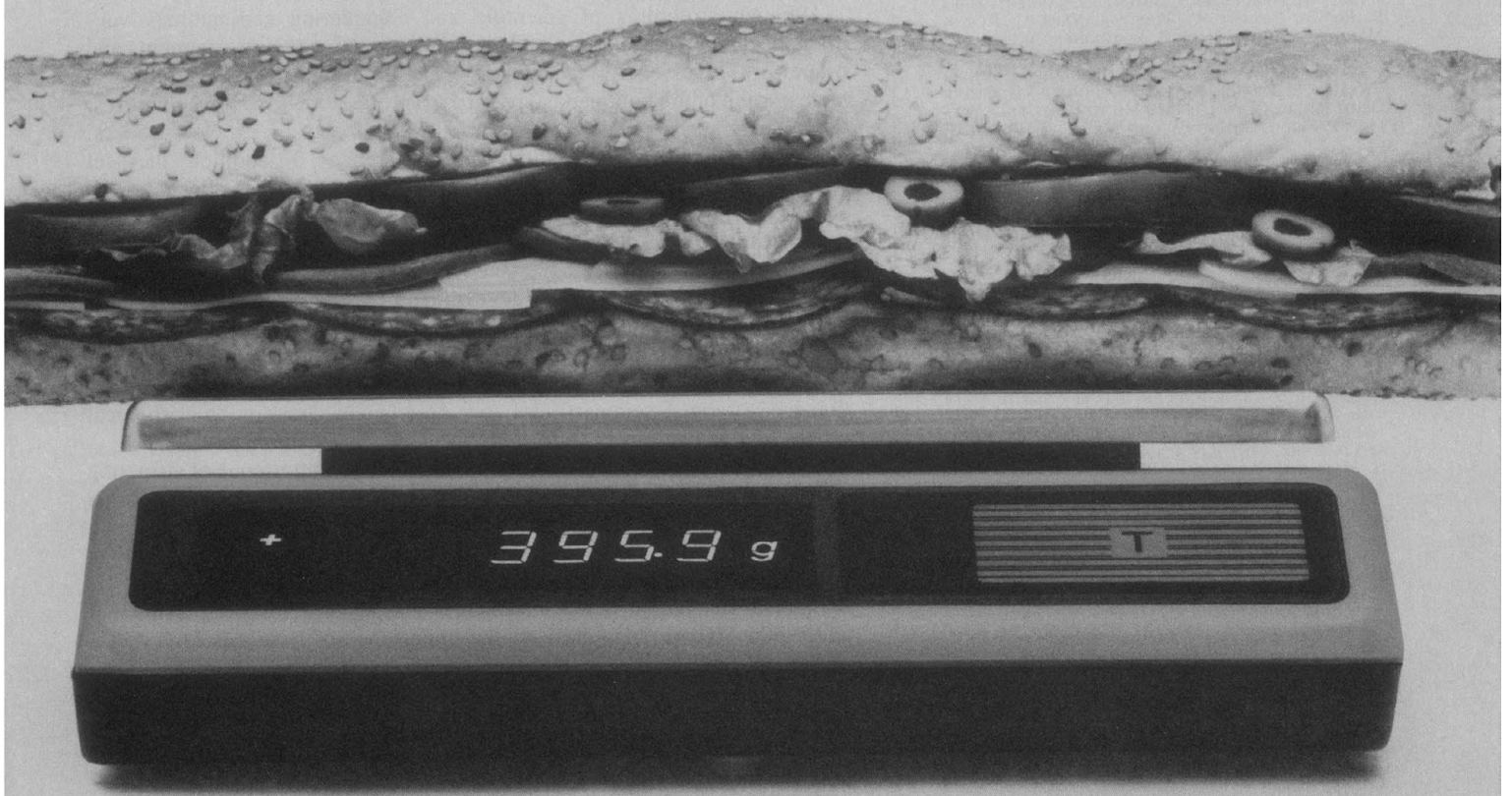

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"wonderfully heuristic"? That population genetics failed to address macroevolutionary phenomena because it did not take a holistic view of the integrated genotype? It is refreshing to see Mayr admit that Sewall Wright recognized the importance of gene interactions and influenced Simpson's development of the idea of quantum evolution; but can we agree that Wright "made little use of this insight in his equations and graphs"? Here and elsewhere one feels that Mayr has been a victim of that same lamentable rift between mathematical theoreticians and naturalists that delayed the arrival of the Modern Synthesis, and that persists still.

Mayr's larger theses, which I believe are on the whole well defended, are important enough to bear examination. Mayr feels strongly that the physical sciences have had an unwarranted influence on the philosophy of science and the prevailing ideas of what constitutes acceptable scientific method; he is vehement in his assertion that attempts to apply in biology the reductionism, elementary mechanistic ideas, and mathematical formulation of general laws that serve physics so well have hindered the development of sound biological concepts. Mathematical theory is useful in physics, but in sciences such as systematics and much of evolutionary biology "the contributions of mathematics are very minor" and often misleading. Biological systems are so complex and so integrated that reductionism is as often a hindrance to progress in biology as it is (as in the case of Mendel) an advantage. Mayr's antireductionism is especially evident in his treatment of population genetics, which, by defining evolution as changes in gene frequencies, cannot explain, he says, the evolution of complex adaptations and the origin of diversity.

Perhaps the major thesis of Mayr's book, and the most important one, is that biology can expand the philosophy of science beyond the limits defined by the physical sciences. Not only are biological systems too complex to admit of simple reductionism; they are too diverse to admit of universal laws and can be described only by "probabilistic" generalizations to which there invariably will be exceptions. Mayr's book is a deeply felt celebration of diversity: the diversity of life that makes biological "laws," or regularities, so different from physical laws; the study of diversity that led naturalists to make so many more contributions to biology than are often recognized (this is, indeed, a major theme); the recognition of diversity with-

Reviewed in This Issue