

SCIENCE

30 August 1968

Vol. 161, No. 3844

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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AAAS SYMPOSIUM VOLUMES

In Agriculture and Related Fields



AGRICULTURE AND THE QUALITY OF OUR ENVIRONMENT

Editor: N. C. Brady

476 pages, bibliography, author and subject indexes. 1967.
Price: \$13.50. AAAS members' cash orders: \$11.50.

Agriculture and the Quality of Our Environment addresses itself to this two-pronged problem: How does environmental quality affect agriculture and how does agriculture affect the quality of the environment?

This book provides a good summary and analysis of agriculture's stake in the quality of our environment. It also identifies the part which science must play to solve environmental pollution problems.

GROUND LEVEL CLIMATOLOGY

Editor: Robert H. Shaw

408 pp., 144 illus., bibliog., index, 1967.
Price: \$12.50. AAAS members' cash orders: \$10.50.

Ground Level Climatology consists of twenty papers dealing generally with the theme of weather and agriculture (including forestry) and specifically with the climate closely surrounding plants and animals—the microclimate. Investigators in the field of ground level climatology seek to understand the complex relationships between living organisms and their environment: the relation of climate to the distribution and abundance of plants and animals; the effects of weather modification on physical processes within the microclimate; and the effects of moisture, temperature, and energy balance on physiological functions.

AGRICULTURAL SCIENCES FOR THE DEVELOPING NATIONS

Editor: A. H. Moseman

232 pp., 37 illus., bibliog., index, 1964.
Price \$6.75. AAAS members' cash orders: \$6.00.

The symposium was devoted to the role of agricultural science and technology in the acceleration of economic progress in newly developing nations. The twelve chapters of this volume comprise an informed summary of the problems and opportunities of technical, economic, and educational assistance in agriculture. The book will be helpful in furnishing some background experience for the use of agricultural planners in the newly emerging countries.

GERM PLASM RESOURCES

Editor: Ralph E. Hodgson

394 pp., 59 illus., bibliog., index, 1961.
Price: \$9.75. AAAS members' cash orders: \$8.50.

The 25 papers treat the subject according to origin of germ plasm, developmental programs, new approaches to uses and perpetuation, and protection of plant and animal germ plasm.

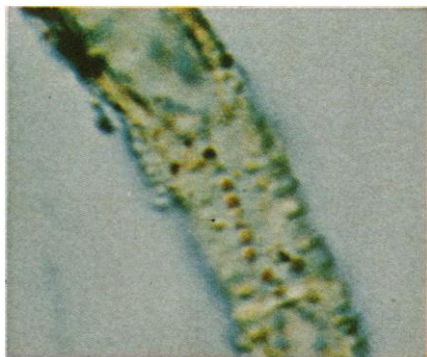
Progress in improving the usefulness of the available germ plasm is measured. The need for additional germ plasm is pointed out, and problems relating to further development, preservation, and utilization of germ plasm to advance plant and animal production are indicated.

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term "false color," as is now widely known to phytopathologists, ecologists, agronomists, and other users of aerial photography, refers to what is seen with the unique KODAK EKTACHROME Infrared AERO Film. This picture, however, was made with a microscope, not an airplane. It was taken by L. E. Casida, Jr. of Pennsylvania State University to illustrate his puzzling report in *Science* 159, 199 that bacteria, live or dead, can be visualized *in situ* in habitats like soil, marine muds, or the inside of the living, unstained clover root-hair in this photograph.* Unlike use of stains or phase attachments,

*It's more striking when the color slide is projected.

Casida finds, there is no confusing bacteria with other microorganisms or with humic or inorganic particles of similar size and shape. Only the bacteria consistently photograph red, he reports.

Why? We designed the film to represent the 710-910mμ infrared band by red. Is there something about the curvature of the bacterial outer membrane that involves infrared? Casida mentions that possibility among others.

If not content to await further word from him on what is going on, ask Eastman Kodak Company, Department 942, Rochester, N.Y. 14650 how to obtain and process KODAK EKTACHROME Infrared AERO Film.

As the artist sees

This year and next Jeannette Klute's exquisite work, as in years gone by, is bringing a joyful peace to the eyes of beholders at one-woman Klute shows in the exhibition halls of 26 lands. She hadn't thought of herself as an artist when she entered our employ in 1940, one of a crew of girls hired to run a color enlarger.



Just as parallels are scarce to the way Miss Klute's career developed, so uncommon is the scientist-artist collaboration with her boss, the director of Photo Technology at Kodak. Ralph M. Evans is himself an unusual director, provided with administrative associates of such high competence that he can function personally as a working scientist despite an official responsibility for 431 other persons' work.

Human color perception is the field Evans has long investigated. Its phenomena underlie the best known part of our business. Chemists to make the dyes in film and psychophysicists to study color stimuli are not enough. Perception is the product of stimuli and circumstance. There is no such thing as brown light, but there is orange light. A surface from which orange light enters the eye may look brown if other light enters from nearby at the same time. Brown is greyed

orange. "Greyness," a new-found dimension which Evans is currently introducing to color science, can pass through zero and become "fluorence" when a color appears to glow with its own light. The artist's eye, such as Miss Klute possesses, has known since the days of the great painters what the scientists are now slowly learning and systematizing.

Hence the collaboration. Our cold-hearted goal, of course, is to pin down just what happens when a white border degrades a color print even though the colors remain physically unchanged, and we want to know what can or cannot be done to make a convenient color print stimulate and simulate as well as does the transparency or projected slide.



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30 August 1968

Vol. 161, No. 3844

SCIENCE

LETTERS	Hunger in the United States: <i>O. L. Freeman; H. Pollack; P. Griminger</i> ; UFO Trouble in <i>Science</i> : <i>E. U. Condon</i> ; Scope of State Research: <i>P. J. Chenery; J. S. Burlew</i> ; University of Delaware's Independence: <i>M. C. Stewart</i> ; Purchase of Computers: Cost and Size Criteria: <i>A. V. Williams; R. G. Glasser</i> ; Research and Education: IUBS Resolution: <i>P. Weiss</i>	843
EDITORIAL	National Institutes of Health: Change of Leadership	847
ARTICLES	Measurement, Statistics, and the Schemapiric View: <i>S. S. Stevens</i>	849
	Central American Sea-Level Canal: Possible Biological Effects: <i>I. Rubinoff</i>	857
	Heart Poisons in the Monarch Butterfly: <i>T. Reichstein et al.</i>	861
NEWS AND COMMENT	Desert Research Institute: A Formula for Growth	866
	Student Power: NSA Takes Aim at Status Quo	869
	Fulbright Program: Retrenchment the Word	870
	ONR: Economy Cuts Hit London Office	871
BOOK REVIEWS	<i>The Brain Drain</i> , reviewed by <i>G. B. Baldwin</i> ; other reviews by <i>E. M. Emme, J. A. Erwin, E. R. Kerley, W. D. Keller, S. A. Schumm, D. Rudnick, G. W. Anderson, R. W. Hamming, J. R. Raper</i>	873
REPORTS	Beryllium-7 in Ocean Water: <i>W. B. Silker et al.</i>	879
	Shell Porosity of Recent Planktonic Foraminifera as a Climatic Index: <i>A. W. H. Bé</i>	881
	Activity Coefficients of Aqueous Sodium Chloride from 15° to 50°C Measured with a Glass Electrode: <i>A. H. Truesdell</i>	884
	Fissure Basalts and Ocean-Floor Spreading on the East Pacific Rise: <i>E. Bonatti</i>	886
	Solar Constant: First Direct Measurements: <i>E. G. Laue and A. J. Drummond</i>	888

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Glassy Objects (Microtektites?) from Deep-Sea Sediments near the Ivory Coast: <i>B. P. Glass</i>	891
High-Pressure Polymorphism of Titanium Dioxide: <i>J. C. Jamieson</i> and <i>B. Olinger</i>	893
Juvenile Hormone: Activity of Natural and Synthetic Synergists: <i>W. S. Bowers</i>	895
Clay Sols versus Clay Gels: Biological Activities Compared: <i>P. F. Low</i> et al.	897
Rete Mirabile of Dolphin: Its Pressure-Damping Effect on Cerebral Circulation: <i>E. L. Nagel</i> et al.	898
Puromycin: Action on Neuronal Mitochondria: <i>P. Gambetti</i> , <i>N. K. Gonatas</i> , <i>L. B. Flexner</i>	900
Histamine Release in vitro: Inhibition by Catecholamines and Methylxanthines: <i>L. M. Lichtenstein</i> and <i>S. Margolis</i>	902
Lupus Nephritis: Varying Complement-Fixing Properties of Immunoglobulin G Antibodies to Antigens of Cell Nuclei: <i>T. Tojo</i> and <i>G. J. Friou</i>	904
Proteins in Denaturing Solvents: Gel Exclusion Studies: <i>P. F. Davison</i>	906
Uroporphyrinogen III Cosynthetase in Bovine Erythropoietic Porphyria: <i>E. Y. Levin</i> .	907
Choline Acetyltransferase: Regional Distribution in the Abdominal Ganglion of <i>Aplysia</i> : <i>E. Giller, Jr.</i> , and <i>J. H. Schwartz</i>	908
Centrifugation of Mammalian Cells on Gradients: A New Rotor: <i>T. G. Pretlow II</i> and <i>C. W. Boone</i>	911
Oncogenicity by Methyl Methanesulfonate in Male RF Mice: <i>N. K. Clapp</i> , <i>A. W. Craig</i> , <i>R. E. Toya, Sr.</i>	913
Migratory Animals as Dispersal Agents of Cultural Materials: <i>R. F. Heizer</i>	914
<i>Technical Comments: Ice on Venus: Can It Exist?: T. Owen; J. A. Businger and J. R. Holton; W. F. Libby</i>	915
ASSOCIATION AFFAIRS Preliminary Program, 135th Annual Meeting, Dallas, Texas	919
MEETINGS Information and Control Processes in Living Systems: <i>D. M. Ramsey</i> ; Calendar of Events	923

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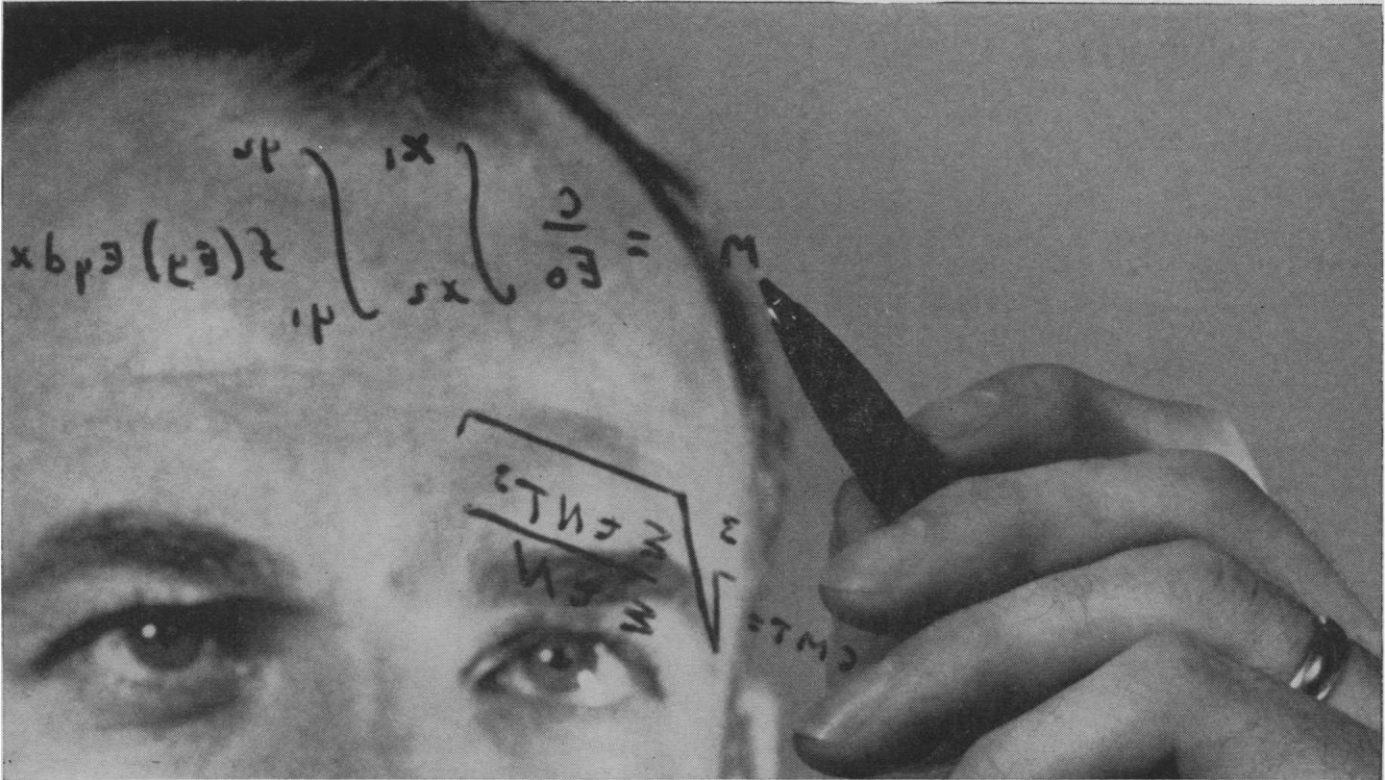
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COVER

Pores and spine base in *Globigerinoides conglobatus* (Brady) from central North Atlantic. Variations in shell porosity of Recent species of planktonic Foraminifera are related to their latitudinal occurrences (about $\times 8200$). See page 881. [A. W. H. Bé, Lamont Geological Observatory, Palisades, New York]

The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objects are to further the work of scientists, to facilitate cooperation among them, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.



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Systems Safety Engineers. Experienced in safety analysis. Establishment of safety requirements, criteria and design reviews.

Human Factors. Experienced in human factor problems related to technical design and proposal preparation.

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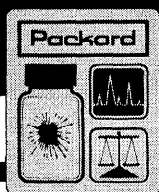
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UFO Trouble in *Science*

AAAS President Roberts assures me that the columns of *Science* are available for a reply to its article, "UFO project: Trouble on the ground" (26 July, p. 339). The article is gossip. It is so essentially trivial that the nonfacts, anonymous opinions, and unsupported statements and misstatements it contains are of no particular importance.

At one point, its author declares with unconscious irony that "it is difficult to know what to make of the Colorado fracas." It is at least as difficult to know what to make of *Science's* editors sending a reporter to Boulder to gather such immateria and solemnly spread it on your pages. This tittle-tattle is what now passes for scientific journalism?

Evidently we have lost touch out here in Colorado with the mainstream of science. We still think that facts, rather than what "some observers believe" are the stuff of science. This being so, we are concentrating attention on preparation of the report on Colorado University's substantial investigation of unidentified flying objects. We have a large volume of data to process and analyze, so the report will take some time to complete. When it is released, we trust the editors of *Science* will read it, and, if they have some lingering respect for scientific method, comment upon it. Meanwhile, they and the readers of *Science* can profitably concern themselves with matter of more import than alleged "fracases."

E. U. CONDON

*University of Colorado,
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Scope of State Research

A news item "State research aid," states that the Pennsylvania Science and Engineering Board "claims to be the first state-sponsored science board with funding capabilities" (19 July, p. 247). Sapolsky, in his article "Science advice for state and local government" (19 Apr., p. 280), lists four state agencies which fund research projects. These include the Connecticut Research Commission, the Louisiana State Science Foundation, the New York State Science and Technology Foundation, and the North Carolina Board of Science and Technology. Since March 1964, the North Carolina board has made grants totaling \$1,781,325 from state

funds for the support of 94 research projects which are expected to benefit the state. These include a regional nuclear structures laboratory, marine geological research, a multiuniversity computing center, and studies of air and water pollution.

PETER J. CHENERY

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. . . The Connecticut Research Commission has been making research grants for several years. For example, during the fiscal year ending 30 June, it funded 42 projects with a total value of \$1,270,328.

JOHN S. BURLEW

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University of Delaware's Independence

Boffey's article on the University of Delaware (10 May, p. 628) was interesting, but parts of it might give a misleading impression. The fracas between the university and the state budget director was less a demonstration of the university's independence from state control than a richly earned rebuff to the budget director, a staff aide to the Governor. Had the Delaware legislature, where state power is vested, or the Governor himself attempted to control university policy through oversight of its spending, there might or might not have been the same result. But for the budget director to attempt such control is considered a usurpation of power which does not belong to him. The legislature's action in this matter was deeply appreciated by many people. . . .

MARION C. STEWART

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Purchase of Computers: Cost and Size Criteria

Mathews' article "Choosing a scientific computer for service" (5 July, p. 23) should serve as a useful, dispassionate counterpoint to the dissonant clamor of competing equipment salesmen and the "buy by brand name" attitudes of many administrators.

But one factor Mathews fails to stress—memory size and the length of the machine's internal word unit—strengthens the case for the large computer. Many practical research problems, especially in the social sciences, demand for their solution core storage capacities in excess of those commonly provided by small or medium machines. Larger computers are designed to operate efficiently with large memory arrays while optional hang-on units for smaller machines can create inefficiencies. Partitioning a large problem (involving either complex processing or large data sets) to make it fit on a small machine increases processing time. It also demands programming talent which, as Mathews notes, is in short supply. The successful implementation of time-sharing also demands large internal memories.

While smaller computers *can* offer savings for engineers and for student use in classes, the case for a proliferation of such machines in an organization of moderate to large size is weak, especially if the machines are disparate in size and come from different manufacturers. Most organizational users would, I think, find it more efficient to have the energies of the local programmers focused on maintaining and improving the services of a central large machine.

Finally, one can only say amen to Mathews' plea to keep old computers around until the natural processes of decay (of machine and of its users) permit graceful retirement.

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It is unfortunate that Mathews found it necessary to force the reader to indulge in a guessing game as to the actual identity of the computers mentioned. A table basically equivalent to his Table 1 for all commercially available computers would be a very useful addition to the annual *Guide to Scientific Instruments*. Numerous laboratories have already had to duplicate the work of gathering just such facts for the purpose of determining where to start in the search for the computer best meeting their needs. Of course any such table is bound to be incomplete (as Mathews has stressed) in its characterization of the machines. Anybody who has looked at the field can suggest alternative measures in place of those used

by Mathews. The great virtue of Mathews' presentation is that he oversimplifies the complex structure to a set of members which fit in one table easily. Once the most general features are located in such a table the procedures Mathews describes for gathering more details become usable. . . .

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Research and Education: IUBS Resolution

The International Union of Biological Sciences at their General Assembly in September 1967 passed unanimously the following resolution submitted by Paul Weiss (United States) and P. Chouard (France):

Considering that

1) The growing momentum of knowledge in the biological sciences and its fundamental bearing on human welfare and destiny calls for increasing efforts at further broadening and strengthening both basic and applied research in biology and its branches;

2) This task requires high-quality education of mounting numbers of qualified students in close contact with the sources and practitioners of advancing knowledge;

3) Emphasis on quality, rather than sheer proliferation, of both workers and publications seems of paramount importance for maximum efficiency in this progress;

The IUBS resolves,

1) That research and education be carried on in the closest possible association;

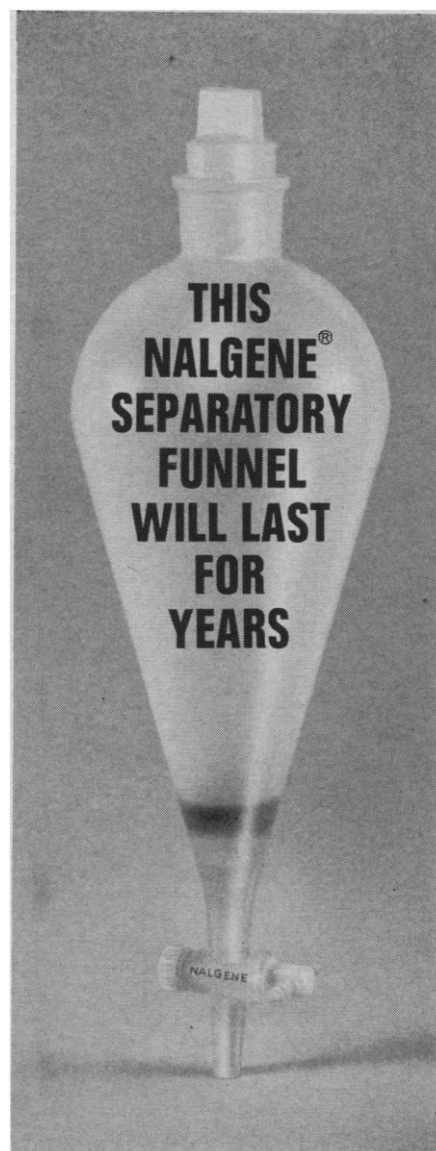
2) That trends toward divergence between the activities of advancing and of disseminating knowledge be vigorously counteracted;

3) That talented research workers be expected to take an active part in the educational process, and that the exemption of research workers from educational functions be made an exceptional dispensation for special cause, rather than a reward for excellence; and

4) That teachers be given opportunities for conducting research by time allowed from their full duties.

To this, F. W. G. Baker, secretary of the International Council of Scientific Unions, added the following postscript: "The possible effects on teachers and research workers throughout the world are eagerly awaited."

PAUL WEISS
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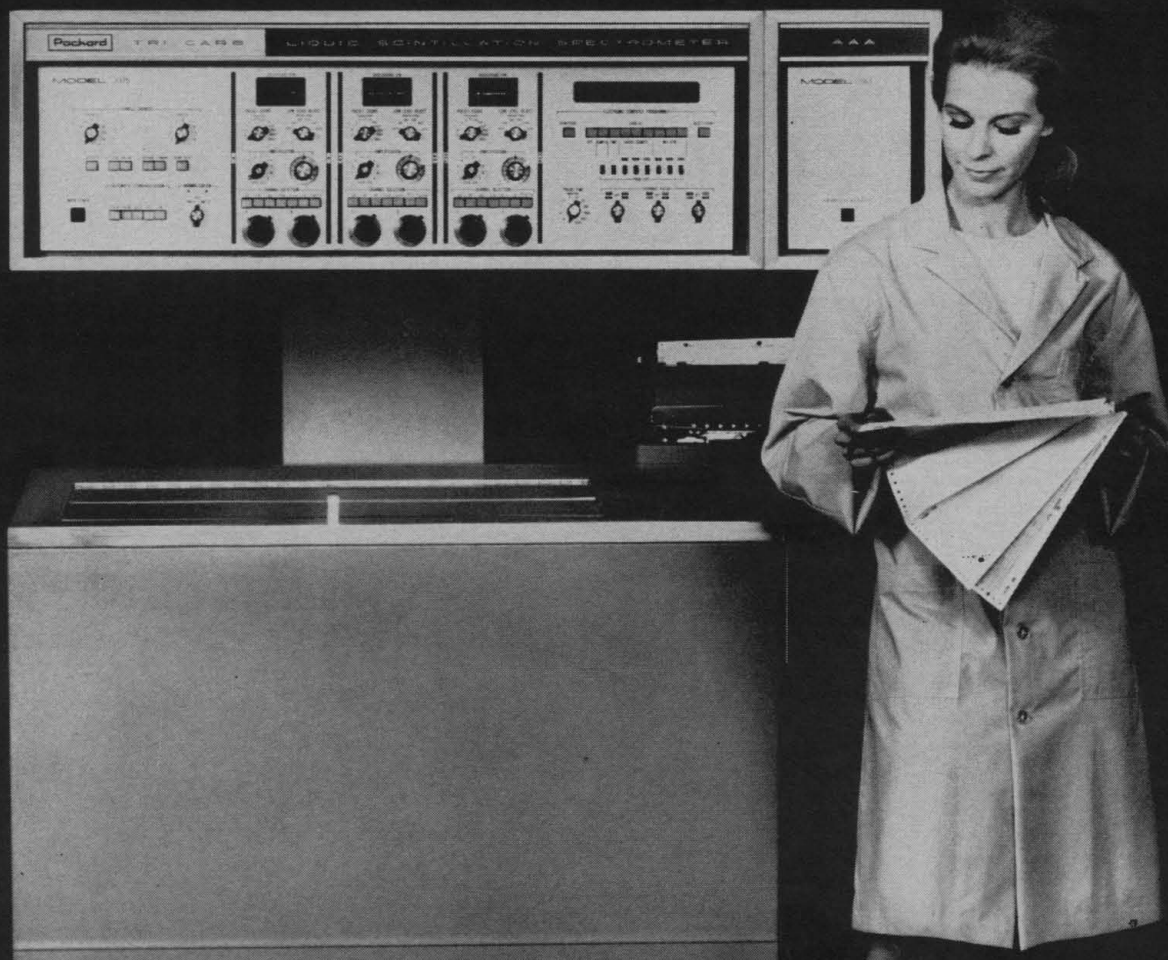
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National Institutes of Health: Change of Leadership

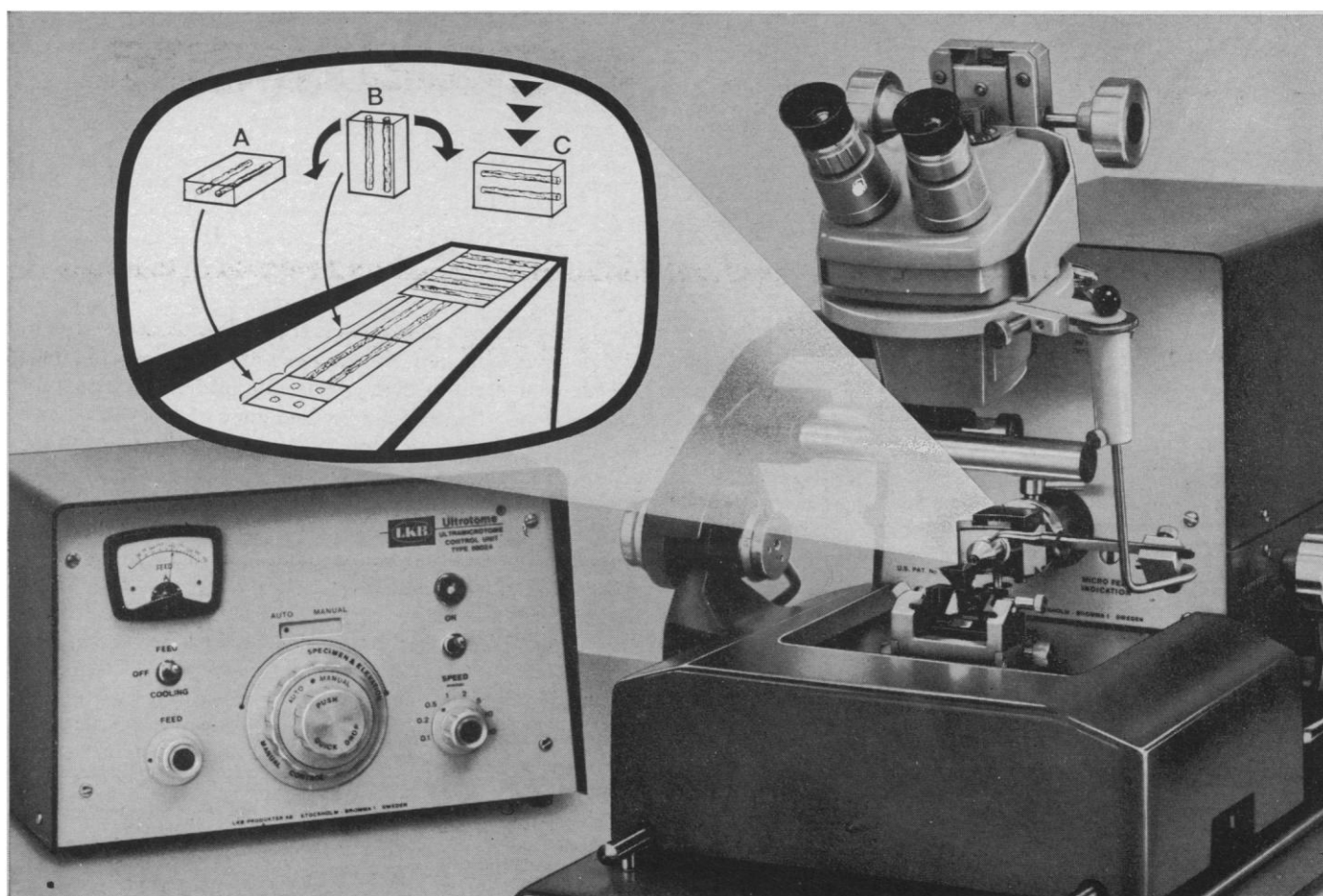
During the coming weekend, James Shannon retires as director of the National Institutes of Health and is succeeded by Robert Q. Marston. The occasion represents more than a change in leadership. It signifies the end of a great era and the beginning of another of unknown dimensions. Dr. Shannon was by far the foremost architect of expansion of federal support of scientific research. He was fortunate in beginning his term of office in 1955 when the public and the Congress were eager to increase support for research. He was in part lucky and in part astute in his choice of powerful allies. The chairmen of the relevant subcommittees on appropriations, Representative John Fogarty and Senator Lister Hill, were extremely effective. Mrs. Mary Lasker, with her intense interest in medical matters and her easy access to Presidents, was often helpful.

Despite his political successes, Dr. Shannon never lost touch with the scientific enterprise. He was alert to new developments and quick to increase support for promising areas. Although highly sensitive to political needs and pressures, he was not subservient to them.

Toward the end of his term, Dr. Shannon encountered a series of adverse developments. The favorable attitude of the public toward research cooled. Representative Fogarty died, and the composition of the House subcommittee changed. Another ally, Senator Hill, prepared to retire, and Mary Lasker was no longer so helpful. One of the most unhappy developments was the emergence of destructive congressional pressures which forced NIH to institute bureaucratic controls on expenditures of grantees.

In assuming leadership at NIH, Dr. Marston faces a complex set of problems. He must mold the mission of NIH to fit the spirit of the times. He must establish a new base of political support in Congress. He must solidify his backing in scientific and medical circles. He must assemble a new group of senior administrators. The most urgent task is to adjust to the changed public attitudes. The public's major concern today in the health field is with the delivery of reasonably priced, high-quality medical care. The demand for medical services has been increasing rapidly. It has been spurred by enhanced confidence in the effectiveness of medical practice, by increases in population and disposable income, by an expansion of private health insurance, and by Medicare and Medicaid. Current expenditures for medical services are around \$50 billion annually. The NIH has two important roles in this scene. It has primary responsibility for federal support of health research and of education of medical personnel. At the moment, the greatest congressional concern and interest is in the area of training. There are severe shortages of medical personnel at every professional level—shortages of physicians, nurses, and technologists.

In the early days of the Shannon regime, federal support of research was in part a mechanism for supporting medical education. Under Dr. Marston, medical education may become a means of fostering research. In view of his experience as director of the Regional Medical Program, Dr. Marston may align NIH activities closely with the improved delivery of medical services. However, in trimming to the political winds of the moment, Dr. Marston can be expected to remember that the basic means of improving medical practice is through research.—PHILIP H. ABELSON



Focus on Ultramicrotomy

This is the second of a series presenting the LKB Ultratome III by explaining its ability to solve problems in Ultramicrotomy.

LKB ULTRATOME III SOLVES PROBLEM OF ORIENTATION.

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holder allows one and the same specimen to be adjusted in three directions perpendicular to each other without any need to loosen the specimen in the holder. Due to the goniometer-type construction of the orientation head with its unique 45° arc displacement, the axis of the specimen block can be positioned, and rigidly fixed at angles up to 45° with respect to the axis of the specimen arm. This provides the fastest and most precise structure orientation possible without the need for any reembedding or other additional procedures.

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This orientation head is exclusive to the LKB Ultramicrotome LKB 8800.



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AAAS Annual Meeting

Dallas • Texas — 26–31 December 1968



The American Association for the Advancement of Science will hold its 1968 Annual Meeting in Dallas, Texas, 26–31 December. The Adolphus (1321 Commerce), Baker (1400 Commerce), Sheraton-Dallas (Southland Center), and Statler-Hilton (1914 Commerce) hotels will be used for housing. All the hotels will have Registration Centers.

HOTEL RATES* (Per Day)

HOTEL	SINGLE	DOUBLE	TWIN	SUITES†	PARKING
Adolphus	\$10–14	\$14–17	\$15–18	\$35–up	Free
Baker	11–17	14–20	16.50–20	32–75	Free
Sheraton-Dallas	13	18	18	42–61	\$1.50
Statler-Hilton	13	18	18	36.50–76	Free

*All rooms are subject to a 3% city transient room tax.

†Rates for suites, parlor and one to three bedroom.

There is a charge of \$4.00 for cots.

ADVANCE REGISTRATION FORM

MAIL TO: American Association for the Advancement of Science
Dept. R, 1515 Massachusetts Ave., NW, Washington, D.C. 20005

- ☐ Enclosed is \$10 Registration Fee (*Program* and Convention Badge)
☐ Enclosed is \$15 Registration Fee (including spouse) (*Program* and Convention Badges)
☐ Enclosed is \$5 Student Registration Fee (16 years and older) (*Program* and Convention Badge)
☐ Enclosed is \$5 for the *Program* only

PLEASE PRINT OR TYPE

NAME: _____
(Last) (First) (Middle Initial)

MULTIPLE REGISTRATION: _____
(List student's full name. Attach list if space is insufficient.)

MAILING ADDRESS: _____
(For receipt of *Program*) (Street) (City/State) (Zip Code)

INSTITUTION OR
COMPANY AFFILIATION: _____

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FIELD OF INTEREST: _____

CONVENTION ADDRESS: _____

APPLICATION FOR HOTEL RESERVATIONS

Please print or type and mail to: **AAAS Housing, Dallas Convention Bureau, 1507 Pacific Avenue, Dallas, Texas 75201**
(Reservations received after 13 December cannot be assured.)

CHOICE OF HOTEL: First _____ Second _____ Third _____

ROOM: ☐ Single ☐ Double ☐ Twin ☐ Suite Preferred rate \$ _____

Number in party _____ sharing this room will be (list name and address of each person, including your own):

ARRIVAL: Date _____; _____ AM, _____ PM

DEPARTURE: Date _____; _____ AM, _____ PM

Be sure to list definite arrival and departure date and time. Hotel reservations will be held *only* until 6 PM unless otherwise specified.

NAME: _____
(Individual requesting reservation)

ADDRESS: _____
(Street) (City and State) (Zip Code)



PRELIMINARY PROGRAM

135th ANNUAL MEETING,

DALLAS, TEXAS

26–31 December 1968

(General Chairman: Hon. J. Erik Jonsson, Mayor of Dallas)

AAAS INVITED LECTURES AND PANELS

- ☐ Special Lecture I (26 Dec.).
To be selected.
- ☐ Special Lecture II (26 Dec.).
To be selected.
- ☐ Distinguished Lecture (27 Dec.).
James A. Shannon (Director, National Institutes of Health).
- ☐ Frontiers of Science Lecture I (27 Dec.).
To be selected.
- ☐ RESA Annual Address and Panel Discussion (28 Dec.).
Athelstan Spilhaus (President, Franklin Institute).
- ☐ George Sarton Memorial Lecture (28 Dec.).
Owsei Temkin (The Johns Hopkins University).
- ☐ Address of the Retiring AAAS President (28 Dec.).
Don K. Price (Harvard University).
- ☐ Sigma Xi–Phi Beta Kappa Lecture (29 Dec.).
To be selected.
- ☐ Frontiers of Science Lecture II (29 Dec.).
Robert B. Livingston (University of California at San Diego).
- ☐ Frontiers of Science Lecture III (30 Dec.).
John B. Calhoun (National Institutes of Health).
- ☐ Panel Discussion on Science Technology and Latin American Development (30–31 Dec.).
Harrison Brown, *Chairman* (California Institute of Technology).
- ☐ Panel Discussion on the Financial Crisis in Science (31 Dec.).

AAAS COMMITTEE SYMPOSIA

- ☐ Committee on Science in the Promotion of Human Welfare and Scientists' Institute for Public Information
 - Unanticipated Environmental Hazards Resulting from Technological Intrusions (28–29 Dec.).
- ☐ Committee on Arid Lands
 - Water Importation into Arid Lands (30–31 Dec.).

GENERAL SYMPOSIA

- ☐ Genetic Technology: Some Public Considerations (26–27 Dec.).
- ☐ Sports and Its Participants
 - I. The Scientific Basis for Athletic Performances (26 Dec.).
 - II. Conditioning the Human Body: Fitness for Sports and Life (27 Dec.).
 - III. Girls and Women in Play and Sport (27 Dec.).
 - IV. Psychology and Sociology of Sport (28 Dec.).
 - V. Sport and Games (28 Dec.).
- ☐ Global Effects of Environmental Pollution (26–27 Dec.).
- ☐ Arts and Science—Will there be a Difference? (29 Dec.).
- ☐ Interface—Art and Technology (30 Dec.).
- ☐ Space Applications: Earth-Oriented Applications of Unmanned Satellites (28–29 Dec.).
- ☐ Art and Science: The Analysis of Communication of Form (30 Dec.).
- ☐ Review of United States Science Policy (29 Dec.).

SYMPOSIA OF AAAS SECTIONS AND AFFILIATED SOCIETIES

Mathematics (A)

- ☐ Section Program
 - Vice Presidential Address, "Connection Between Variational Principles and Stability Phenomena," A. H. Taub (29 Dec.).
 - Comparison of Einstein Theory of Gravitation and Observation (29 Dec.).
- ☐ American Mathematical Society
 - Third Annual Symposium on Some Mathematical Questions in Biology (27 Dec.).
- ☐ National Council of Teachers of Mathematics
 - Mathematics Education (27 Dec.).

Physics (B)☐ Section Program

- Vice Presidential Address, "Trends in Physics Education," Stanley S. Ballard (29 Dec.).
- Physics Education Projects (29 Dec.).
- Does Physics Have Relevance? (30 Dec.).

☐ American Astronautical Society

- Bio-engineering and Cabin Ecology (30 Dec.).

Chemistry (C)☐ Section Program

- Chemical Topics (26-27 Dec.).

☐ American Association of Clinical Chemists

- Contributed Papers (28 Dec.).

Astronomy (D)☐ Section Program

- Centennial of the Birth of George Ellery Hale (27 Dec.).
- Nature and Implications of UFO Reports (27-28 Dec.).
- Jupiter and the Outer Planets
 - I. Atmospheric Composition (29 Dec.).
 - II. Atmospheric Structure (29 Dec.).
 - III. Atmospheric Dynamics (29 Dec.).
 - IV. Problems of Origin and Evolution (30 Dec.).
- Pulsars (30 Dec.).

Geology and Geography (E)☐ Section Program

- Antarctic Research
 - I. General (26 Dec.).
 - II. Cold Poles and Heat Balance (27 Dec.).
 - III. Conjugate Phenomena (27 Dec.).
 - IV. Dynamics of the Antarctic Ocean (28 Dec.).
 - V. Antarctic Ecosystems (28 Dec.).
 - VI. Glaciology (29 Dec.).
 - VII. Antarctica (29 Dec.).
 - The Earth as a Planet (30 Dec.).
- ☐ Association of American Geographers
- Geography and Science (27 Dec.).
- ☐ Geological Society of America
- Environmental Geochemistry in Relation to Human Health and Disease (30 Dec.).
- ☐ National Speleological Society
- Contributed Papers in Cave Biology (27 Dec.).
 - Contributed Papers in Cave Geology (27 Dec.).

Zoological Sciences (F)☐ Section Program

- Vice Presidential Address, Vincent C. Dethier (30 Dec.).
- The Physiology of Fighting and Defeat (28 Dec.).

☐ American Fisheries Society

- Cytogenetics of Fishes
 - I. Hybridization and Speciation (27 Dec.).
 - II. Cytological Studies (27 Dec.).
 - III. Biochemical Studies (28 Dec.).

☐ American Society of Naturalists

- DNA Content and Gene Multiplicity in Higher Organisms (30 Dec.).

☐ American Society of Zoologists

- Past Presidents' Symposium (29 Dec.).
- Cellular Aspects of Control of Color Change (29 Dec.).
- Contributed Papers on Comparative Endocrinology (27-28 Dec.).
- Contributed Papers on Comparative Physiology (26-30 Dec.).
- Contributed Papers on Developmental Biology (28-31 Dec.).
- Turnover in Biological Systems (28 Dec.).
- Biology of Unpolluted Streams (27-28 Dec.).
- Ecology and Origin of Species (30 Dec.).
- Penetration of Calcium Carbonate Substrates by Lower Plants and Invertebrates (28-30 Dec.).
- Contributed Papers on Invertebrate Zoology (26-27 Dec.).
- Functional Morphology of the Kidney (29 Dec.).
- Contributed Papers on Vertebrate Zoology (30-31 Dec.).
- Contributed Papers on Miscellaneous Subjects (26-28 Dec.).

☐ Animal Behavior Society

- The Use of Space by Animals and Men
 - I. Relation of Territoriality to Dominance (29 Dec.).
 - II. Factors Influencing Intraspecific Contact (29 Dec.).
 - III. Population Density and Crowding (30 Dec.).
 - IV. The Role of Distance in the Evolution of Communication (30 Dec.).
 - V. Environmental Conditions and Human Behavior (31 Dec.).
- Contributed Papers (27-31 Dec.).

☐ Ecological Society of America

- Adaptations of Intertidal Organisms (27-28 Dec.).
- Contributed Papers (27-30 Dec.).
- Physiological Ecology of Amphibians (29-30 Dec.).

☐ Herpetologists' League

- Contributed Papers (28-29 Dec.).

☐ Society of Systematic Zoology

- Systematic Significance of Vertebrate Brain Structure (27 Dec.).
- Problems in Systematics of Parasites (27 Dec.).
- Marine Burrowing Organisms (27 Dec.).
- Contributed Papers (29 Dec.).

Botanical Sciences (G)

☐ Section Program

- Grasslands of Southern Central North America (27 Dec.).
- Ecological Consequences of Widespread Uses of Herbicides and Defoliants (29 Dec.).
- Biosatellite II Experiments and Results (28 Dec.).

Anthropology (H)

☐ Section Program

- Vice Presidential Address, "Physical Anthropology: The Search for General Processes and Principles," Gabriel W. Lasker (27 Dec.).
- Anthropology of Bone (27 Dec.).
- Environment and Prehistory from Woodlands to Desert (28 Dec.).
- Contributed Papers (29 Dec.).
- Problems of Relationship between Nutrition and Culture (30 Dec.).
- Ideology and Social Change in Latin America (31 Dec.).

Psychology (I)

☐ Section Program

- Vice Presidential Address, Delos D. Wickens.

☐ American Speech and Hearing Association

- Sensory Feedback in Human Behavior (30 Dec.).

Social and Economic Sciences (K)

☐ Section Program

- Vice Presidential Address, "A Critique of Theories of Claude Levi-Strauss and Talcott Parsons in the Light of Comparative Investigation," Guy E. Swanson (28 Dec.).
- Review of the United States Science Policy (29 Dec.).
- Science and Public Policy Workshop (30 Dec.).

☐ American Sociological Association

- Comparative Sociology and Contemporary Social Issues
 - I. Theoretical and Methodological Issues in Comparative Sociology (28 Dec.).
 - II. Cross-National Comparisons of the Generation Gap and the Growth of Civil Protests and Political Participation (29 Dec.).
 - III. Comparative Analysis of Social Inequalities (29 Dec.).
 - IV. Socialization for Achievement: Cross-Culture and and Cross-Class Comparisons (30 Dec.).

☐ American Society of Criminology

- Criminology and Corrections: Bridging the Gap between Theory and Practice (28 Dec.).
- Research Papers in Juvenile Delinquency (28 Dec.).

☐ National Institute of Social and Behavioral Science

- Contributed Papers (28 Dec.).

☐ Society for the Scientific Study of Religion

- Values and Metaphysics in Science (30 Dec.).
- Measuring Individual Differences in Religion (30 Dec.).

History and Philosophy of Sciences (L)

☐ Section Program

- Vice Presidential Address, "Review of the History of the Development of the Energy Concept up to the Publication of Lagrange's 'Mecanique Analytique' (1788)," Robert Bruce Lindsay (28 Dec.).
- Energy and Society (28 Dec.).

☐ History of Science Society

- The Occult Sciences and the History of Science (28 Dec.).
- Science and Society in Nineteenth-Century Britain (29 Dec.).
- Genetics in the Late Nineteenth and Early Twentieth Century (29 Dec.).
- Work in Progress (30 Dec.).

☐ Society for the History of Technology

- Topics in the History of Technology (27 Dec.).
- Industrial Archeology (27 Dec.).
- Technology and Values (29 Dec.).
- Technology as a Social Process (29 Dec.).

☐ Society for General Systems Research

- Social Systems in the General Systems Spectrum (27 Dec.).
- The Problem of Verification (27 Dec.).
- Analogues of Organizational Dynamics (28 Dec.).
- The Analysis and Evaluation of a Scientific Field (28 Dec.).
- Systems Research in Organization and Management (29 Dec.).
- General Systems and Urban Systems (29 Dec.).
- Conflict Resolution and Arms Control (30 Dec.).
- Meta Language Dialogues and Meta Theoretical Synthesis in Education (30 Dec.).

Engineering (M)

☐ Section Program

- Space Applications: Earth-Oriented Applications of Unmanned Satellites
 - I. Earth Observation (28 Dec.).
 - II. Earth Resources (28 Dec.).
 - III. Communications, Navigation and Traffic Control; National and International Aspects (29 Dec.).
 - IV. Panel Discussion and Summary (29 Dec.).

Medical Sciences (N)

☐ Section Program

- The Control of Fertility (27 Dec.).
- Molecular Approaches to Learning (30-31 Dec.).

☐ American Association of Bioanalysts

- Some Concepts and Trends in Clinical Bioanalysis (28 Dec.).

☐ American Psychiatric Association

- Aggression (29-30 Dec.).

Dentistry (Nd)

☐ Section Program

- Mucous Membranes and Their Secretions (27 Dec.).
- Physiology of Oral Mucous Membranes (28 Dec.).

Pharmaceutical Sciences (Np)☐ Section Program

- Luncheon and Vice Presidential Address, Andre Archambault.
- Contributed Papers (27–28 Dec.).
- Distinguished Lecture, Arnold Welch (28 Dec.).

Agriculture (O)☐ Section Program

- Research for the World Food Crisis (27 Dec.).
- New Frontiers of Agricultural Research (28 Dec.).

Industrial Science (P)☐ Section Program

- Luncheon and Retiring Vice Presidential Address, "Evaluating Research Results—Before and After," Allen V. Astin (30 Dec.).
- Technical Obsolescence and Continuing Education for Engineers (28 Dec.).
- Current State of Research Management (30 Dec.).
- The Current State and Outlook for Research-on-Research (30 Dec.).

Education (Q)☐ Section Program

- Vice Presidential Address, "Education for Societies in Transition," Willard J. Jacobson (27 Dec.).
- New Developments in Education Technology (26–28 Dec.).
 - I. Computers in Education (26 Dec.).
 - II. Communication and Multi-Media in Education (27 Dec.).
 - III. Individualized Instruction (28 Dec.).
- Education and Societies in Transition (27 Dec.).
- Joint Session with AERA (28 Dec.).

☐ Alpha Epsilon Delta

- Career Opportunities in the Health Professions (28 Dec.).

☐ American Institute of Biological Sciences

- Biology and Society (27 Dec.).

☐ American Nature Study Society

- Science, Education, and Society
 - I. Unified Knowledge of Man and Environment (27 Dec.).
 - II. The System, Socio-Economic-Political, and Ecosystems (28 Dec.).
 - III. Tailoring Outdoor Programs to Community Needs (29 Dec.).

☐ Commission on Undergraduate Education in the Biological Sciences

- Issues in College Biology Teaching (28–29 Dec.).

☐ National Science Teachers Association

- Developing Scientific Literacy in College Science Courses (28 Dec.).
- A Systems Approach to Science Education (29 Dec.).

☐ Science Teaching Societies

- The Role of Science Education in an Urban Environment (29 Dec.).

☐ Science Courses for Baccalaureate Education

- Integrated Science as Base for General and Cultural Program (30 Dec.).

Information and Communication (T)☐ Section Program

- Vice Presidential Address, J. C. R. Licklider (30 Dec.).
- TV in the Southwest (28 Dec.).
- Scientific Films in Communication (28 Dec.).
- Science-Knowledge Communications Interface (30 Dec.).

Statistics (U)☐ Section Program

- Vice Presidential Address, "Problems of Communications Between Biologists and Statisticians," Charles I. Bliss (30 Dec.).
- New Methodology in Classification (28 Dec.).
- Empirical Sampling Studies (28 Dec.).
- Statistical Theory (29 Dec.).
- Biological Rhythms (30 Dec.).
- Radio-Immuno Assays (30 Dec.).

☐ Biometric Society

- Random Counts in Scientific Work (26–27 Dec.).

General Science (X)☐ Academy Conference

- Dinner and Presidential Address, John H. Melvin (27 Dec.).
- Funding Academies (27 Dec.).
- Collegiate Academies (27 Dec.).
- American Junior Academy of Science Papers (28 Dec.).

☐ Cooperative Committee on the Teaching of Science and Mathematics

- Science for Our Time—Relevance or Rebellion (29 Dec.).

☐ Sigma Delta Epsilon

- Problems in Feeding the Hungry (29 Dec.).