SCIENCE

19 June 1970

Vol. 168, No. 3938

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The new Cary 14UV.
The only thing we've compromised is the price.

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If you're a little short on spectrophotometer spending money, there's no reason to end up with an instrument that's short on performance.

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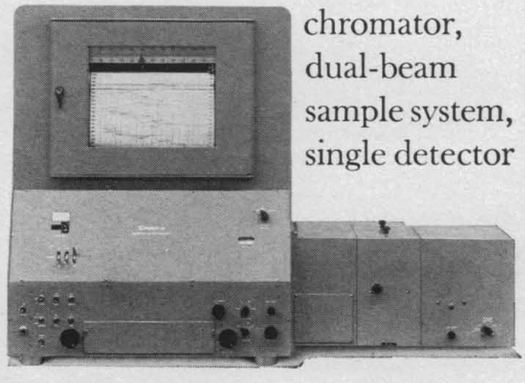

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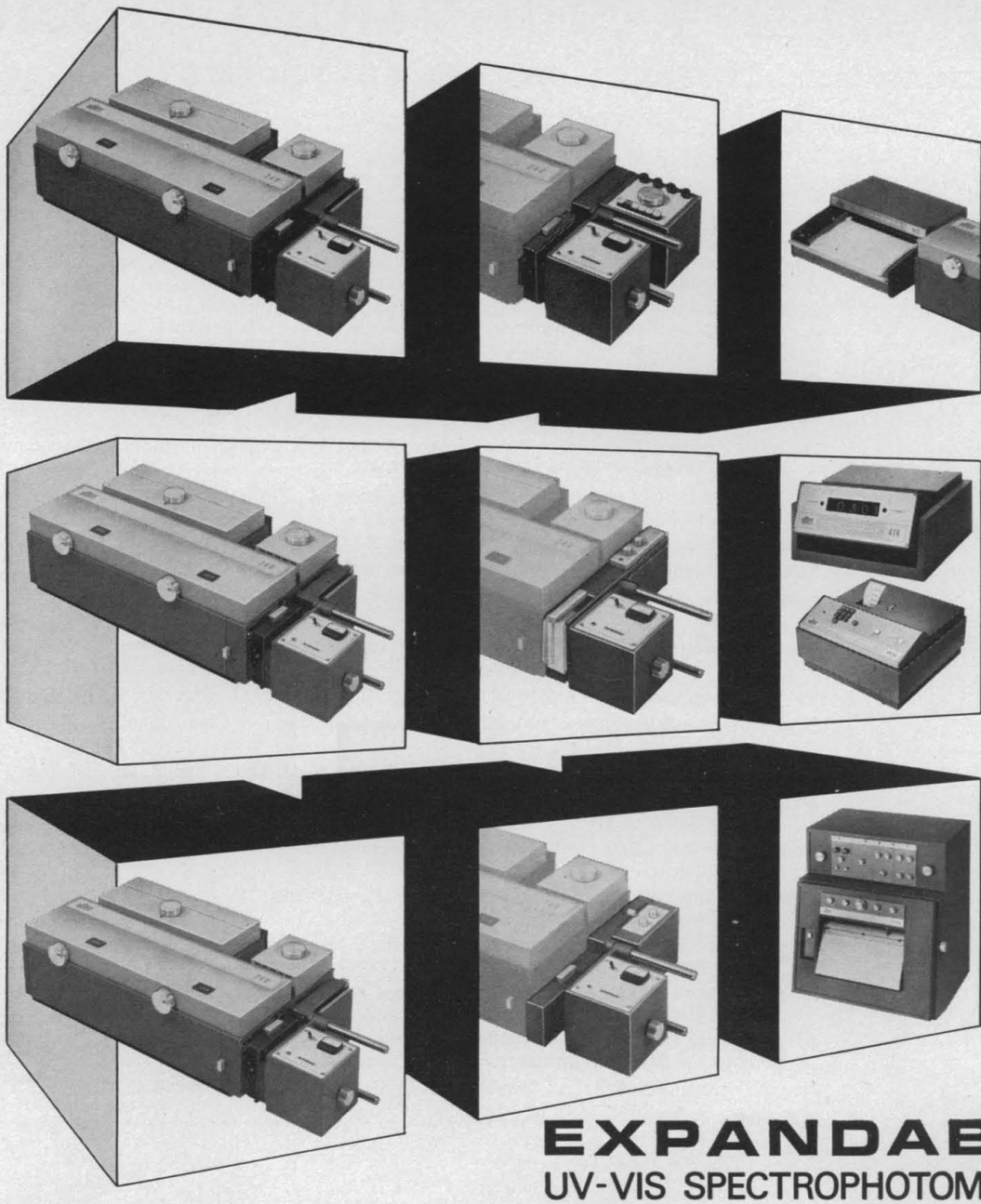
COVER

Hawaiian fly, *Drosophila grimshawi*. More than 300 similar species have evolved on the Hawaiian Islands. Many, like this one, have elaborate markings on the wings, unlike the familiar *Drosophila melanogaster*. (Actual length, 5.5 millimeters) See page 1414. [A. A. LaPlante, University of Hawaii]



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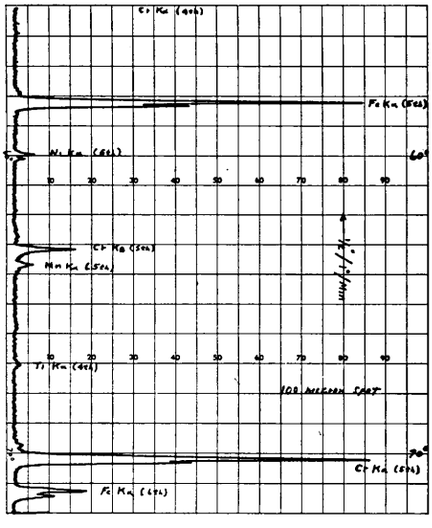
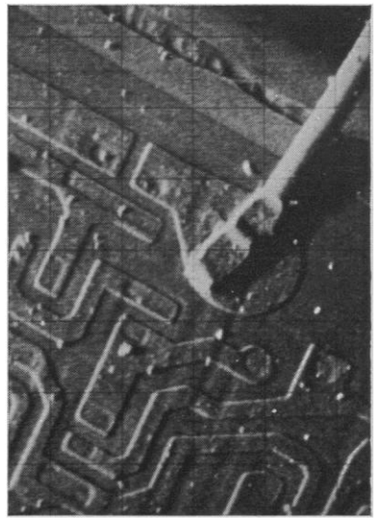
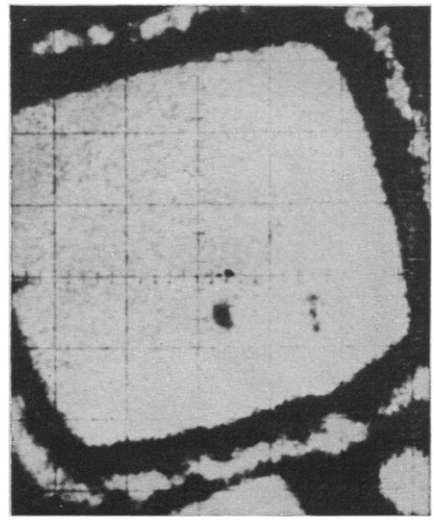


Spectral Scan 718 Alloy



Primary Backscatter Electron Image IC 240X



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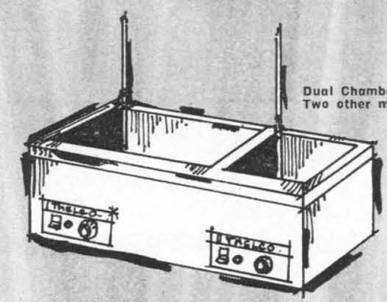

Dual Chamber Serological Bath
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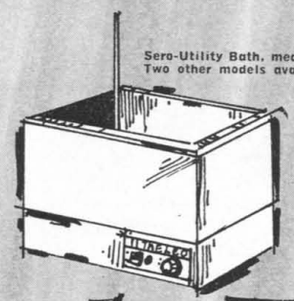

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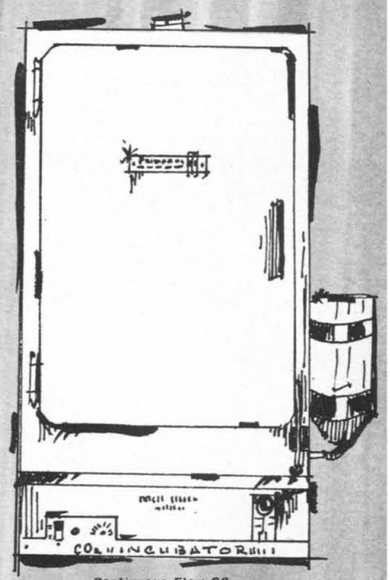

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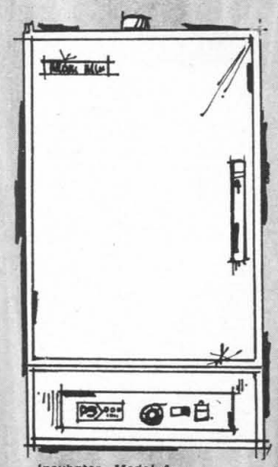

Incubator, Model 4.
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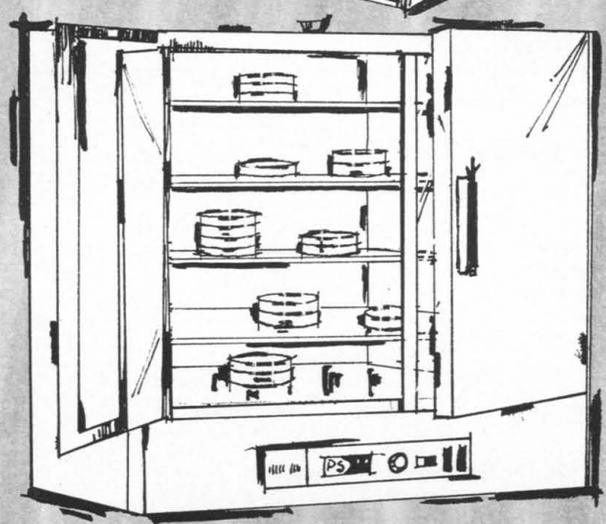

Forced Circulation Incubator, Model 6M.

Forced Circulation Oven, Model 18.
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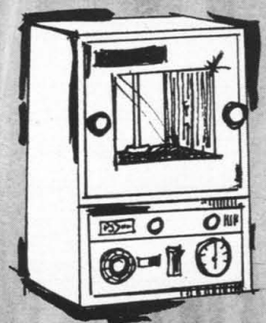

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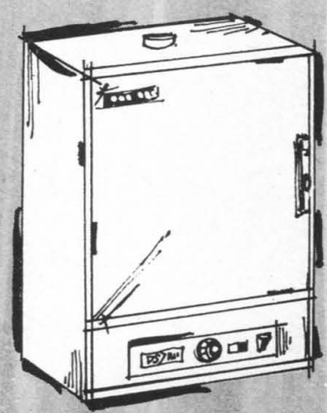

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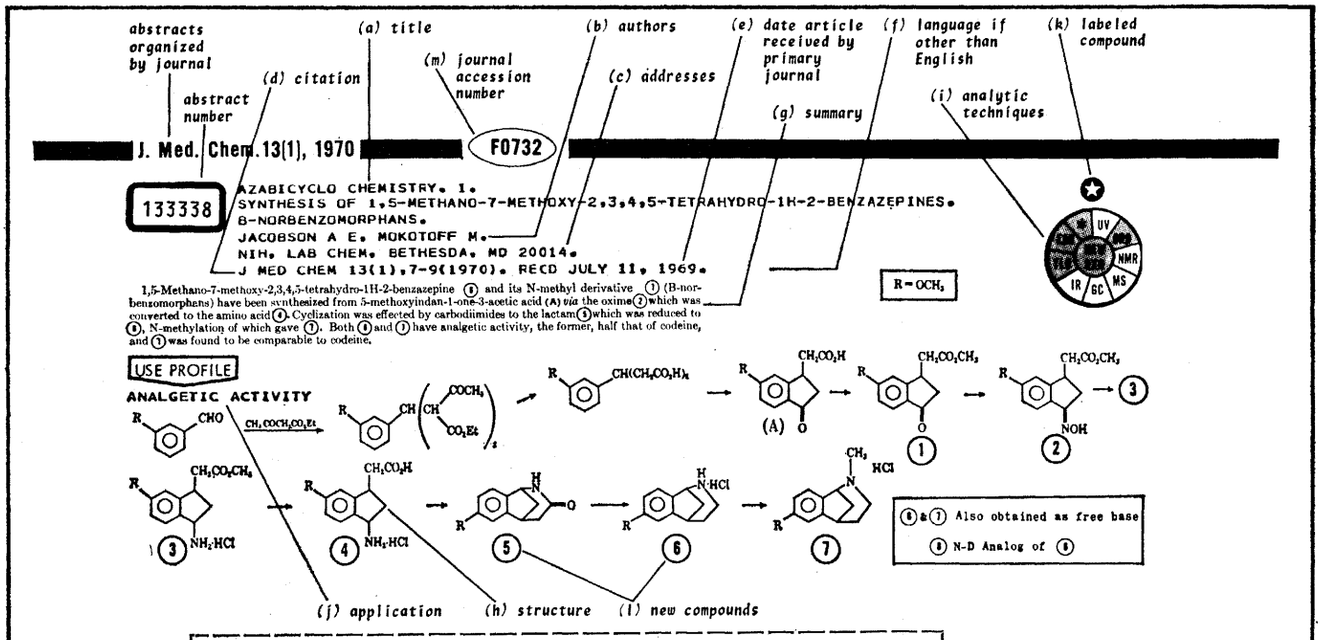

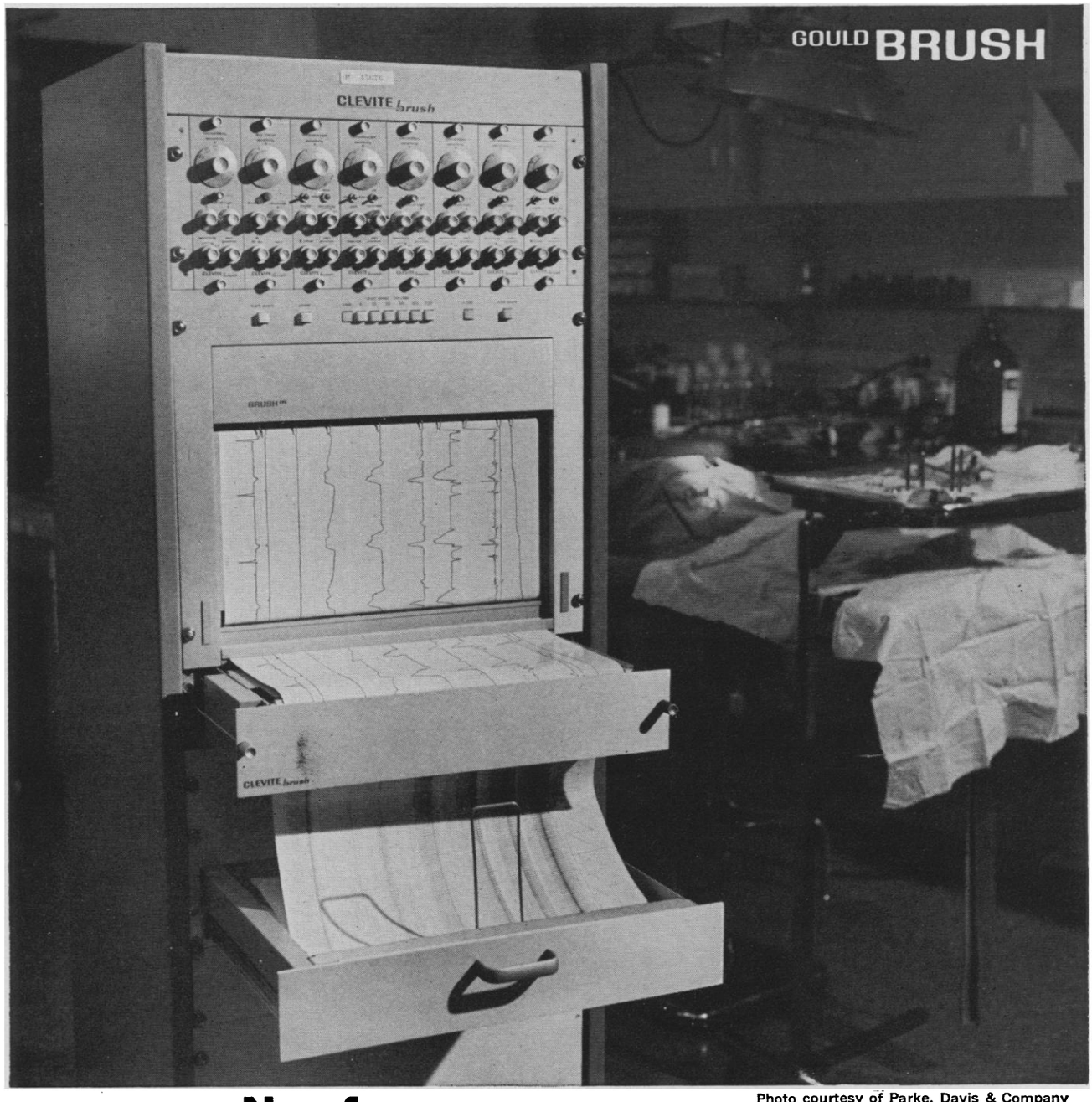

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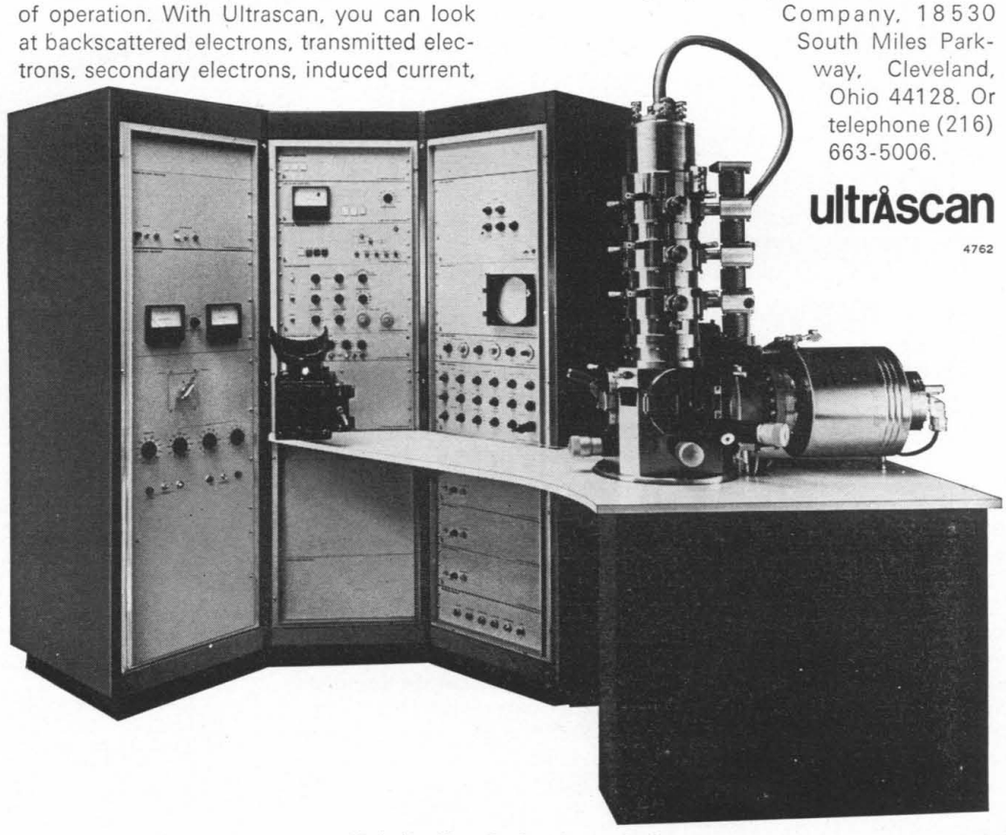

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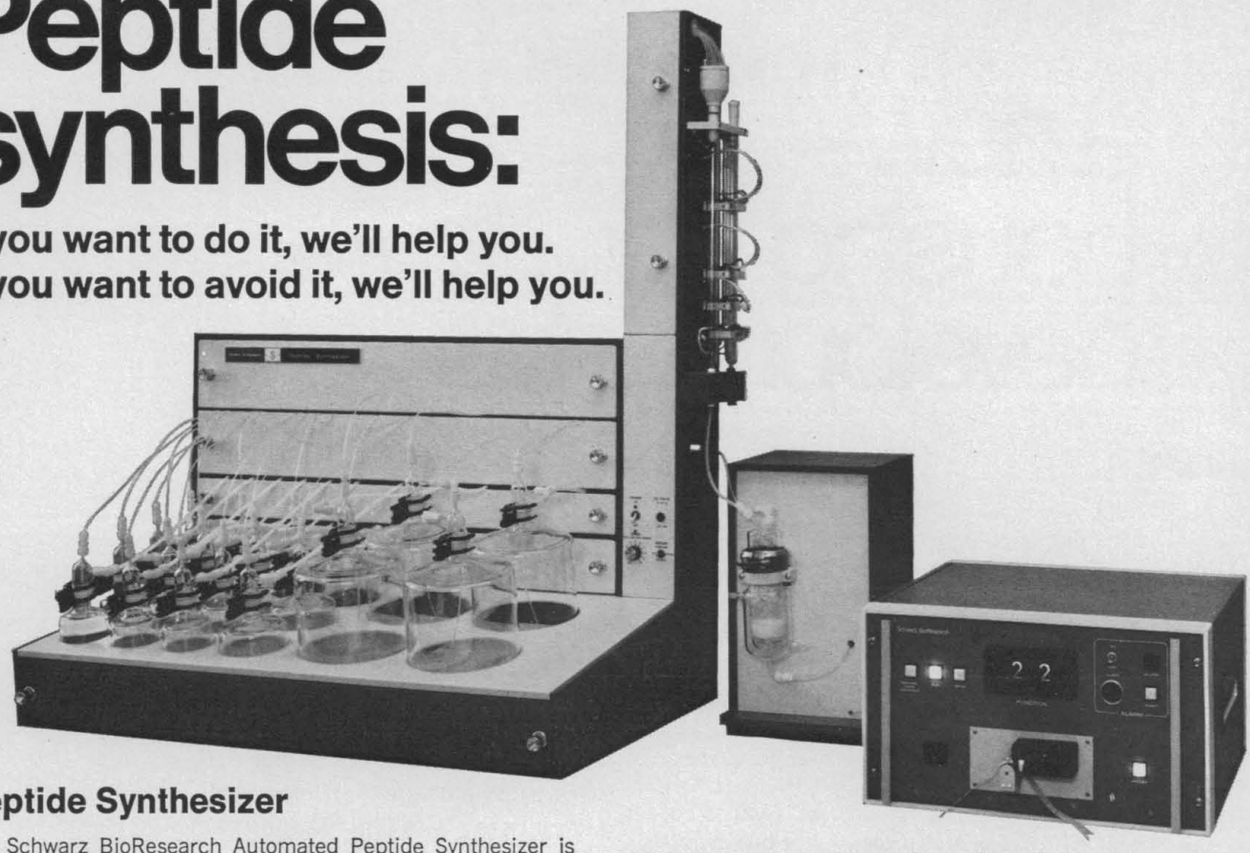

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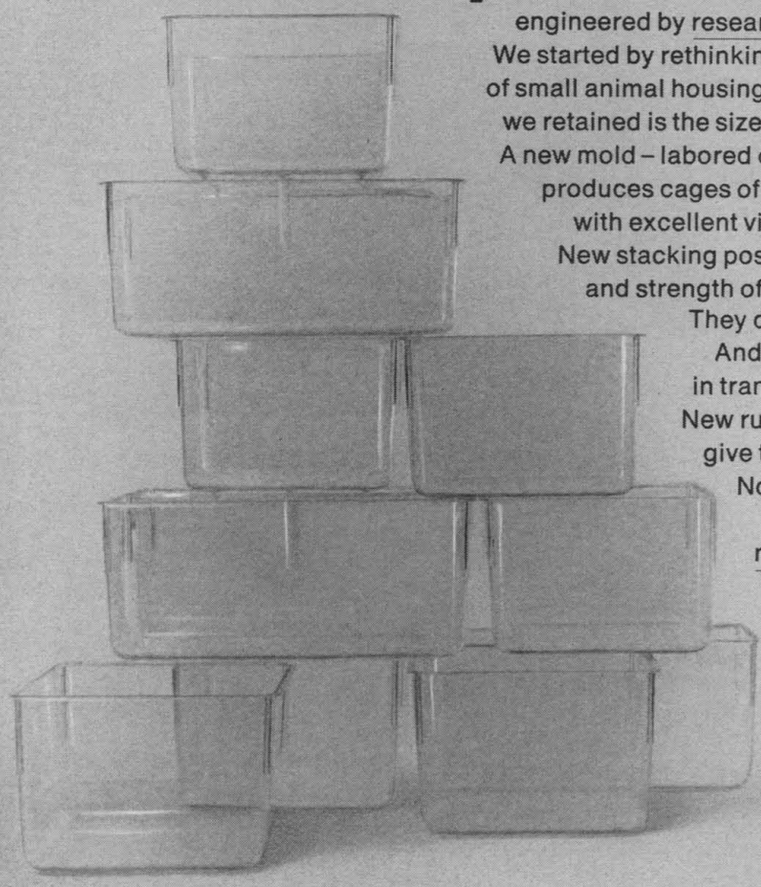

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the potentiality of computer-assisted instruction, it has largely been addressed to the issue of economics." The authors cite Oettinger's *Run, Computer, Run* as support for their statement. But is Oettinger informed only when he is skeptical about the economics of CAI? To quote Oettinger further: "The basic needs . . . common to most enterprises [are] better ideas, better people, and more money. . . . Every attempt to introduce technological change into education has revealed [that] we know precious little about the psychology of learning, and what we know is more relevant to the laboratory than to the classroom" (*7*). We wholeheartedly share his concern and skepticism, especially with respect to the helter-skelter attempts to incorporate the computer in a conventional educational environment without defining a cohesive instructional model for the individual (*8, 9, 10*).

Is the plasma display panel the key to an expensive student console? For the large quantity price of $1800 per console or terminal, existing engineering technology can provide a TV quality image with color and 3-D, speech recognition and speech output, plus a light pen for identifying any aspect of the display. This terminal could store all text centrally, rather than in each student's console, providing distributed costs for centrally located terminal capabilities, facile updating, flexibility in operation, and in "library" management.

Alpert and Bitzer's opening assertion that CAI is a "medium of instruction is later followed by "the introduction of the major new technology into the educational process. . . ." The latter properly negates their characterization of CAI and stands as a direct contradiction. Resolving this inconsistency would alleviate some of the remaining misconceptions.

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We believe Seidel *et al.* present little evidence to substantiate the "four misconceptions" which they list as a consequence of reading our article. For example, they assert that in our paper "valid instructional processes or models . . . seem to be taken for granted, rather than . . . viewed as the primary and fundamental problem whose continuing solution must progressively guide hardware and software design." This conclusion is antithetical to our approach. If there is a feature which uniquely characterizes the PLATO program, it is that the designs of hardware and technological software are defined by the educational objectives rather than by the availability of existing commercial technology. With this in mind, the PLATO system was designed for maximum adaptability, not only to accommodate teaching strategies, formulated in accordance with a variety of educational theories, but also to encourage research and development leading to the systematic establishment of valid educational models.

Further, Seidel *et al.* assert that we have ignored the economic evaluation of CAI by other agencies, in particular the economic evaluation of lesson preparation. This is immediately contradicted by their citing our reference to the study of the Committee for Economic Development (*1*), a study which did not include the PLATO system in its analysis of the economics of computer-assisted instruction. We stated that the cost of lesson material preparation using the PLATO III system is much lower (by at least a factor of 10) than for the systems evaluated by the CED. Our data cover the preparation of almost 1000 hours of completed lesson material in a wide variety of subjects. Assuming the economic validity of both analyses, and we see no reason

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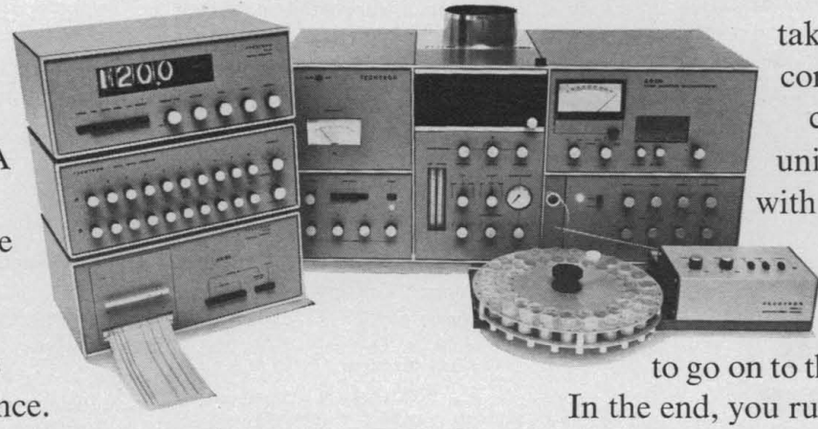

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to question either, a logical conclusion is that the PLATO III system is far more flexible and more economical than others in the preparation of lesson materials.

After several other criticisms, the authors proceed to the following assertion: "For the large quantity price of $1800 per console or terminal, existing engineering technology can provide a TV quality image with color and 3-D, speech recognition and speech output . . . [and] could store all text centrally. . . ." This unsupported statement which implies that new technology is not needed to make CAI economically feasible is, in itself, a technological misconception. This particular misconception has, in the past, limited rather than encouraged the development of computer-based education.

DANIEL ALPERT
DONALD L. BITZER
Graduate College, University of Illinois, Urbana 61801

Reference

1. "Innovation in Education: New Directions for the American School," a statement on national policy by the Research and Policy Committee of the Committee for Economic Development, New York (1968).

U.S. Radio Astronomy in Decline

American astronomers and physicists recently attended an inaugural symposium in Groningen, Netherlands, for the Westerbork Synthesis Radio Telescope, a major new facility for research in radio astronomy. In a few months another major facility, the 100-meter telescope near Bonn, Germany, will begin operation.

Radio astronomy in the United States was almost nonexistent in the decade following World War II, but in the late 1950's and early 1960's it moved rapidly to the forefront after the completion of several powerful instruments. However, it is inevitable that radio astronomy in our country will deteriorate again since no new instrumental facilities are presently under construction. Our instruments of the 1950's cannot compete with the new ones now coming into use in other countries. A number of ambitious American proposals for new instruments have been made in the past decade, but none has been funded.

The strength of the American economy and our leading position in the world are based upon excellence in technological and scientific disciplines. Radio astronomy is one of the most exciting and rapidly developing fields of science and one which demands—and contributes to—the most advanced technology. We urge that the present stalemate on radio astronomy facilities be broken and that construction of some of the proposed instruments be undertaken. This is necessary if the United States is again to play an important role in this field.

ALAN T. MOFFET*
Owens Valley Radio Observatory, California Institute of Technology, Pasadena 91109

* This letter was also signed by E. M. Burbidge, William C. Erickson, William A. Fowler, K. I. Kellermann, D. H. Rogstad, Maarten Schmidt, Charles L. Seeger, G. Westerhout, John A. Wheeler, and L. Woltjer.

Marital Success of Scientists

Robert Graves's comments on scientists' wives ("The human toll of science," 3 Apr., p. 96) are unfair to scientists and, I think, statistically unsound. As a scientist's wife, I know many more cases of satisfactory marriages among our colleagues than unsatisfactory or broken ones. Of these, half a dozen have celebrated their golden anniversaries and a great many have passed 20 years of marriage. We talk of the broken marriages, thus publicizing them out of proportion to their numbers.

Graves says that scientists "cannot communicate with their wives about their work in the way open to most husbands." There he pinpoints the problem in most unsatisfactory marriages: lack of communication. A scientist is no more to blame than is a poet or historian who doesn't talk to his wife.

Successful wives of scientists have made one of several choices: they have studied some science before or during marriage, or through conversation they have acquired a superficial knowledge of the field in which the husband works, or they have held up the social and stimulating side of the partnership, or they have developed an interest of their own in which they can communicate. Most scientists marry college-educated women. Science is a major part of daily life, and no woman—or poet—has a right to consider that scientists "live in an exclusive world in which things are viewed in a strange and different way."

BETTY N. SHOR
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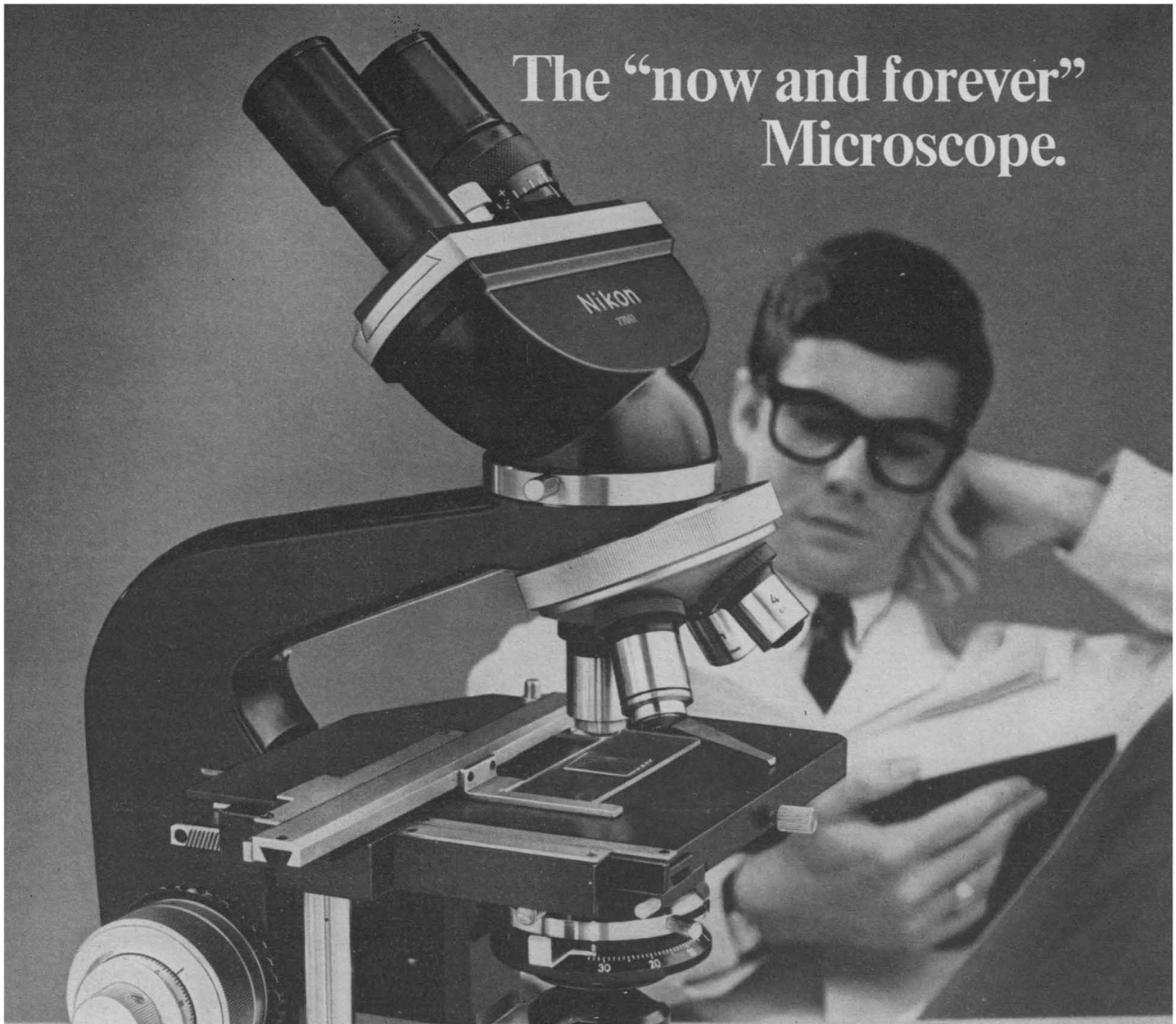

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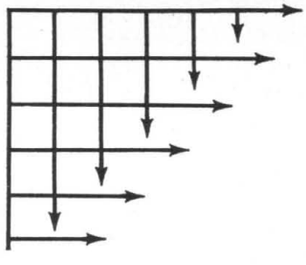

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19 June 1970, Volume 168, Number 3938 **SCIENCE**

Dying with Dignity

Marcus Aurelius' assertion that "an emperor should die standing up" and the Western pioneer's wish to die with his boots on exemplify the desire to die with dignity. Increasingly we lose this opportunity. Progress in the prevention and cure of acute illness has shifted most deaths to the chronic disease category and has made lingering terminal illness more frequent. In earlier days, most people died at home or at work, tended by friends and family. Now the terminal patient has largely lost the security of dying in familiar surroundings, for most deaths occur in a hospital or nursing home, where medical skill and sophisticated equipment sometimes prolong vital signs after all hope of recovery and sometimes after sentience and self-control have disappeared. These capabilities are sometimes used, yet typically the treatment given the terminal patient is poorer in quality and quantity than that given the patient who is expected to recover, for the interest of the hospital staff is in saving lives and restoring health. No member of the staff has had professional training in dealing with dying patients, their relatives, or the problems of bereavement. All of this makes for added stress for the patient and his family. One study has found that in the year following the death of one member of a family, the death rate among close relatives is twice as high if the primary death occurred in a hospital or nursing home as it is if the primary death occurred at home. We have the curious situation that medical progress has made death more stressful for relatives, more expensive for the family, and more troublesome for society. Because these are discomforting matters, we have pushed them aside; death seems to have replaced sex as the socially taboo topic.

Yet physicians, psychiatrists, and sociologists are becoming more interested in the conditions and circumstances of dying. Among research findings is the demonstration of a significant dip in death rates just before patients' birthdays, before such major events as Presidential elections, and among Jewish patients before the Day of Atonement. (Remember that John Adams and Thomas Jefferson both lived until the 50th anniversary of the signing of the Declaration of Independence, and died that afternoon.) This type of self-control of the time of dying poses few problems. More active controls—suicide and euthanasia—raise moral difficulties. And the physician's own increasing skill leads him into ethical dilemmas. When and for how long should he use heroic methods to continue life a little longer? Is a heart transplant worth the $20,000 or more it costs? Would a billion dollars a year be well spent on 50,000 heart transplants, with their frequently short survival times and high maintenance costs? Which patients get, and which should get, the use of scarce facilities that permit a few of them to live a few more days or weeks?

Physicians alone cannot answer such questions. They call for wider attention, for they all involve scientific, ethical, humanitarian, social, and sometimes religious considerations.

Is society ready to analyze death and the prolongation of life in terms of cost-benefit analysis, or to consider shifting the use of expensive facilities from the hopelessly ill to those whose future holds more promise? What about the customary reluctance to administer powerful but addictive drugs until "near the end"? What do we think of the "senseless prolongation" of life? Birth is no longer blindly accepted, but increasingly is planned and timed. Does this development and the growing acceptance of abortion indicate a readiness to consider euthanasia? The taboo against the discussion of such questions will have to relax, and seems already to be doing so. A society increasingly concerned about the quality of life cannot omit the final chapter from its concern.

—DAEL WOLFLE

along any of these dimensions, but could not categorize them with respect to shape or color. Humphrey's results harmonized with a report of C. Trevarthen of Caltech (submitted to, but not read at, the conference) that human subjects with forebrain commissures transected were able to compare relative positions, velocities, sizes, or brightness values of objects presented within opposite hemifields, but that they could not match objects in terms of color or shape. Even among advanced primates the tectofugal system seems to process information about location, size, or movement of objects, whereas their identification as shapes or colors demands the cooperation of the geniculofugal system. Although most of the information presented at this conference was new, the participants were, on several occasions, gratified by the extent to which diverse pieces of evidence fell together into a cohesive picture of the vertebrate visual system.

This meeting was sponsored by a small grant from the National Institute of Mental Health (MH 17163). The proceedings will be published during 1970 as three issues of a new journal *Brain, Behavior and Evolution*; the three issues will be available to nonsubscribers as a single edition.

DAVID J. INGLE
Neuropsychology Laboratory, McLean Hospital, Belmont, Massachusetts
GERALD E. SCHNEIDER
Department of Psychology, Massachusetts Institute of Technology, Cambridge

Forthcoming Events

July

19–24. American Assoc. of **Clinical Chemists**, 22nd natl., Buffalo, N.Y. (D. A. Pragay, P.O. Box 38, Buffalo 14215)

20–22. American Inst. of **Aeronautics and Astronautics**, Detroit, Mich. (W. I. Marble, 2 Pennsylvania Plaza, New York 10001)

20–22. Society of **Automotive Engineers**, Detroit, Mich. (W. I. Marble, 2 Pennsylvania Plaza, New York 10001)

20–22. Conference on the **Fatigue Problem**, Boston, Mass. (J. A. Fellows, American Soc. for Metals, Metals Park, Ohio 44073)

20–22. Society of Mechanical Engineers **Reliability and Maintainability** Conf., Detroit, Mich. (W. I. Marble, 2 Pennsylvania Plaza, New York 10001)

20–24. Association for the Study of **Animal Behavior**, Birmingham, England. (S. Dimond, Dept. of Psychology, University College, Cardiff, Wales)

20–24. Symposium on Coastal **Geodesy**, Munich, Germany. (G. W. Lennon,

Inst. of Coastal Oceanography and Tides, Bidston Observatory, Birkenhead, Cheshire, England)

20–24. **Reactions in Solution**, intern. conf., Kent, England. (G. R. Martin, Chemical Lab., Univ. of Kent at Canterbury, Canterbury, Kent)

20–24. **Urban Systems Engineering**, Henniker, N.H. (M. Wachs, Univ. of Illinois, Chicago)

21–23. Society for **Experimental Biology**, Dublin, Ireland. (A. P. M. Lockwood, Dept. of Oceanography, Univ. of Southampton, Southampton, England)

21–23. National Symp. on Data and Instrumentation for **Water Quality Management**, Madison, Wis. (I. Grossman, New York State Dept. of Health, Div. of Pure Waters, Albany 12208)

21–24. Conference on **Atomic Physics**, 2nd intern., Oxford, England. (E. K. Woodgate, Dept. of Physics, Clarendon Lab., Parks Rd., Oxford)

21–24. **Computer Science** Symp., 2nd annual, Bangkok, Thailand. (L. Padunchewit, Computer Science Lab., Chulalongkorn Univ., Bangkok)

22–24. **Electronic Probe Analysis**, 5th natl. conf., New York, N.Y. (P. Lublin, Gen. Telephone & Electronics Lab., Bayside, N.Y. 11630)

22–24. An **Equipment Manuals** Symp., Los Angeles, Calif. (R. Post, Dept. of the Army, Materiel Command, Washington, D.C. 20315)

24–26. **Linguistic** Soc. of America, Columbus, Ohio. (T. A. Sebeck, Patton House, Indiana Univ., Bloomington 47401)

25–1. Institute on **Religion in an Age of Science**, Star Island (Portsmouth), N.H. (Mrs. E. R. Goodenough, 89 Irving St., Cambridge, Mass. 02138)

26–1. **Water Pollution Research**, 5th intern. conf., San Francisco, Calif. (J. Parkhurst, California Host Corp., Room 635, Davis Hall, Univ. of California, Berkeley 94720)

27–31. Instrument Soc. of America, Research Conf. on **Instrumentation Science**, 29th, Geneva, N.Y. (N. E. Huston, Univ. of Wisconsin, Madison 53706)

28–30. Conference on **Nondestructive Evaluation**, Philadelphia, Pa. (J. A. Fellows, American Soc. for Metals, Metals Park, Ohio 44073)

29–31. International Symp. on **Biomechanics**, San Diego, Calif. (Y. C. Fung, 5022 Basic Science Bldg., Univ. of California, San Diego 92037)

29–31. **Acoustical Holography**, 3rd intern. symp., Newport Beach, Calif. (H. E. Calkins, Douglas Advanced Research Labs., McDonnell Douglas Corp., Huntington Beach, Calif. 92647)

29–1. **Reticuloendothelial** Soc., 4th intern., Freiburg, Germany. (K. Flemming, 7799 Heiligenberg, Postfach 3, West Germany)

30–1. **Equine Nutrition,** 2nd symp., Ithaca, N.Y. (H. F. Hintz, Dept. of Large Animal Medicine, Cornell Univ., Ithaca 14850)

August

2–5. American Soc. of **Animal Science**, University Park, Pa. (G. P. Lofgreen, Imperial Valley Field Station, 1004 E. Holton Rd., El Centro, Calif. 92243)

2–5. **Primitology,** 3rd intern. congr. Zurich, Switzerland. (J. Biegert, Anthropological Inst., Univ. of Zurich, CH 8001, Zurich)

2–6. National **Medical** Assoc., Atlanta, Ga. (E. C. Walden, 4200 Edmonson Ave., Baltimore, Md. 21229)

2–7. Society for **Industrial Microbiology,** Kingston, R.I. (V. S. Kenny, Gagliardi Research Corp., P.O. Box 390, East Greenwich, R.I. 02818)

3–4. American Soc. of **Safety Engineers,** San Diego, Calif. (A. C. Blackman, The Society, 850 Busse Highway, Park Ridge, Ill. 60068)

3–7. Future Implications of **Biomedical Technologies** Conf., Deerfield, Mass. (C. Williams, National Science Foundation, Washington, D.C.)

3–7. American College of **Chest Physicians,** 11th intern. congr. on Diseases of the Chest, Lausanne, Switzerland. (M. Kornfield, 112 E. Chestnut St., Chicago, Ill. 60611)

5–7. **Engineering in Medicine**—Bioceramics Conf., Henniker, N.H. (C. W. Hall, Southwest Research Inst., San Antonio, Tex.)

3–7. **Molecular Biology and Pathology,** 3rd conf., Saratoga Springs, N.Y. (K. T. Lee, Dept. of Pathology, Albany Medical College, Albany, N.Y. 12208)

4–6. **Stress Corrosion Cracking** Conf., Philadelphia, Pa. (J. A. Fellows, American Soc. for Metals, Metals Park, Ohio 44073)

5–7. Association of American **Feed Control** Officials, Louisville, Ky. (B. Poundstone, Kentucky Agricultural Experiment Sta., Univ. of Kentucky, Lexington 40506)

5–7. Applications of **X-Ray Analysis,** 19th conf., Denver, Colo. (J. B. Newkirk, Dept. of Metallurgy, Univ. of Denver, Denver 80210)

5–12. International Council on **Health, Physical Education and Recreation,** Sydney, Australia. (A. Willee, Dept. of Physical Education, Univ. of Melbourne, Melbourne, Australia)

6–15. **Antarctic Geology and Solid Earth Geophysics,** intern. symp., Oslo, Norway. (L. DeGoes, Natl. Acad. of Sciences, 2101 Constitution Ave., NW, Washington, D.C. 20418)

9–12. **Soil Conservation** Soc. of America, Toronto, Ont., Canada. (H. W. Pritchard, 7515 NE Ankeny Rd., Ankeny, Iowa 50021)

9–13. **Biocommunications** 70 Conf., Houston, Tex. (H. R. Smith, Medical Illustration, Room 414E, Baylor College of Medicine, Houston 77025)

9–14. **Food Science and Technology,** 3rd intern. congr., Washington, D.C. (C. L. Willey, Inst. of Food Technologists, 221 N. LaSalle St., Chicago, Ill. 60601)

9–15. **Microbiology,** 10th intern. congr., Mexico City, Mexico. (L. F. Bojalil, Apartado Postal P.O. Box 60-603, Mexico 18, D.F. Mexico)

10–13. Society of **Automotive Engineers,** Los Angeles, Calif. (W. Marble, 2 Pennsylvania Plaza, New York 10001)

10–14. Continuing **Engineering Education,** Andover, N.H. (W. M. Mueller, Amer. Soc. for Metals, Metals Park, Ohio)

10–14. Environmental Aspects of **Nuclear Power Stations** Symp., New York, N.Y. (J. H. Kane, Div. for Technical Information, U.S. Atomic Energy Commission, Washington, D.C. 20545)

10–14. **Particulate Matter Systems** Conf., Deerfield, Mass. (D. W. Fuerstenau, Univ. of California, Berkeley)

11–13. **Photovoltaic** Specialists Conf., Seattle, Wash. (J. Loferski, Div. of Engineering, Brown Univ., Providence, R.I.)

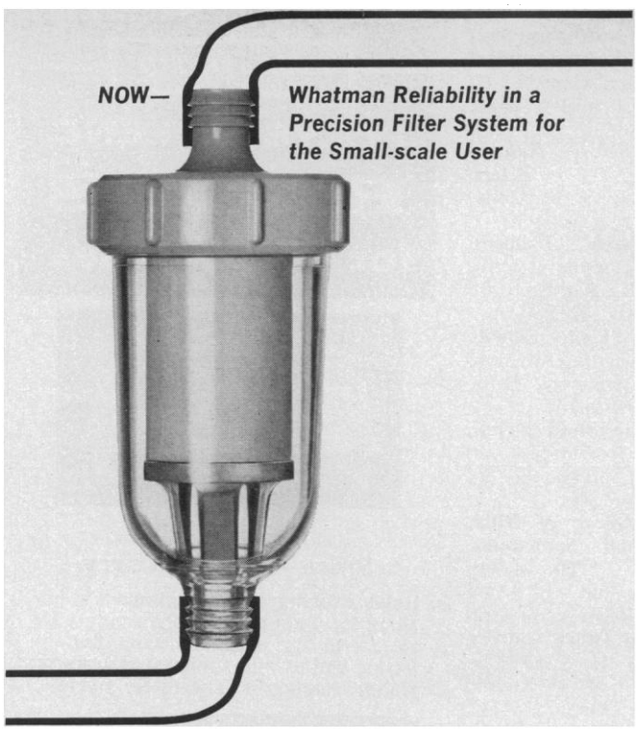
16–18. American Acad. of **Physical Medicine and Rehabilitation,** New York, N.Y. (C. C. Herold, 30 N. Michigan Ave., Chicago, Ill. 60602)

16–21. World **Medical** Assoc., 24th general assembly, Oslo, Norway. (A. E. Romnaldez, 10 Columbus Circle, New York 10019)

16–27. **Wool Research,** 4th intern. conf., Berkeley, Calif. (H. Lundgren, U.S. Dept. of Agriculture, 800 Buchanan St., Albany, Calif. 94710)

17–19. **Alaska Science** Conf., 21st annual, College. (Hannelore, c/o Dept. of Civil Engineering, Univ. of Alaska, College 99701)

17–19. American **Peptide** Symp., 2nd, Cleveland, Ohio. (R. R. Smeby, Cleveland Clinic Foundation, 2020 E. 93 St., Cleveland)



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17–19. **Trace Analysis with an Emphasis on Pollution and Environment Factors**, Edmonton, Alta., Canada. (J. A. Plamdeck, Dept. of Chemistry, Univ. of Alberta, Edmonton)

17–20. International Conf. on **Ephemeroptera**, Tallahassee, Fla. (W. L. Peters, P.O. Box 111, Florida A & M Univ., Tallahassee 32307)

17–21. New England Assoc. of **Chemistry Teachers**, 32nd summer conf., Manchester, N.H. (H. B. Bjornson, 95 Falls Ave., Medford, Mass. 02155)

17–21. **Computers in Undergraduate Science Education**, Chicago, Ill. (R. Blum, Dept. of Physics and Astronomy, Univ. of Maryland, College Park 20742)

17–21. National **Metric Study** Conf., Deerfield, Mass. (R. P. Trowbridge, c/o Engineering Foundation, 345 E. 47 St., New York 10017)

17–21. International Assoc. of **Milk, Food and Environmental Sanitarians**, Cedar Rapids, Iowa. (H. L. Thomasson, P.O. Box 437, Shelbyville, Ind. 46178)

17–21. Symposium on **Recovery of Uranium from the Ores and Other Sources**, Rio de Janeiro, Brazil. (J. H. Kane, Div. of Technical Information, U.S. Atomic Energy Commission, Washington, D.C. 20545)

17–22. **Anatomical** Congr., 9th intern., Leningrad, U.S.S.R. (W. Bargmann, Dept. of Anatomy, Univ. of Kiel, Kiel, Germany)

17–22. **Carbohydrate Chemistry**, 5th intern. symp., Paris, France. (F. Percheron, 4, Ave. de l'Observatoire, 75, Paris 6e)

18–21. **Chemical Engineering** Conf., Melbourne, Australia. (P. D. O'Connor, Australian Acad. of Science, Gordon St., Canberra City, A.C.T., 2601)

18–21. **Detonation**, 5th intern. symp., Pasadena, Calif. (S. J. Jacobs, U.S. Naval Ordnance Lab., Silver Spring, Md. 20910)

18–27. International **Astronomical** Union, 14th general assembly, Brighton, England. (L. Perak, General Secretary, Astronomical Inst., Czechoslovak Acad. of Science, Prague 2)

19–20. **Water Quality**, 5th annual intern. symp., Washington, D.C. (David X. Manners Co., 237 East Rocks Rd., Norwalk, Conn. 06851)

19–26. Institute of **Mathematical Statistics**, Hanover, West Germany. (L. Katz, Statistical Lab., Michigan State Univ., East Lansing 48823)

20–21. American **Astronautical** Soc., Santa Barbara, Calif. (T. Mitchell, Univ. of California, Santa Barbara)

20–22. Therapy of **Advanced Cancer**, 9th natl. conf., Madison, Wis. (R. J. Samp, University Hospitals, 1300 University Ave., Madison 53706)

21–23. **Soil Geomorphology** Field Conf., Tucson, Ariz. (J. W. Hawley, Soil Science Soc. of America, P.O. Box 3129, University Park, N.M. 88001)

23. **Botanical** Soc. of America, Bloomington, Ind. (B. F. Palser, Dept. of Botany, Rutgers Univ., New Brunswick, N.J. 08903)

23–26. Association of American **Geographers**, San Francisco, Calif. (J. W. Nystrom, 1146 16th St., Washington, D.C. 20036)

23–27. **Phycological** Soc. of America,

Bloomington, Ind. (P. L. Walne, Dept. of Botany, Univ. of Tennessee, Knoxville 37916)

23–28. American Soc. of **Agronomy**, Tucson, Ariz. (M. Stelly, 677 S. Segoe Rd., Madison, Wis. 53711)

23–28. International **Diabetes** Federation Symp. and Conf., 7th, Buenos Aires, Argentina. (V. G. Foglia, Paraguay 2155, 7° piso, Buenos Aires)

23–28. International **Law** Assoc. Conf, 54th, The Hague, Netherlands. (A. Cronheim, Holland Organizing Centre, 16, Lange Voorhout, The Hague)

23–28. **Liquid Crystal**, 3rd intern. conf., Berlin, Germany. (R. Hosemann, Fritz-Haber Institut der Max-Planck-Gesellshaft, Faradayweg 46.1, Berlin 33)

23–29. **Crop and Soil Science** Meetings, Tucson, Ariz. (M. Stelly, 677 S. Segoe Rd., Madison, Wis. 53711)

23–29. American **Fern** Soc., Bloomington, Ind. (A. M. Evans, Dept. of Botany, Univ. of Tennessee, Knoxville 37916)

23–29. American Soc. of **Plant Physiologists**, Bloomington, Ind. (W. H. Klein, Radiation Lab., Smithsonian Institution, Washington, D.C. 20560)

23–29. American Soc. of **Plant Taxonomists**, Bloomington, Ind. (L. I. Nevling, Jr., Arnold Arboretum and Gray Herbarium, 22 Divinity Ave., Cambridge, Mass. 02138)

23–29. American Soc. of **Zoologists**, Bloomington, Ind. (G. Sprugel, Jr., Illinois Natural History Survey, 179 Natural Resources Bldg., Urbana 61801)

24–26. **Chemical Engineering** Conf., Sydney, Australia. (P. D. O'Connor, Secy., Australian Acad. of Science, Gordon St., Canberra City, A.C.T., 2601)

24–26. **Energy and the Environment**, 24th annual conf., Oak Ridge, Tenn. (W. W. Grigorieff, Special Projects Office, Oak Ridge Associated Universities, P.O. Box 117, Oak Ridge 37830)

24–26. **Genetics** Soc. of America, Seattle, Wash. (B. Wallace, Dept. of Genetics, Cornell Univ., Ithaca, N.Y. 14850)

24–26. **Mathematical** Assoc. of Amercia, Laramie, Wyo. (A. B. Willcox, The Association, 1225 Connecticut Ave., NW, Washington, D.C. 20036)

24–26. International Conf. on **Psychosurgery**, Copenhagen, Denmark. (E. R. Hitchcock, Dept. of Surgical Neurology, Royal Infirmary, Edinburgh, Scotland)

24–26. International Conf. on **Radiation Effects in Semiconductors**, Albany, N.Y. (J. W. Corbett, Dept. of Physics, State Univ. of New York at Albany, Albany 12203)

24–27. **Soil Science** Soc. of America, Tucson, Ariz. (J. W. Hawley, The Society, P.O. Box 3129, University Park, N.M.)

24–28. Application of **Environmental R & D to Landfill Disposal for Solid Wastes**, Deerfield, Mass. (E. A. Glysson, Univ. of Michigan, Ann Arbor)

24–28. Quantitative Decision Making for Delivery of **Health Care**, Andover, N.H. (A. Jacobs, Univ. of Rochester, Rochester, N.Y.)

24–29. Congress of Intern. Soc. of **Haematology**, Munich, Germany. (J. L. Tullis, 110 Francis St., Boston, Mass. 02215)

25–28. Symposium on the **Chromosphere-Corona Transition Region**, Boulder,

Colo. (J. W. Evans, Director, Sacramento Park Observatory, Sunspot, N.M. 88349)

25–28. Western **Electronic** Show and Convention, Los Angeles, Calif. (R. Howard, WESCON, 3600 Wilshire Blvd., Los Angeles 90005)

25–28. Institute of **Mathematical Statistics**, Laramie, Wyo. (L. Katz, Statistical Lab., Michigan State Univ., East Lansing 48823)

26–29. **Small-Angle X-Ray Scattering**, 2nd intern. conf., Graz, Austria. (O. Kratky, Inst. for Physical Chemistry, Univ. of Graz, Heinrichstrasse 28, A-8010 Graz)

27–30. Society for the Study of **Amphibians and Reptiles**, 13th annual, Kansas City, Mo. (J. L. Vial, Dept. of Biology, Univ. of Missouri, Kansas City 64110)

28–30. International **Mathematical** Union, 6th general, Menton, France. (C. B. Morrey, Jr., Dept. of Mathematics, Univ. of California, Berkeley)

28–30. **Soil Geomorphology** Field Conf., Tucson, Ariz. (J. W. Hawley, Soil Science Soc. of America, P.O. Box 3129, University Park, N.M. 88001)

28–1. American **Quaternary** Assoc., Yellowstone Natl. Park and Bozeman, Mont. (M. Davis, Great Lakes Research Div., Univ. of Michigan, Ann Arbor 48104)

28–2. International **Mineralogical** Assoc., 7th congr., Tokyo, Japan. (C. E. Tilley, Dept. of Mineralogy and Petrology, Univ. of Cambridge, Cambridge, England)

29–3. American **Physiological** Soc., Bloomington, Ind. (H. Hazelrigg, News Bureau, Indiana Univ., 306 N. Union St., Bloomington 47401)

30–2. American Inst. of **Chemical Engineering**, Denver, Colo. (J. Henry, 345 E. 47 St., New York 10017)

30–2. **Electronic Materials** Technical Conf., New York, N.Y. (A. Reisman, I.B.M., P.O. Box 218, Yorktown Heights, N.Y. 10598)

30–2. **Geological** Assoc. of Canada and **Mineralogical** Assoc. of Canada, Winnipeg, Man. (R. F. J. Scoates, Manitoba Mines Branch, 900 Norguay Bldg., Winnipeg)

30–4. Laurentian **Hormone** Cont., Quebec, Canada. (J. Sanford, Laurentian Conf. Office, 222 Maple Ave., Shrewsbury, Mass. 01545)

30–4. **Strength of Metals and Alloys**, 2nd intern. conf., Asilomar, Calif. (J. A. Fellows, American Soc. for Metals, Metals Park, Ohio 44073)

30–5. **History of Medicine**, 22nd intern. congr., Bucharest, Rumania. (B. Dutescu, Strada Rozelar 13, Bucharest)

30–5. **Ornithological** Congr., 15th intern., The Hague, Netherlands. (N. Tinbergen, Dept. of Zoology, Parks Rd., Oxford, England)

31–2. Symposium on **Heteroatom Chemistry**, London, Ont., Canada. (D. H. Hunter, Dept of Chemistry, Univ. of Western Ontario, London)

31–3. American **Sociological** Assoc., Washington, D.C. (E. H. Volkart, 1001 Connecticut Ave., NW, Washington, D.C. 20036)

31–4. Modern Concepts in **Corrosion Engineering**, Andover, N.H. (W. H. Boyd, Battelle Memorial Inst., Columbus, Ohio)

31–4. American Soc. of **Limnology and Oceanography**, Kingston, R.I. (G. H. Lauff, W. W. Kellogg Biological Sta., Michigan State Univ., Hickory Corners 49060)

31–4. **Neuropathology**, 7th intern. congr., Paris, France. (J. Lapresle, Hôpital de la Salpetriere, 47 Bld. de l'Hôpital, 75 Paris 13e)

31–4. Symposium on **Polarisation Phenomena in Nuclear Reactions**, Madison, Wis. (J. Teillar, Laboratoire Joliot-Curie, Faculte des Sciences d'Orsay, Orsay 91, France)

31–4. **Poultry Science** Assoc., Knoxville, Tenn. (C. B. Ryan, Texas A & M Univ., College Station 77843)

September

1–3. Association for **Computing Machinery**, 25th natl. conf., New York, N.Y. (S. Matsa, IBM Corp., 410 E. 62 St., New York 10021)

1–3. **Nuclear Power** in 1970, Williamsburg, Va. (W. Thomas, American Nuclear Soc., Virginia Electric & Power, 7th and Franklin, Richmond, Va. 23219)

1–10. International **Mathematical Union**, 6th general assembly and intern. congr. of mathematicians, Nice, France. (J. Dieudonne, c/o Faculty of Science, Univ. of Nice, Nice)

2–9. British Assoc. for the **Advancement of Science**, Durham, England. (J. M. Robertson, 3 Sanctuary Bldgs., 20 Great Smith St., London S.W.1, England)

3–5. **Mineralogical** Assoc. of Canada and Geological Assoc. of Canada, joint annual mtg., Winnipeg, Man. (D. T. Anderson, Dept. of Geology, Univ. of Manitoba, Winnipeg)

3–9. International Union of **Biochemistry**, 8th intern. congr., Rome, Italy. (P. Desnuelle, Inst. de Chimie Biologique, Faculté des Sciences, Place Victor-Hugo 13, Marseille, France)

4–8. Society of General **Physiologists**, Woods Hole, Mass. (M. Lieberman, Dept. of Physiology, Duke Univ., Durham, N.C.)

4–8. American **Psychological** Assoc., Miami Beach, Fla. (K. B. Little, APA, 1200 17th St., NW, Washington, D.C. 20036)

6–12. World's **Poultry Science** Assoc., 14th world congr., Madrid, Spain. (R. Cole, Agriculture House, Knightsbridge, London, S.W.1, England)

6–12. Society of **Protozoologists**, Washington, D.C. (D. M. Hammond, Dept. of Zoology, Utah State Univ., Logan 84321)

7–11. **Behavioral Temperature Regulation**, Lyon, France. (J. D. Hardy, John B. Pierce Foundation Lab., 290 Congress Ave., New Haven, Conn. 06519)

7–11. International Congr. on **Cybernetics**, 6th, Namur, Belgium. (G. R. Boulanger, Palais des Expositions, Place Andre Rijokmans, Namur)

7–11. Symposium on **Developments in the Management of Low and Intermediate Level Radioactive Wastes**, Aix-en-Provence, France. (J. H. Kane, Div. of Technical Information, U.S. Atomic Energy Commission, Washington, D.C. 20545)

7–11. International Congr. of the **Transplantation** Soc., 3rd, The Hague, Netherlands. (A. Cronheim, Holland Organizing Centre, 16, Lange Voorhout, The Hague)

7–12. **Cardiology**, 6th world congr. London, England. (J. Shillingford, British Cardiac Soc., Postgraduate Medical School, Ducane Rd., London W.12)

7–12. International Assoc. of **Geochem-**

istry and Cosmochemistry, Oslo, Norway. (E. Andersen, Reactor School, Inst. for Atomenergi, 2007 Kjeller, Norway)

7–12. **Pharmaceutical Sciences,** 31st annual intern. congr., Washington, D.C. (G. B. Griffenhagen, American Pharmaceutical Assoc., 2215 Constitution Ave., NW, Washington, D.C.)

7–12. **Magnetism**, intern. conf., International Union of Pure and Applied Physics, Grenoble, France. (W. C. Marshall, Atomic Energy Research Establishment, Harwell, England)

8–11. American Chemical Soc., **Molecular Sieve Zeolites,** 2nd intern. congr., Worcester, Mass. (L. B. Sand, Dept. of Chemical Engineering, Worcester Polytechnical Inst., Worcester 01609)

8–12. Symposium on **Molecular Structure and Spectroscopy,** Columbus, Ohio. (K. N. Rao, Dept. of Physics, Ohio State Univ., Columbus 43210)

9–11. Canadian **Medical and Biological Engineering** Conf., 3rd, Halifax, Nova Scotia, Canada. (D. Mutch, Nova Scotia Technical College, P.O. Box 1000, Halifax)

9–13. American **Electroencephalographic** Soc., Washington, D.C. (P. T. White, 8700 W. Wisconsin, Milwaukee, Wis. 53226)

10–12. **Electrical Double Layer and Its Influence on Electrode Processes** Conf., Lexington, Ky. (G. D. Christian, Dept. of Chemistry, Univ. of Kentucky, Lexington 40506)

10–12. **Parapsychological** Assoc., 13th annual intern. conv., New York, N.Y. (J. G. Pratt, Box 152, Univ. of Virginia School of Medicine, Charlottesville 22901)

11–12. Utah Acad. of **Sciences, Arts and Letters.** (K. T. Slack, University of Utah, Salt Lake City 84112)

11–19. American Soc. of **Clinical Pathologists**, Atlanta, Ga. (M. Damron, 445 N. Lake Shore Dr., Chicago, Ill. 60611)

13–16. American **Fisheries** Soc. centennial celebration mtg., New York, N.Y. (R. F. Hutton, AFS, 15th and New York Ave., NW, Washington, D.C. 20005)

13–17. American Soc. of **Mechanical Engineers,** petroleum mechanical engineering conf., Denver, Colo. (A. B. Conlin, 345 E. 47 St., New York 10017)

13–17. **Raman Spectroscopy,** 2nd intern. conf., Oxford, England. (D. A. Long, Dept. of Structural Chemistry, Univ. of Bradford, Bradford 7, Yorkshire, England)

13–18. American **Chemical** Soc., Chicago, Ill. (F. T. Wall, Executive Director, ACS, 1155 16th St., NW, Washington, D.C. 20036)

13–18. **Illuminating Engineering** Soc., natl. technical conf., Vancouver, B.C., Canada. (R. C. Ringold, 345 E. 47 St., New York 10017)

14–17. American **Hospital** Assoc., 72nd annual, Houston, Tex. (E. L. Crosby, The Association, 840 Lake Shore Dr., Chicago, Ill. 60611)

14–17. Society of **Photo-Optical Instrumentation** Engineers, technical symp., Anaheim, Calif. (H. F. Sander, 216 Avenida Del Norte, Redando Beach, Calif. 90277)

14–18. **International Council of the Aeronautical Sciences** Congr., Rome, Italy. (R. R. Dexter, c/o American Inst. of Aeronautics and Astronautics, 1290 Sixth Ave., New York 10009)

BOOKS RECEIVED

(*Continued from page 1444*)

How Psychotherapy Heals. The Process of Intensive Psychotherapy. Richard D. Chessick. Science House, New York, 1969. xii + 228 pp. $9.95.

Les interconnexions en électronique. J. Henry. Masson, Paris, 1970. viii + 160 pp., illus. Paper, 58 F.

Introduction aux phénomènes de transport linéaires dans les semiconducteurs. J. Travernier and D. Calecki. Masson, Paris, 1970. vi + 240 pp., illus. Paper, 80 F. Collection de monographies de physique, vol. 7.

An Introduction to Hamiltonian Optics. H. A. Buchdahl. Cambridge University Press, New York, 1970. xvi + 360 pp. $18.50. Cambridge Monographs on Physics.

Introduction to Natural Science. Part 2, The Life Sciences. V. Lawrence Parsegian, Paul R. Shilling, Floyd V. Monaghan, and Abraham S. Luchins. Academic Press, New York, 1970. xvi + 728 pp., illus. $10.95.

The Invisible University. Postdoctoral Education in the United States. Report of a study conducted under the auspices of the National Research Council. National Academy of Sciences, Washington, D.C., 1969. xxiv + 312 pp., illus. Paper, $10.

Issues in American Education. Commentary on the Current Scene. Arthur M. Kroll, Ed. Oxford University Press, New York, 1970. vi + 202 pp. Cloth, $6; paper, $1.95.

Language and Dialect in Hawaii. A Sociolinguistic History to 1935. John E. Reinecke. Stanley M. Tsuzaki, Ed. University of Hawaii Press, Honolulu, 1969. xviii + 254 pp., illus. $9.

Lectures on Numerical Methods. I. P. Mysovskih. Translated from the Russian by L. B. Rall. Wolters-Noordhoff, Groningen, Netherlands, 1969. viii + 344 pp. $12.50.

Life History Research in Psychopathology. Merrill Roff and David F. Ricks, Eds. University of Minnesota Press, Minneapolis, 1970. x + 322 pp., illus. $10.

Log of a Moon Expedition. Written and illustrated by Luděk Pešek. Translated from the German edition (1967) by Helene Schmidt. Knopf, New York, 1969. xiv + 114 pp. $3.95.

Lord Rayleigh. The Man and His Work. Robert Bruce Lindsay. Pergamon, New York, 1970. viii + 252 pp. Cloth, $7; paper, $4.75. Commonwealth and International Library: Selected Readings in Physics; Men in Physics.

LYaPAS. A Programming Language for Logic and Coding Algorithms. M. A. Gavrilov and A. D. Zakrevskii, Eds. Translated from the Russian edition (Moscow, 1966) by Morton Nadler. Academic Press, New York, 1969. xx + 476 pp., illus. $24.50. ACM Monograph Series.

Magnetism and Metallurgy. Ami E. Berkowitz and Eckart Kneller, Eds. Academic Press, New York, 1969. Vol. 1 (xiv + 512 pp., illus. + index. $29.50); vol. 2 (xiv + pp. 513–838, illus. + index. $17).

Manual on Food and Nutrition Policy.

B. F. Johnston and J. P. Greaves. Food and Agriculture Organization of the United Nations, Rome, 1969 (available from UNIPUB, New York). viii + 96 pp. Paper, $2. FAO Nutritional Studies, No. 22.

Mechanism and Materialism. British Natural Philosophy in an Age of Reason. Robert E. Schofield. Princeton University Press, Princeton, N.J., 1970. viii + 336 pp. $9.50.

Methods for Numerical Taxonomy. W. R. Lockhart and John Liston, Eds. American Society for Microbiology, Bethesda, Md., 1970. x + 62 pp., illus. Paper, $3.

Micromechanics of Flow in Solids. John J. Gilman. McGraw-Hill, New York, 1969. x + 294 pp., illus. $15. McGraw-Hill Series in Materials Science and Engineering.

Microscopical Indentification of Organic Compounds. Behrens-Kley. Translated from the German edition (Leipzig, 1922) by Richard E. Stevens. Microscope Publications, Chicago, 1969. vi + 234 pp. + plates. $24.50.

The Nature and Function of Peroxisomes (Microbodies, Glyoxysomes). A conference, New York, May 1969. James F. Hogg, Ed. New York Academy of Sciences, New York, 1969. Illus. Paper, $18. *Annals of the New York Academy of Sciences*, vol. 168, art. 2, pp. 209–381.

A New Deal in Geology, Geography and Related Sciences. René Malaise. Published by the author, Hersbyvagen 1, S-181 42 Lidingö, Sweden, 1969. 328 pp., illus. Paper, $10.

Nonbenzenoid Aromatics. Vol. 1. James P. Snyder, Ed. Academic Press, New York, 1969. xii + 327 pp., illus. $17.50.

Nuclear Structure and Nuclear Reactions. Proceedings of the International School of Physics, "Enrico Fermi," Course 40, Varenna, Italy, June–July 1967. M. Jean and R. A. Ricci, Eds. Academic Press, New York, 1969. xvi + 816 pp., illus. $30.

Numerical Taxonomy. Proceedings of a colloquium, St. Andrews, Fife, Scotland, September 1968. A. J. Cole, Ed. Academic Press, New York, 1969. xvi + 328 pp., illus. $9.

Plant Physiology. Frank B. Salisbury and Cleon Ross. Wadsworth, Belmont, Calif., 1969. xvi + 766 pp., illus. $12.95. Wadsworth Botany Series.

Population Genetics in Animal Breeding. Franz Pirchner. Translated from the German edition (Hamburg, 1964) by Franz Pirchner and Max von Krosigk. Freeman, San Francisco, 1969. xiv + 274 pp., illus. $8. Agricultural Science Series.

The Possibilities of Charting Modern Life. A Symposium for Ethnological Research about Modern Time, Stockholm, March 1967. Sigurd Erixon, Greta Arwidsson, and Harald Hvarfner, Eds. Pergamon, New York, 1970. xiv + 170 pp. $8. Wenner-Gren Center International Symposium Series, vol. 13.

Principles of Surgery. Seymour I. Schwartz, David M. Hume, Richard C. Lillehei, G. Thomas Shires, Frank C. Spencer, and Edward H. Storer, Eds. McGraw-Hill, New York, 1969. Vol. 1 (xvi + 1272 pp., illus.); vol. 2 (xvi + pp. 1217–1862, illus.). Single volume edition, $24.50; 2 volume edition, $29.50.

Proceedings of the Second International

Congress of Primatology. Atlanta, Ga., 1968. Karger, Basel, 1969 (U.S. distributor, Phiebig, White Plains, N.Y.). Vol. 1, Behavior, C. R. Carpenter, Ed., xiv + 282 pp., illus. $18; vol. 2, Recent Advances in Primatology, H. O. Hofer, Ed., xiv + 226 pp., illus. $15; vol. 3, Neurology, Physiology, and Infectious Diseases, H. O. Hofer, Ed., xiv + 206 pp., illus. $15. Boxed, $40 the set.

Process Chemistry. Vol. 4. C. E. Stevenson, E. A. Mason, and A. T. Gresky, Eds. Pergamon, New York, 1970 viii + 676 pp., illus. $27. Progress in Nuclear Energy, Series 3.

Progress in High Tempertaure Physics and Chemistry. Vol. 3. Carl A. Rouse, Ed. Pergamon, New York, 1969. viii + 328 pp., illus. $14.

Psychochemical Research in Man. Methods, Strategy, and Theory. Arnold J. Mandell and Mary P. Mandell, Eds. Academic Press, New York, 1969. xxiv + 448 pp., illus. $18.50.

Radio Emission of the Sun and Planets. V. V. Zheleznyakov. Translated from the Russian edition (Moscow, 1964) by H. S. H. Massey. J. S. Hey, Ed. Pergamon, New York, 1970. xiv + 698 pp., illus. $40. International Series of Monographs in Natural Philosophy, vol. 25.

RNA-Polymerase and Transcription. Proceedings of the first international Lepetit Colloquium, Florence, November 1969. L. Silvestri, Ed. North-Holland, Amsterdam; Interscience (Wiley), New York, 1970. x + 340 pp., illus. Paper, $12.

So Human an Animal. René Dubos. Scribner, New York, 1970. xiv + 272 pp. Paper, $2.45. Lyceum Edition.

Stationary Stochastic Processes. Takeyuki Hida. Princeton University Press, Tokyo, 1970. viii + 168 pp. Paper, $3. Mathematical Notes.

Surging Glacier Conference Issue. Papers presented at two conferences: Seminar on the Causes and Mechanics of Glacier Surges, St. Hilaire, Quebec, September 1968; Symposium on Surging Glaciers, Banff, Alberta, June 1968. J. W. Ambrose, Ed. National Research Council of Canada, Ottawa, 1969. Illus. Paper, $2. Canadian Journal of Earth Sciences, vol. 6, No. 4, part 2, pp. 807–1018.

Technical Career Index. James L. Lubin. Padric, Bernardsville, N.J., 1969. 266 pp. Paper, $4.95.

Technology and the Polity. Irene Taviss and Judith Burbank. Harvard University Press, Cambridge, Mass., 1969. vi + 54 pp. Paper, $2. Harvard University Program on Technology and Society, Research Review No. 4.

Technology and Values. Irene Taviss and Linda Silverman. Harvard University Press, Cambridge, Mass., 1969. vi + 58 pp. Paper. Harvard University Program on Technology and Society, Research Review No. 3.

The Tenrecs: A Study in Mammalian Behavior and Evolution. J. F. Eisenberg and Edwin Gould. Smithsonian Institution Press, Washington, D.C., 1970 (available from the Superintendent of Documents, Washington, D.C.). vi + 138 pp., illus. $3.25. Smithsonian Contributions to Zoology, No. 27.

The Tepehuan of Chihuahua. Their Material Culture. Campbell W. Pennington. University of Utah Press, Salt Lake