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12 April 1974

Vol. 184, No. 4133

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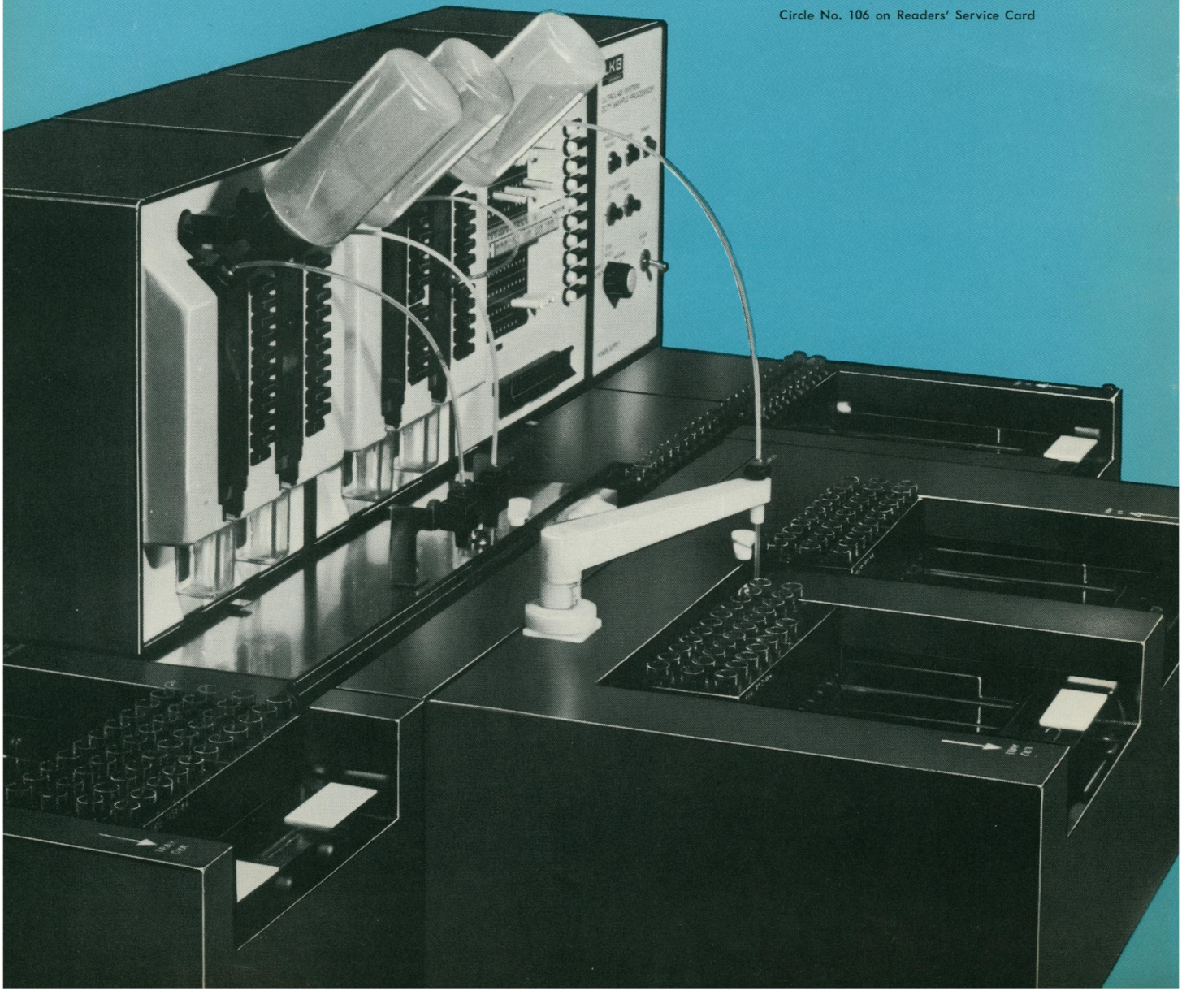

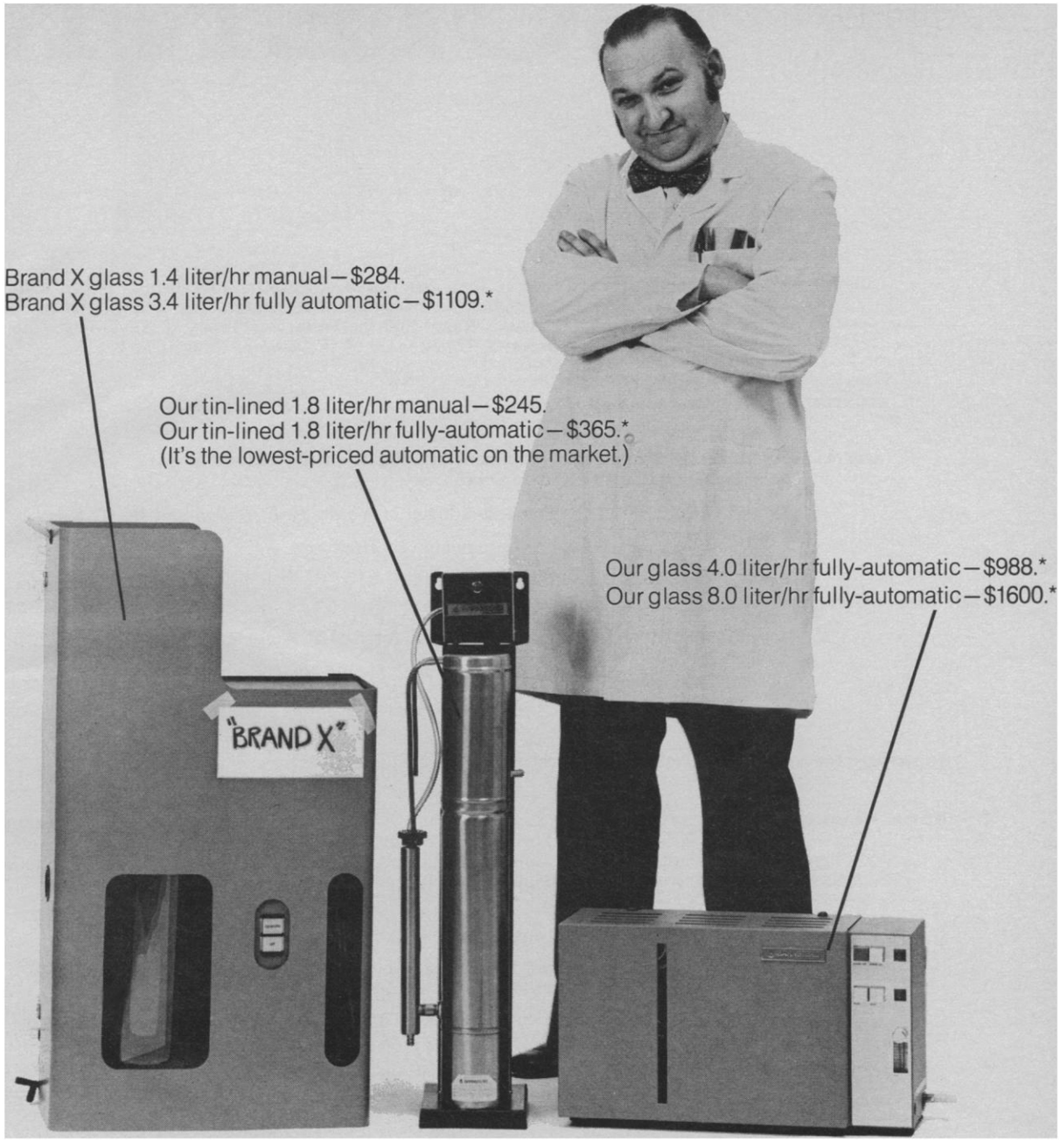

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COVER

Flock of young homing pigeons returning to their loft. The initial orientation of individual birds released under overcast skies can be altered by changing the direction of the magnetic field around their heads. See page 180. [Lee R. G. Snyder, Stanford University, Palo Alto, California]

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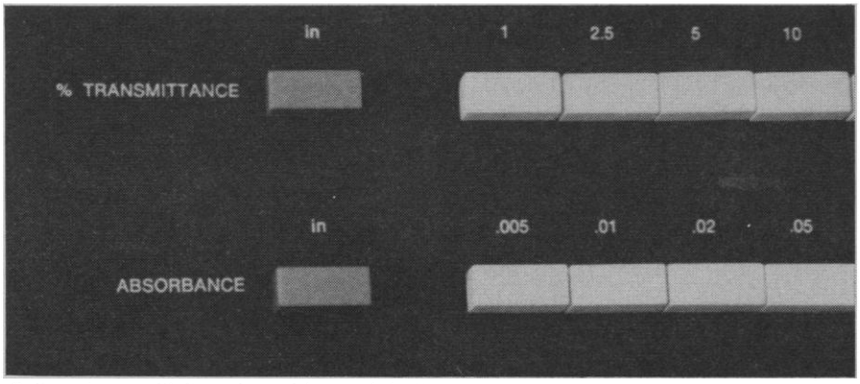

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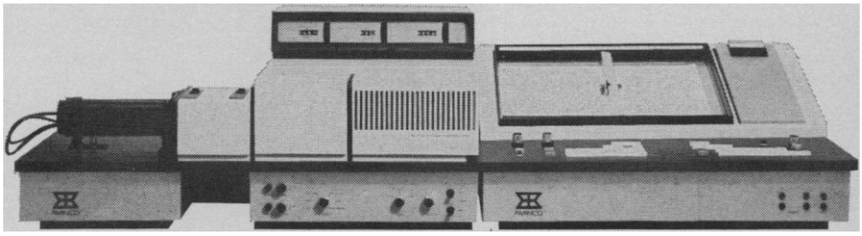

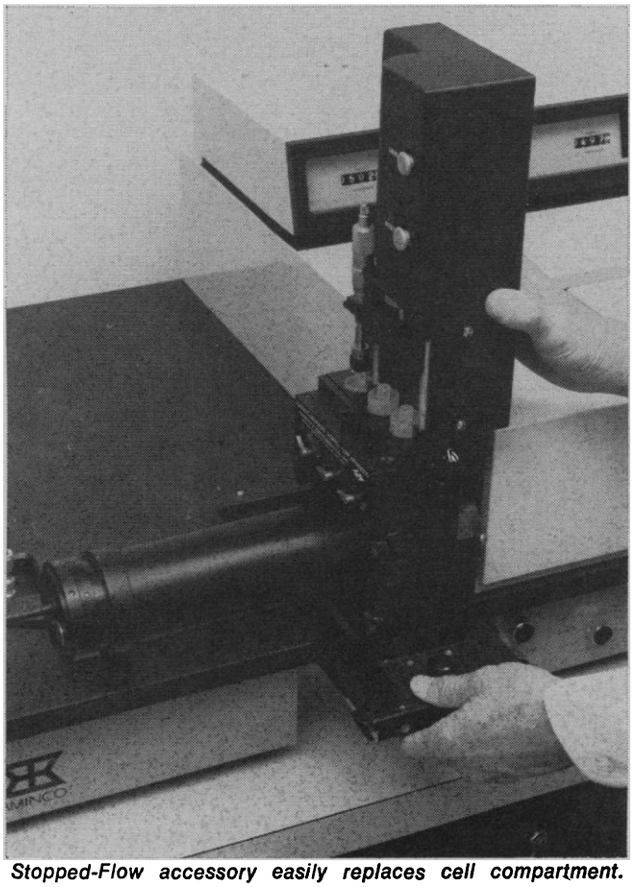

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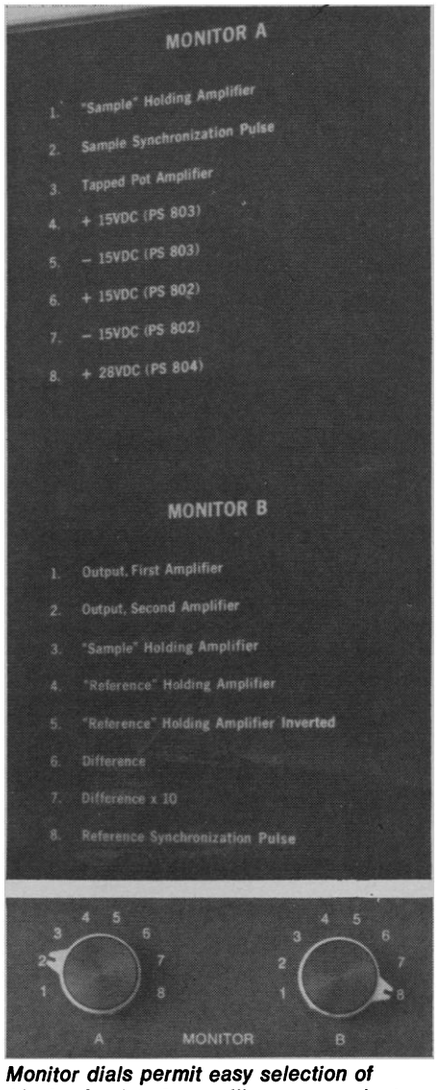

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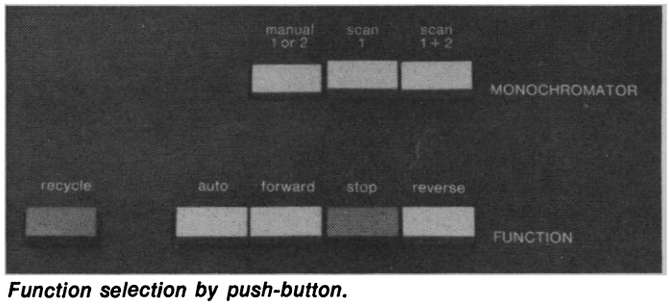

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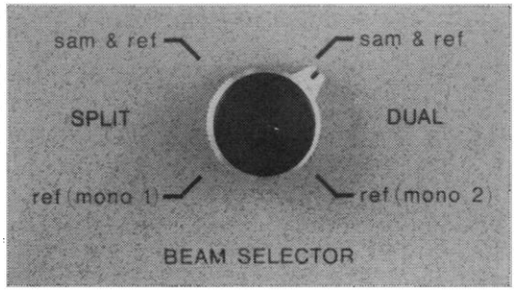

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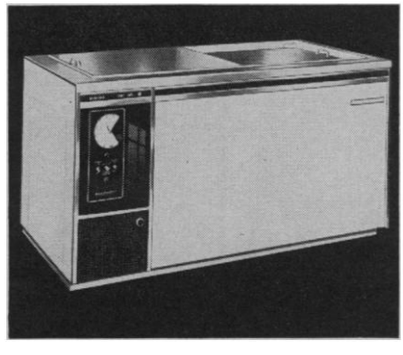

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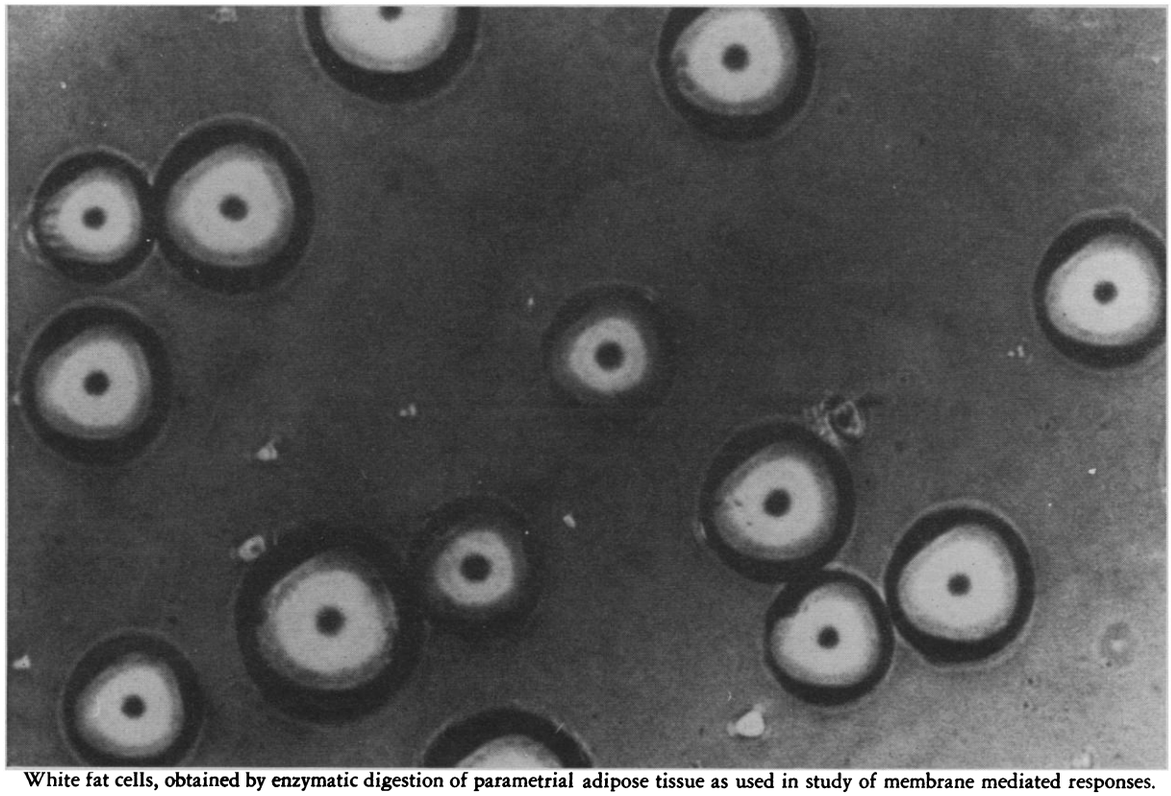

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In microbiological studies of animal cells, it often is desirable to isolate and separate the cells for further study. The researcher's need is to separate the cells from the connective and cementing materials without damaging the cells themselves.

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The enzyme mixture is named after its more unique member, *Collagenase*. Worthington supplies Collagenase in several degrees of purity ranging from crude to highly-purified; researchers have generally found that the less purified material is more effective in releasing intact cells from tissues. The effectiveness, however, seemed to differ with different tissues, and it did not always match the quantitative differences noted in our assay labs.

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The increasing use of Collagenase in cell isolation is encouraging. Credit for the program's success is due to the many researchers who cooperated so openly with their time and talent.

Your comments and interest are welcome. Additional information on this application of Collagenase and a copy of our current catalog are available on request.

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But a slip of an anonymous *New York Times* typesetter symbolizes even better the discrepancy between promise and performance during the present Administration. In the *Times* edition of 29 January 1973, a tiny box on page 1 announced a sweeping new federal science support program, details of which were to be found on an inside page. This just happened to be the obituary page. I wondered then whether this entertaining slip was Freudian or sibyllic.

In view of subsequent government steps, characterized recently by the Federated Societies of Experimental Biology as "preparing the funeral march of the National Institutes of Health," I should have been alarmed rather than amused.

GEORGE MARGOLIS
Department of Pathology,
Dartmouth Medical School,
Hanover, New Hampshire 03755

Birth Order, Family Size, and Intelligence

The relation of birth order and family size to intelligence reported in the article by Belmont and Marolla (14 Dec. 1973, p. 1096) is remarkably similar to my observations in a study of almost 800,000 National Merit scholarship participants (*1*). However, whereas Belmont and Marolla determined the relation by means of a nonverbal test (Raven Progressive Matrices), my own study indicated that the effects were probably verbal in origin. Since the data used by Belmont and Marolla also contain language scores, I hope that the relation of this variable to the nonverbal scores will also be studied.

Belmont and Marolla note that the mean score for only children does not follow a family size gradient. I have also observed this phenomenon (*2*), but I have found no adequate explanation for it. That is, if scores tend to decline with both birth order and family size, why doesn't an only child follow this same rule and thus have the highest mean score of all?

HUNTER M. BRELAND
Developmental Research Division,
Educational Testing Service,
Princeton, New Jersey 08540

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2. ———, "Birth order, family configuration, and verbal achievement," *Research Bulletin 72-47* (Educational Testing Service, Princeton, N.J., 1972).

Occam's Razor and the Watergate Tapes

In his report "Watergate tapes: Critics question main conclusions of expert panel" (News and Comment, 22 Feb., p. 732), Nicholas Wade adds his contribution to the tape decoy that has been distracting our attention toward what constitutes consciously manipulable and easily distortable "evidence" ever since Alexander Butterfield accidentally (?) revealed the presence of the tapes last July. Wade apparently supports President Nixon's public relations and legal defense staffs in their allegation that the technical experts appointed by Judge Sirica and the White House (!) may have overlooked the possibility of technical failure in the Uher 5000 recorder.

But, if we accept this "explanation" of the 18½-minute silence on that tape, then we must formulate separate explanations for each of two already missing tapes, for any tapes or tape segments that turn out to be missing or rerecorded in the future, for missing dictaphone recordings, for portions excised from documents, for missing CIA records, and so forth.

As scientists who believe with William of Occam that "entities must not be multiplied without necessity," should we not seek a more direct and elegant explanation? There are two, both formulable in terms of "sinister forces." One posits mysterious spirit beings whose actions are beyond our understanding. The other points toward self-serving human beings whose actions would be defined as "cover-up to the third power" (a cover-up of a cover-up of a cover-up).

JAMES SILVERBERG
Department of Anthropology,
University of Wisconsin, Milwaukee

Conserving Renewable Resources

Colin W. Clark (17 Aug. 1973, p. 630) presents an elucidating and useful model of how a resource with a regenerative capacity may be overexploited. He uses the Antarctic blue whale population as an example.

Regrettably, a quick reader may get the impression that Clark presents a strong mathematical argument in favor of the view that only through socialism would the world be able to avoid catastrophic overexploitation of its natural resources. The postulate of Clark's

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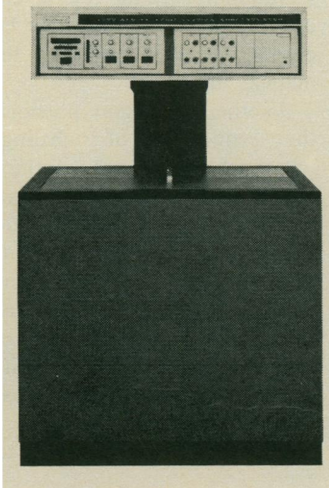

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subtitle, that depletion may result from high discount rates used by private exploiters, is unjustified. His model gives the same result irrespective of whether there is one or several private or nonprivate exploiters, provided they have the highest capital value of future net profits as their objective. To my knowledge this is the objective of most fishing fleets—whether they are operated by state agencies in socialist states or not.

However, extinction does not necessarily follow in the cases indicated in Clark's model, if the cost function is refined slightly. A major cost component in fishing whales with modern vessels is the capital cost of the vessels. This cost depends on the rate of interest (the discount rate), the depreciation time, and the initial investment. These dependencies all counteract the effect that interest and time have on the capital value of the revenue. Thus, for instance, since whale catching and factory vessels have little value without whales, extinction of the whale population would mean that depreciation of these costly vessels would occur at the same time; therefore, a quick extinction strategy may imply a drastic increase in harvesting costs, which, in particular, is important when investment decisions are made. If these capital variables are included in the harvest cost function, extinction does not, when catching is at all profitable, generally follow as the optimal strategy for the catcher, whose sole goal is the highest capital value of net profits in the future.

JÖRGEN CHRISTENSEN
Pipersgaten 3B, Stockholm K, Sweden

Clark argues that overharvesting a renewable resource leads to reduction or possibly to destruction of the supply. But, despite his application of the principle of discounted cash flow, I do not agree with his conclusion that overfishing results particularly from the operation of private (capitalist) forces.

Discounted cash flow is at best only a convenient means for expressing the time-dependent relationship among alternative uses of resources. Any operator, private or public, who has a large investment in facilities geared to a highly specialized operation and not easily translated into other channels of use, will tend to operate those facilities until the return from them approaches the direct cost of operation.

The public operator is even more likely than the private to continue beyond this point for a variety of reasons, including administrative inertia and the need to avoid labor redundancy. Further, because of his politically convenient accounting practices, it is unlikely that the public operator will really know when he is no longer covering his direct costs. Operators, public or private, when faced with a declining resource, are unlikely to view their immediate problem through the remote concept of discounted cash flow.

The foregoing has no bearing on the ethical or long-range economic desirability of striving for an international agreement to avoid the destruction or severe depletion of the blue whale. But such an agreement must stand on its own merit and, to be effective, must limit public operators as well as private.

J. V. WHIPP
C. F. Braun & Co., Ltd.,
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Both Christensen and Whipp make the valid point that the effect of discount rates is independent of the social form of management. Forests provide another example of a slow-growing resource for which the sustainable yield is highly sensitive to the rate of discount used by planners—public or private (*1*). Perhaps my article did not sufficiently stress the need to consider this effect critically. Many economists would agree that, in an imperfect world, social and private discount rates may differ significantly (*2*).

Christensen also makes a useful observation regarding capital costs. I am open to suggestion as how best to incorporate these costs into the mathematical model.

Another important phenomenon for the economics of whaling is the presence of several distinct species which are harvested in the same location. This situation is analogous to the two-prey, one-predator systems studied by ecologists. In such systems it may happen that the more productive prey species "supports" the predator population at a level high enough to eliminate the other prey species. I have argued elsewhere (*3*) that Antarctic whaling is perhaps subject to this effect.

COLIN W. CLARK
Department of Mathematics,
University of British Columbia,
Vancouver 8, Canada

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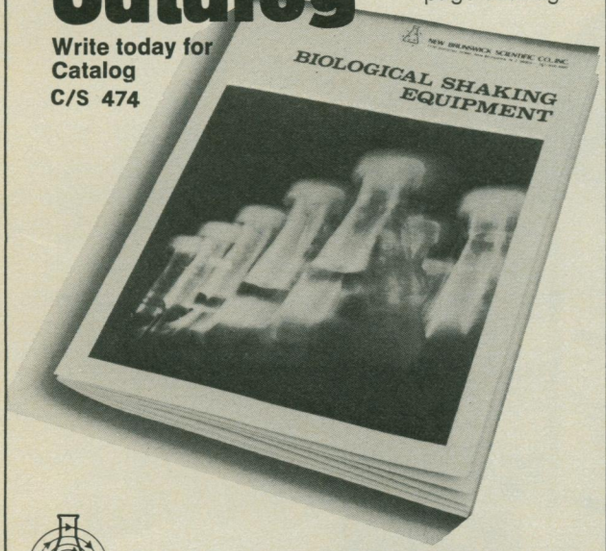

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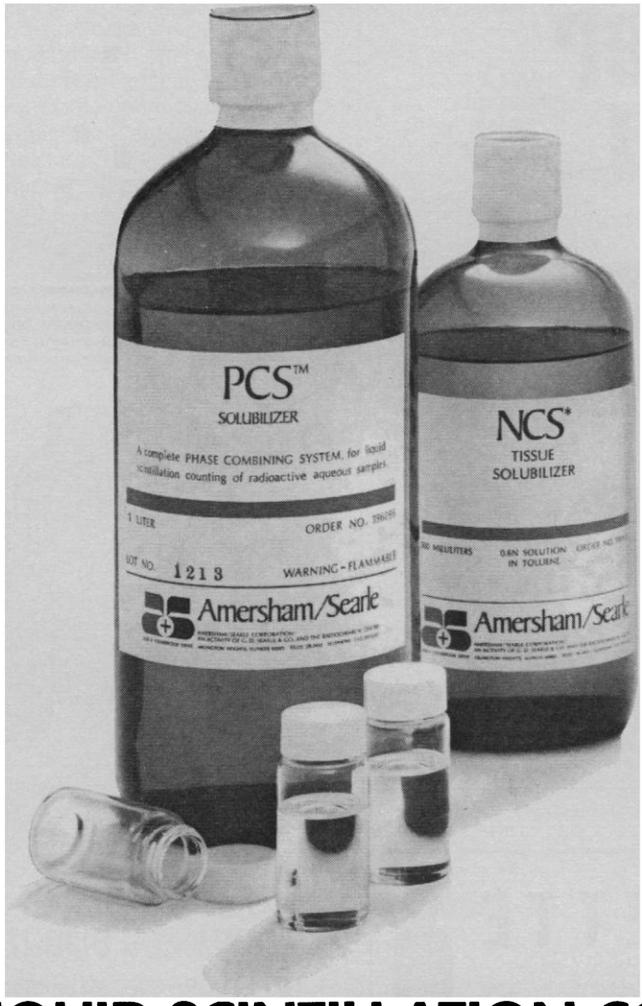

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***NCS with Spectrafluor for liquid scintillation counting NCS U.S. Patent 3,506,828**

12 April 1974, Volume 183, Number 4133 **SCIENCE**

End of the Oil Embargo

The United States has completed successfully the first phase of an adjustment to drastic changes in the cost and availability of petroleum. Statistics* covering inventories and consumption of oil and its products show that the oil embargo failed to cut supplies to a danger point. Indeed, the end of the embargo found the United States with total inventories 6 percent above those of a year ago.

Consumption of petroleum in the United States follows a cyclical pattern. During the summer, the use of gasoline is at a peak and consumption of heating oil is at a minimum. During the winter months, the opposite is true, but because of sharply enhanced consumption of heating oil, the net effect is that the months of maximum demand are December through March. In that period, consumption usually reaches a peak that is 14 to 17 percent above summer lows.

The petroleum industry builds up inventories during the summer and draws on them in the heating season. In typical recent years, total stocks have dropped from roughly 800 million barrels† to roughly 700 million barrels during the winter months.

The year 1973 was not a typical one for the oil industry. Even before the embargo, stocks were unusually small, whereas demand was sharply greater. For comparison, in early October 1970, total inventories were 777 million barrels, whereas demand was less than 14 million barrels per day. In 1973 at the corresponding time, total inventories were 743 million barrels, with demand at 17 million barrels per day. Much of the inventories is not available because it is tied up in filling pipelines, in tankers, or in process; the contrast between the 2 years is more profound than the figures show.

As suppliers of a vital commodity, the international oil companies have a responsibility to provide dependable supplies and to maintain a sufficient inventory to meet contingencies, but the companies had failed to build adequate reserves in this country. Thus the Arab embargo was applied at a time when it could have maximum effect. It came when the ratio of inventory to demand was unusually low and just before the heavy consumption of the heating season.

When the embargo was announced, consumption was at a rate about 9 percent above that of the previous year. Had normal patterns been allowed to persist, the United States would have experienced disruptive shortages. The country was spared extreme hardship by reason of a fortunate combination of factors: (i) for the first 2 months after its start, the embargo leaked substantially; (ii) the public responded well to pleas for conservation—only toward the end of the embargo did part of the people press the panic button over gasoline shortages; (iii) the weather was milder than average; and (iv) after a long period of fumbling, the federal government finally chose an effective energy czar, William Simon. His program has produced annoyance and criticism, but it has worked. During the crucial months of January and February, when the embargo was fully effective, total inventories dropped from 759 to 710 million barrels; the usual seasonal decrease is 60 to 70 million barrels. Gasoline stocks rose about 9 percent, which is about the usual increase during that period.

In summary, the embargo was ineffective. The United States discovered that it could live with a 15 percent curtailment in consumption without great hardship. With the advent of spring and a resumption of large-scale oil imports, the public will resume some of its energy-consuming habits. But we have shared a dramatic experience, and life will not be quite the same again.—PHILIP H. ABELSON

* Published in the *Oil and Gas Journal*. † One barrel is equal to 42 gallons or 159 liters.

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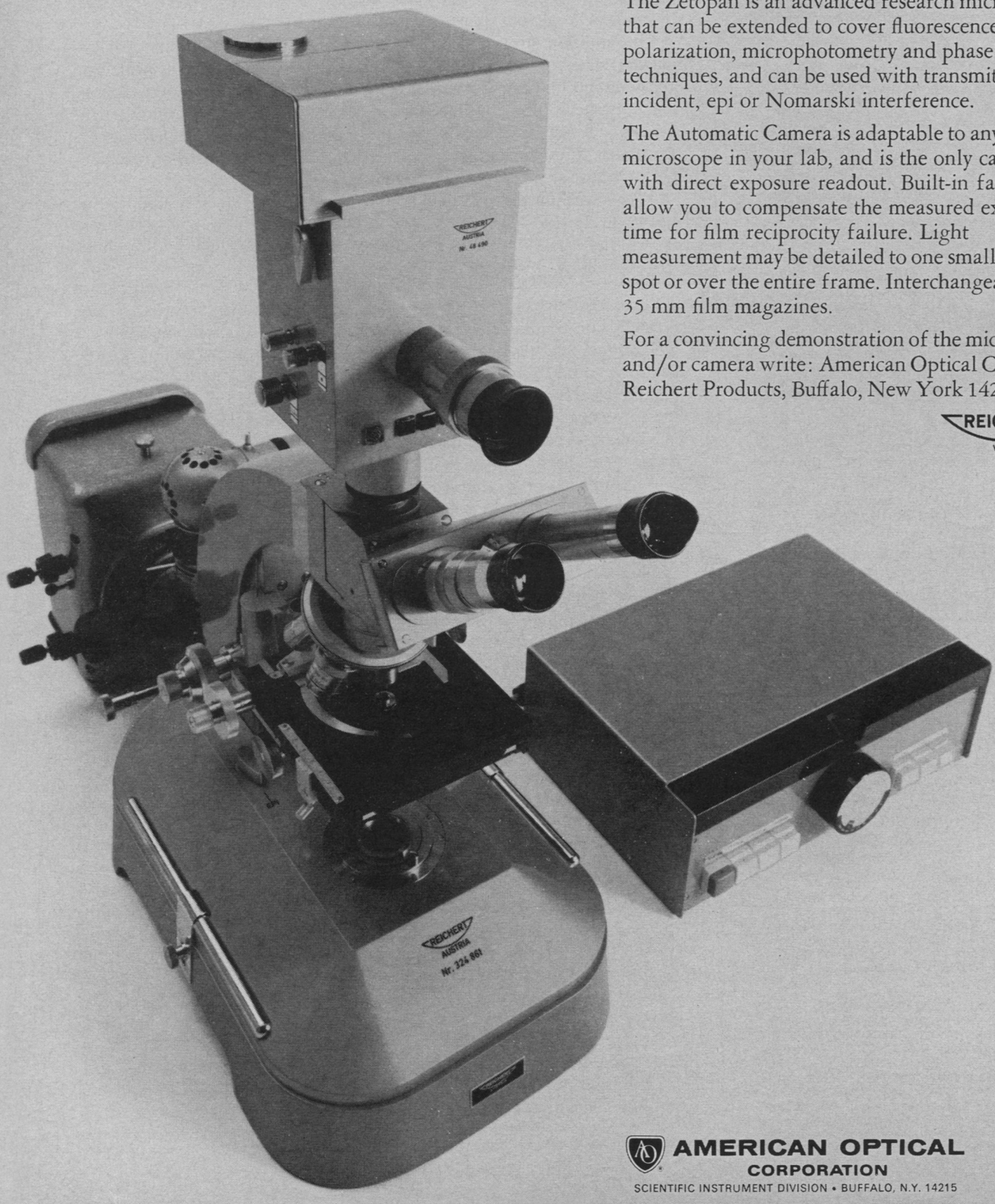

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A verbal montage of the state of science in the 70's

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First St., SW, Rochester, Minn. 55901)

19–23. American **Urological** Assoc., St. Louis, Mo. (R. J. Hannigan, AVA, 1120 N. Charles St., Baltimore, Md. 21201)

19–23. National Conf. on **Social Welfare**, 101st annual, Natl. Assoc. of Social Workers, Council on Social Work Education, and American Public Welfare Assoc., Cincinnati, Ohio. (M. E. Berry, NCSW, 22 W. Gay St., Columbus, Ohio 43215)

19–24. **Mass Spectrometry and Allied Topics**, 22nd annual conf. American Soc. for Mass Spectrometry, Philadelphia Pa. (F. E. Saalfeld, Naval Research Lab., Code 6110, Washington, D.C. 20375)

19–25. American **Gastroenterological** Assoc., San Francisco, Calif. (C. B. Slack, 6900 Grove Rd., Thorofare, N.J. 08086)

20–22. **Aerospace Electronics** Conf., Inst. of Electrical and Electronic Engineers, Dayton, Ohio. (IEEE Dayton Office, 124 E. Monument Ave., Dayton 45402)

20–22. **Physical Therapy Chest** Symp., Inst. of Rehabilitation Medicine, New York, N.Y. (J. Goodgold, Room RR 617, IRM, 400 E. 34 St., New York 10016)

20–22. American Soc. for **Quality Control**, 28th Boston, Mass. (R. W. Shearman, ASQC, Room 6197, 161 W. Wisconsin Ave., Milwaukee, Wis. 53203)

20–23. **Biology of Cytoplasmic Microtubules**, New York Acad. of Sciences, New York. (G. R. Gruber, NYAS, 2 E. 63 St., New York 10021)

20–25. World Congr. on the **Prevention of Occupational Accidents and Diseases**, 7th, Natl. Industrial Safety Organisation, Intern. Social Security Assoc., and Intern. Labour Office, Dublin, Ireland. (P. J. Reynolds, Ansley House, Dublin 4)

21–22. Society for **Information Display**, San Diego, Calif. (V. J. Fowler, GTE Labs. Inc., 40 Sylvan Rd., Waltham, Mass. 02154)

21–22. Society for **Surgery of the Alimentary Tract**, San Francisco, Calif. (R. Zeppa, P.O. Box 875, Biscayne Annex, Miami, Fla. 33152)

21–24. American Inst. of **Industrial Engineers**, New Orleans, La. (J. F. Jericho, AIIE, 25 Technology Park/Atlanta, Norcross, Ga. 30071)

21–24. New Hampshire **Medical** Soc., New Castle. (H. S. Putnam, 4 Park St., Concord, N.H. 03301)

22–23. National **Fire Protection** Assoc., Miami, Fla. (NFPA, 60 Batterymarch St., Boston, Mass. 02110)

22–24. American Inst. of **Chemists**, Kansas City, Mo. (J. L. Hickson, AIC, 7315 Wiscinsin Ave., Washington, D.C. 20014)

22–24. **Compliance with Therapeutic Regimens**, Hamilton, Ont., Canada. (D. L. Sackett, Room 3H2, McMaster Univ. Medical Centre, 1200 Main St. W., Hamilton L8S 4J9)

22–24. International Symp. on **Rating of Nonmetallic Inclusion in Bearing Steels**, American Soc. for Testing and Materials, Boston, Mass. (H. Hamilton, ASTM, 1916 Race St., Philadelphia, Pa. 19103)

22–25. American **Proctologic** Soc., Washington, D.C. (H. Gibson, APS, 320 W. LaFayette, Detroit, Mich. 48226)

23–25. American **Gynecological** Soc., Hot Springs, Va. (T. N. Evans, 275 E. Hancock, Detroit, Mich. 48201)

23–26. Canadian **Otolaryngological** Soc., Toronto, Ont. (T. D. R. Briant, COS, Box 8244, Ottawa, Ont. K1G 3H7)

26–31. International Assoc. for the **Prevention of Blindness** and the Intern. Organization against **Trachoma**, Paris, France. (A. Dubois Poulson, 8 Ave. Leseueur, 75007 Paris)

26–1. American Assoc. on **Mental Deficiency**, Toronto, Ont., Canada. (G. Soloyanis, AAMD, 5201 Connecticut Ave., NW, Washington, D.C. 20015)

28–30. International Symp. on **Intestinal Absorption and Malabsorption**, Lexington, Ky. (T. Z. Csaky, Dept. of Pharmacology, Univ. of Kentucky Medical Center, P.O. Box 24, Lexington 40506)

28–30. Massachusetts **Medical** Soc., Boston. (T. Gephart, 22 The Fenway, Boston 02215)

28–31. International **Microwave Power Inst.** Symp., 9th, Inst. of Electrical and Electronics Engineers, Milwaukee Chapter of the Microwave Theory and Techniques Group and Electron Devices Group, Milwaukee, Wis. (T. K. Ishii, Marquette Univ., 1515 W. Wisconsin Ave., Milwaukee 53233)

29–31. **Effects of the Energy Shortage on Transportation Balance**, intern. symp., Pennsylvania Transportation Center, Federal Highway Administration, U.S. Dept. of Transportation, University Park, Pa. (L. W. Joiner, Research Bldg. B, U.S. Dept. of Transportation, University Park 16802)

29–31. **Frequency Control** Symp., 28th annual, U.S. Army Electronics Technology and Devices Lab., Atlantic City, N.J. (J. R. Vig, U.S. Army Electronics Command, AMSEL-TL-MF, Fort Monmouth, N.J. 07703)

29–2. International Congr. of **Cytology**, 5th, Miami Beach, Fla. (A. Meisels, ICC, 1050 Chemin Ste. Foy, Quebec 6, P.Q., Canada)

30–1. Association for the **Care of Children in Hospitals**, 9th annual, Chicago, Ill. (M. Sice, Recreational Therapy Dept., Children's Memorial Hospital, 2300 Children's Plaza, Chicago 60614)

31–2. International Soc. for the **History of Behavioral and Social Sciences**, 6th annual, Durham, N.H. (R. B. Evans, Dept. of Psychology, Conant Hall, Univ. of New Hampshire, Durham 03824)

31–2. South Dakota State **Medical** Assoc., Aberdeen. (R. D. Johnson, 711 N. Lake Ave., Sioux Falls, S.D. 57104)

June

1–10. Southern Pacific **Medical** Soc., Moorea, Tahiti. (C. K. Leiske, 1125 Cherry Ave., Long Beach, Calif. 90813)

2–3. Medical **Contact Lens**, 3rd intern. symp., Lyons, France (G. P. Halberg, 40 W. 77 St., New York 10024)

2–5. Society of **Professional Well Log Analysts**, 15th, McAllen, Tex. (E. R. Blakeman, Superior Oil Co., Houston, Tex. 77001)

2–6. **Industrial and Commercial Power Systems Conf.**, Inst. of Electrical and Electronics Engineers, Denver, Colo. (Office of Technical Activities Board, IEEE, 345 E. 47 St., New York 10017)

2–6. **Medical Library** Assoc., San Antonio, Tex. (J. S. LoSasso, MLA, Suite 3208, 919 N. Michigan Ave., Chicago, Ill. 60611)

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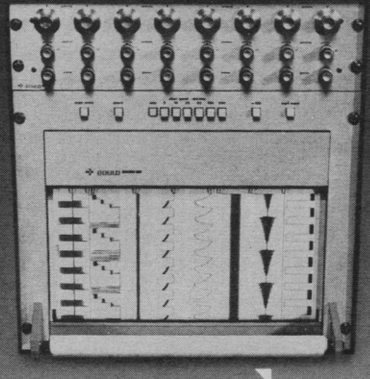

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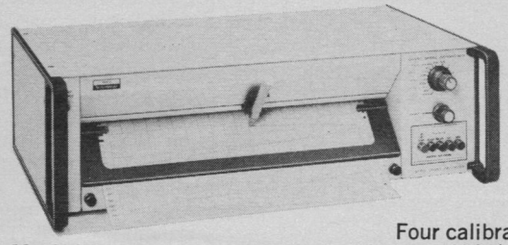

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2–7. American Soc. of **Biological Chemists**, Minneapolis, Minn. (R. A. Harte, ASBC 9650 Rockville Pike, Bethesda, Md. 20014)

2–7. **Biophysical** Soc., Minneapolis, Minn. (M. O. Dayhoff, Natl. Biomedical Research Foundation, Georgetown Univ. Medical Center, 3900 Reservoir Rd., NW, Washington, D.C. 20007)

3–5. **Oral Biology**, 6th intern. conf., Intern. Assoc. for Dental Research, Toronto, Canada. (A. R. Frechette, IADR, 211 E. Chicago Ave., Chicago 60611)

3–6. **Immunology**, 4th intern. conf., Immune System and Infectious Diseases, Buffalo, N.Y. (F. Milgrom, Dept. of Microbiology, State Univ. of New York, Buffalo 14214)

3–7. **Human Factors in Health Care and Technology** Conf., Scientific Affairs Div. of the North Atlantic Treaty Organization, Lisbon, Portugal. (R. M. Pickett, Bolt, Beranek and Newman, Inc., 50 Moulton St., Cambridge, Mass. 02138)

4–7. National Conf. on **Measurements of Laser Emissions for Regulatory Purposes**, Div. of Electronic Products, Bureau of Radiological Health, Food and Drug Administration, and Dept. of Health, Education, and Welfare, Rockville, Md. (R. W. Peterson, Chief, Electro-Optics Branch, Div. of Electronic Products, Bureau of Radiological Health (RH-220), 5600 Fishers Lane, Rockville 20852)

5–6. Symposium on the **Toxicity of Metals**, Industrial Health Foundation, Pittsburgh, Pa. (IHF, 5231 Centre Ave., Pittsburgh 15232)

5–7. International Conf. on **Submillimeter Waves and Their Applications**, Inst. of Electrical and Electronics Engineers, Atlanta, Ga. (E. Taylor, Massachusetts Inst. of Technology, Cambridge 02139)

6–7. **Geodesy/Solid-Earth and Ocean Physics**, 7th conf., American Geophysical Union, Defense Mapping Agency, Natl. Aeronautics and Space Administration, Natl. Oceanic and Atmospheric Administration, Ohio State Univ. Dept. of Geodetic Science, and U.S. Geological Survey, Columbus, Ohio. (AGU, 1707 L St., NW, Washington, D.C. 20036)

6–7. **Indepth Study of Non-Human Primates**, Delaware Valley and Metropolitan New York Branches of the American Assoc. for Laboratory Animal, East Brunswick, N.J. (W. H. Mitchell, Products for Animal Management, P.O. Box 70, New Britain, Pa. 18901)

6–7. **Role of Immunological Factors, Infectious, Allergic and Autoimmune Processes**, 8th Miles intern symp., Miles Labs., Inc., Baltimore, Md. (E. G. Bassett, Miles Labs., Inc., Elkhart, Ind. 46514)

6–9. Association for the **Psychophysiological Study of Sleep**, 14th annual, Jackson Hole, Wyo. (D. Foulkes, Univ. of Wyoming, Box 3291, University Station 82071)

6–12. International **Theriological** Congr., American Soc. of Mammalogists, Moscow, U.S.S.R. (R. S. Hoffmann, Committee on Intern. Relations, ASM, Museum of Natural History, Univ. of Kansas, Lawrence 66045)

7–10. Society of **Biological Psychiatry**, Boston, Mass. (I. F. Small, Larue D. Carter Memorial Hospital., 1315 W. 10 St., Indianapolis 46202)

7–10. Society for **Economic Botany**, East Lansing, Mich. (H. G. Wilkes, Biology Dept., College II, Univ. of Massachusetts, Boston 02125)

9–11. American Assoc. of **Petroleum Geologists**, Rocky Mountain Section, Casper, Wyo. (W. H. Curry III, P.O. Box 3001, Casper 82601)

9–12. Society for **Developmental Biology**, 33rd annual, Athens, Ga. (W. S. Badman, SDB, P.O. Box 502, Kalamazoo, Mich. 49005)

9–12. **Public Health Hazards of Viruses in Water**, American Public Health Assoc., Mexico City, D.F. (N. R. Bernstein, APHA, 1015 18th St., NW, Washington, D.C. 20036)

9–13. **Special Libraries** Assoc., Toronto, Ont., Canada. (F. E. McKenna, SLA, 235 Park Ave., S, New York 10003)

9–14. **Geothermal Energy** Conf., Engineering Foundation, Pacific Grove, Calif. (EF, 345 E. 47 St., New York 10017)

10–11. **Microanalysis with the Scanning Electron Microscope** Conf., EMventions Microanalysis Lab., Rockville, Md. (J. M. Wehrung, EML, 2351 Shady Grove Rd., Rockville 20850)

10–12. Conference on **Laboratory Instruction in Chemistry**, Intern. Union of Pure and Applied Chemistry, Troy, N.Y. (R. L. Strong, Dept. of Chemistry, Rensselaer Polytechnic Inst., Troy 12181)

10–12. American **Neurological** Assoc., 99th annual, jointly with Assoc. of British Neurologists, Boston, Mass. (S. A. Trufant, Cincinnati General Hospital, Cincinnati, Ohio 45229)

10–13. **Quantum Electronics**, 8th intern. conf., American Inst. of Physics and the Inst. of Electrical and Electronics Engineers, San Francisco, Calif. (D. Edgar, Courtesy Associates, Suite 700, 1629 K St., NW, Washington, D.C. 20006)

10–14. **Mathematical Research Conf. on Special Functions**, Natl. Science Foundation, Blacksburg, Va. (J. A. Cochran, Dept. of Mathematics, Virginia Polytechnic Inst. and Virginia Univ., Blacksburg 24061)

11–13. **Astronomical Soc. of the Pacific**, Bishop, Calif. (L. E. Salanave, ASP, 75 Southgate Ave., Daly City. Calif, 94015)

11–14. **Electrodynamics of Substorms and Magnetic Storms**, American Geophysical Union, Bayse, Va. (AGU, 1707 L St., NW, Washington, D.C. 20036)

11–14. **Endangered and Threatened Species of North America**, Wild Canid Survival and Research Center, Washington, D.C. (WCSRC, Wolf Sanctuary, P.O. Box 16204, St. Louis, Mo. 63105)

11–14. American Soc. of **Mechanical Engineers**, New Orleans, La. (R. B. Finch, ASME, 345 E. 47 St., New York 10017)

11–14. Society of **Nuclear Medicine**, San Diego, Calif. (M. Glos, SNM, 305 E. 45 St., New York 10017)

12–14. **Endocrine** Soc., Atlanta, Ga. (M. M. Branch, Suite 319, 1411 Classen Blvd., Oklahoma City, Okla. 73106)

12–14. International **Microwave** Symp., Inst. of Electrical and Electronics Engineers, Atlanta, Ga. (E. B. Joy, School of Electrical Engineering, Georgia Inst. of Technology, Atlanta 30332)

12–14. Canadian **Psychological** Assoc., 35th annual, Windsor, Ont. (M. Bunt, Univ. of Windsor, Windsor II, Ont.)

12–14. Society of **Research Administra-**

tors, Northeastern section, New York, N.Y. (L. Lasker, New York Medical College, Fifth Ave. at 106 St., New York 10029)

12–15. **Analysis of Lipids and Lipoproteins**, American Oil Chemists' Soc., Washington, D.C. (E. G. Perkins, Dept. of Food Science, Burnsides Research Lab., Univ. of Illinois, Urbana)

12–24. **Adaptability of the Cardiac Muscle**, International Soc. of Cardiology, Prague, Czechoslovakia. (F. Kolbel, Third Clinic for Internal Medicine, Unemocnice 1, 120 00 Prague 2)

13–15. Midwestern Conf. of **Parasitologists**, annual, Ann Arbor, Mich. (J. H. Greve, Dept. of Veterinary Pathology, Iowa State Univ., 50010)

13–16. Society of **Biological Psychiatry**, Boston, Mass. (I. F. Small, 1315 W. 10 St., Indianapolis, Ind. 46202)

16–19. International **Communications** Conf., Inst. of Electrical and Electronics Engineers, Minneapolis, Minn. (A. Cohen, Inst. of Technology, Univ. of Minnesota, Minneapolis 55455)

16–20. Canadian **Anesthetists** Soc., St. John's, Newfoundland. (CAS, 178 St. George St., Toronto, Ont., M5R 2M7)

16–20. **Medicinal Chemistry**, 14th symp., American Chemical Soc., Durham, N.H. (R. E. Lyle, Dept. of Chemistry, Parson Hall, Univ. of New Hampshire, Durham 03824)

16–20. **Photochemistry Conf. Honoring Prof. Francis E. Blacet**, Nashville, Tenn. (T. W. Martin, Box 1506/B, Vanderbilt Univ., Nashville 37235)

16–21. American Inst. of **Biological Sciences**, Tempe, Ariz. (J. R. Olive, AIBS, 3900 Wisconsin Ave., NW, Washington, D.C. 20016)

16–21. **Botanical** Soc. of America, Tempe, Ariz. (B. F. Palser, Dept. of Botany, Rutgers Univ., New Brunswick, N.J. 08903)

16–21. American **Fern** Soc., Tempe Ariz. (T. R. Webster, Biological Sciences Group, Univ. of Connecticut, Storrs 06268)

16–21. International Conf. on **Microscopy**, McCrone Research Inst., Chicago, Ill. (W. C. McCrone, 2820 S. Michigan Ave., Chicago 60616)

16–21. **Mycological** Soc. of America, Tempe, Ariz. (C. T. Rogerson, New York Botanical Garden, Bronx, N.Y. 10458)

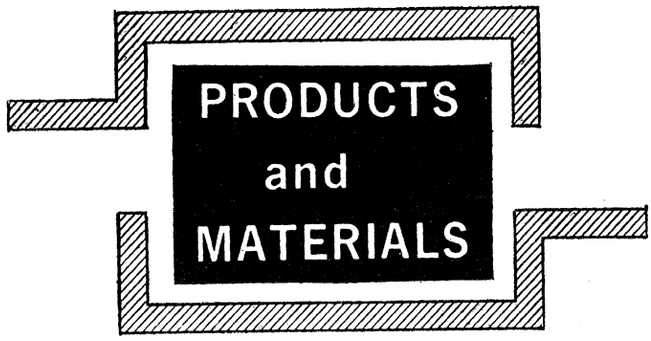
16–21. American Soc. of **Plant Taxonomists**, Tempe, Ariz. (D. E. Stone, Dept. of Botany, Duke Univ., Durham, N.C. 27706)

16–21. American **Rheumatism** Assoc., Toronto, Ont., Canada (L. Bonfiglio, ARA, 1212 Ave. of the Americas, New York 10036)

16–22. World Confederation for **Physical Therapy**, 7th intern. congr., Montreal, P.Q., Canada. (WCPT, Brigray House 20/22, Mortimer St., London W.1, England)

16–24. American **Physical Therapy** Assoc., Montreal, P.Q., Canada. (R. Noland. APTA, 1156 15th St., NW, Washington, D.C. 20005)

17–19. **Recent Advances in the Analytical Chemistry of Pollutants**, 4th symp., American Chemical Soc. and U.S. Environmental Protection Agency, Basle, Switzerland. (D. M. Hercules, Dept. of Chemistry, Univ. of Georgia, Athens 30602)



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An articulated light guide is available for attachment to lasers. It consists of modular mirror holders and rotating tubes and provides a flexible pathway for directing laser light and optical viewing fields. The optical axis of the assembly corresponds to the axis of rotation to maintain the light beam in the center of the guide system. Length and bore of the units are optional. Standard mirrors are front-surface, multiple-layer mirrors with high reflectivity at specified wavelengths. Space Sciences Division, Whittaker Corporation. Circle No. 132 on Readers' Service Card.

Contact Angle Analyzer

Studies of surface properties such as surface treatment, roughness, effect of additives, printability, and adhesion are facilitated with a new contact angle analyzer. The model includes a drop generator that controls drop size with high precision. The device is a table-top projector with wide-angle optics. A tungsten-halogen light source is equipped with a dichroic filter to remove heat. The image of the liquid drop in contact with the surface studied is projected at 40× on a frosted screen that has a protractor scale and etched horizontal and vertical scales. Imass, Incorporated. Circle No. 133 on Readers' Service Card.

Optical Emission Spectrometer

The model 310 optical emission spectrometer rapidly analyzes ferrous or nonferrous alloys and reads directly in percent concentration. Model 310 employs cylindrical mirrors to sample discharge for all wavelengths. The focal length is 1.5 meters and the capacity is up to 60 photomultiplier tubes. The available spectral range is from 1900 to 9000 angstrom units. The standard readout is on a cathode-ray tube console in digital form. Options include a teletypewriter printout and interfacing and fully computerized operation. Labtest Equipment Company. Circle No. 135 on Readers' Service Card.

Literature

Aminco Laboratory News (spring 1974 issue) features studies of applications and uses of the company's products on site and new product descriptions. American Instrument Company. Circle No. 136 on Readers' Service Card.

Pharmacia Systems for Column Chromatography illustrates modular systems for chemical analysis including the chromatograph, columns, flow adapters, valves, connectors reservoirs, mixers and pumps. Pharmacia Fine Chemicals. Circle No. 141 on Readers' Service Card.

Fourier Transform Analyzers (SAI-470) lists features, concepts, principles of operation and specifications of this signal analyzing device. Signal Analysis Operation, Test Instrument Division, Honeywell, Incorporated. Circle No. 143 on Readers' Service Card.

ABEM Geophysical Instruments is a short catalog for mining, hydro, civil engineering, and exploitation geophysics including seismic apparatus. Atlas Copco ABEM AB. Circle No. 140 on Readers' Service Card.

FMI Lab Pumps describes a line of valveless, variable, and reversible pumps for handling solutions, suspensions, slurries, and gases in the laboratory. Fluid Metering, Incorporated. Circle No. 144 on Readers' Service Card.

Newly offered instrumentation, apparatus, and laboratory materials of interest to researchers in all disciplines in academic, industrial, and government organizations are featured in this space. Emphasis is given to purpose, chief characteristics, and availability of products and materials. Endorsement by *Science* or AAAS is not implied. Additional information may be obtained from the manufacturers or suppliers named by circling the appropriate number on the Readers' Service Card (see pages 122A and 186C) and placing it in the mailbox. Postage is free.—RICHARD G. SOMMER

BOOKS RECEIVED

(*Continued from page 153*)

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Nuclear Physics. M. G. Bowler. Pergamon, New York, 1973. xii, 420 pp., illus. $18. International Series of Monographs in Natural Philosophy, vol. 53.

Organic Reactions. Vol. 20. William G. Dauben and nine others, Eds. Wiley, New York, 1973. xii, 494 pp., illus. $22.50.

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