Microcalorimetry Techniques: Applications to Cellular Systems

Techniques and results of microcalorimetric investigations of cellular systems were discussed at a meeting held 9 through 11 July 1973, at the Chemical Center, Lund University, Sweden. Special emphasis was given to clinical applications. It was attended by 40 scientists with widely varying backgrounds and specialties. Chemists, microbiologists, cell biologists, biochemists, clinical chemists, physicians, and makers of calorimeters were present.

The application of thermal measurements to the study of cellular systems and to clinical applications is a relatively new and expanding field whose development has been made possible by the availability of simply constructed, sensitive, and reliable microcalorimeters.

Of the most immediate clinical application was the report of a calorimetric method for the diagnosis of systemic lupus erythematosus. By means of a test based on increased heat production during leukocyte phagocytosis accompanying this disease, 14 out of 15 positive cases and the majority of subjects in the probable and possible diagnostic categories were identified.

A calorimetric procedure for the rapid identification and typing of bacteria in urine was described. This fall the procedure will become part of a hospital's routine testing program.

The greatest number of investigators are working with human erythrocytes. The rate of heat production during the resting state of the red cell has been determined in three different laboratories with good agreement among them. The possibility of using microcalorimetry for the diagnosis of various forms of anemia, including sickle cell disease, is being explored. There was considerable discussion about the effects of the methods of storage and handling of blood cells upon thermal measurements of those cells. It appears that significant studies on the aging of cells might be made calorimetrically.

The calorimetric technique is very well suited for the study of reactions occurring at cell surfaces. Investigations of the binding of lectins to lymphocytes and the action of thrombin on human blood platelets were described. The thermal phenomena accompanying the release of histamine from sensitized mast cells has been utilized to quantitatively determine the inhibitory effect of various drugs.

The very general nature of the mea-

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surement of heat makes calorimetry applicable to a wide variety of experimental situations. Thus, work on samples of skin, biopsy material, muscle, and cells grown in tissue culture was reported. An interesting reference was made to an in vivo study of the rate of heat production accompanying human muscle contraction in which significant differences were found between normal and hypothyroid subjects.

As indicated by this brief report, the range of subjects suitable for microcalorimetric measurements is vast. The technique is definitely in its early stages of development, but already appears to be capable of producing significant results, both in fundamental science and in useful practical applications for clinical medicine.

PHILIP D. Ross Laboratory of Molecular Biology, National Institute of Arthritis, Metabolism, and Digestive Diseases, National Institutes of Health, Bethesda. Maryland 20014

Forthcoming Events

February

13-14. Industrial Solvents Symp., Industrial Health Foundation, Pittsburgh, Pa. (IHF, 5231 Centre Ave., Pittsburgh 15232)

13-15. Conference on Biological Effects of Electromagnetic Radiation, New York Acad. of Sciences, New York, N.Y. (G. R. Gruber, NYAS, 2 E. 63 St., New York 10021)

13-15. Society of Photographic Scientists and Engineers, Houston, Tex. (R. H. Wood, SPSE, 1330 Massachusetts Ave., NW, Washington, D.C. 20005) 13-15. International Solid State Cir-

13-15. International Solid State Circuits Conf., Inst. of Electrical and Electronic Engineers, Philadelphia, Pa. (Office of Technical Activities Board, IEEE, 345 E. 47 St., New York 10017)

13-16. American Acad. of Forensic Sciences, Dallas, Tex. (H. L. Kimball, P.O. Box 302, New Hartford, Conn. 06057)

13-16. National Assoc. of Medical Examiners, Dallas, Tex. (W. G. Ecker, Laboratory, St. Francis Hospital, Wichita, Kan. 67214)

14-16. Society of University Surgeons, St. Louis, Mo. (E. W. Fonkalsrud, Dept. of Surgery, Univ. of California Medical Center, Los Angeles 90024)

14-18. American Group Psychotherapy Assoc., New York, N.Y. (M. Keefe, AGPA, 1865 Broadway, New York 10023)

15-20. Biofeedback Research Soc., 5th annual mtg., Colorado Springs, Colo. (F. Butler, Dept. of Psychiatry, #202, Univ.



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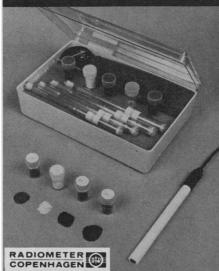


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19-23. American College of Surgeons, San Juan, P.R. (S. H. Fromm, 117 San Pedro, Urb. Horizon, Rio Piedras, P.R. 00926)

20-23. Society of Professors of Education, Chicago, Ill. (R. E. Bayles, School of Education, Atlanta Univ., Atlanta, Ga. 30314)

21–23. Texas Junior College Teachers Assoc., San Antonio. (G. Burrier, TJCTA, South Plains College, Levelland, Tex. 79336)

23-28. American Inst. of Mining, Metallurgical and Petroleum Engineers, Dallas, Tex. (J. B. Alford, AIMMPE, 345 E. 47 St., New York 10017)

24-26. Canadian Ceramic Soc., Montreal, P.Q. (H. L. Taylor, Suite 110, 2175 Sheppard Ave., Willowdale, Ont., Canada)

24-27. American Assoc. of Community and Junior Colleges, Washington, D.C. (AACJC Housing Bureau, 1129 20th St., NW, Washington, D.C. 20036)

24-28. Medical Soc. of the State of New York, New York. (H. I. Fineberg, 420 Lakeville Rd., Lake Success, N.Y. 11040)

24-1. American Association for the Advancement of Science, annual mtg., San Francisco, Calif. (E. Zeutschel, AAAS Meetings Office, 1515 Massachusetts Ave., NW, Washington, D.C. 20005)

25-26. National Conf. on New Systems in Health and Welfare Management, New York, N.Y. (R. E. Gitelman, Dept. W-37, Div. of Business and Management, New York Univ., 600 Third Ave., New York 10016)

25-27. Physical Electronics Conf., 34th annual, American Physical Soc., Murray Hill, N.J. (H. D. Hagstrum, Bell Labs., 600 Mountain Ave., Murray Hill 07974)

25-2. American Nature Study Soc., San Francisco, Calif. (B. McKnight, Faculty of Education, State University College, New Paltz, N.Y. 12561)

26-28. Flow Measurements as Related to National Needs Conf., Mechanics Div., Inst. for Basic Standards, and Natl. Bureau of Standards, Gaithersburg, Md. (L. K. Irwin, Mechanics Div., Physics Bldg. B214, Natl. Bureau of Standards, Washington, D.C. 20234)

26-28. Industrial Pharmacy, 13th intern. conf., Univ. of Texas College of Pharmacy, Univ. of Texas Pharmacy Extension Service, and Federal Food and Drug Administration, Lake Travis, near Austin. (J. A. Bardin, Pharmacy Extension Service, Pharmacy Bldg. 101, Univ. of Texas, Austin 78712)

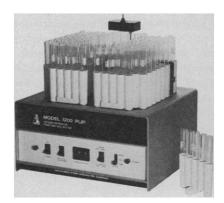
26-1. Climatic Impact Assessment Program, 3rd conf., U.S. Dept. of Transportation, Cambridge, Mass. (E. F. Rice, Code AMR, Transportation Systems Center, Kendall Sq., Cambridge 02142)

26-1. Symposium on Fundamental Cancer Research, 27th, Houston, Tex. (J. Brandenberg, M. D. Anderson Hospital and Tumor Inst., Houston 77025)

27-2. Association for Children with Learning Disabilities, 11th annual intern. conf., Houston, Tex. (L. I. Lock, ACLD, 2200 Brownsville Rd., Pittsburgh, Pa. 15210)

27-2. Pediatric Neurology and Neurosurgery, intern. mtg., Mexico City, Mexi-

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March

1-3. Student American Medical Assoc., Dallas, Tex. (C. C. Hewitt, 1400 Hicks Rd., Rolling Meadows, Ill. 60008)

1-8. American Soc. of Clinical Pathologists, Los Angeles, Calif. (J. Graves, Intersociety Committee on Pathology Information, Inc., 9650 Rockville Pike, Bethesda, Md. 20014)

2-6. California Medical Assoc., San Francisco. (R. L. Thomas, 693 Sutter St., San Francisco 94102)

3-9. Noah Worcester Dermatological Soc., Marco Island, Fla. (H. Poltnick, 1553 Woodward, Detroit, Mich. 48226)

4-6. Electrostatic and Electromagnetic Confinement of Plasmas and the Phenomenology of Relativistic Electron Beams Conf., New York Acad. of Sciences, Atomic Energy Commission, and Leonardo Acad. of Sciences, New York, N.Y. (G. R. Gruber, NYAS, 2 E. 63 St., New York 10021)

4-8. Medical Data Processing Symp., French Inst. for Research in Information and Automation, Toulouse. (E. E. Van Brunt, Project Chief, Medical Data System, Medical Methods Research, 3779 Piedmont Ave., Oakland, Calif. 94611)

5. Computerized Laboratory Systems Symp. American Soc. for Testing and Materials, Cleveland, Ohio. (J. B. Wheeler, ASTM, 1916 Race St., Philadelphia, Pa. 19103)

6-7. Conference on Use of Wastewater in the Production of Food and Fiber, Oklahoma City, Okla. (R. L.-R. Carpenter, Oklahoma State Dept. of Health, NE 10th and Stonewall, Oklahoma City 73105)

7-8. American Psychopathological Assoc., 64th annual, Boston, Mass. (J. Cole, Boston State Hospital, 591 Morton St., Boston 02124)

7-9. Central Surgical Assoc., Cincin-nati, Ohio. (A. J. Walt, 540 E. Canfield Ave., Detroit, Mich. 48201)

8-11. Acupuncture and Chinese Medicine, 2nd world symp., San Francisco, Calif. (J. Kao, Managing Editor, American Journal of Chinese Medicine, P.O. Box 555, Garden City, N.Y. 11530)

9-12. American Assoc. of Pathologists and Bacteriologists, San Francisco, Calif. (A. J. French, 1335 E. Catherine St., Ann Arbor, Mich. 48104)

9-16. International Acad. of Pathology, San Francisco, Calif. (L. D. Stoddard, Medical College of Georgia, Augusta 30902)

10-14. International Anesthesia Research Soc., 48th congr., San Francisco, Calif. (B. B. Sankey, 3645 Warrensville Center Rd., Cleveland, Ohio 44122) 10-14. Society of Toxicology, Wash-ington, D.C. (R. A. Scala, Medical Re-

search Div., Esso Research and Engineering Co., Linden, N.J. 07036)

10-15. American Soc. of Photogrammetry, St. Louis, Mo. (L. P. Jacobs, 105 N. Virginia Ave., Falls Church, Va. 22046)

11-14. American Soc. of Neurochemistry, 5th annual, New Orleans, La. (S.

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11-15. Symposium on Isotope Techniques in Groundwater Hydrology, Intern. Atomic Energy Agency, Vienna, Austria. (J. H. Kane, Office of Information Services, U.S. Atomic Energy Commission, Washington, D.C. 20545)

12-14. National Federation of Abstracting and Indexing Services, Chicago, Ill. (S. Keenan, NFAIS, 3401 Market St., Philadelphia, Pa. 19104)

13. Symposium on Sickle Cell Anemia and Other Hemoglobinopathies—Teaching Day in Hematology, Research Foundation of the State Univ. of New York, Brooklyn, N.Y. (B. Kearney, Box 20, Downstate Medical Center, 450 Clarkson Ave., Brooklyn 11203)

13-15. American Acad. of Occupational Medicine, San Francisco, Calif. (J. M. MacMillan, Reynolds Metals Co., P.O. Box 27003, Richmond, Va. 23261)

15-19. National Science Teachers Assoc., Chicago, Ill. (R. H. Carleton, NSTA, 1201 16th St., NW, Washington, D.C. 20036)

17-20. American Assoc. of **Dental** Schools, Atlanta, Ga. (B. F. Miller, AADS, 1625 Massachusetts Ave., NW, Washington, D.C. 20036)

18-22. Lunar Science Conf. 5th, NASA Johnson Space Center and Lunar Science Inst., Houston, Tex. (LSI, 3303 NASA Rd. 1, Houston 77058)

20-22. International Topical Conf. on Tetrahedrally Bonded Amorphous Semiconductors, Yorktown Heights, N.Y. (M. H. Brodsky, IBM Corp., T. J. Watson Research Center, Yorktown Heights, 10598)

21-22. Symposium on the **Preventabil**ity of Perinatal Injury, Natl. Foundation-March of Dimes, New York, N.Y. (Coordinator, SPPI, NF-MD, 315 Park Ave., S., New York 10010)

21-23. Florida Acad. of Sciences, Orlando. (I. Foster, Eckert College, St. Petersburg, Fla.)

21-23. Mississippi Acad. of Sciences, Biloxi. (C. L. Dodgen, University Medical Center, Jackson, Miss. 39216)

21–24. International Assoc. for **Dental Research**, North American Div., Atlanta, Ga. (A. R. Frechette, IADR, 211 E. Chicago Ave., Chicago, Ill. 60611)

22-23. Michigan Acad. of Science, Arts and Letters, East Lansing. (D. Stokes, 1006 Rackham Bldg., Univ. of Michigan, Ann Arbor 48104)

25-26. State Medical Soc. of Wisconsin, Milwaukee. (E. R. Thayer, Box 1109, Madison, Wis. 53701)

25–28. American College of **Surgeons**, Houston, Tex. (E. W. Gerrish, ACS, 55 E. Erie St., Chicago, Ill. 60611)

25-28. Institute of Electrical and Electronics Engineers, New York, N.Y. (D. G. Fink, IEEE, 345 E. 47 St., New York 10017)

25-29. Molecular Biology and Mechanisms of Virus Disease, winter confs., Intern. Chemical and Nuclear Corp. and the Univ. of California at Los Angeles, Squaw Valley, Calif. (Conf. Office, Virus Research, c/o Dept. of Bacteriology, Univ. of California, Los Angeles 90024)

26-27. Reducing Fuel Consumption and Emissions by Combustion Modifications, Central States Section, Combustion Inst., Madison, Wis. (G. Borman, Univ. of Wisconsin, 1513 University Ave., Madison 53706)

26–29. American Astronomical Soc., Lincoln, Neb. (H. M. Gurin, AAS, 211 FitzRandolph Rd., Princeton, N.J. 08540) 26–29. National Atomic and Molecular

Physics Conf., 6th, Inst. of Physics, Swansea, England. (Meetings Officer, IP, 47 Belgrave Sq., London, SW1X 8QX, England)

27. American Soc. of Clinical Oncology, Houston, Tex. (A. Evans, Children's Hospital of Philadelphia, 1740 Bainbridge St., Philadelphia 19146)

27-29. Nuclear Structure and High Energy Physics Conf., Inst. of Physics, Glasgow, Scotland. (IP, 47 Belgrave Sq., London, SW1X 8QX, England)

27-29. Textile Research Inst., 44th annual, New York, N.Y. (TRI, 601 Prospect Ave., P.O. Box 625, Princeton, N.J. 08540)

28–29. American Board of Medical Specialties, Chicago, Ill. (J. C. Nunemaker, Suite 1160, 1603 Orrington, Evanston 60201)

28-30. American Assoc. for **Cancer Research**, 65th annual, Houston, Tex. (H. J. Creech, AACR, Inst. for Cancer Research, Fox Chase, Philadelphia, Pa. 19111)

28-30. South Carolina Acad. of Science, Hartsville. (J. M. Barry, College of General Studies, Univ. of South Carolina, Columbia 29208)

29-30. New England **Bioengineering** Conf., 2nd annual, American Soc. of Engineering Education and the Inst. of Electrical and Electronics Engineers, Worcester, Mass. (R. A. Peura, Worcester Polytechnic Inst., Worcester 01609)

29-31. American Psychosomatic Soc., 31st, Philadelphia, Pa. (D. Oken, 265 Nassau Rd., Roosevelt, N.Y. 11575) 29-31. Seismological Soc. of America,

29-31. Seismological Soc. of America, Las Vegas, Nev. (W. K. Cloud, SSA, P.O. Box 826, Berkeley, Calif. 94701)

29-31. National Wildlife Federation, Denver, Colo. (T. L. Kimball, NWF, 1412 16th St., NW, Washington, D.C. 20036)

29-3. American Soc. of Abdominal Surgeons, Las Vegas, Nev. (B. F. Alfano, 675 Main St., Melrose, Mass. 02176)

30-4. Gas Turbine Conf., American Soc. of Mechanical Engineers, Zurich, Switzerland. (M. Churchill, ASME, 345 E. 47 St., New York 10017)

31-3. International Soc. for Experimental Hematology, 3rd, Houston, Tex. (J. J. Trentin, Div. of Experimental Biology, College of Medicine, Texas Medical Center, Houston 77025)

31-5. American College of Physicians, New York, N.Y. (E. C. Rosenow, Jr., 4200 Pine St., Philadelphia, Pa. 19104)

April

1-2. Synchrotron Radiation and Its Applications to the Analysis of Problems in Scientific Investigation Conf., Inst. of Physics, Reading, England. (Meetings Officer, IP, 47 Belgrave Sq. London, SW1X 8QX, England)

1-3. American Assoc. of **Petroleum** Geologists, San Antonio, Tex. (T. L. Bear, Bear & Kistler, 1052 W. 6 St., Los Angeles, Calif. 90017)

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1-3. Society of Economic Paleontologists and Mineralogists, San Antonio, Tex. (R. Tener, Box 979, Tulsa, Okla. 74101) 1-4. American Assoc. of Anatomists, Cleveland, Ohio. (J. E. Pauly, Univ. of Arkansas, School of Medicine, Little Rock 72201)

1-4. Industrial Water and Pollution Conf., Water and Wastewater Equipment Manufacturers Assoc., Detroit, Mich. (R. C. Hughes, WWEMA, 744 Broad St., Newark, N.J. 07102)

1-4. Geochemical Exploration, 5th intern. symp., Vancouver, B.C., Canada. (J. J. Barakso, Mineral Environment Labs. Lud., 705 W. 15 St., North Vancouver)

1-5. International Symp. on Advances in Polymer Friction and Wear, American Chemical Soc., Los Angeles, Calif. (L.-H. Lee, Wilson Center of Technology, Xerox Corp., Webster, N.Y. 14580)

1-5. Farm and Agricultural Industries, 11th intern. conf., Intern. Commission of Agriculture and Food Industries and the Greek Chemists' Assoc., Athens. (L. de Saint Rat, ICAFI, 24, rue de Teheran, 75008 Paris, France)

1-5. American College of Radiology, New Orleans, La. (W. C. Stronach, ACR, 20 N. Wacker Dr., Chicago, Ill. 60606)

2-4. Fast Reactor Safety Conf., American Nuclear Soc., Beverly Hills, Calif. (J. B. Moore, Southern California Edison, P.O. Box 800, Rosemead, Calif. 91770)

2-4. Mechanical Properties of Materials at High Rates of Strain, Inst. of Physics, Oxford, England. (J. Harding, Dept. of Engineering Science, Parks Rd., Oxford, OX1 3PJ)

2-5. American Astronomical Soc., Palo Alto, Calif. (J. Veverka, Center for Radiophysics and Space Research, Space Sciences Bldg., Cornell Univ., Ithaca, N.Y. 14850)

2-5. American College Health Assoc., Dallas, Tex. (J. W. Dilley, 2807 Central St., Evanston, Ill. 60201)

3-4. National Conf. on New Systems in Health and Welfare Management, Chicago, Ill. (R. E. Gitelman, Dept. W-37, Div. of Business and Management, New York Univ., 600 Third Ave., New York 10016)

Univ., 600 Third Ave., New York 10016) 3-4. Railroad Conf., American Soc. of Mechanical Engineers and Inst. of Electrical & Electronics Engineers, Pittsburgh, Pa. (E. K. Farrelly, Port Authority of New York and New Jersey, World Trade Center, New York 10047)

3-4. Metal Semiconductor Contacts Conf., Inst. of Physics, Manchester, England. (Meetings Officer, IP, 47 Belgrave Sq., London, SW1X 8QX, England)

3-5. American Soc. for Artificial Internal Organs, Chicago, Ill. (K. K. Burke, ASA10, Box 777, Boca Raton, Fla. 33432)

3-7. International Union of Angiology Congr., 9th, Florence, Italy. (F. Pratesi, Via della Robbia 5, Florence 50132)

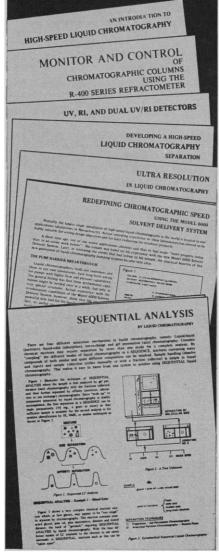
4-7. American Fertility Soc., Miami, Fla. (H. H. Thomas, 1801 Ninth Ave., S. Birmingham, Ala. 35205)

4-7. Missouri State Medical Assoc., Kansas City. (R. McIntyre, P.O. Box 1028, Jefferson City, Mo. 65101)

5-6. Alabama Acad. of Science, Birmingham. (D. Costes, Science Dept., Troy State Univ., Troy 36081)

5-6. American Burn Assoc., Cincinnati,

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7-10. Conference on Environmental Acoustics, American Soc. for Testing and Materials, Columbus, Ohio. (J. McFadden, ASTM, 1916 Race St., Philadelphia, Pa. 19103)

7-12. American Assoc. of **Immunologists**, Atlantic City, N.J. (H. Metzger, AAI, 9650 Rockville Pike, Bethesda, Md. 20014)

7-12. American **Physiological** Soc., Atlantic City, N.J. (R. G. Daggs, APS, 9650 Rockville Pike, Bethesda, Md. 20014)

8-10. Engineering Aspects of Magnetohydrodynamics Symp., Tullahoma, Tenn. (Y. C. L. Wu, Energy Conversion Research Div., Univ. of Tennessee Space Inst., Tullahoma 37388)

8-11. European Sleep Research Soc., 2nd congr., Rome, Italy. (W. P. Koella, Ciba-Geigy AG, K 125/1109, 4002 Basel, Switzerland)

8-12. American Soc. for Experimental Pathology, Atlantic City, N.J. (G. B. Mider, ASEP, 9650 Rockville Pike, Bethesda, Md. 20014)

8-12. International Symp. on Wound Healing, Rotterdam, Netherlands. (Secretary, Holland Organizing Centre, 16 Lange Voorhout, The Hague, Netherlands)

8-12. American **Orthopsychiatric** Assoc., San Francisco, Calif. (M. F. Langer, AOA, 1790 Broadway, New York 10019)

8-12. American Soc. for Pharmacology and Experimental Therapeutics, Atlantic City, N.J. (E. B. Cook, ASPET, 9650 Rockville Pike, Bethesda, Md. 20014)

9-11. Thin Films, 8th conf., Inst. of Physics, Sussex, England. (Meetings Officer, IP, 47 Belgrave Sq., London, SW1X 8QX, England)

9-13. James Ewing Soc., Honolulu, Hawaii. (A. S. Ketcham, Clinical Center 10N116, Natl. Cancer Inst., Bethesda, Md. 20014)

9-14. Conference on Industrial Problems in Source Sampling and Monitoring, Engineering Foundation, Pacific Grove, Calif. (EF, 345 E. 47 St., New York 10017)

10-13. Tennessee Medical Assoc., Gatlinburg. (J. E. Ballentine, TMA, 112 Louise Ave., Nashville, Tenn. 37203)

11-13. Southern Soc. for Philosophy and Psychology, Tampa, Fla. (M. Loeb, Psychology Dept., Univ. of Louisville, Louisville, Ky. 40208)

11-13. American Assoc. of Physical Anthropologists, Amherst, Mass. (G. J. Armelagos, Dept. of Anthropology, Univ. of Massachusetts, Amherst 01002)

12. Utah Acad. of Sciences, Arts, and Letters, Salt Lake City. (H. Buchanan, Dept of Botany, Weber State College, Ogden, Utah 84403)

12-13. Colorado-Wyoming Acad. of Science, Laramie, Wyo. (J. T. Windell, Dept. of Biology, Univ. of Colorado, Boulder 80302)

14. Conference on Structure and Cognition: The Mutual Relevance of Structural Anthropology and Cognitive Anthropology, Geneseo, N.Y. (G. Erchak, Dept. of Anthropology, State University of New York College at Geneseo, Geneseo 14454)

15–17. Rocky Mountain Bioengineering

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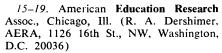
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and the Intern. Biomedical Sciences Instrumentation, 11th annual jointly, Instrument Soc. of America, Colorado Springs, Colo. (C. D. Ferris, Office of the Dean, Univ. of Wyoming, College of Engineering, Box 3295, Laramie 82070)

15-17. American Assoc. of **Planned Parenthood Physicians**, Memphis, Tenn. (G. Covington, AAPPP, 810 Seventh Ave., New York 10019)

15-17. Society of Head and Neck Surgeons, Honolulu, Hawaii. (W. A. Maddox, 944 S. 18 St., Birmingham, Ala. 35205)

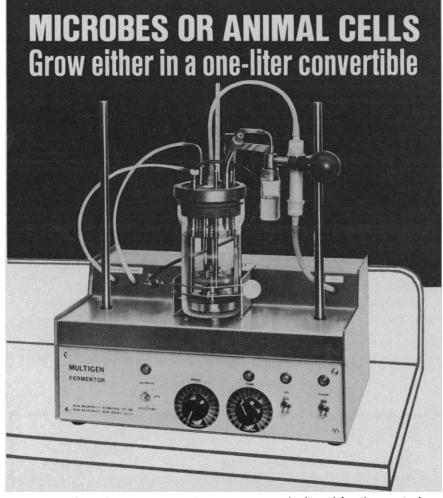
15-18. Pharmacology of Thermoregulation, 2nd intern. symp., Paris, France. (P. Lomax, Dept. of Pharmacology, Univ. of California Medical School, Los Angeles 90024)



15-20. National Council of Teachers of Mathematics, Atlantic City, N.J. (J. D. Gates, NCTM, 1201 16th St., NW. Washington, D.C. 20036)

16-18. Optical and Acoustical Micro-Electronics, 23rd intern. symp., Inst. of Electrical and Electronics Engineers and Optical Soc. of America, New York, N.Y. (J. Fox, Polytechnic Inst. of Brooklyn, 333 Jay St., Brooklyn, N.Y. 11201)

16-18. Technology of Controlled Nuclear Fusion Conf., American Nuclear Soc., San Diego, Calif. (G. R. Hopkins, Gulf General Atomic, P.O. Box 608, San Diego 92112)



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16-21. American College of Allergists, Paris, France. (E. Bauers, 2100 Dain Tower, Minneapolis, Minn. 55402)

17-18. American Geriatrics Soc., Toronto, Ont., Canada. (E. Henderson, AGS, Room 1470, 10 Columbus Circle, New York 10019)

17-20. International **Communication** Assoc., New Orleans, La. (M. Z. Sincoff, Center for Communication Studies, Ohio Univ., Athens, Ohio 45201)

18-19. Pennsylvania Acad. of Science, Bloomsburg. (G. C. Shoffstall, Jr., 214 Whitmore Lab., Pennsylvania State Univ., University Park 16802)

18-20. American Cleft Palate Assoc., Boston, Mass. (G. R. Smiley, School of Dentistry, Univ. of North Carolina, Chapel Hill 27514)

18–20. Eastern **Psychological** Assoc., Philadelphia, Pa. (M. Benimoff, Dept. of Psychology, Glassboro State College, Glassboro, N.J. 08028)

18-20. Association for the Advancement of Medical Instrumentation, 9th annual, New Orleans, La. (J. Skillin, Suite 417, AAMI, 1500 Wilson Blvd., Arlington, Va. 22209)

18-20. Population Assoc. of America, New York, N.Y. (J. W. Brackett, Box 14182, Benjamin Franklin Sta., Washington, D.C. 20044)

19. Kansas Acad. of Science, Pittsburg. (L. C. Anderson, Div. of Biology, Kansas State Univ., Manhattan 66506)

19–20. Nebraska Acad. of Sciences, Lincoln. (C. B. Schultz, 212 Morrill Hall, Univ. of Nebraska, Lincoln 68508)

20-22. American Acad. of Facial Plastic and Reconstructive Surgery, Palm Beach, Fla. (C. N. Patterson, 1110 W. Main St., Durham, N.C. 27701)

20-25. Pahlavi Medical Congr., 5th, Shiraz, Iran. (A. K. Amir-Jahed, Dept. of Surgery, Pahlavia Univ., Shiraz)

21-24. International Assoc. for Dental Research, (North American Div.), Atlanta, Ga. (A. R. Frechette, IADR, 211 E. Chicago Ave., Chicago 60611)

21-24. International Symp. on Circuits and Systems Theory, Inst. of Electrical and Electronics Engineers, San Francisco, Calif. (O. Chau, Dept. of Electrical Engineering, Computer Science, Univ. of California, Berkeley 94720)

21-25. Oral Surgery, 5th intern. conf., Madrid, Spain. (J. Rud, Royal College of Surgeons, Lincoln's Inn Field, London, WC2A 3PN, England)

21-25. American **Radium** Soc., Maui, Hawaii. (F. N. Rutledge, Univ. of Texas, M. D. Anderson Hospital and Tumor Inst., Texas Medical Center, Houston 77025)

22-24. Institute of Management Sciences, Boston, Mass. (M. R. DeMelim, IMS, 146 Westminster St., Providence, R.I. 02903)

22-24. International Symp. on Circuits and Systems, Inst. of Electrical and Electronics Engineers and Circuits and Systems Soc., San Francisco, Calif. (IEEE, Inc. 345 E. 47 St., New York 10017)

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