SCIENCE

12 October 1973

Vol. 182, No. 4108

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

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The LKB Ultrolab Diluter is one of the fastest and most accurate diluters on the market. It will siphon up a preset volume of a sample liquid and flush it out with a preset volume of a reagent at a rate of up to 1200 times an hour.

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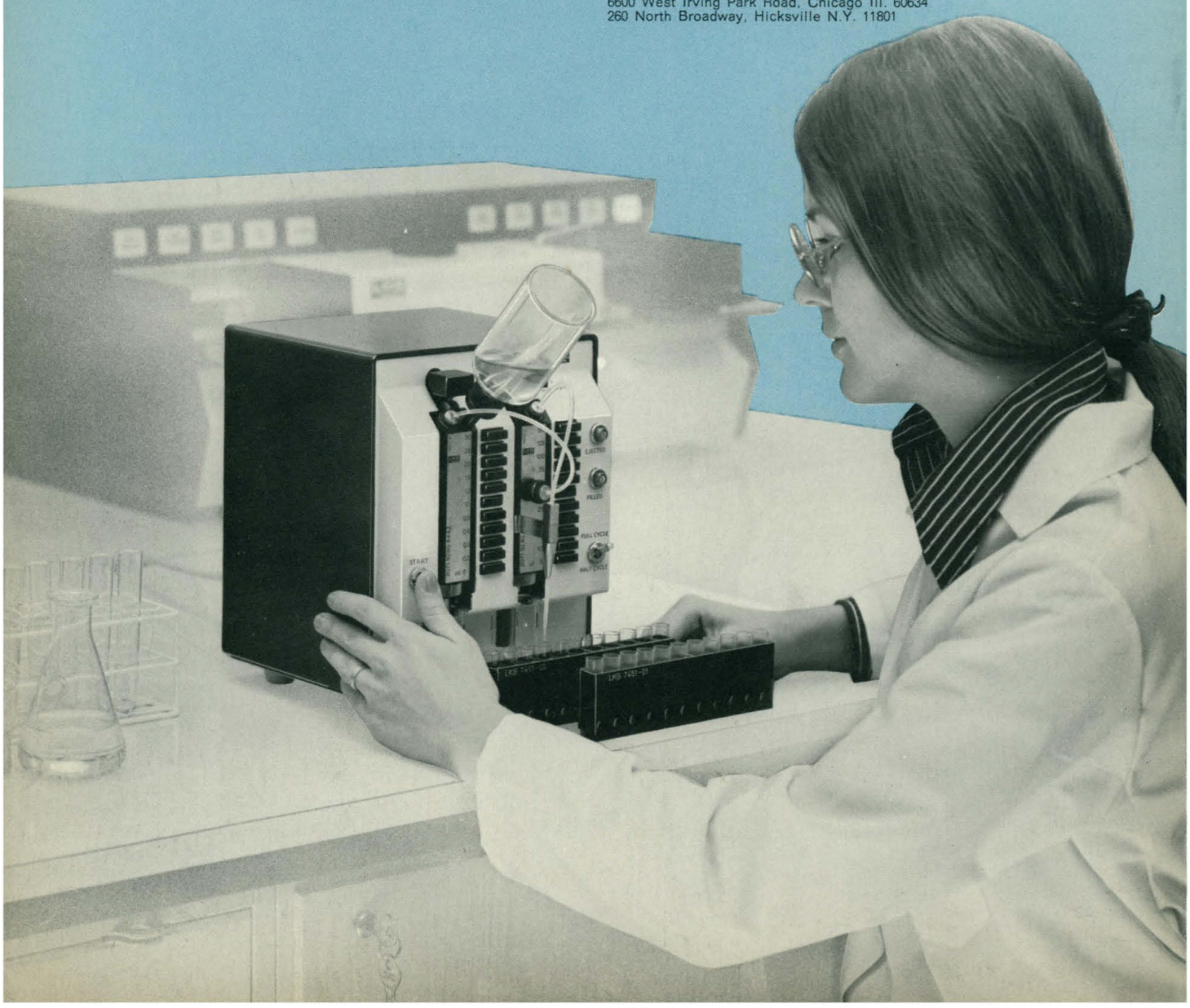
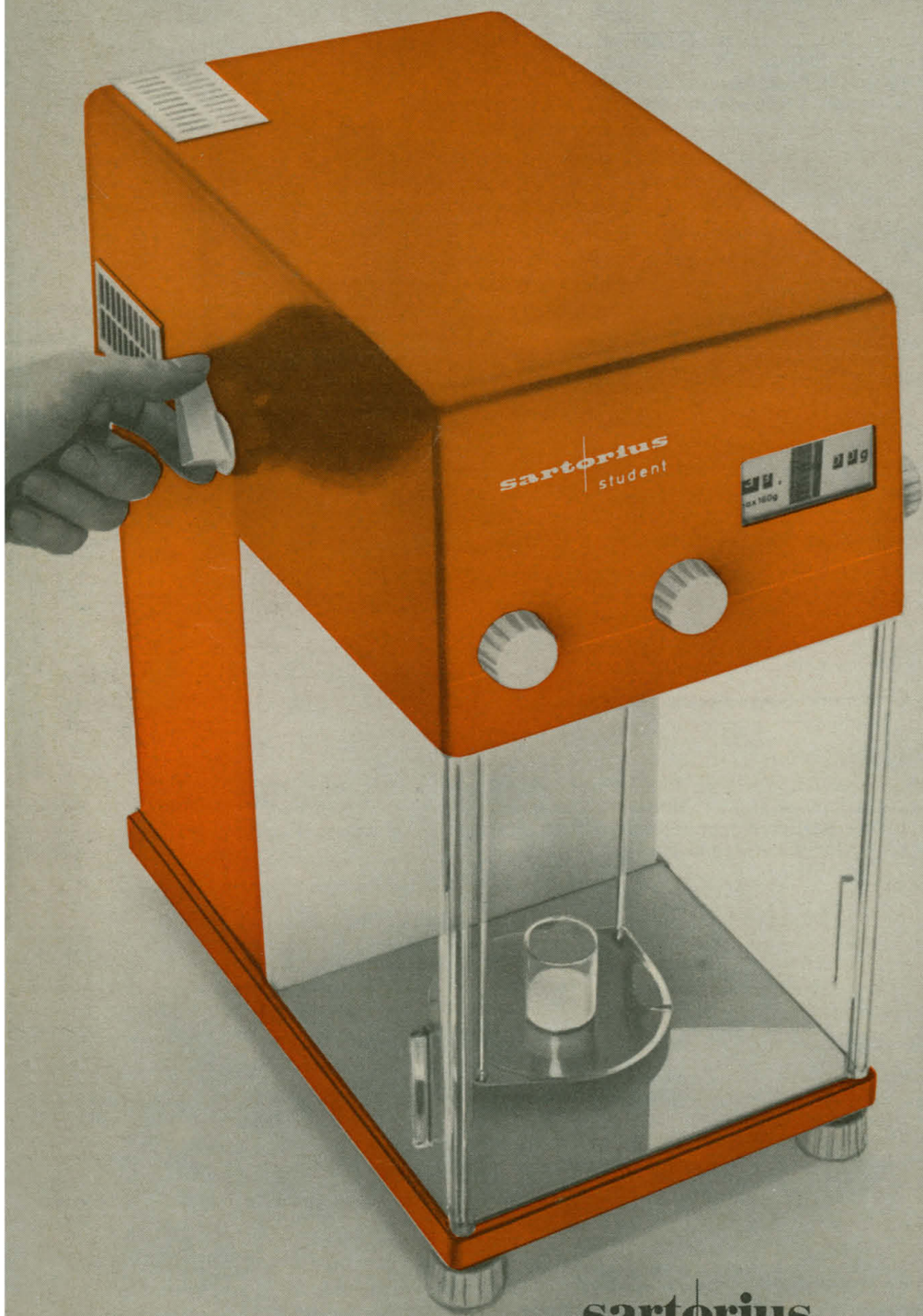


Our new 160g student balance with automatic pre-weighing costs less than other balances without it.



For less than the cost of comparable balances *without* pre-weighing, your next student balance can be a modern, full-size analytical instrument with automatic pre-weighing built-in. This convenient feature eliminates 'trial and error' dialing of coarse weight, avoids unnecessary wear on delicate knife edges and speeds up weighings by as much as 80%.

The all new Sartorius 2842 has a capacity of 160 g; all-digital readout to 0.1 mg with large, easy to read numerals; 1 g optical range and ±0.05 mg precision. Other advanced features include: oversized pan, large weighing chamber with removable glass floor to facilitate cleaning, a locking system for weights in the 'release' position to protect knife edges, front-mounted controls, and an all-metal balance housing in contemporary orange finish.

The new Sartorius 2842 with automatic pre-weighing makes it easier to teach proper weighing technique; it also makes weighings faster and easier for students. For literature, write: Sartorius Division, Brinkmann Instruments, Cantiague Road, Westbury, N.Y. 11590.

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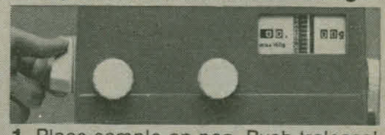

1. Place sample on pan. Push 'release' lever up. Optical scale now indicates weight to nearest gram. (32-33 g)

2. Dial in coarse weight. This will now appear to left of optical scale. (32 g)

3. Push 'release' lever down. Set micrometer, read final weight. (32.2921 g)

sartorius balances

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COVER

Destruction of prop roots of red mangrove tree was the work of an isopod crustacean, *Sphaeroma terebrans*, a wood borer that is causing a progressive shrinking of the Ten Thousand Islands of the Everglades National Park off southwestern Florida. See page 173. [George Morrison, National Park Service]

Distributed Systems: maxi power at mini prices.

Minicomputers have gained great popularity in high-technology areas because they are often the most cost-effective way to do many dedicated tasks. But like everything else in this universe, they have their limitations. The user sometimes wishes he could add bulk storage and high-performance peripherals as cost-effectively as he acquired the original mini. For those who own or plan to acquire several minis, there is now a way to do this.

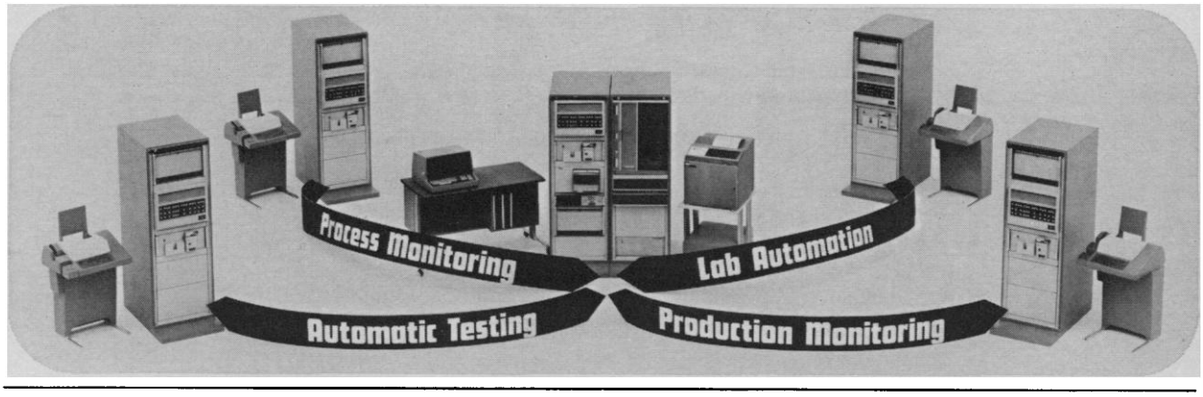
The concept, which we call distributed systems, consists of integrating all your HP 2100 dedicated minicomputer systems into a single network at whose center is another mini, a disc-based HP 2100S multi-programming, real-time executive.

In a distributed system, each user can gain the full power of the central computer as if he were the only user. Each can store large amounts of data on the central computer's disc, run programs at the central computer complex for his dedicated mini, and use its high-performance peripherals such as line printers and high-speed card readers. While each dedicated mini continues to acquire data, control experiments or monitor processes, the central computer can simultaneously analyze the data, generate reports for management, and be used for preparing programs.

A further level of computer power is also available with HP distributed systems, for the central computer can communicate directly with a host IBM 360/370, enabling HP 2100 networks to be an integral part of a hierarchal information distribution and processing system.

Key to it all are two Distributed Systems Packages: the HP 91701, about $6000 of hardware and software that establish and manage communications between the control 2100 and each satellite 2100 system; and the HP 91780 (about $5000) that performs a similar function for the central 2100 and host IBM computer.

If this idea interests you, ask for literature on Distributed Systems.



Increase surface chemistry data with an HP monochromatized ESCA Spectrometer.

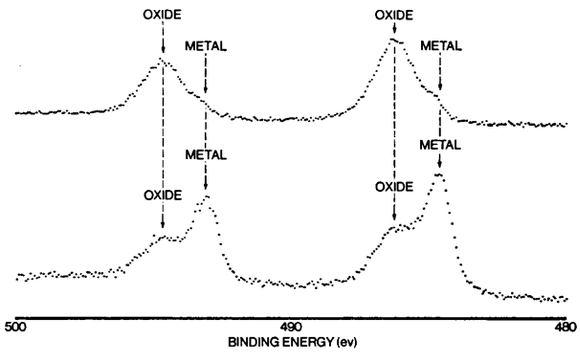
One of the most promising and powerful new analytical techniques, ESCA (Electron Spectroscopy for Chemical Analysis) now provides a chemical characterization of sample surfaces (10-20 angstrom deep). It has a broad range of applications: the effect of sunlight on polymers, the composition and uniformity of deposited thin films, the efficiency of washing processes, the molecular structure of complex organic molecules, and the effect of lubricants on metallic surfaces, as well as many other problems.

An especially important application for ESCA appears to be in characterizing catalysts. Catalysts are essential to the manufacture of materials, yet determining the properties of these compounds and finding methods to evaluate their efficiency are important problems that until recently have defied almost all analytical techniques.

Predicting the performance of fresh catalysts has been equally difficult. ESCA offers hope here; not only can it determine the oxidation states of species at the surface, but it can give information about surface conductivity, an important parameter for characterizing catalyst activity.

Although early investigators have already made important discoveries in surface chemistry and physics with ESCA, they have been unable to realize its full potential because of the design limitations of the first generation of instruments.

In all these spectrometers, the raw X-rays



An example of the kind of surface chemical information ESCA provides is shown in these spectra of tin. In the upper spectrum, tin (3d) ESCA peaks occur from the surface of a copper alloy sample. Mostly tin oxide with a small amount of metal is present. The lower spectrum shows tin (3d) peaks after the sample was surface "cleaned" with argon ion bombardment for five minutes. Note how the results indicate the partial removal of the tin oxide surface layer.

used to excite the sample produced satellite emission lines and a characteristic background that showed up in the ESCA spectrum and confused its interpretation. They were limited by an inability to use and control sample charging effects.

Our 5950A ESCA Spectrometer incorporates a unique spherically-bent quartz crystal monochromator that offers greatly improved performance above limitations of non-monochromatized X-ray photo-electron spectrometers. It allows chemists and physicists to take full advantage of the ESCA technique. System prices start at $125,000 (U.S. only). Ask for further information.

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The 9805 also performs the four basic arithmetic functions, *%, 1/x, x/12, $\log_e$ x, $\log_{10}$ x, e^x,* exponents, and grand total accumulation. All calculations are performed to ten significant digits.

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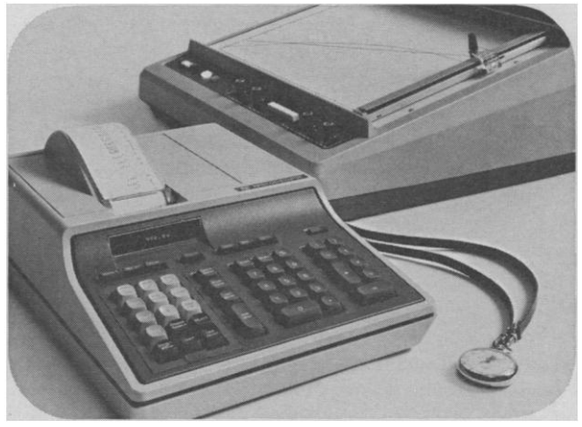
The basic stat version of the HP 9805 costs $1295. Send for details.



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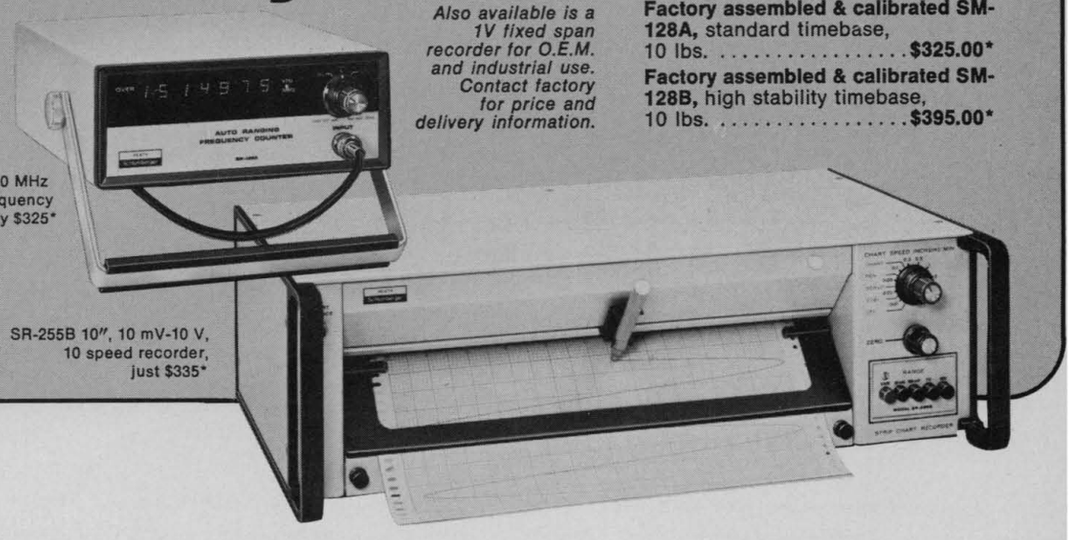

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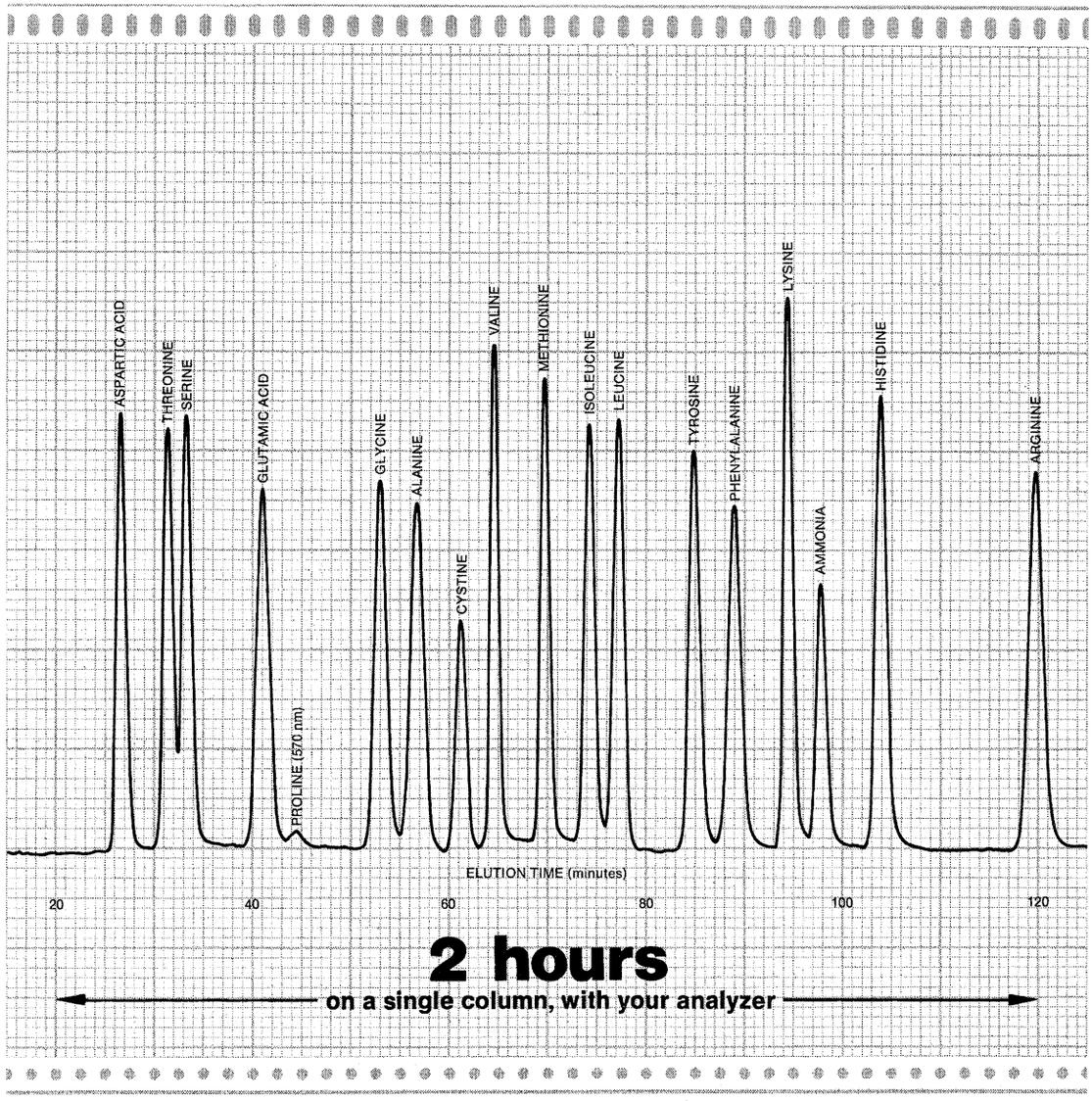

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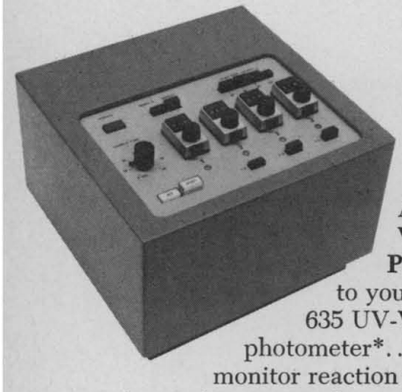

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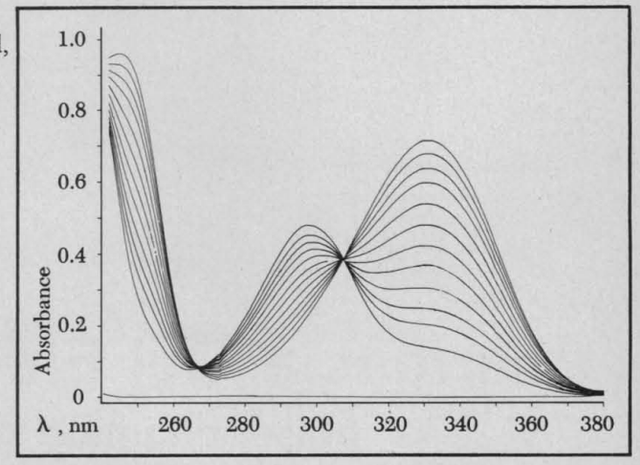
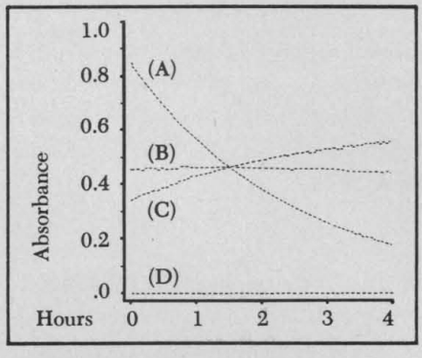


Repetitive scans of a methyl salicylate hydrolysis reaction. Absorption at 333 nm decreases with increase at 300 nm; two isosbestic points defined. Temperature, 30°C.



The kinetics of methyl salicylate hydrolysis monitored at four wavelengths: (A) 333 nm (B) 309 nm (C) 300 nm (D) 400 nm. Temperature, 30°C.

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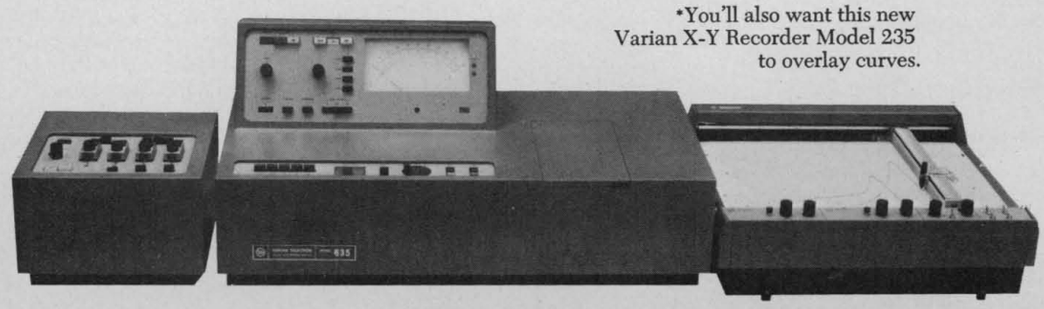

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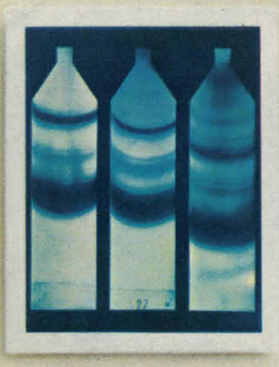
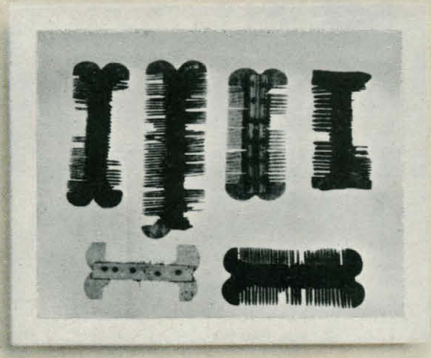


Chromatogram of urological specimen. Type 108.

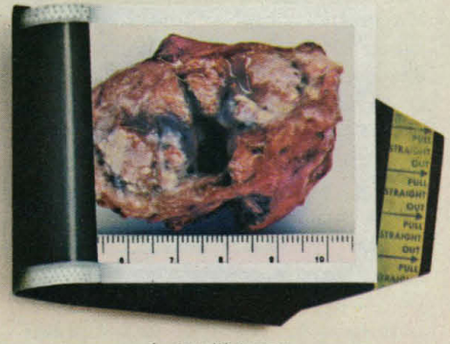


Bone combs from Middle Ages. Type 52.

Photomicrograph of experimental galvanized coating. X100. Type 107.

35mm slide of muscle structure. Type 46L.

Damaged automobile piston. Type 55 positive/negative.



Lung with tumor. Type 108.

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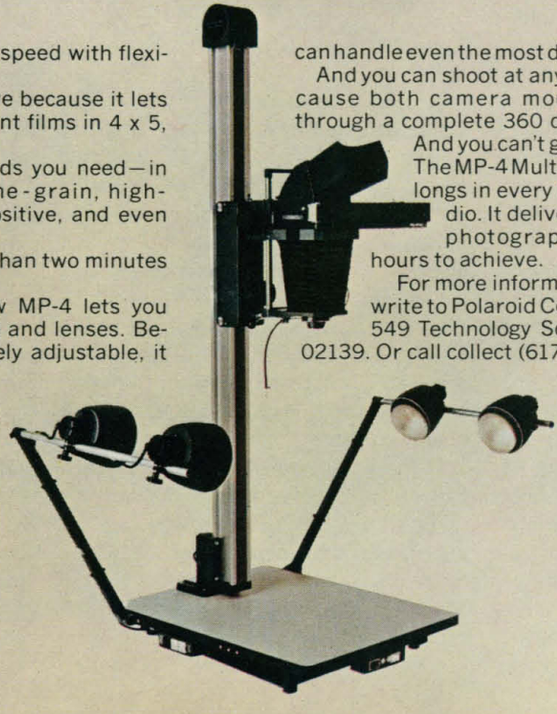

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Historical Footnote

In the government circles of Washington, D.C., an important letter may be written by from one to a dozen individuals, but never by the person who signs it; and ever since the appearance in 1945 of Vannevar Bush's *Science, the Endless Frontier* (*1*), the question has arisen from time to time of who wrote President Franklin D. Roosevelt's letter of 17 November 1944, asking Bush to prepare the famous blueprint for federal support of fundamental science after World War II?

Now comes the answer from the man who did it—Oscar M. Ruebhausen, a senior partner with the New York law firm of Debevoise, Plimpton, Lyons & Gates.

According to Ruebhausen, the idea came from another lawyer, the late Oscar S. Cox of Washington. As general counsel for the Lend-Lease Administration during the early years of the war, Cox watched with admiration the contributions to the American military effort by the Office of Scientific Research and Development (OSRD), the wartime agency conceived and directed by Bush. In common with other thoughtful Americans, Cox decided that after the war the government should find ways of using for civilian purposes the science-support devices that OSRD had designed.

Sometime in the fall of 1944, Cox had a thought that he promptly passed on by phone to his friend, Ruebhausen, then general counsel for OSRD. Would it not be a good idea, Cox asked, to prevail on the President to request Bush in writing to suggest means by which the government could continue as a patron of science when peace came? Ruebhausen, impressed, relayed the notion to his boss. "Bully!" was Bush's reaction. "But we'd better draft the letter ourselves. After all, we want the President to ask us the right questions." So Ruebhausen prepared a draft and cleared it with Bush and Cox. He then carried it in person to Roosevelt's speechwriter, Judge Samuel I. Rosenman, who excised a couple of paragraphs before having it readied for the President's signature.

Ruebhausen no longer recalls the contents of the deleted sections. He does remember "the youthful pride I had in the rhetoric of the second paragraph . . . which I thought was so like FDR's style" (*2*). His reference is to the statement in the President's letter that the "information, the techniques, and the research experience developed [during the war] by the Office of Scientific Research and Development and by the thousands of scientists in the universities and in private industry, should be used in the days of peace ahead for the improvement of the national health, the creation of new enterprises bringing new jobs, and the betterment of the national standard of living."

Today, the spirit of these words lives in the National Science Foundation, the federal organization that the Bush report recommended as a peacetime successor to OSRD.

MILTON LOMASK
Office of Government and Public Programs, National Science Foundation, Washington, D.C. 20550

References

1. V. Bush, *Science, the Endless Frontier* (National Science Foundation, Washington, D.C., 1945).
2. O. M. Ruebhausen, letter to D. Wolfle, 7 June 1972.

Fractionation Services

As a service to the scientific community, the American Red Cross National Fractionation Center provides facilities and staff for the large-scale (up to 100 liters) isolation from blood and tissue of purified proteins, cellular enzymes, membrane fractions, and so forth, which are not available from commerical sources. No charge is made for the services of the center.

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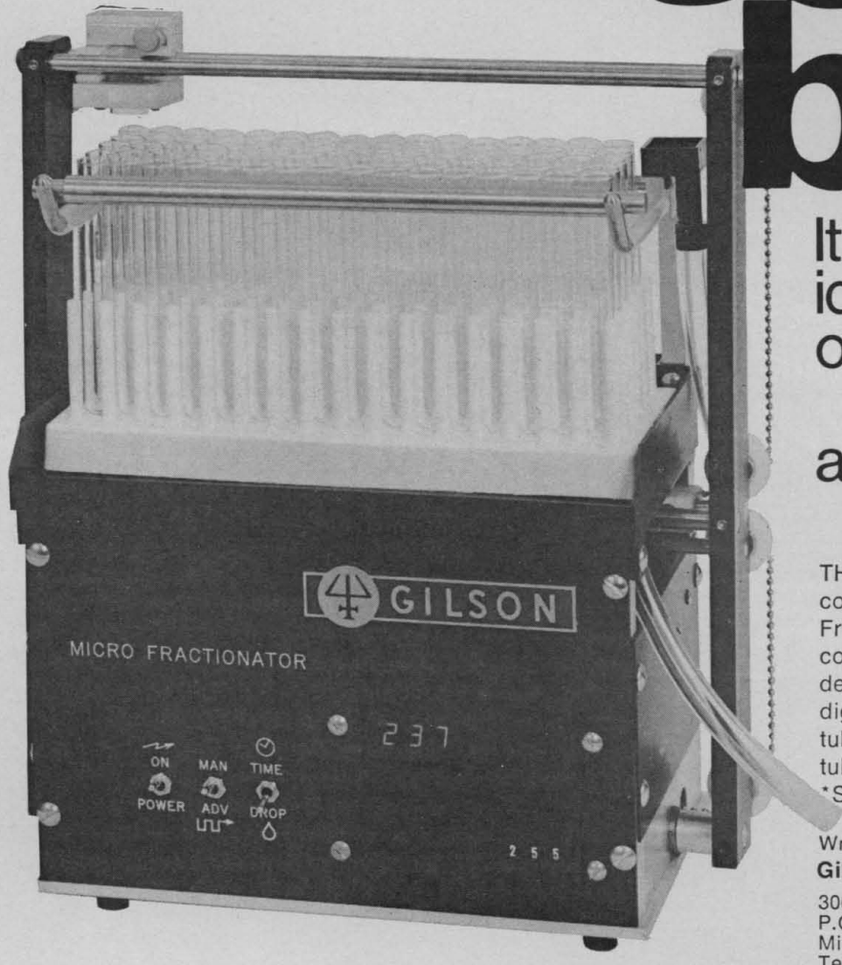

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12 October 1973, Volume 182, Number 4108 **SCIENCE**

A New International Program

The term "scientific community" is often used in a context that implies effective organization, with unity of purpose and action. In general, the implication is far from fact. One discipline that is unusually cohesive is geophysics. This is true on a national scale; performance is particularly exemplary on the international level. To a major extent this behavior arises out of the needs of the discipline. The entire earth is a laboratory of geophysics, and projects often involve cooperation of scientists from many nations.

The largest scientific cooperative venture ever conducted, International Geophysical Year (IGY), involved 60,000 participants from 67 countries. Attracted by the success of IGY, other disciplines have attempted special international programs, but in general they have not come to much. Usually preparation was inadequate.

Geophysicists, together with geologists, are now in the process of launching a major new international project, and their procedures could well be studied by those having similar ambitions. The new venture, called the Geodynamics Project, is designed to exploit the many opportunities for new insights resulting from recent advances in earth science. It is now widely accepted that the crust of the earth consists of a limited number of tectonic plates (some of them continents) and that these are in motion. Their collisions give rise to earthquakes, volcanism, mountain-building, and other geological, geochemical, and geophysical phenomena.

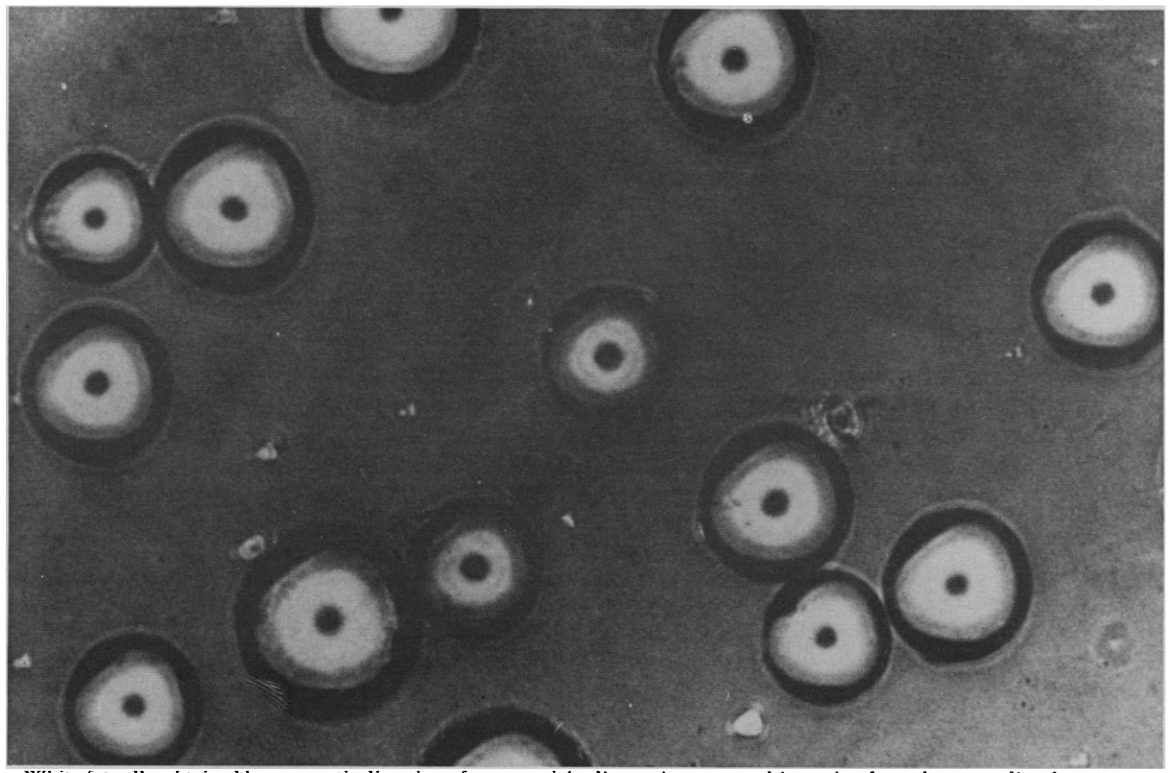
Much of the original impetus for the program was supplied in 1968 by the Geophysics Research Board of the National Academy of Sciences–National Research Council. In the intervening years, thoroughgoing planning has been done for the major, active phase of the project, scheduled for 1974 through 1979. Chairman of both the U.S. Geodynamics Committee and the International Geodynamics Project is Charles Drake of Dartmouth. He has obtained the backing of seven of the major earth science societies and has enlisted the cooperation of industry, government, and academia. For example, each of the major universities was asked to nominate a correspondent who would serve as a contact between the project and his university. About 100 institutions named such a representative. In delineating activities for the program and in establishing priorities, the U.S. national committee set up 14 ad hoc working groups, which included about 140 leading, active scientists. These groups identified opportunities and priorities in their spheres of interest and prepared backup material. Subsequently, the total package was examined and reworked extensively in a 3-day session involving about 50 experts. The material was polished further and has now been published.* The report outlines a comprehensive field program ranging from the mid-Atlantic Ridge to the western Aleutians, and from the Arctic to Antarctica. It lists opportunities, objectives, and priorities for field and laboratory studies. Participants will include micropaleontologists, geochemists, geomagneticians, seismologists, and vertebrate paleontologists.

The program has stirred wide interest and enthusiasm among earth scientists. Especially notable have been four meetings in Latin America, including that in Mexico City, arranged in part by the members of the Geodynamics Committee. Stimulated by the program, the hemisphere's geophysicists have been working together as never before.

The Geodynamics Committee is now seeking official government blessing for the project and some modest additional financial support for geodynamics research. The committee and its associates have outlined an excellent program. Their efforts fully merit government recognition and support.—PHILIP H. ABELSON

* *U.S. Program for the Geodynamics Project* (National Academy of Sciences, Washington, D.C., 1973).

Worthington Collagenase...



White fat cells, obtained by enzymatic digestion of parametrial adipose tissue as used in study of membrane mediated responses.

specifically blended for cell isolation.

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.

Many researchers found that a natural mixture of digestive enzymes produced by a non-toxigenic strain of the bacterium *Clostridium histolyticum* provided the separation remarkably well. The enzymes, without the toxin that many of the *Colstridia* produce, effectively digest away the materials connecting the cells into a tissue, but leave the cells themselves virtually untouched.

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.

A program was therefore initiated by Worthington aimed at correlating effectiveness of samples on specific tissues with results of our own biochemical assays. We enlisted the support of several dozen prominent researchers; they evaluated more than a hundred samples of regular production and specially prepared lots of Collagenase in their own studies.

Evaluation of these studies has enabled us to categorize our crude Collagenase into four different types which are blended and classified according to the specific tissues for which each is best suited. The four types are available as listed in our current catalog.

TYPE	CHARACTERISTIC	TISSUE BEST SUITED
I	Normal balance	Fat cells; Adrenal tissue
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IV	Low Tryptic activity	Pancreatic Islet cells

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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Human Histocompatibility Antigens and Susceptibility to Disease

A cooperative seminar on human histocompatibility antigens and susceptibility to disease was held in Santa Barbara, California, on 4 to 6 October 1972 under the U.S.–Japanese Agreement in Science. Those in attendance included ten scientists from the United States, eight from Japan, and two from India. In addition to being expert in transplantation immunology and tissue typing, the participants offered representation of the disciplines of genetics, epidemiology, computer technology, pathology, and surgery. The objectives of the seminar were to consider appropriate international studies of the relations of HL-A to disease and to improve the reagent facilities of the countries involved.

The initial half-day session was devoted to a survey of the general significance and problems of histocompatibility testing, with special emphasis on the HL-A system—reviewing data on the comparison of HL-A specificities in Japanese and Caucasians and on the relation between HL-A specificities and several disease conditions. R. Payne (Stanford University) began by identifying the two segregant series of the HL-A system with its total of at least 30 specificities. The effectiveness of HL-A typing in increasing graft survival in transplants between siblings was emphasized, but it was pointed out that other, possibly independent, genetic loci (that of mixed lymphocyte interaction) are also important in graft rejection. The complexity of the known genetic linkages in both mice and man was pointed out by B. Amos (Duke University). The MLC locus in mice lies between the K and D regions of H-2, being close to the Ir loci and to the Ss and Slp loci as well. Although disease-associated phenomena are only partially understood, it was emphasized that one of the genes conferring susceptibility or resistance to Gross leukemia virus is associated with certain alleles of the K region of the H-2 complex. The complexity of the HL-A system in man is less well understood than is the H-2 locus in mice; but it seems likely that the K region in mice is analogous to the second segregant series of man and that the HL-A system is closely linked to the MLC locus in man. There is some evidence for a locus controlling immunoglobulin levels and hypersensitivity reactions in this genetic region. P. Terasaki (UCLA) continued the discussion, with emphasis on racial and disease-associated HL-A factors in man. Specificities HL-A 1, 3, 8, and W14 are lacking in Japanese, and Japanese and Caucasians differ in the relative rate of occurrence of a variety of other histocompatibility specificities. The clearest example of a disease-histocompatibility relationship seems to be psoriasis, in which HL-A 13 and W17 are increased and HL-A 12 is decreased as compared to the normal Caucasian population. Others pointed out that there may be decreases of certain HL-A specificities with age and during the course of severe, debilitating disorders.

The second session was concerned with a detailed discussion of typing techniques, procurement of reagents, methods of data analysis, and reports from the Japanese delegates on studies of HL-A specificities in their populations. The major technique used in typing is complement-mediated cellular lysis by selected alloantiserums. The micromethods used by Japanese and U.S. investigators were similar. A major difference is that in the United States it is usual to find more than one method used in each laboratory for detection of membrane antigens. A discussion of procurement of appropriate reagents was led by E. Yunis (University of Minnesota). Since most antiserums in use today have been obtained from postpartum mothers, serum is collected on the third postpartum day and screened for antibody activity. If such activity is found at a titer of 1:4 or greater, two units of plasma are collected in an anticoagulant by plasmaphoresis. Serum prepared from this with calcium chloride is then dispensed in vials for later use. Since the specificity of antiserums collected at different intervals postpartum varies, it has been found useful to retest serum from these donors several times during a 9-month postpartum period. It was estimated that a minimum of 24 separate cell preparations are required for screening antiserums, and it was pointed out that cell preparations may be preserved in dimethylsulfoxide, fetal calf serum, and minimum essential medium in liquid nitrogen or for shorter periods on the bottom of a mechanical freezer where the temperature is maintained at −70°C or lower. Although computer analysis has now become an in-

tegral part of tissue typing, the programs used vary from laboratory to laboratory and visual inspection of data remains an important laboratory tool. K. Tsuji (Keio University) and Y. Iwasaki (Chiba University) offered reports of HL-A typing among native Japanese and M. Yokoyama (Honolulu) reported similar data on Japanese living in Hawaii. These data were generally similar to the results obtained by Terasaki described earlier. Because of the large proportion of blanks or unidentified specificities apparent in the genotyping of each of these series, it is to be expected that serums obtained from multiparous Japanese women will provide the international scientific community with significant additional identifiable serologic specificities.

The third session continued the discussion of HL-A in different populations, the role of HL-A typing in transplantation, and the potential of application of legal fingerprinting (dermatoglyphics) techniques to tissue typing. K. Balakrishnan (India) presented data concerning the HL-A typing of members of various castes in India. There was no recognizable difference between members of each of the four castes studied. These individuals were close to Caucasians in the distribution of their HL-A antigens and differed from the distribution of HL-A antigens evident in Japanese. There was a difference in distribution of HL-A antigens when northern and southern Indians were compared. The discussion of tissue typing and transplantation was brief, but centered on the fact that identify for four antigens ("full-house" matches) permitted improved survival of organ grafts. T. Inou and M. Matsukura (Tokyo University) presented data on the reclassification of dermatoglyphics and their potential use in compatibility testing. Although the data were interesting the thought was expressed that a correlation was not what would be predicted because of the multitactorial determinants of fingerprints.

The fourth session was concerned with HL-A typing and susceptibility to disease. A. Lilienfeld (Johns Hopkins University) began the discussion by reviewing the reported occurrences of neoplasm with an increased family incidence. This was followed by a discussion of the relationships of HL-A specificities and disease. The clearest examples of such as association seemed to be psoriasis and celiac disease. In the former, an increase in W-17 was most marked in patients with a family

history of psoriasis and HL-A 13 was most prominent when a family history of psoriasis could not be elicited. K. Orita (Okayama University), K. Tsuji, and T. Yoshida (Aichi Cancer Center) discussed results of Japanese investigators with respect to their studies of susceptibility to cancer and HL-A typing with special emphasis on gastric cancer. M. Aizawa (Hokkaido University) reported a study of the relation between HL-A typing and the occurrence of Australian antigen. K. Nomoto (Kyushu University) closed the discussion by reviewing the possibility of relating HL-A typing with certain defects in the ability of hosts to efficiently handle certain bacterial agents such as BCG.

The fifth and final session was concerned with a discussion of the ways in which international cooperation between the countries involved in this seminar might effectively increase our knowledge of the relation between cell surface markers and immune responsiveness or disease. The first order of business seems to be to provide up-to-date information on available serums, to train Japanese investigators in techniques in use in the United States, and to standardize methods for use in the various countries. It was felt that these objectives could be achieved in part by establishing a serum bank in Japan and having local and international workshops. With the availability of these facilities and maintenance of the lines of communication developed during this seminar, it should be possible to begin critical investigations of the relation of HL-A specificities to various disorders that have different geographic rates of occurrence.

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D. T. ROWLANDS, JR.
School of Medicine, University of Pennsylvania, Philadelphia 19104

Forthcoming Events

November

11–16. American **Nuclear** Soc., San Francisco, Calif. (O. J. DuTemple, ANS, 244 E. Ogden Ave., Hinsdale, Ill. 60521)

12–14. **Geochemical** Soc., Dallas, Tex. (E. E. Angino, Dept. of Geology, Univ. of Kansas, Lawrence 66044)

12–14. **Geological** Soc. of America, Dallas, Tex. (E. B. Eckel, GSA, P.O. Box 1719, Boulder, Colo. 80302)

12–14. **Operations Research** Soc. of America, 44th mtg., San Diego, Calif. (J. V. Ravenis, Research and Advanced Technology, MS7-15, General Dynamics Electronic Dynamics Div., Box 127, San Diego 92112)

12–14. **Paleontological** Soc., Dallas, Tex. (W. O. Addicott, U.S. Geological Survey, 345 Middlefield Rd., Menlo Park, Calif. 94025)

12–16. Conference on **Hemoglobins: Comparative Molecular Biology Models for the Study of Disease**, New York Acad. of Sciences, Silver Spring, Md. (S. Sinanian, NYAS, 2 E. 63 St., New York 10021)

12–16. Symposium on the **Physical Behaviour of Radioactive Contaminants in the Atmosphere**, Intern. Atomic Energy Agency and World Meteorological Organization, Vienna, Austria. (J. H. Kane, Office of Information Services, Atomic Energy Commission, Washington, D.C. 20545)

12–17. Society of **Photographic Scientists and Engineers**, Tokyo, Japan. (F. W. Gerretson, SPSE, Bywater Rd., Annapolis, Md. 21401)

13–15. Eastern **Analytical** Symp., American Chemical Soc., New York, N.Y. (L. Brancone, Lederle Labs., American Cyanamid Co., Pearl River, N.Y. 10965)

13–16. **Magnetism and Magnetic Materials** Conf., 19th, Inst. of Electrical and Electronics Engineers, Boston, Mass. (IEEE, 345 E. 47 St., New York 10017)

14. **Viruses in the Environment and Their Potential Hazards** Conf., Burlington, Ont., Canada. (B. J. Dutka, Microbiology Labs., Canada Centre for Inland Waters, P.O. Box 5050, Burlington, K7R 4A6)

14–16. **Applied Remote Sensing of Arid Lands Resources and Environment**, 4th conf., Tucson, Ariz. (M. A. Peel, Jr., Div. of Continuing Education, Univ. of Arizona, Tucson 85721)

14–16. Society for **Applied Spectroscopy**, New York, N.Y. (R. F. Hirsch, Chemistry Dept., Seton Hall Univ., South Orange, N.J. 07079)

14–16. International Conf. on **Health Technology Systems**, Soc. for Advanced Medical Systems and Operations Research Soc. of America, San Francisco, Calif. (M. F. Collen, 3779 Piedmont Ave., Oakland, Calif. 94611)

14–16. **Nuclear Science** Symp., Inst. of Electrical and Electronics Engineers, San Francisco, Calif. (Technical Activities Board, IEEE, 345 E. 47 St., New York 10017)

14–17. American Assoc. for **Automotive Medicine**, Oklahoma City, Okla. (A. Carriere, 801 Green Bay Rd., Lake Bluff, Ill. 60044)

14–17. American Acad. of **Neurological Surgery**, Pasadena, Calif. (R. H. Patterson, Jr., AANS, 525 E. 68 St., New York 10021)

14–17. Western **Surgical** Assoc., Houston, Tex. (W. P. Mikkelsen, WSA, 1127 Wilshire Blvd., Los Angeles 90017)

14–18. American Assoc. of **Psychiatric Services for Children**, Chicago, Ill. (AAPSC, 1701 18th St., NW, Washington, D.C. 20009)

15. Symposium on **Fatigue Behaviour of Composite Materials**, Inst. of Physics, London, England. (Meetings Officer, IP, 47 Belgrave Sq., London SW1X 8QX)

15–16. Symposium on **Childhood Obesity**, New York, N.Y. (M. Winick, Inst. of Human Nutrition, Columbia Univ., 511 W. 166 St., New York 10032)

15–16. **Electron Diffraction for the Investigation of Structure** Conf., Inst. of Physics, London, England. (Meetings Officer, IP, 47 Belgrave Sq., London SW1X 8QX)

15–16. Society of **Naval Architects and Marine Engineers**, 81st annual, New York, N.Y. (SNAME, 74 Trinity Pl., New York 10006)

15–17. American Soc. for **Cell Biology**, Miami Beach, Fla. (G. D. Pappas, Dept. of Anatomy, Albert Einstein College of Medicine, 1300 Morris Park Ave., Bronx, N.Y. 10461)

16. American **Geographical** Soc., New York, N.Y. (B. W. Adkinson, AGS, Broadway at 156 St., New York 10032)

16–17. Oklahoma **Acad. of Science**, Oklahoma City. (J. Lovell, Biological Sciences Dept., Southwestern State College, Weatherford, Okla. 73096)

16–17. Tennessee **Acad. of Science**, Nashville. (J. D. Caponetti, Dept. of Botany, Univ. of Tennessee, Knoxville 37916)

16–17. **Pathogenic Microorganisms from Atypical Clinical Sources**, Leo F. Rettger Soc. of the ASM, New Haven, Conn. (T. Sall, Dept. of Life Science, Ramapo College of New Jersey, P.O. Box 542, Mahwah 07430)

17–20. American Assoc. of **Gynecological Laparoscopists**, New Orleans, La. (J. M. Phillips, 11239 S. Lakewood Blvd., Downey, Calif. 90241)

18–21. Academy of **Psychosomatic Medicine**, Williamsburg, Va. (K. Shannon, Jr., 813 River Rd., Shreveport, La. 71105)

19–21. American **Physical** Soc., Fluid Dynamics Div., New Haven, Conn. (W. W. Havens, APS, 335 E. 45 St., New York 10017)

19–22. International Conf. on **High Voltage DC and/or AC Power Transmission**, Institution of Electrical and Radio Engineers, London, England. (IERE, 8-9 Bedford Square, London WC1B, 3RG)

19–24. Philippine Acad. of **Ophthalmology and Otolaryngology**, Manila. (G. D. Lim, PAOO, P.O. Box 1510, Manila)

20–22. European Conf. on **Research into Management of Information Services and Libraries**, Assoc. of Special Libraries and Information Bureaus, Paris, France. (E. Lowry-Corry, ASLIB, 3 Belgrave Sq. London, SW1X 8PL, England)

24–25. National Federation of Catholic **Physicians Guilds**, Anaheim, Calif. (R. H. Herzog, NFCPG, 2825 N. Mayfair Rd., Milwaukee, Wis. 53222)

25–28. Association of **Military Surgeons** of the U.S., 80th annual, Washington, D.C. (W. Welham, AMSUS, 8502 Connecticut Ave., NW, Chevy Chase, Md. 20015)

25–30. **Radiological** Soc. of North America, Chicago, Ill. (J. W. Beeler, RSNA, 713 E. Genesee St., Syracuse, N.Y. 13210)

26–28. **Chemical Marketing Research** Assoc., St. Louis, Mo. (C. C. Harvey,

Ethyl Corp., 451 Florida St., Baton Rouge, La. 70801)

26–29. **Entomological** Soc. of America, Dallas, Tex. (W. P. Murdoch, 4603 Calvert Rd., College Park, Md. 20740)

26–29. Conference on **Na^+,K^+ ATPase Complex**, New York Acad. of Sciences, New York, N.Y. (S. Sinanian, NYAS, 2 E. 63 St., New York 10021)

26–30. International Symp. on the **Earth's Gravitational Field and Secular Variations in Position**, Australian Acad. of Science and Intern. Assoc. of Geodesy, Sydney. (R. S. Mather, School of Surveying, Univ. of New South Wales, P.O. Box 1, Kensington, NSW 2033)

27–28. **Divers' Gas Purity** Symp., Columbus, Ohio. (P. S. Riegel, Battelle-Columbus Labs., 505 King Ave., Columbus 43201)

27–29. Symposium on **Wildlife in an Urbanizing Environment**, Springfield, Mass. (D. R. Progulske, Dept. of Forestry and Wildlife Management, Univ. of Massachusetts, Amherst 01002)

27–2. Society for **Clinical and Experimental Hypnosis**, Newport Beach, Calif. (M. Kenn, SCEH, 140 West End Ave., New York 10023)

28–30. International Symp. on **Recycling and Corporate Goals: A New Environmental Technology or a New Economic Priority?**, Rüschlikon/Zurich, Switzerland. (R. Brun, Gottlieb Duttweiler Inst. for Economic and Social Studies, CH-8803 Rüschlikon/Zurich)

28–30. Intra-**Science Research** Foundation, 7th mtg., Santa Monica, Calif. (S. M. Pokras, ISRF, P.O. Box 430, Santa Monica 90406)

28–2. American **Anthropological** Assoc., New Orleans, La. (E. J. Lehman, AAA, 1703 New Hampshire Ave., NW, Washington, D.C. 20009)

29–30. **Effectiveness of On-Line Biomedical Computing**, 2nd natl. conf., Advancement of Medical Instrumentation, Rosslyn, Va. (J. Skillin, AAMI, Suite 417, 1500 Wilson Blvd., Arlington, Va. 22209)

29–30. Conference on the **Managua Earthquake**, Earthquake Engineering Research Inst. and the Ministry of Public Works of Managua, San Francisco, Calif. (C. Rojahn, U.S. Geological Survey, Room 7067, 390 Main St., San Francisco 94105)

30–3. American **Psychoanalytic** Assoc., New York, N.Y. (S. Goodman, APA, 1 E. 57 St.. New York 10022)

December

1–2. National Federation of **Catholic Physicians' Guilds**, Anaheim, Calif. (R. H. Herzog, 2825 N. Mayfair Rd., Milwaukee, Wis. 53222)

1–4. American Soc. of **Hematology**, Chicago, Ill. (S. Tobinson, Beth Israel Hospital, Boston, Mass. 02215)

1–5. **American Medical Assoc.**, Anaheim, Calif. (E. B. Howard, AMA, 535 N. Dearborn St., Chicago, Ill. 60610)

1–6. American Acad. of **Dermatology**, Chicago, Ill. (D. P. Compton, AAD, 2250 Northwest Flanders St., Portland, Ore. 97210)

2–4. **Technology of Water Quality** Conf., American Water Works Assoc., Cincinnati, Ohio. (AWWA, 2 Park Ave., New York 10016)

2–6. American Acad. for **Cerebral Palsy**, Washington, D.C. (J. E. Bryan, AACP, 1255 New Hampshire Ave., NW, Washington, D.C. 20036)

2–6. Interdisciplinary Symp. on Advanced Concepts and Techniques in the Study of **Snow and Ice Resources**, U.S. Natl. Committee for the Intern. Hydrological Decade, Monterey, Calif. (H. S. Santeford, Jr., USNC/IHD, Natl. Acad. of Sciences, 2101 Constitution Ave., NW, Washington, D.C. 20418)

2–7. **Automatic Cytology** Conf., Engineering Foundation, Pacific Grove, Calif. (EF, 345 E. 47 St., New York 10017)

2–10. International Union for **Quaternary Research**, Christchurch, New Zealand. (J. M. Sons, University of Canterbury, Christchurch)

3–5. Advances in **Analytical Toxicology** Symp., Inst. of Clinical Toxicology, Houston, Tex. (E. G. Comstock, ICT, P.O. Box 2565, Houston 77001)

3–5. Southern **Surgical** Assoc., Hot Springs, Va. (D. C. Sabiston, Duke Univ. Medical Center, Durham, N.C. 27710)

4–8. Central American **Medical** Congr., 15th, San José, Costa Rica. (G. Jiménez, Colegio de Medicos, San José)

5–7. **Electric Furnace** Conf., American Inst. of Mining, Metallurgical & Petroleum Engineers and Metallurgical Soc., Cincinnati, Ohio. (C. Moore, AIMMPE, 345 E. 47 St., New York 10017)

6–7. American College of **Chemosur-**

gery, Chicago, Ill. (R. S. Moraites, ACC, 7721 Montgomery Rd., Cincinnati, Ohio 45236)

6–8. International Study Group for **Steroid Hormones**, 6th, Rome, Italy. (C. Conti, ISGSH, Istituto di Patologia Medica II, Policlinico Umberto I, Universita di Roma, Rome)

6–11. American Acad. of **Optometry**, San Francisco, Calif. (C. C. Koch, AAO, 214-215 Foshay Tower, Minneapolis, Minn. 55402)

7–9. American Acad. of **Psychoanalysis**, New York, N.Y. (J. Barnett, AAP, 40 Gramercy Park N., New York 10024)

9–13. American Soc. of **Hospital Pharmacists**, 8th, New Orleans, La. (J. A. Oddis, ASHP, 4630 Montgomery Ave., Bethesda, Md. 20014)

10–12. **Sensing of Environmental Pollutants**, 2nd conf., American Inst. of Aeronautics and Astronautics and Inst. of Electrical and Electronics Engineers, Washington, D.C. (AIAA, 1290 Avenue of the Americas, New York 10019)

10–14. American Soc. of **Agricultural Engineers**, Chicago, Ill. (J. L. Butt, ASAE, P.O. Box 229, St. Joseph, Mich. 49085)

10–14. American Geophysical Union, Section on **Hydrology**, San Francisco, Calif. (R. Lee, Div. of Forestry, 337 Percival Hall, West Virginia Univ., Morgantown 26506)

11–14. International Symp. on **Biomembranes**, Madurai, India. (J. Jayaraman, ISB, Dept. of Biological Sciences, Madurai Univ., Madurai 625021)

12–15. Latin American Federation of **Parasitologists**, 3rd congr., Medellin, Colombia. (M. Restrepo, Departmento de Microbiologia y Parasitologia, Facultad de Medicina, Apartado aero 883, Medellin, Colombia)

12–16. American **Psychoanalytic** Assoc., New York, N.Y. (M. A. Berezin, 90 Forest Ave., West Newton, Mass. 02165)

17–19. Conference on **Computers in Spectroscopy**, Soc. for Analytical Chemistry and Inst. of Physics, London, England. (Meetings Officer, IP, 47 Belgrave Sq., London, SW1X 8QX)

17–21. Association of **Engineers and Architects in Israel**, 3rd world congr., Tel-Aviv. (AEAI, Engineers Inst., 200 Dizengoff Str., POB 3082, Tel-Aviv)

17–21. **Marine Waste Disposal**, 2nd intern. congr., Assoc. Nazionale di Ingegneria Sanitaria, San Remo, Italy. (Istituto di Ingegneria Sanitaria, del Politecnico di Milano, Segreteria per 1 Convegni Intern., Piazza Leonardo da Vinci, 32 Milano, Italy)

17–23. International Assoc. for **Medical Research and Cultural Exchange**, Yaounde, Cameroun. (IAMR, 4, rue de Seze, 75 Paris 9e, France)

26–30. Society for the **History of Technology**, San Francisco, Calif. (M. Kranzberg, Dept. of Social Sciences, Georgia Inst. of Technology, Atlanta 30332)

27–30. **Animal Behavior** Soc., Houston, Tex. (N. M. Jessop, Dept. of Biology, U.S. International Univ., San Diego, Calif. 92106)

27–30. **Biometric** Soc., Eastern North American region, New York, N.Y. (F. B. Cady, Biometric Unit, 337 Warren Hall, Cornell Univ., Ithaca, N.Y. 14850)

27–30. Institute of **Mathematical Statistics**, New York, N.Y. (L. Katz, Statistical Lab., Michigan State Univ., East Lansing 48823)

27–30. Western Society of **Naturalists**, San Diego, Calif. (D. H. Montgomery, Dept. of Biological Sciences, California Polytechnic State Univ., San Luis Obispo 93401)

27–30. Society of **Protozoologists**, Houston, Tex. (D. M. Hammond, Dept. of Zoology, Utah State Univ., Logan 84321)

27–30. American **Statistical** Assoc., New York, N.Y. (J. W. Lehman, ASA, 806 15th St., NW, Washington, D.C. 20005)

27–30. American Soc. of **Zoologists**, Houston, Tex. (C. J. Goodnight, Dept. of Biology, Western Michigan Univ., Kalamazoo 49001)

28–29. **Industrial Relations** Research Assoc., New York, N.Y. (D. B. Johnson, 7114 Social Science Bldg., Univ. of Wisconsin, Madison 53706)

28–30. **Archaeological** Inst. of America, St. Louis, Mo. (E. A. Whitehead, AIA, 260 West Broadway, New York 10013)

28–30. American **Economic** Assoc., New York, N.Y. (R. Fels, 1313 21st Ave. S., Nashville, Tenn. 37212)

28–30. **History of Science** Soc., San Francisco, Calif. (R. H. Stuewer, School of Physics and Astronomy, Univ. of Minnesota, Minneapolis 55455)

28–30. **Linguistic** Soc. of America, San Diego, Calif. (T. A. Sebeok, LSA, Room 800, 1717 Massachusetts Ave., NW, Washington, D.C. 20036)

January

2–4. **Solid State Physics,** 11th conf., Inst. of Physics, Manchester, England. (Meetings Officer, IP, 47 Belgrave Sq., London, SW1X 8QX, England)

7–8. **Application of Lasers to the Processing and Examination of Materials,** Inst. of Physics, Sussex, England. (Meetings Officer, IP, 47 Belgrave Sq., London, SW1X 8QX, England)

7–10. Symposium on **Beaufort Sea Coastal and Shelf Research,** Arctic Inst. of North America, San Francisco, Calif. (J. E. Sater, AINA, 1619 New Hampshire Ave., NW, Washington, D.C. 20009)

13–17. American **Medical Tennis** Assoc., Tampa, Fla. (B. Drake, AMTA, P.O. Box 183, Alton, Ill. 62002)

14–16. Southwest **Allergy** Forum, Scottsdale, Ariz. (E. G. Barnet, SAF, 550 W. Thomas Rd., Phoenix, Ariz. 85013)

14–18. **Biology and Chemistry of Eucaryotic Cell Surfaces** Conf., 6th, Intern. Union of Biochemistry, Miami, Fla. (Miami Winter Symposia, P.O. Box 906, Biscayne Annex, Miami 33152)

14–18. International Soc. of **Magnetic Resonance,** 5th, Bombay, India. (D. Fiat, Weizmann Inst. of Science, Rehovot, Israel)

14–25. International Assoc. of **Meteorology and Atmospheric Physics,** Melbourne, Australia. (G. B. Tucker, Commonwealth Meteorology Research Centre, P.O. Box 5089AA, Melbourne 3001)

15–17. American Soc. for **Surgery of the Hand,** Dallas, Tex. (J. A. Boswick, Jr., 4200 E. Ninth Ave., Denver, Colo. 80220)

15–19. American **Mathematical** Soc., San Francisco, Calif. (E. Pitcher, Dept. of Mathematics, Lehigh Univ., Bethlehem, Pa. 18015)

15–19. National Soc. of **Professional Engineers,** Biloxi, Miss. (P. H. Robbins, NSPE, 2029 K St., NW, Washington, D.C. 20006)

17–19. International Conf. of **Communications,** Inst. of Electrical and Electronics Engineers, Minneapolis, Minn. (M. S. Ulstad, ICC, P.O. Box 35366, Minneapolis 55435)

17–19. **Mathematical** Assoc. of America, San Francisco, Calif. (H. L. Alder, Dept. of Mathematics, Univ. of California, Davis 95616)

19–23. American Acad. of **Allergy,** Bal Harbour, Fla. (J. O. Kelley, AAA, 225 E. Michigan St., Milwaukee, Wis. 53202)

19–24. American Acad. of **Orthopaedic Surgeons,** Dallas, Tex. (C. V. Heck, AAOS, 430 N. Michigan Ave., Chicago, Ill. 60611)

20–26. American **Library** Assoc., Chicago, Ill. (D. H. Clift, ALA, 50 East Huron St., Chicago 60611)

20–1. **Dermatology,** intern. conf., Nairobi, Kenya. (E. F. Finnerty, North American Clinical Dermatologic Soc., 510 Commonwealth Ave., Boston, Mass. 02215)

21–23. **Hemophilia—Recent Advances in Biochemistry, Physiology, and Therapy,** New York Acad. of Sciences and the Natl. Hemophilia Foundation, New York, N.Y. (G. R. Gruber, NYAS, 2 E. 63 St., New York 10021)