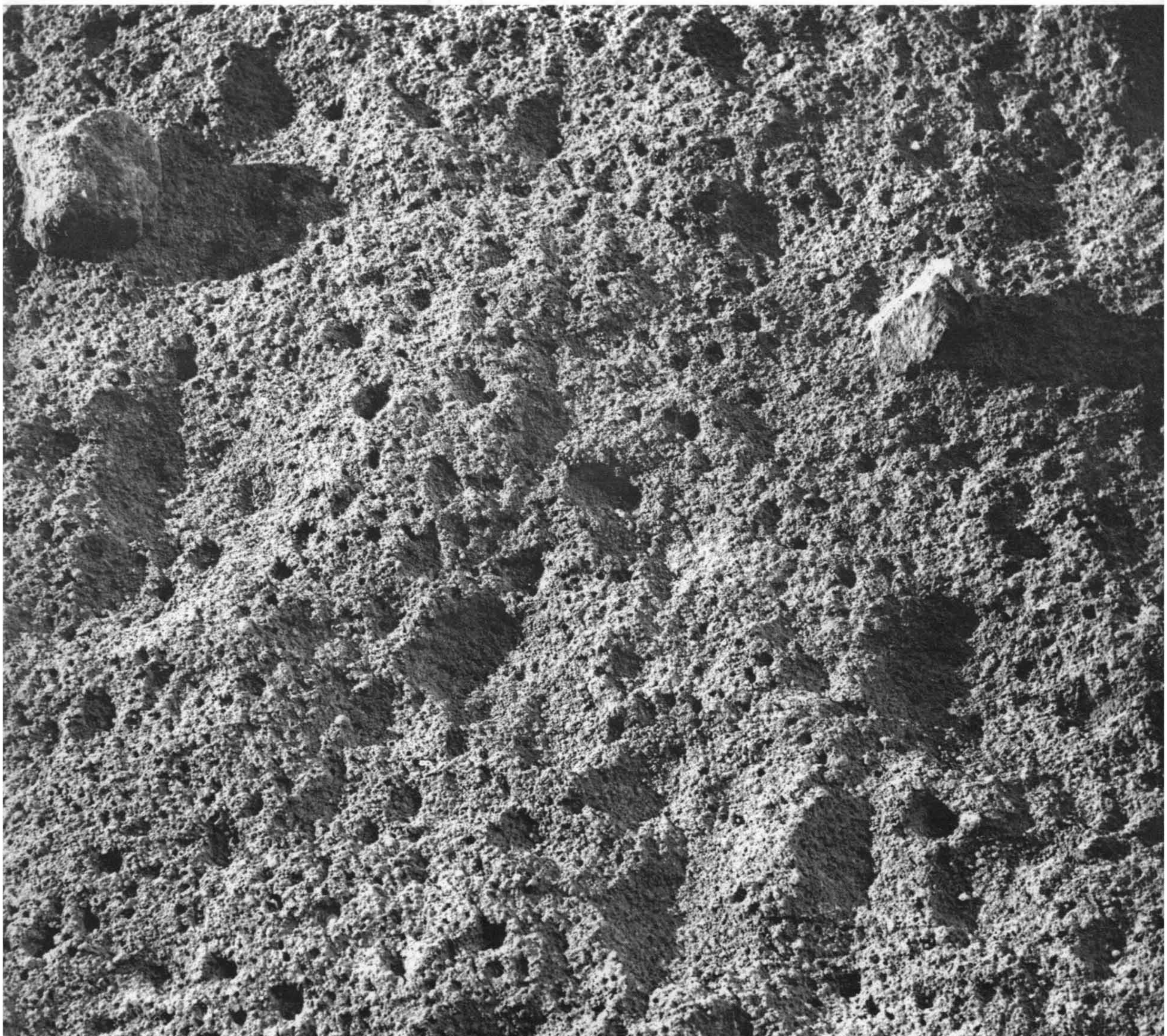
SCIENCE

15 July 1966
Vol. 153, No. 3733

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



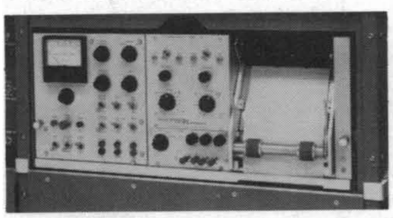
SIMULATED LUNAR SOIL

Smaller samples...
stronger forces...
direct scanning...
in the

ANALYTICAL ULTRACENTRIFUGE

As investigations delve ever more deeply into molecular structure and function, the need for and development of advanced accessories for the Model E is inevitable. Several such accessories are briefly described here.

The Photoelectric Scanner

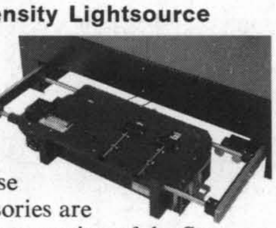


The Scanner looks at the analytical cell through the absorption optical system during centrifugation and, almost instantaneously, translates measures of optical density into chart-recorded curves. Integral and derivative curves are recorded simultaneously, and calibration steps are traced out before each scan. Thus the investigator is freed from the camera, and the developing and handling of film—and has the advantage of seeing what is happening in the cell as it happens.

Since the Scanner utilizes the split-beam photometry principle, double as well as single sector cells can be used with precise results, and the Scanner can also automatically subtract solvent reading in one sector from sample-solvent reading in the other sector to obviate baseline runs. Wavelengths are selectable from 440 mμ to 236 mμ and may be changed during a run.

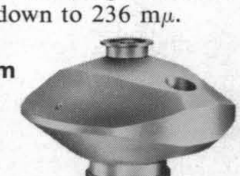
Several applications of direct scanning were reported last year; in one, an association-dissociation study by Gerhart and Schachman (*Biochemistry 4,* 1054), the authors were able to distinguish the catalytic and regulatory protein subunits of aspartate transcarbamylase. Direct scanning was used to follow the binding of 5-bromocytidine triphosphate to separated subunits of the enzyme and the reconstituted enzyme of the same sample.

The Monochromator and High Intensity Lightsource



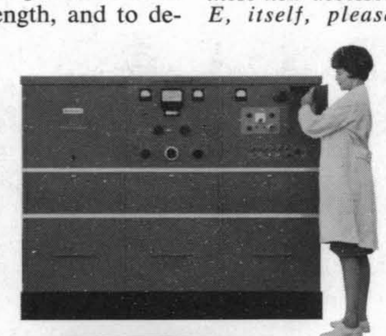
While these two accessories are essential to operation of the Scanner, they can also be utilized independently to add to the versatility of the highly discriminating absorption optical system. The Monochromator provides a selection of wavelengths from 440 mμ to 265 mμ and permits changes in wavelength during a run. It is therefore possible to use lower concentrations, through choice of an appropriate wavelength, and to detect components in the sample whose absorption peaks are at different wavelengths. In itself the Monochromator is primarily for sedimentation equilibrium work. The High Intensity Lightsource provides much more intense monochromatic light to reduce exposure times and facilitate sedimentation velocity studies. It also extends the range of usable wavelengths down to 236 mμ.

The Titanium Rotor



The titanium An-H rotor is identical in configuration to the aluminum An-D, but because of the greater strength-to-weight ratio of the titanium, it can be taken to 68,000 rpm to generate 372,000 *g* at the bottom of the cell, 336,000 *g* at the cell center. Using the stronger forces, Nelson (*J. Biol. Chem. 239,* 3737, 1964) found that multiple peaks too diffused to be recognized with any certainty at previously available speeds became clearly apparent when run at the titanium rotor's maximum speed, and the presence of a third component in the sample could be detected—suggesting another area of usefulness for the rotor.

For additional information on any of these new accessories or on the Model E, itself, please write to Spinco Division of Beckman Instruments, Inc., at the address shown below.



Beckman® INSTRUMENTS, INC.
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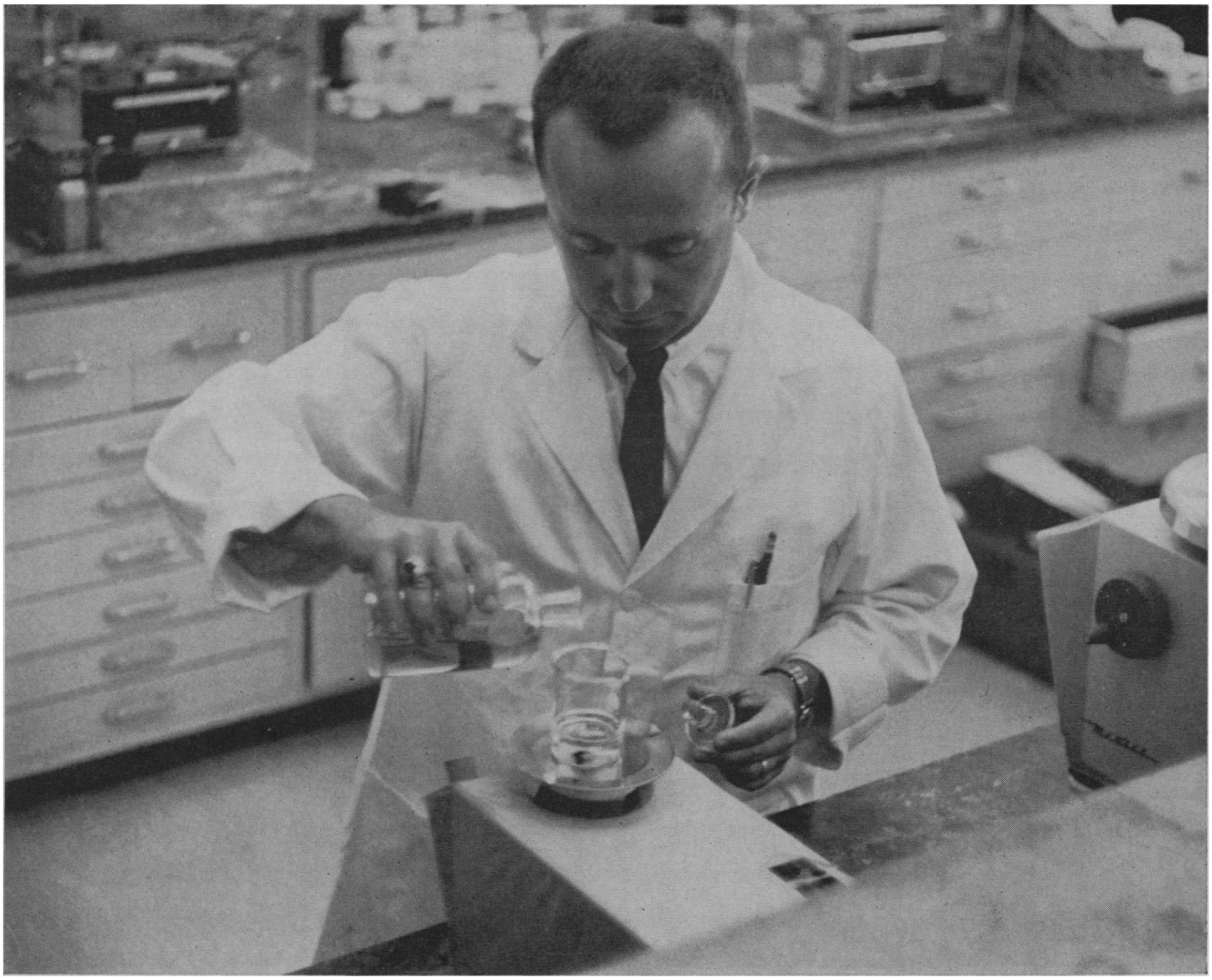

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SCIENCE

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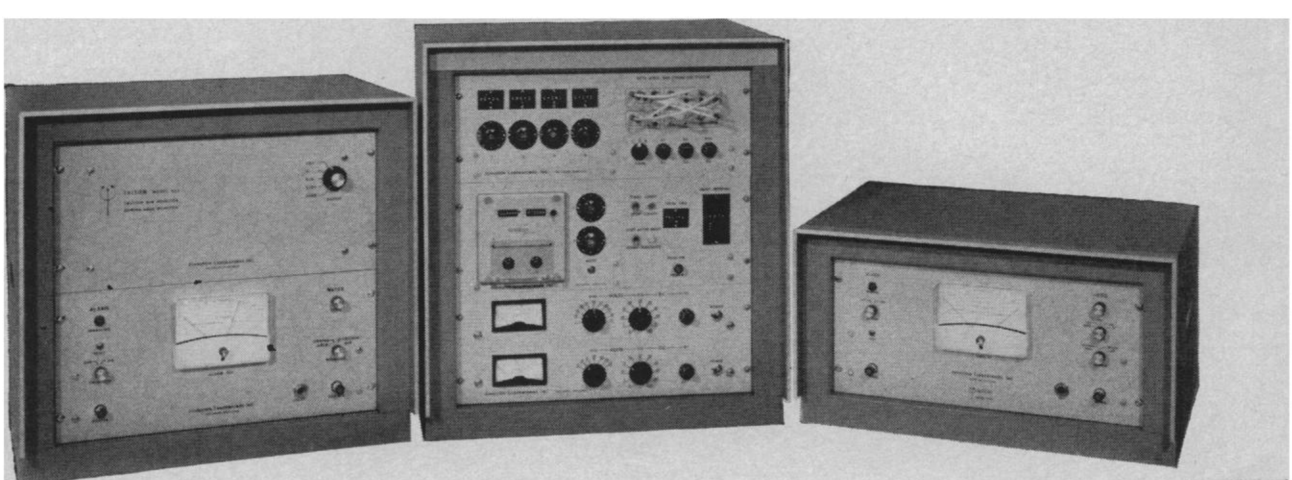
COVER

Surface made of dust and resembling the portion of the lunar surface photographed by Luna 9. The area shown is about 2 feet by 3 feet (0.6 meter by 0.9 meter). The material is dry, commercial Portland cement powder. The surface features were formed by throwing handfuls of powder at the surface in order to simulate the action of low-velocity ejecta from meteorite impacts in lunar soil. See page 290. [Cornell University]



CLOTHES BY DYNASTY OF HONG KONG LTD. CALCULATOR BY MONROE, PHOTOGRAPHED AT SEA PALACE, HONG KONG, BY FRANK WOLFE.

Language is no barrier. Monroe's PC 1421 printing calculator handles the most sophisticated figuring problems—anywhere. The only 10 key printing calculator that automatically marks the decimal. It has a totaling capacity of 21 digits and features half-cent round off.

 MONROE

Parasites as competitors

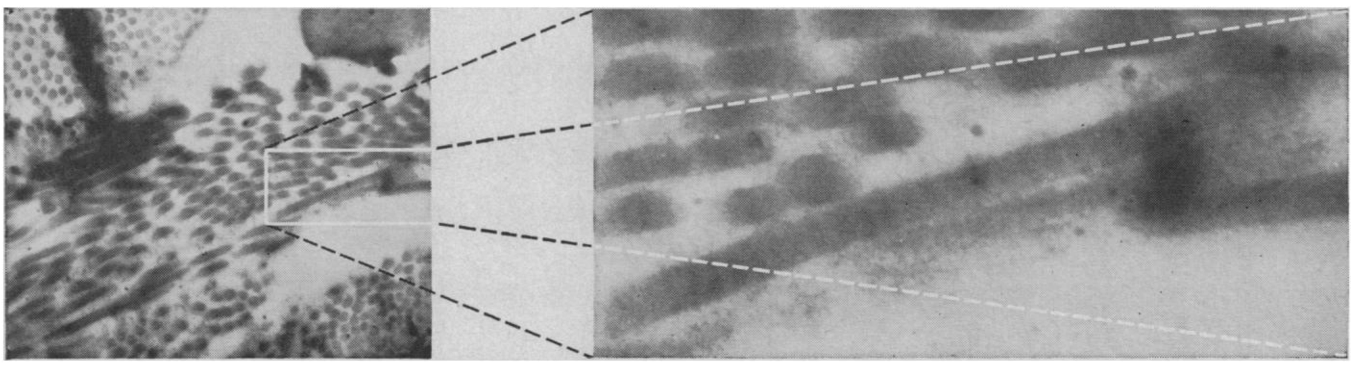
Any established but commercially uncommitted investigator in the field of parasitology who would like to strike up a correspondence with a friendly bunch of chemists can do so by making himself known to Dr. Stanley R. Ames, Distillation Products Industries (Division of Eastman Kodak Company), Rochester, N.Y. 14603.

The feed trade has known our vitamins A and E for a couple of decades. The feed trade uses vitamins to raise the efficiency of conversion of vegetable matter to salable protein and other animal matter. Taking a broad view, we see that vitamins aren't all that affect this efficiency. Both help and competition come from various organisms that live inside the beasts of economic interest. Among the helpers, for example, are the rumen inhabitants of cattle and sheep.* We are looking them over pretty closely. The competitors are known to the practical-minded as parasites. We are looking at them, too, have lots of chemicals, a few ideas, and can use more of both with due precaution properly to identify all intellectual property in advance of discussion.

*While Americans have never taken goats to their hearts, Americans aren't the only people on earth.

Show and tell

August 8, 9, 10, 11, and the morning of 12 we can be met in the corridor just inside the main entrance to the Marine Biological Laboratory at Woods Hole, Mass., by those who have questions about thin-layer chromatography by the convenient EASTMAN CHROMAGRAM System, about recording chromatograms through photography or autoradiography, or about photographic materials and techniques for any other scientific purpose, including the new KODAK Electron Image Plate (*see below*).



More informative electrons

KODAK Electron Image Plates are hereby announced. Here, without change of the original 10,000× magnification obtained from 100-KV electrons, we show it rendering collagen fibers in human skin. We also try to show how much detail is available in the plate for further exploitation by optical enlargement. With the electron microscopes operating at 75KV and 100KV, the high kilovoltage would be driving too many electrons too fast through the emulsion to touch off all the silver halide crystals that ought to be touched off. Further loss of information would be incurred when these lost electrons bounced back into the emulsion, slowed down enough to cause fuzz.

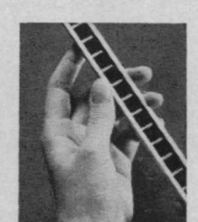
What had to be done about it we have done. While we were at it, in the interests no less of performance than of user convenience, we adapted the new KODAK Electron Image Plate to a developer that comes as a liquid instantly ready for use: KODAK HRP Developer. A mnemonic by which to remember HRP is "high resolution plate," but the bottle delivers more than mnemonic.

Should any communication difficulties develop on this subject with your local photographic supplier, please alert Eastman Kodak Company, Special Applications, Rochester, N.Y. 14650.

Microfilm in short strips

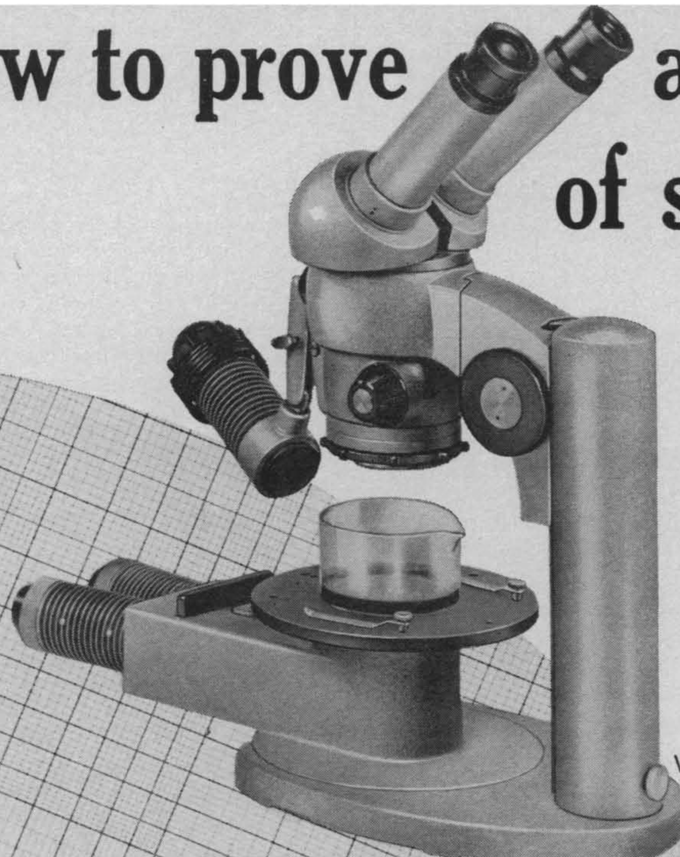
This is an information system that uses ordinary telephones, a pleasant human being, and some easy-to-understand equipment. Nothing should be made any more complicated than necessary. Get in touch with Eastman Kodak Company, Business Systems Markets Division, 770 Broadway, New York City 10003, and ask about the RECORDAK® MICROSTRIP® *System.*

... and if you wish



The hope of doing each other some good prompts these advertisements

Kodak



would not be complete without some mention of the strong and usually successful measures taken by the governments of these countries to prevent the spread of science in them. These measures are seldom known to the stay-at-home American scientist, or to the casual visitor. While inhibitory policies exist in all aspects of science, the ones applying to tangible goods such as scientific instruments are the most easily and objectively treated. A prime tool is the import tariff, which can run 200 to 300 percent. Underdeveloped countries do not produce any significant variety of scientific instruments themselves, so almost everything used must be imported. Hardly anybody ever pays such tariffs, of course; the rest do without, or spend a lot of time lobbying to get an exemption. Only a few exceptionally energetic or prestigious individuals in a few leading institutions succeed with the exemptions, and frequently wait years even then.

Another effective tool is currency controls, which can add several hundred percent in cost, years of delay, and kilograms of paperwork. These often apply even to people who have the tariff exemption.

A third tool for the exclusion of scientific instruments from the underdeveloped country is much less obvious but comparable in effectiveness: the restriction of importers and dealers in such goods. The scientist in a large advanced country, who can get a surprising amount of sophisticated instrumentation into his lab for purchase or trial tomorrow by a phone call today, and most of what he needs in 30 days, finds it hard to imagine a situation where no example exists in his country of an instrument he wants to see, where he has to buy it irrevocably just for a look, where purchase may take years if it is possible at all, and where he has to fix it himself if it misbehaves. The manufacturers are eager for stock, demonstration, and repair, and a number of dealers in such countries are able and willing, but both are prevented by government regulations. How do you even learn the existence of new instruments under such conditions?

Such inhibitions on the tools of science lie on a continuum, with a rank order which correlates closely with degree of underdevelopment. At the top we find countries like Sweden and Switzerland, with modest tariffs generally under 10 percent, free currency convertibility, and strong distribution organizations with stock for sale or demonstration, and repair. Just below we find the United States, differing only in somewhat higher tariffs, up to 25 or 50 percent, but with automatic exemptions for many institutions. Further down lie Spain and Italy, where each item must be imported directly by the user in his own name, under letter-of-credit terms, but where the dealer structure is still strong and most unpleasant details are handled promptly and expeditiously by them. Further yet, in most of Latin America, we find the wild tariffs, incomprehensible currency controls, willing but impotent dealers, very little equipment, and scientists helpless to do the work they want. At the bottom, in Asia and Africa, only the most sensitive antennae pick up any signal at all, and any purchase of modern instrumentation has more to do with miracles than with science, even though the country may be shelling out plenty of hard currency for other commodities, have institutions for research and higher learning, and have some educated people in it.

If the governments of the countries concerned could be persuaded just to get out of the way, the needed equipment would flow in.

LEE CAHN
7500 Jefferson Street,
Paramount, California

Sophistication, Old and New

Let Engel and Catchpole (Letters, 25 March) come into the 20th century. All their examples of the pejorative use of the word "sophisticated"—by Burke, Dryden, Emerson, Disraeli, and, with a final flourish, Pope—are certainly enjoyable, but they are linguistically as dead as their distinguished authors. The *American College Dictionary* gives as its first definition of "sophisticated": "(of a person, the ideas, tastes, manners, etc.) altered by education, worldly experience, etc.; changed from the natural character or simplicity; artificial." As its second: "adapted to the tastes of sophisticates: *sophisticated music*." And only as the last: "deceptive; misleading." The one antonym listed is "naive."

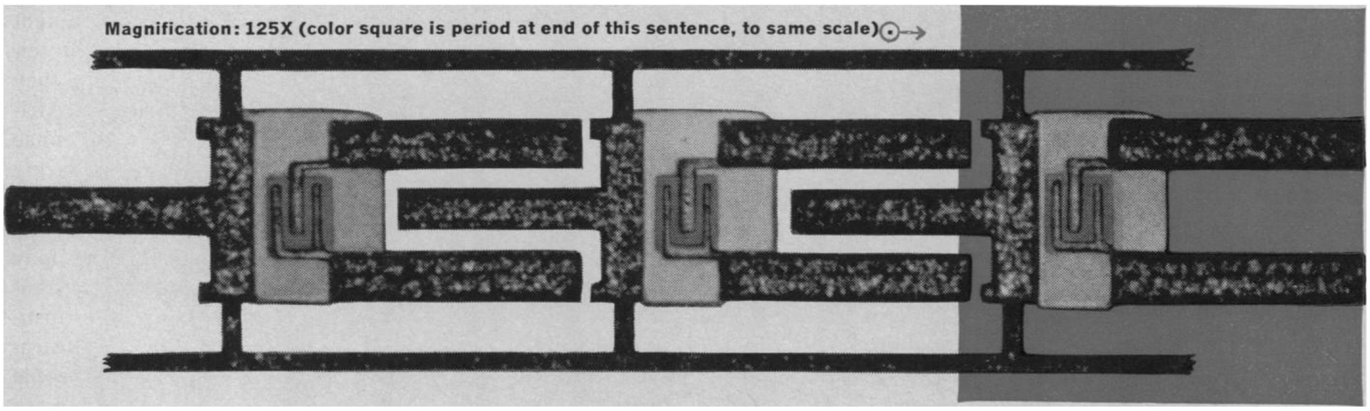
Dear Messrs. Engel and Catchpole, leave archaisms lie; or, better yet, leave them to the unsophisticated.

ROY I. WOLFE
203 Douglas Drive, Toronto, Ontario

Report from

BELL LABORATORIES

"Beam lead" technique for fabricating solid-state devices

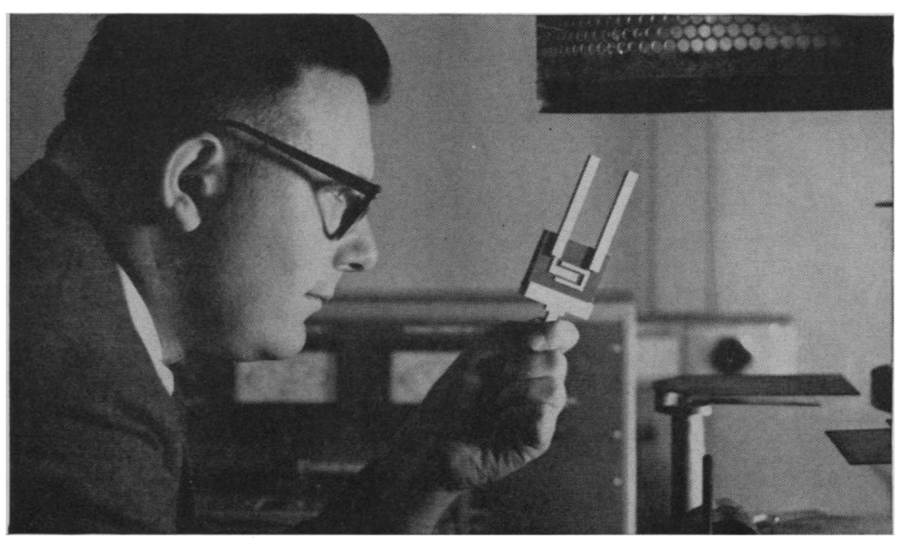


Row or "ladder" of beam-lead transistors fabricated experimentally at Bell Laboratories has a transistor every 16 mils along its length. Each transistor (on light-gray areas) has three beam leads (dark-gray rectangular areas) for electrical and mechanical connection. The side rails at top and bottom of photo are used only for support and ease of handling.

To make tiny solid-state devices and circuits, groups of elements are generally formed on a single semiconductor slice or substrate. Then the slice is "diced" (physically separated) into pieces as either individual units or groups of units for integrated circuits. If used individually, they are connected to terminals or to other devices with short segments of extremely fine wire—a difficult and time-consuming operation. If used as groups of devices, they often need special processing to electrically isolate those making up each circuit.

Bell Laboratories' M. P. Lepselter has developed a promising solution to both of these problems. After the device elements are formed, mechanically strong electrical leads are deposited onto them. These electrically and mechanically intraconnect the devices and circuits. Unwanted semiconductor material between the individual devices in a circuit is then removed . . . isolating them electrically, yet leaving them mechanically joined. This permits batch processing of electrical leads, eliminating many individual connections and requiring only connection to external terminals.

Thus, handling tiny devices and circuits is simplified. The leads, precisely positioned with respect to each other, are easily connected to a circuit board or other support, perhaps eventually by automated techniques. They are strong enough so that the semiconductor wafer or chip needs no further attachment to the substrate. Entire circuits joined by beam intraconnections can be handled as one unit.



M. P. Lepselter examines beam-lead model (enlarged about 300 times). Beams were thermally aged in 360° C steam for 1000 hours, centrifuged to 130,000 G, bent 90° twenty times without failure. Beams can be tapered for smooth impedance matching, widened to act as heat sinks.

15 July 1966, Volume 153, Number 3733

SCIENCE

The Human Use of Computing Machines

The relation of man and computers has entered a new era, in which interaction is becoming quick and simple. A decade ago, use of computers seemed impractical for most scientists. Those conversant with the machines talked of the frustrating hours spent in programming, compiling, and debugging. There were long delays between concept and fruition, as users awaited their turn. Usually the computations merely took advantage of the fact that the new devices were much faster than desk calculators.

In this last decade the speed and memory of computers has been improved. Present-day models calculate 10^7 to 10^8 times as fast as a man does. These developments, however, are not so important as those which make for greater ease of using the machines. A sizable group of very competent men have created libraries of programs and subroutines. Some of them have turned their attention to other quick means of communicating with computers and to the complementary problem of obtaining information from the machine in a much more usable form.

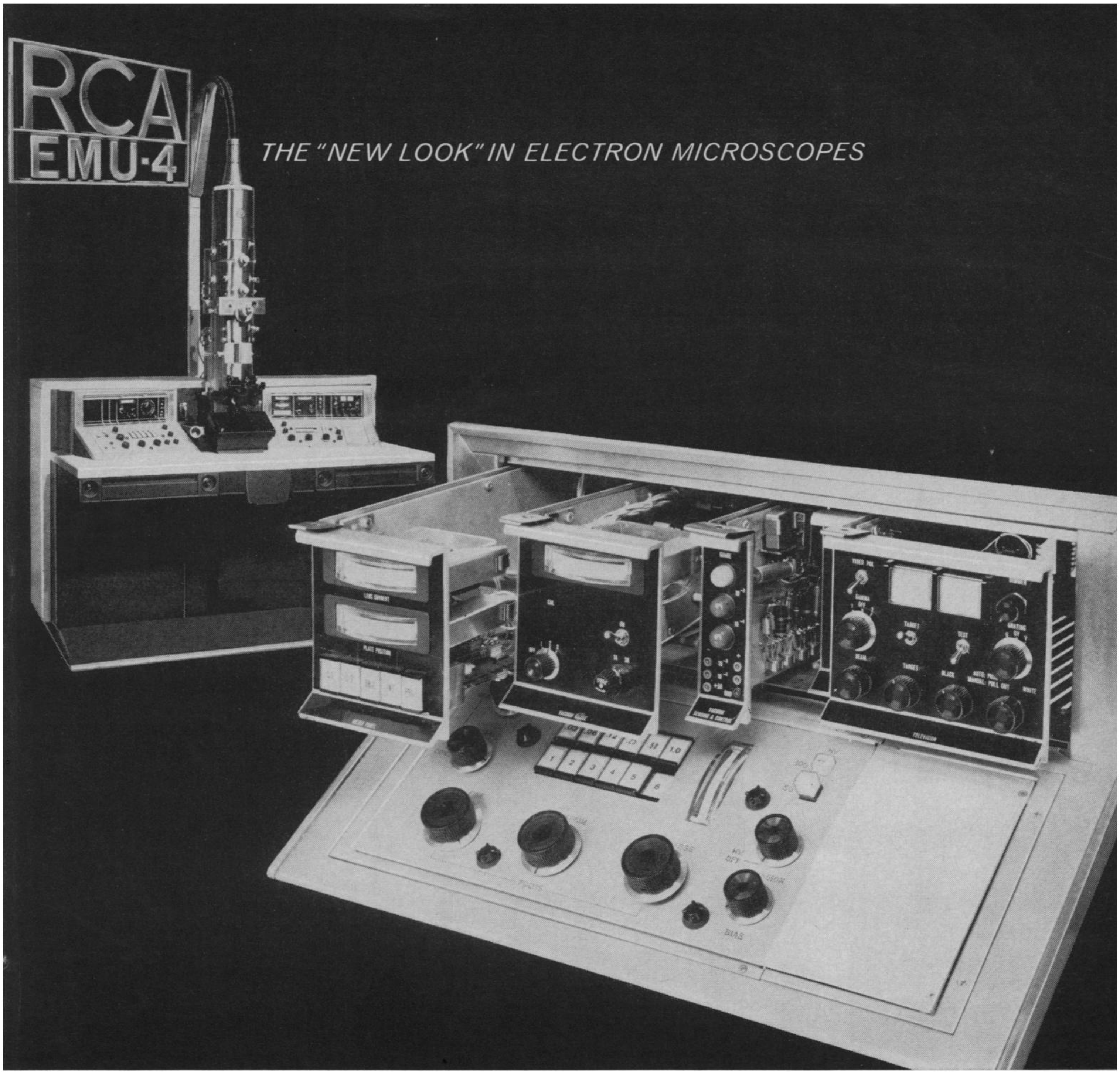
An impressive sample of this progress was presented on 20 and 21 June at a symposium at the Bell Telephone Laboratories, Murray Hill, New Jersey. The audience numbered about 200 and included representatives from more than a hundred universities throughout the country. The group was truly interdisciplinary; it included substantial representation from the humanities, the social sciences, biology and medicine, the physical sciences, and, of course, mathematics and engineering.

At the Bell Laboratories some 1400 men spend at least half their time working with computers, of which 40 are available. These include special-purpose computers for on-line problem solving, a console for handling pictorial input and output, and a computer which takes graphic or symbolic input and delivers auditory output. Under design is a system in which a central machine will serve 200 to 300 typewriter consoles and contain an elaborate program library.

Today, instructions to a computer can often be conveyed by typing simple English or abbreviations. Another means of easy access to the computer is through a console that employs something similar to an oscilloscope screen and a light pen. The computer converts a rough sketch into a finished drawing. Block circuit drawings can be quickly assembled through a series of instructions mediated by a light pen.

The computer can communicate with the user in new, simple forms. To the scientist, perhaps the most impressive development is the graphic presentation of data. Earlier, the output from the machine usually took the form of almost indigestible quantities of printed results. Today a glance at a curve on a screen or the plot of a thousand points can provide an almost instant summation of the same output. Another impressive development is that of teaching a computer to talk. Through manipulation of controls, the investigator can change the character and emphasis of the speech. This work seems to be speeding the day when it will become possible to speak to a computer and to obtain quickly a spoken as well as a visible output.

Improvements in computers and in the ease of using them portend a further great expansion in their use in all the sciences and in many of the humanities. "After growing wildly for years the field of computing now appears to be approaching its infancy."—PHILIP H. ABELSON


RCA
EMU-4
THE "NEW LOOK" IN ELECTRON MICROSCOPES

America, San Francisco, Calif. (G. Thomas, Dept. of Mineral Technology, Univ. of California, Berkeley)

21–26. **Hematology,** 11th intern. congr., Sydney, Australia. (F. P. Walsh, 1 York St., Sydney)

21–26. **Illuminating Engineering** Soc., natl. technical conf., Minneapolis, Minn. (A. D. Hinckley, The Society, 345 E. 47 St., New York 10017)

21–7. British Assoc. for the **Advancement of Science,** 128th annual mtg., Nottingham, England. (Secretary, 20 Great Smith St., 3 Sanctuary Bldg., London S.W.1)

22–24. **Computer and Information Sciences,** symp., Columbus, Ohio. (J. T. Tou, Communication Science Research Center, Columbus Laboratories, Battelle Memorial Inst., 505 King Ave., Columbus, Ohio 43201)

22–24. **Physiology,** 12th Scandinavian congr., Turku, Finland. (K. Hartiala, Dept. of Physiology, Turku Univ., Turku)

22–26. Society of **Photo-Optical Instrumentation** Engineers, 11th annual technical symp., St. Louis, Mo. (R. T. Hedden, 16 Harneywold Dr., St. Louis 63136)

22–26. **Poultry Science** Assoc., Utah State Univ., Logan. (C. B. Ryan, Dept. of Poultry Science, Texas A&M Univ., College Station 77843)

22–27. **Food Science and Technology,** 2nd intern. congr., Warsaw, Poland. (A. Borys, Inst. Przemyslu Miesnego, Rakowiecka 36, Warsaw 12)

22–27. **History of Medicine,** 20th intern. congr., Berlin, Germany. (Secretariat, Augustastr. 37, 1 Berlin 45)

22–27. Pan American Federation of Associations of **Medical Schools,** 1st general assembly, Bogota, Colombia. (E. Braga, Caixa Postal 26-ZC-39, Rio de Janeiro, GB, Brazil)

22–10. **Science,** 11th Pacific congr., Tokyo, Japan. (Pacific Science Assoc., Bishop Museum, Honolulu, Hawaii 96819)

23–25. **Biological Photographic** Assoc., 36th annual mtg., Lexington, Ky. (P. Brook, The Association, Cornell Univ. Medical College, 1300 York Ave., New York, N.Y.)

23–26. **Electronics,** western show and conv., Los Angeles, Calif. (S. Sensiper, WESCON, 3600 Wilshire Blvd., Suite 1920A, Los Angeles 99005)

23–30. **Luminescence,** intern. congr., Budapest, Hungary. (G. Szigeti, Research Inst. for Technical Physics, Hungarian Acad. of Sciences, P.O. Box Ujpest 1, No. 76, Budapest)

23–1. **Radio Astronomy** and the Galactic System, symp., Noordwijk, Netherlands. (J. H. Oort, University Observatory, Leiden, Netherlands)

24–26. Principles of **Radiation Protection,** conf., Oak Ridge, Tenn. (Special Projects Office, Oak Ridge Associated Univs., P.O. Box 117, Oak Ridge, Tenn. 37830)

24–29. International Soc. of **Blood Transfusion,** 11th biennial congr., Sydney, Australia. (G. T. Archer, 1 York St., Sydney)

24–29. **Prehistoric and Protohistoric Sciences,** 7th intern. congr., Prague, Czechoslovakia. (S. J. De Laet, Seminaire d'Archéologie de l'Université, 2 Blandijnberg, Ghent, Belgium)

25. Scandinavian **Pharmacologists**, mtg., Turku, Finland. (K. Hartiala, Dept. of Physiology, Turku Univ., Turku)

25–27. Inter-Union Commission on **Solar and Terrestrial Relationships**, mtg., Belgrade, Yugoslavia. (C. W. Allen, Univ. of London Observatory, Mill Hill Park, London N.W.7, England)

26–29. **Low Temperature Calorimetry**, conf., Otaniemi, Finland. (O. V. Lounasmaa, Dept. of Technical Physics, Inst. of Technology, Otaniemi)

26–29. Rural **Sociological** Soc., annual mtg., Miami, Fla. (J. A. Beegle, Dept. of Sociology and Anthropology, Michigan State Univ., East Lansing)

26–2. **Biometeorology**, 4th intern. congr., Rutgers Univ., New Brunswick, N.J. (F. Sargent, II, 524 Burrill Hall, Univ. of Illinois, Urbana 61801)

27. American Assoc. of **Electromyography and Electrodiagnosis**, San Francisco, Calif. (M. K. Newman, 16861 Wyoming Ave., Detroit 21, Mich.)

27–28. Society for the Study of **Social Problems**, annual mtg., Miami Beach, Fla. (F. F. Lee, Dept. of Sociology and Anthropology, Northeastern Univ., Boston, Mass. 02115)

28–1. Association of American **Geographers**, Toronto, Ont., Canada. (J. K. Hart, 1146 16th St., NW, Washington, D.C. 20036)

28–2. **Hormones**, Laurentian conf., Mont Tremblant, P.Q., Canada. (J. Sanford, 222 Maple Ave., Shrewsbury, Mass. 01545)

28–4. **Electron Microscopy**, 6th intern. congr., Kyoto, Japan. (Chairman of the Organizing Committee, Inst. for Virus Research, Kyoto Univ., Kyoto)

29–1. **Technical Information Center Administration**, 3rd annual conf., Philadelphia, Pa. (M. Warrington, Graduate School of Library Science, Drexel Inst. of Technology, Philadelphia 19104)

29–31. Preparation and Properties of Electronic Materials for **Control of Radiative Processes**, conf., Boston, Mass. (E. P. Warekois, MIT Lincoln Laboratory, Lexington, Mass. 02173)

29–31. **Electronic Materials**, conf., Boston, Mass. (American Inst. of Mining, Metallurgical and Petroleum Engineers, 345 E. 47 St., New York 10017)

29–31. **Instrumentation in Aerospace Simulation Facilities**, 2nd intern. congr., Stanford Univ., Stanford, Calif. (P. L. Clemens, VKF/AP, Arnold Air Force Base Station, Tenn.)

29–31. **Mathematical** Assoc. of America, Rutgers Univ., New Brunswick, N.J. (H. M. Gehman, State Univ. of New York at Buffalo, Buffalo 14214)

29–31. **Metallurgists**, 5th annual conf., Toronto, Ont., Canada. (Canadian Inst. of Mining and Metallurgy, 906 Drummond Bldg., 117 St. Catherine St., W., Montreal 2, P.Q.)

29–31. **Physical Chemistry of Solids**, symp., Univ. of Montreal, Montreal, P. Q., Canada. (W. C. Cooper, Noranda Research Centre, 240 Hymus Blvd., Pointe Claire, P.Q., Canada)

29–31. **Solvent Extraction Chemistry**, intern. conf., Göteborg, Sweden. (The Conference, Dept. of Chemistry, Gibraltargatan 5 H, Göteborg S)

29–31. **Textiles**, Canadian seminar, Queens Univ., Kingston, Ont. (Textile Technical Federation of Canada, 4795 St. Catherine St., W. Westmount, Montreal, P.Q.)

29–1. American **Sociological** Assoc., Miami Beach, Fla. (E. H. Volkart, 1001 Connecticut Ave., NW, Washington, D.C.)

29–2. **Internal Medicine**, Czechoslovak congr., Prague, Czechoslovakia. (O. Riedl, 4th Medical Clinic, Faculty of General Medicine, Charles Univ., U Nemocnice 2n, Prague 2)

29–2. American **Mathematical** Soc., Rutgers Univ., New Brunswick, N.J. (G. L. Walker, The Society, P.O. Box 6248, Providence, R.I.)

29–2. **Neutron Monitoring** for Radiological Protection, symp., Vienna, Austria. (S. Somasundaram, Div. of Health, Safety, and Waste Disposal, Intern. Atomic Energy Agency, Vienna)

29–2. **Operations Research**, 4th intern. conf., MIT, Cambridge, Mass. (K. D. Tocher, United Steel Co., Cybor House, 1–5 Tapton Hall Rd., Sheffield, England)

29–2. American **Physiological** Soc., fall mtg., Baylor Univ., Houston, Tex. (The Society, 9650 Wisconsin Ave., Washington, D.C. 20014)

29–2. **Solar-Terrestrial Physics**, inter-Union symp., Belgrade, Yugoslavia. (E. Herbays, Intern. Scientific Radio Union, 7, pl. Emile Danco, Brussels 18, Belgium)

29–3. Problems of **Animal Nutrition and Feed Production**, symp., Brno, Czechoslovakia. (Vlad. Sevcik, Research Inst. for Animal Nutrition, Feed Science and Technology, Ministry of Agriculture, Pohorelice, Czechoslovakia)

29–3. **Palynology**, 2nd intern. conf., Utrecht, Netherlands. (F. P. Jonker, State Univ., Botanical Museum and Herbarium, Lange Niewatraat 106, Utrecht)

29–23. **Photogrammetry in the Measurement of the Earth's Surface**, symp., Prague, Czechoslovakia. (L. Skladal, Intern. Soc. for Photogrammetry, Hybernska 2, Prague 1)

30–1. Association for **Computing Machinery**, 21st natl. conf., Los Angeles, Calif. (B. R. Parker, P.O. Box 4233, Panorama City, Calif. 91412)

30–1. Society of **General Physiologists**, Marine Biological Laboratory, Woods Hole, Mass. (E. E. Clark, Box 43 Pupin, Columbia Univ., New York 10027)

30–2. **Collection and Processing of Field Data**, symp., Canberra, Australia. (E. F. Bradley, Div. of Plant Industry, P.O. Box 109, Canberra)

30–2. Institute of **Mathematical Statistics**, annual mtg., Rutgers Univ., New Brunswick, N.J. (J. R. Rosenblatt, A337 Admin., Gaithersburg, Natl. Bureau of Standards, Washington, D.C. 20234)

30–3. International **Mineralogical** Assoc., 5th general mtg., Cambridge, England. (C. E. Tilley, Dept. of Mineralogy and Petrology, Downing Pl., Cambridge)

31–2. **Synthesis**, symp., Chemical Inst. of Canada, organic div., Banff, Alta. (R. W. Bachelor, Dept. of Chemistry, Univ. of Alberta, Calgary)

31–3. German Soc. for the History of **Medicine, Physical Science, and Technology**, 49th annual mtg., Braunschweig, West Germany. (A. Hermann, The Society, Deutsches Museum, 8 Munich 26, West Germany)

31–3. Society of **General Physiologists**, annual mtg., Marine Biological Laboratory, Woods Hole, Mass. (Miss E. E. Clark, The Society, Marine Biological Lab., Woods Hole 02543)

31–6. **Low Temperature Physics**, 10th intern. conf., Moscow, U.S.S.R. (V. P. Peshkov, Inst. for Physical Problems, Acad. of Sciences of the U.S.S.R., Lenin Prospekt, Moscow)

31–7. **High Energy Physics**, 13th intern. conf., Univ. of California, Berkeley. (T. H. Chenoweth, Lawrence Radiation Laboratory, Univ. of California, Berkeley 94720)

September

1–3. **Genetics** Soc. of America, Chicago, Ill. (R. P. Wagner, Dept. of Zoology, Univ. of Texas, Austin)

1–5. International College of **Angiology**, 8th annual mtg., Madrid, Spain. (H. E. Shaftel, 50 Broadway, New York, N.Y. 10004)

2–4. **Czechoslovak Soc. of Arts and Sciences in America**, 3rd congr., New York, N.Y. (R. Sturm, Skidmore College, Saratoga Springs, N.Y. 12866)

2–6. American **Psychological** Assoc., 74th annual mtg., New York, N.Y. (A. H. Brayfield, 1200 17th St., NW, Washington, D.C. 20036)

2–6. **Psychometric** Soc., mtg., New York, N.Y. (W. G. Mollenkopf, Procter and Gamble Co., Box 599, Cincinnati, Ohio 45201)

3–5. International Soc. for the **History of Pharmacy**, 40th conf., Heidelberg, Germany. (W. Luckenbach, Friederich-Ebert-Anlage 23a, Postfach 1109, 69 Heidelberg 1 West Germany)

3–7. **Solid State Science**, intern. conf., American Univ., Cairo, Egypt. (A. Bishay, Dept. of Physical Sciences, American Univ. in Cairo, 113 Kasr El Aini St., Cairo, UAR)

4–9. American **Phytopathological** Soc., Caribbean Div., 6th annual mtg., Maracay, Venezuela. (G. Malaguti, Centro de Investigaciones Agronomicas Apartado Postal 4690, Maracay)

4–11. **Sociology**, 6th world congr., Evian, France. (G. G. Reader, Dept. of Medicine, Cornell Univ. Medical College, 1300 York Ave., New York 10021)

5–7. **Rare Earths**, conf., Inst. of Physics and the Physical Soc., Univ. of Durham, Durham, England. (Meetings Officer, Inst. of Physics and the Physical Soc., 47 Belgrave Sq., London S.W.1)

5–8. American **Ornithologists'** Union, mtg., Univ. of Minnesota, Duluth. (L. R. Mewaldt, Dept. of Biological Sciences, San Jose College, San Jose, Calif. 95114)

5–9. **Biophysics**, 2nd intern. congr., Vienna, Austria. (A. K. Solomon, Biophysical Laboratory, Harvard Medical School, Boston, Mass. 02115)

5–9. **Coordination Chemistry**, intern. conf., St. Moritz, Switzerland. (G. Schwarzenbach, Eidg. Technical High School, Zurich)

5–9. Use of **Isotopes in Plant Nutrition and Physiology** Studies, symp., Vienna, Austria. (J. H. Kane, Conferences Branch, Div. of Technical Information, U.S. Atomic Energy Commission, Washington, D.C. 20545)