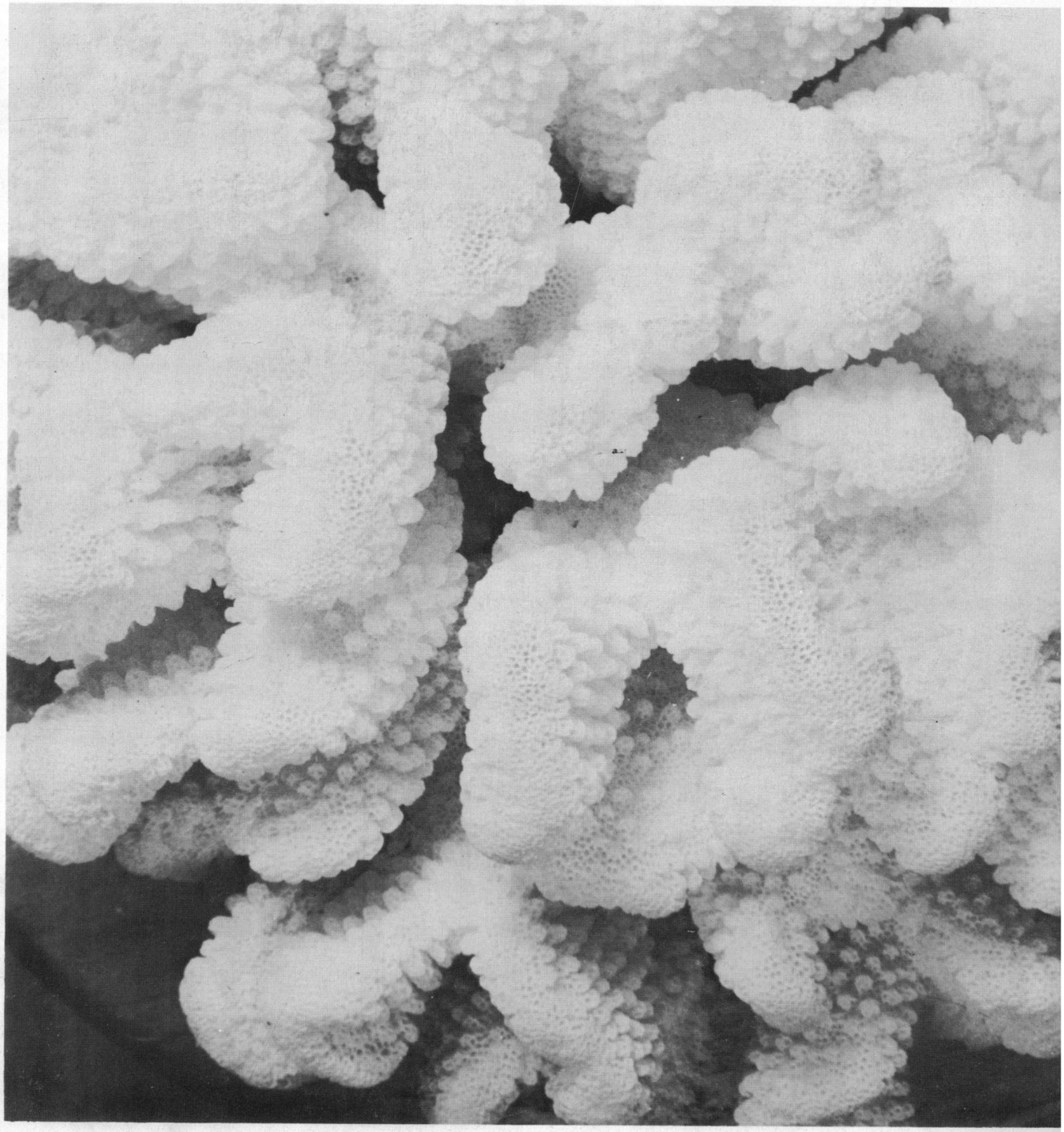
SCIENCE

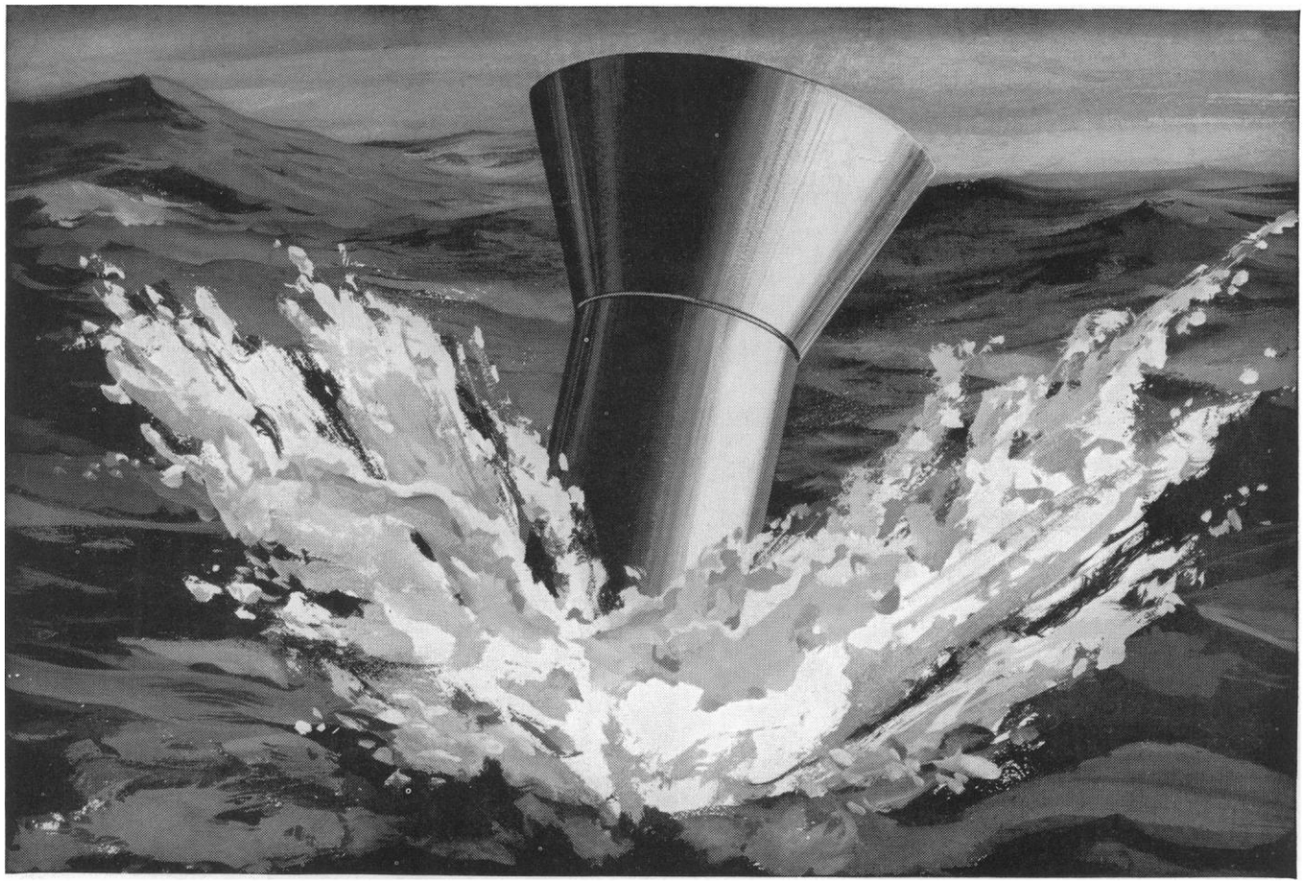
30 June 1961

Vol. 133, No. 3470

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



Index Issue



HOW THE OCEAN GREW "EARS" TO PINPOINT MISSILE SHOTS

A quarter of the world away from its launching pad an experimental missile nose cone enters its ocean target area.

How close has it come to the desired impact point?

Where actually did the nose cone fall?

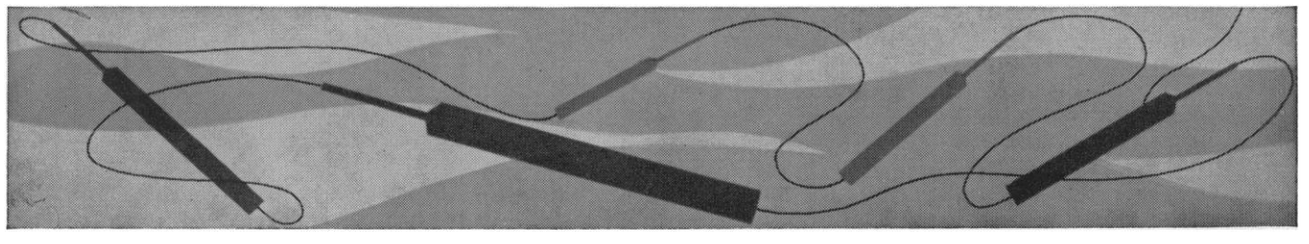
To answer these questions quickly and accurately, Bell Laboratories developed a special system of deep-sea hydrophones—the Missile Impact Locating System (MILS) manufactured by Western Electric and installed by the U. S. Navy with technical assistance from Western Electric in both the Atlantic and Pacific Missile ranges. MILS involves two types of networks.

- One is a long-distance network which utilizes the ocean's deep sound channel. It monitors millions of square miles of ocean. The impacting nose cone releases a small bomb which sinks and explodes at an optimum depth for the transmission of underwater sounds. Vibrations from the explosion are picked up by hydrophones stationed at the optimum depth and carried by cables to shore stations. Time differences in arrivals between these vibrations at different hydrophones are measured and used to compute location of the impact.
- The other is a "bull's-eye" network that monitors a restricted target area with extraordinary precision. This network is so sensitive it does not require the energetic explosion of a bomb but can detect the mere splash of a nose cone striking the ocean's surface—and precisely fix its location.

The universe of sound—above the earth, below the ocean—is one of the worlds of science constantly being explored by Bell Laboratories. The Missile Impact Locating System reflects the same kind of informed ingenuity which constantly reveals new ways to improve the range of Bell System services.

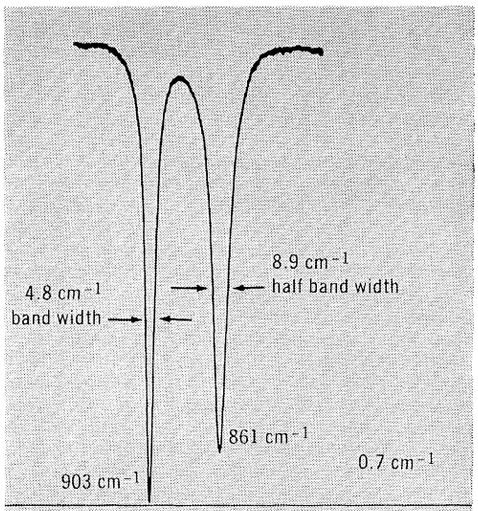
BELL TELEPHONE LABORATORIES

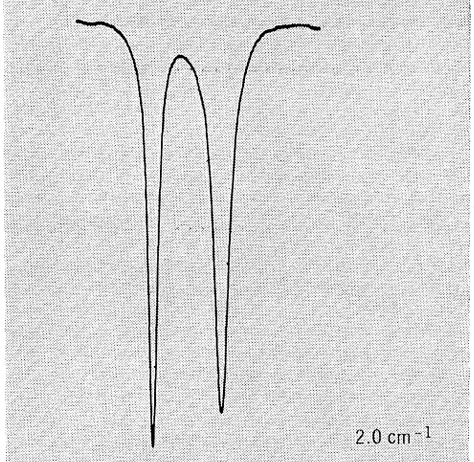
World center of communications research and development

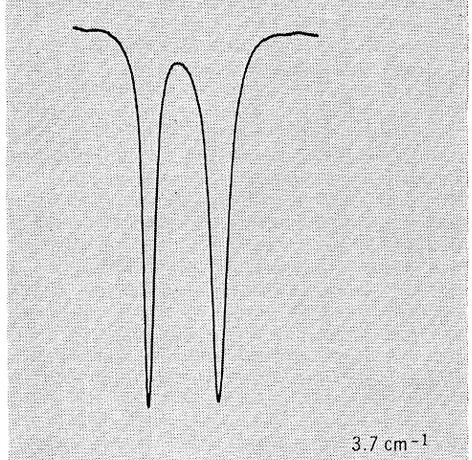


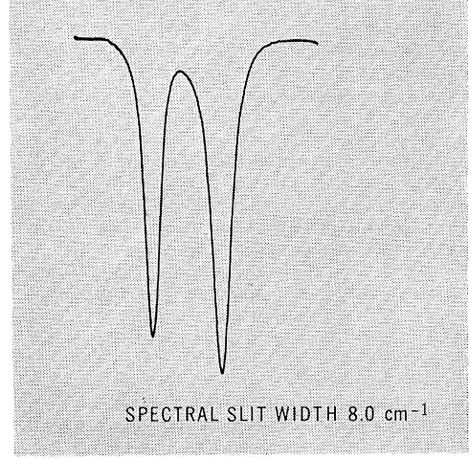
SCIENCE is published weekly by the AAAS, 1515 Massachusetts Ave., NW, Washington 5, D.C. Second-class postage paid at Washington, D.C., and additional mailing office. Annual subscriptions: $8.50; foreign postage, $1.50; Canadian postage, 75¢.

30 June 1961, Volume 133, Number 3470 **SCIENCE**



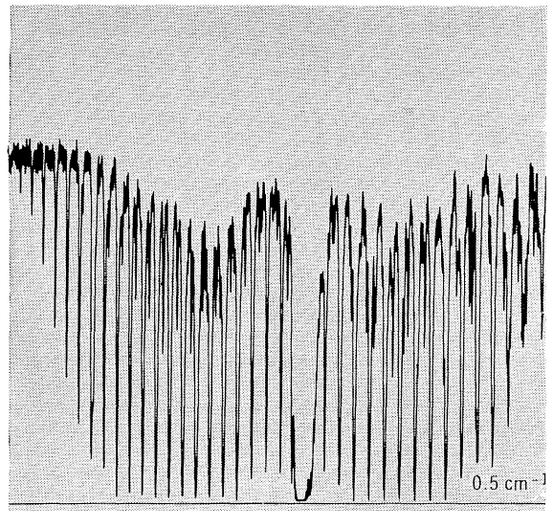


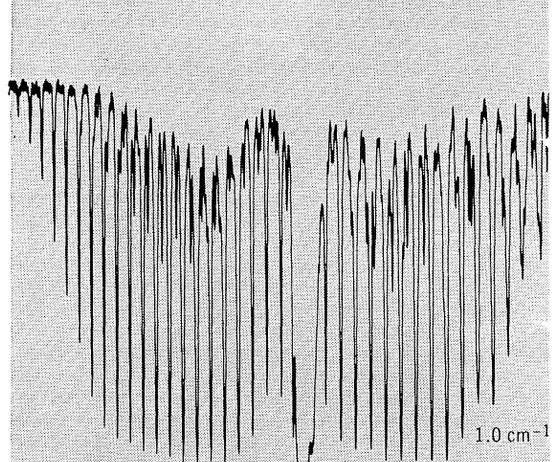


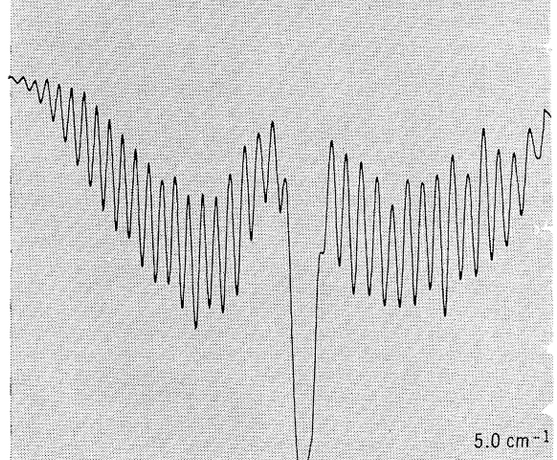


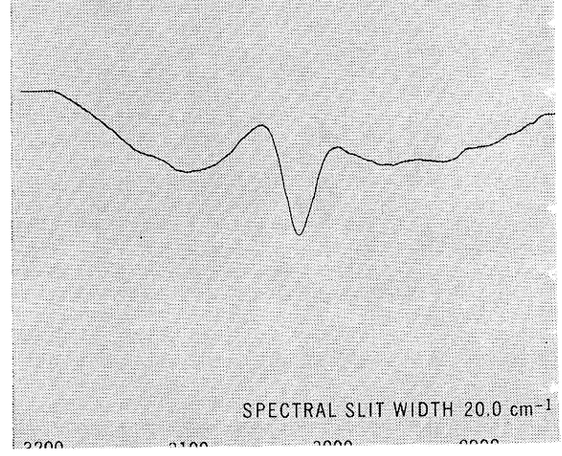
Left, spectrum of a 0.21 mm. thickness sample of spectro-grade cyclohexane demonstrates the importance of high resolution for routine *quantitative analysis.*

Right, the C-H stretching band of methane illustrates the increased research *data obtainable with high resolution spectroscopy.*









Beckman IR... highest resolution for routine quantitative analysis and advanced theoretical studies.

High resolution of the Beckman IR-7 does more than merely separate closely spaced neighboring bands. Note, for instance, how the apparent intensities of the two cyclohexane bands increase with higher resolution. The relatively greater increase in the intensity of the 903 cm^{-1} band at higher resolutions is the result of its narrower half-band width. These two commonly analyzed samples demonstrate the importance of high resolution in both low and high frequency regions and, for both gas and liquid samples. Comparative spectra were run with identical samples; slit width and resolutions, were varied as noted. ⋈ High resolution is essential for *all areas of spectroscopy;* for studies of molecular motion and structure, for differentiating between substances which exhibit similar spectra, and also for providing increased sensitivity and absolute accuracy for quantitative analysis. A further long-run advantage of high resolution is the increased potential for transferring data from one instrument to another. For more information about high resolution spectrophotometers, including indene spectra, write for Data File 38-26-02.

Beckman®
Scientific and Process Instruments Division
Beckman Instruments, Inc.
Fullerton, California

30 June 1961, Volume 133, Number 3470

SCIENCE

SCIENCE, now combined with THE SCIENTIFIC MONTHLY, is published each Friday by the American Association for the Advancement of Science at National Publishing Company, Washington, D.C. SCIENCE is indexed in the *Reader's Guide to Periodical Literature.*

Editorial correspondence should be addressed to SCIENCE, 1515 Massachusetts Ave., NW, Washington 5, D.C. Manuscripts should be typed with double spacing and submitted in duplicate. The AAAS assumes no responsibility for the safety of manuscripts. Opinions expressed by authors are their own and do not necessarily reflect the opinions of the AAAS or the institutions with which the authors are affiliated. For detailed suggestions on the preparation of manuscripts, see *Science* **125**, 16 (4 Jan. 1957).

Advertising correspondence should be addressed to SCIENCE, Room 1740, 11 West 42 St., New York 36, N.Y.

Change of address notification should be sent to 1515 Massachusetts Ave., NW, Washington 5, D.C., 4 weeks in advance. Furnish an address label from a recent issue. Give both old and new addresses, including zone numbers.

Annual subscriptions: $8.50; foreign postage, $1.50; Canadian postage, 75¢. Single copies, 35¢. Cable address: Advancesci, Washington.

One in Eighteen Thousand

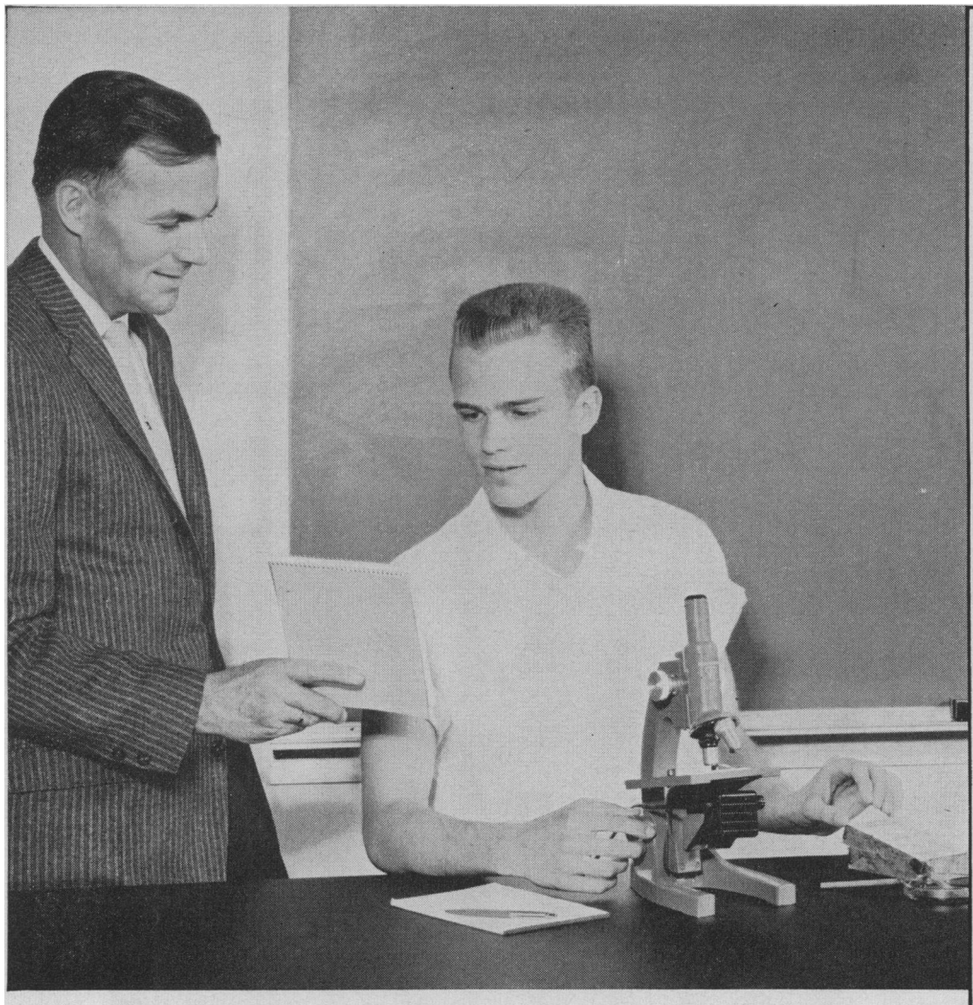
For many scientific purposes an event that happens only once in ten or twenty thousand tries is statistically insignificant; a probability of .0001 or .00005 may, in many cases, be safely disregarded. But in other cases, the focus of interest may be on the unusual event itself—say, a mutation of a gene or the appearance of a strange nuclear particle. The event, though very infrequent, may be of significant interest.

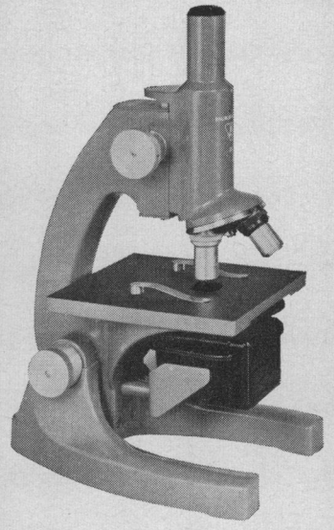
A roughly analogous situation occurs in the administration of human affairs, but the difference lies in the way the event is considered. If the event is unwanted, then steps may be taken to try to prevent its recurrence. The case of Edward L. Yellin is a rare event of this kind. Mr. Yellin, a graduate student in mechanical engineering at the University of Illinois, was given a National Science Fellowship for the academic year 1961–62. His academic record, although it was interrupted by 8 years of work in a steel mill, was excellent; his recommendations were high; and his application included a properly signed and sworn disclaimer of subversive affiliations. Last March, at the time the award was made, there was no reason for the National Science Foundation to suppose that the fellowship was undeserved.

Early in April the House Un-American Activities Committee informed the Foundation that in 1958 Mr. Yellin, who had allegedly been a member of the Communist Party, refused to answer any questions about his activities on the basis of the First Amendment. The Committee also charged that Mr. Yellin, in applying for work at the steel mill, had not indicated that he had had 2 years of college education. Mr. Yellin was cited for contempt of Congress and convicted in 1960. The conviction was upheld upon appeal to a Circuit Court and is now being appealed to the Supreme Court. As a consequence, Mr. Yellin was suspended for 10 days by the University of Illinois. After an unpublicized hearing, at which he is said to have answered all questions fully and frankly, he was reinstated. The clear implication of this action is that the examining committee at Illinois was convinced that Mr. Yellin was morally and intellectually qualified to continue as a student. But the Foundation was not informed of any of these actions or conclusions.

After hearings last week at which members of the Un-American Activities and the House Science and Astronautics committees questioned Foundation officials about the case, the Executive Committee of the National Science Board was convened and the fellowship was revoked on the ground that there was a possibility that the term would be interrupted. Opinion about the wisdom of this action is divided. According to one view, the fellowship might have been suspended to give time for a careful consideration of policy to govern this and future cases. The policy question is: Is conviction for a criminal offense adequate grounds for denying or revoking a fellowship? The law governing fellowships says that they shall be awarded "solely on the basis of ability." The Foundation interprets ability to include, in addition to intellectual capacity, motivation, independence, objective judgment, accuracy, and integrity. Mr. Yellin's record throws doubt upon his qualifications under this broad definition of ability.

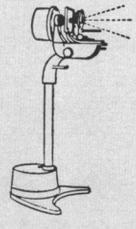
The remedy suggested by this first case of its kind in the 18,000 fellowships that the Foundation has awarded is a simple one. To minimize the chance that so rare an event will occur again the Foundation need only include on its application form a question about the criminal record of the candidate. Cases could then be decided on their merits: some crimes are more relevant than others.—G.DuS.





BAUSCH & LOMB STANDARD TEACHING MICROSCOPES

Standard size and operation, with optics of laboratory microscope excellence.



BAUSCH & LOMB TRI-SIMPLEX MICROPROJECTOR

Projects mounted specimens or living organisms on screen or tracing pad.

BAUSCH & LOMB BUNSEN SPECTROSCOPE

This basic tool of chemical analysis shows spectra of elements.

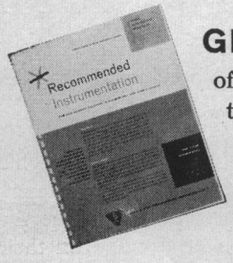
Costs are far less when you buy Bausch & Lomb!

You get extra *years* of use out of this all-time best selling school microscope. And your investment is protected for life.

STANDARD TEACHING MICROSCOPES take all the punishment your students can give them—proved by years of maximum use. And now the new exclusive Bausch & Lomb force-proof clutch and lifetime ball-bearing focus make them even more student-proof!

Like all B&L instruments, they're made in America, to the world's highest standards. They're guaranteed for life against defects in workmanship or materials. A nation-wide network of B&L dealers provides you with prompt service.

That's why it costs you far less to buy B&L.



GET YOUR FREE COPY!

of this data brochure covering the world's finest teaching tools for the balanced science program.

BAUSCH & LOMB
SINCE B&L 1853

BAUSCH & LOMB INCORPORATED
77418 Bausch Street, Rochester 2, N. Y.

Please send Brochure D-152, "Recommended Instrumentation for Life Science Teaching."

NAME, TITLE .....

SCHOOL .....

ADDRESS .....

Meetings

Forthcoming Events

July

24–29. Medical Electro-Radiological Societies, Latin Federation of, 5th congr., Paris, France. (C. Proux, Secretary, 9 rue Daru, Paris 8)

24–30. Urology, 12th intern. congr., Rio de Janeiro, Brazil. (J. Silva de Assis, Secretary, P.O. Box 1275, Belo-Horizonte, Brazil)

26. International Commission for the Prevention of Alcoholism, 7th annual meeting, Washington, D.C. (International Headquarters, 6840 Eastern Ave., NW, Washington 12)

26–28. Detection and Assay of Hormones by Immuno-Clinical Means, Ciba Foundation Colloquium (by invitation only), London, England. (Ciba Foundation, 41 Portland Pl., London, W.1)

27–1. Macromolecular Chemistry, intern. symp., Montreal, Canada. (Organizing Committee, P.O. Box 816, Sarnia, Ontario, Canada)

28–29. Linguistic Soc. of America, Austin, Tex. (A. A. Hill, Box 7790, University Station, Austin 12)

30–2. Soil Conservation Soc. of America, Lafayette, Ind. (H. W. Pritchard, 838 Fifth Ave., Des Moines 14, Iowa)

30–3. International Psycholanalytical Congr., 22nd, Edinburgh, Scotland. (Miss C. de Monehaux, 53 York Terrace, Regents Park, London, N.W.1, England)

31–4. American Crystallographic Assoc., Boulder, Colo. (W. M. Macintyre, Univ. of Colorado, Boulder)

31–4. Biophysics, 1st intern. congr., Stockholm, Sweden. (B. Lindström, Dept. of Medical Physics, Karolinska Institutet, Stockholm 60)

31–4. Differential Equations in Non-Linear Mechanics, Air Force Acad., Colorado Springs, Colo. (J. P. Lasalle, 7212 Bellona Ave., Baltimore 12, Md.)

31–11. Physics of the Solar System and Re-entry Dynamics, conf., Blacksburg, Va. (Bureau of Public Relations, Virginia Polytechnic Inst., Blacksburg)

31–12. Electric Power and Problems of Nuclear Power, seminar, U.N. Economic Commission for Latin America, Mexico, D.F. (A. Dorfman, Chief, Energy and Water Resource Program, Avenue Providencia 871, Santiago, Chile)

August

1–26. Functional Analysis, 8th American Mathematical Soc. summer institute, Stanford, Calif. (P. D. Lax, AMS, 190 Hope St., Providence 6, R.I.)

2–5. International Conf. of Pure and Applied Chemistry, 21st, Montreal, Canada. (R. Morf, Hoffmann-LaRoche, S.A., Grenzachterstrasse 124, Basel, Switzerland)

3–5. Canadian Chemical Conf. and Exhibition, 44th, Montreal. (Chemical Inst. of Canada, 48 Rideau St., Ottawa 2, Ont.)

4–5. Pennsylvania Acad. of Science, 36th summer, Grove City. (J. J. McDermott, Franklin and Marshall College, Lancaster, Pa.)

5–9. International Rorschach Soc., 5th congr., Fribourg-en-Brisgau, Germany. (A. Friedemann, Chemin des Pêcheurs 6, Bienne, Switzerland)

6–10. Occupational Medicine and Toxicology, 3rd Inter-American conf., Miami, Fla. (W. B. Deichmann, School of Medicine, Univ. of Miami, Coral Gables, Fla.)

6–12. Atmospheric Ozone and General Circulation, symp., Arosa, Switzerland. (H. U. Duetsch, 20 Carl Spittelerstrasse, Zürich 53, Switzerland)

6–12. Chemical and Thermodynamic Properties at High Temperatures, symp., Montreal, Canada. (N. F. H. Bright, Natl. Research Council, Ottawa, Canada)

6–12. International Congr. of Pure and Applied Chemistry, 18th, Montreal, Canada. (L. Marion, Natl. Research Council, Ottawa 2, Canada)

7–9. Guidance and Navigation Conf., American Rocket Soc., Palo Alto, Calif. (J. J. Harford, ARS, 500 Fifth Ave., New York, N.Y.)

7–9. International Committee of Electro-Chemical Thermodynamics and Kinetics, 13th meeting, Montreal, Canada. (N. Ibl, Eidg. Technische Hochschule, Laboratorium für Physikalische und Elektrochemie, Universitätsstrasse 6, Zürich 6, Switzerland)

7–9. Space Age Astronomy, intern. symp., Pasadena, Calif. (D. W. Douglas, Jr., Douglas Aircraft Co., Inc., Santa Monica, Calif.)

7–10. National Medical Assoc., New York, N.Y. (J. T. Givens, 1108 Church St., Norfolk, Va.)

7–11. High Temperature Chemistry and Thermodynamics, symp., Montreal, Canada. (L. Brewer, Dept. of Chemistry, Univ. of California, Berkeley)

7–11. Seminar on Fast and Intermediate Reactors, International Atomic Energy Agency, Vienna, Austria. (IAEA, 11 Kärtner Ring, Vienna 1)

8–11. Poultry Science Assoc., State College, Pa. (C. B. Ryan, Texas A & M College, College Station)

8–16. Society of Protozoologists, Prague, Czechoslovakia. (N. D. Levine, College of Veterinary Medicine, Univ. of Illinois, Urbana)

10–16. International Congr. of Biochemistry, 5th, Moscow, U.S.S.R. (N. M. Sissakian, Leninsky prospekt, 33, Moscow, B-71)

10–16. International Union of Biochemistry, 4th general assembly, Moscow, U.S.S.R. (R. H. S. Thompson, IUB, Dept. of Chemical Pathology, Guy's Hospital Medical School, London, S.E.1, England)

12–19. Fast Reactions, summer school, Cambridge, England. (Secretary of the Summer School, Dept. of Physical Chemistry, Lensfield Road, Cambridge)

13–18. Microchemical Techniques, intern. symp., University Park, Pa. (H. J. Francis, Jr., Pennsalt Chemical Corp., P.O. Box 4388, Chestnut Hill Post Office, Philadelphia 18, Pa.)

13–18. Theoretical Aspects of Magnetohydrodynamics, seminar, University Park, Pa. (Conference Center, Pennsylvania State Univ., University Park)

13–19. International Assoc. of Applied Psychology, 14th congr., Copenhagen, Denmark. (Congress Secretariat, 19 Sankt Pederstraede, Copenhagen K.)

13–19. Training for Research in the Processes of Vision, 1st intern. conf., Rochester, N.Y. (Office of Public Information, River Campus Station, Rochester)

14–17. Calorimetry Conf., intern., Ottawa, Canada. (J. E. Kunzler, Bell Telephone Laboratories, Murray Hill, N.J.)

14–19. International Medical Conf. on Mental Retardation, 2nd, Vienna, Austria. (Miss E. Langer, Div. of Maternal and Child Health, State House, Augusta, Maine)

14–19. Symposium on Radiation, Vienna, Austria. (World Meteorological Organization, 1 Avenue de la Paix, Geneva, Switzerland)

14–25. Israel Medical Assoc., 5th world assembly, Jerusalem, Israel. (Beth-Harofeh, 1 Heffman St., Tel-Aviv, Israel)

14–26. Plant Pathology, conf., Lafayette, Ind. (J. F. Schafer, Dept. of Botany and Plant Pathology, Purdue Univ., Lafayette)

14–26. World Eucalyptus Conf., 2nd, São Paulo, Brazil. (Intern. Agency Liaison Branch, Office of the Director General, Food and Agriculture Organization, Viale delle Terme di Caracalla, Rome, Italy)

15–17. International Assoc. of Milk and Food Sanitarians, Jekyll Island, Ga. (H. L. Thomasson, P.O. Box 437, Shelbyville, Ind.)

15–18. Technical Assoc. of the Pulp and Paper Industry, 12th testing conf., Montreal, Canada. (TAPPI, 155 E. 44 St., New York 16)

15–24. International Astronomical Union, 11th general assembly, Berkeley, Calif. (D. H. Sadler, Royal Greenwich Observatory, Hailsham, Sussex, England)

16–18. Hypersonics Conf., intern., Cambridge, Mass. (J. J. Harford, American Rocket Soc., 500 Fifth Ave., New York, N.Y.)

18–21. Association of American Geographers, East Lansing, Mich. (M. F. Burrill, 1785 Massachusetts Ave., NW, Washington 6)

19–30. Agricultural Economists, 11th intern. conf., Cuernavaca, Mexico. (J. Ackerman, Farm Foundation, 600 S. Michigan Ave., Chicago, Ill.)

20–23. International Ergonomics Assoc., 1st congr., Stockholm, Sweden. (T. Olson, Dept. of Industrial Physiology, G.C.I. Lidingövägen 1, Stockholm)

20–24. American Veterinary Medical Assoc., Detroit, Mich. (H. E. Kingman, AVMA, 600 S. Michigan Ave., Chicago 5, Ill.)

21–23. International Hypersonics Conf., Cambridge, Mass. (F. Ridell, Avco Research Laboratory, 301 Lowell St., Wilmington, Mass.)

21–24. Biological Photographic Assoc., Chicago, Ill. (Mrs. J. W. Crouch, Box 1668, Grand Central P.O., New York 17)

21–24. International Conf. on Photoconductivity, Ithaca, N.Y. (E. Burstein, Dept. of Physics, Univ. of Pennsylvania, Philadelphia)

21–26. International Congr. of Psychotherapy, 5th, Vienna, Austria. (W. Spiel, Lazarettg. 14, Vienna 9)

21–26. World Traffic Engineering Conf., Washington, D.C. (Intern. Road Federation, 1023 Washington Bldg., Washington 5)

21–27. International Assoc. of Dental Students, congr., London, England. (D. H. Clark, Royal Dental Hospital, Leicester Sq., London, W.C.2)

21–31. United Nations Conf. on New Sources of Energy, Rome, Italy. (United Nations, New York, N.Y.)

21–2. International Congr. of Practical Medicine, Merano, Italy. (Bundesärztekammer, 1 Hädenkampfstrasse, Cologne, Germany)

21–6. Pacific Science Congr., 10th, Honolulu, Hawaii. (Secretary General, 10th Pacific Science Congr., Bishop Museum, Honolulu)

22–25. International Pharmacological Meeting, 1st, Stockholm, Sweden. (A. Wretlind, Karolinska Institutet, Stockholm 60)

22–30. International Conf. on Protozoology, Prague, Czechoslovakia. (N. D. Levine, College of Veterinary Medicine, Univ. of Illinois, Urbana)

23–25. Gas Dynamics, symp., biennial, Evanston, Ill. (J. J. Harford, American Rocket Soc., 500 Fifth Ave., New York, N.Y.)

23–26. Electron Microscope Soc. of America, Pittsburgh, Pa. (Miss M. L. Rollins, Agricultural Research Service, U.S. Department of Agriculture, P.O. Box 19,687, New Orleans 19, La.)

(See issue of 16 June for comprehensive list)