SCIENCE

30 September 1960

Vol. 132, No. 3431

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

15 THOUSANDTHS OF A SECOND IS A VERY LONG TIME

It's much faster than you can wink an eye, yet time enough for Bell Laboratories' new high-speed switching terminal to transfer your voice to another channel while you are talking by telephone.

The new terminal—recently introduced on the transatlantic cable—uses the idle time in the conversations of talkers on a group of channels to provide paths for other talkers. This time-sharing technique, called Time Assignment Speech Interpolation, permits the sending of 72 simultaneous phone conversations over this deep-sea system where only 36 could be sent before.

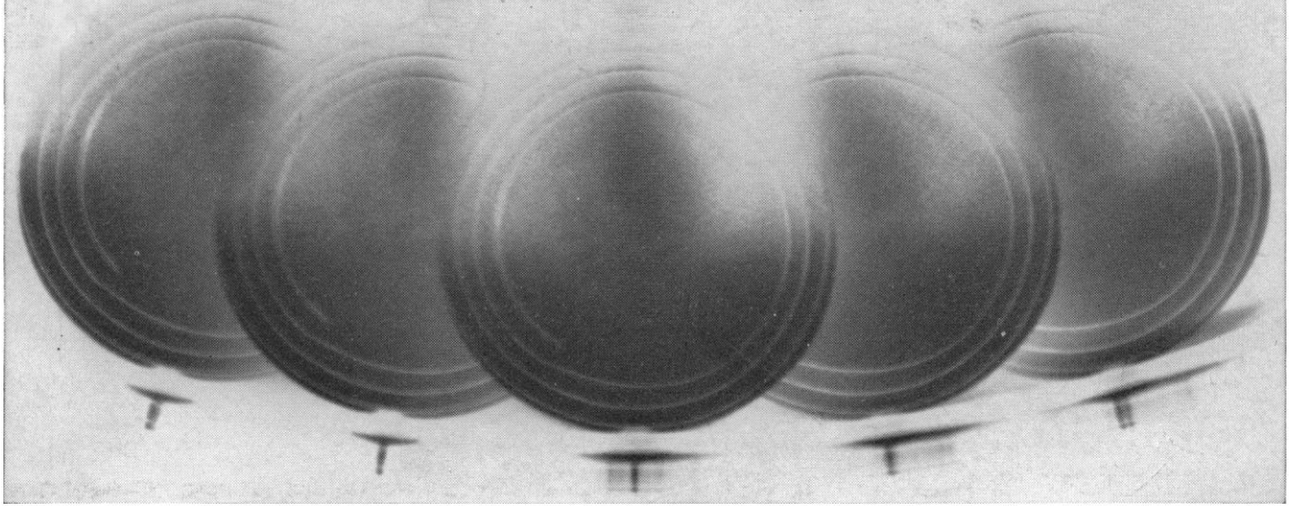
TASI takes advantage of the fact that in a normal telephone conversation you actually talk less than half the time. You do not talk when you are listening, and even when you do talk there are pauses between sentences, words, and syllables. When there are more talkers than channels, TASI puts this idle time to use.

Scanning each circuit thousands of times a second, TASI instantly notices when you aren't talking, then quickly switches in someone who *is*. TASI also notices when you resume talking, immediately finds a channel not in use that moment and switches you to it. Your voice may be switched many times during a single conversation in a time too fast—about 15 milliseconds—for your ear to perceive.

The TASI switching terminal was rendered feasible by the transistor—an invention of Bell Telephone Laboratories. More than 16,000 transistors are employed to achieve the compact, dependable, high-speed circuitry required. TASI is another example of how Bell Laboratories works to keep your telephone service the world's finest.

BELL TELEPHONE LABORATORIES

WORLD CENTER OF COMMUNICATIONS RESEARCH AND DEVELOPMENT



IEC

INTERNATIONAL MODEL PR-2 REFRIGERATED CENTRIFUGE

. . . first choice for blood fractionations and similar low temperature separations.

HERE'S WHY MOST LABORATORY DIRECTORS SPECIFY THE INTERNATIONAL PR-2 FOR LOW-TEMPERATURE SEPARATION

. . . It offers positive temperature control with wide-range versatility for separations between —20° and +10C.
The temperature you set on the control panel is automatically held within ±1°C. In fact, material temperature can be maintained at 0°C indefinitely even at speeds up to 19,000 rpm . . . without subcooling rotor or chamber!

28 INTERCHANGEABLE HEADS . . . horizontal, angle, high-speed, high-capacity and shaker . . . provide accessory combinations to meet virtually all laboratory needs.

WIDE CAPACITY RANGE . . . from 4 liters down to 7 ml. . . . is unmatched in the refrigerated centrifuge class.

Write for Bulletin T.

INTERNATIONAL IEC EQUIPMENT CO.

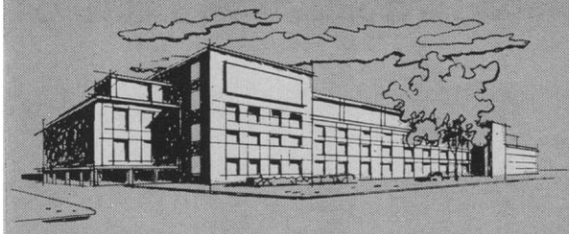
BLDG. NO. 3B, 1284 SOLDIERS FIELD ROAD, BOSTON 35, MASSACHUSETTS

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 September 1960, Volume 132, Number 3431

SCIENCE

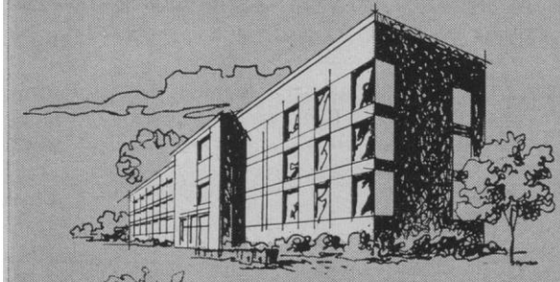
Cover Electron micrograph of the wall of a grain of grass pollen (*Poa annua* L.), made from a thin section of the germinal pore shadowed with platinum. The wall runs from the lower left to the upper right. Of the layers of the wall, the exine is darkest, the mesine is nearly as dark but textured, and the intine is light, similar to the background (left). The cytoplasm is to the right. In the center of the wall is a pore cut medially with an oval plug of exine, overriding a very thin layer of mesine, and the bulging intine (× 25,000). The micrograph was made at the Swiss Federal Institute of Technology, Zurich. [John R. Rowley, University of Massachusetts]



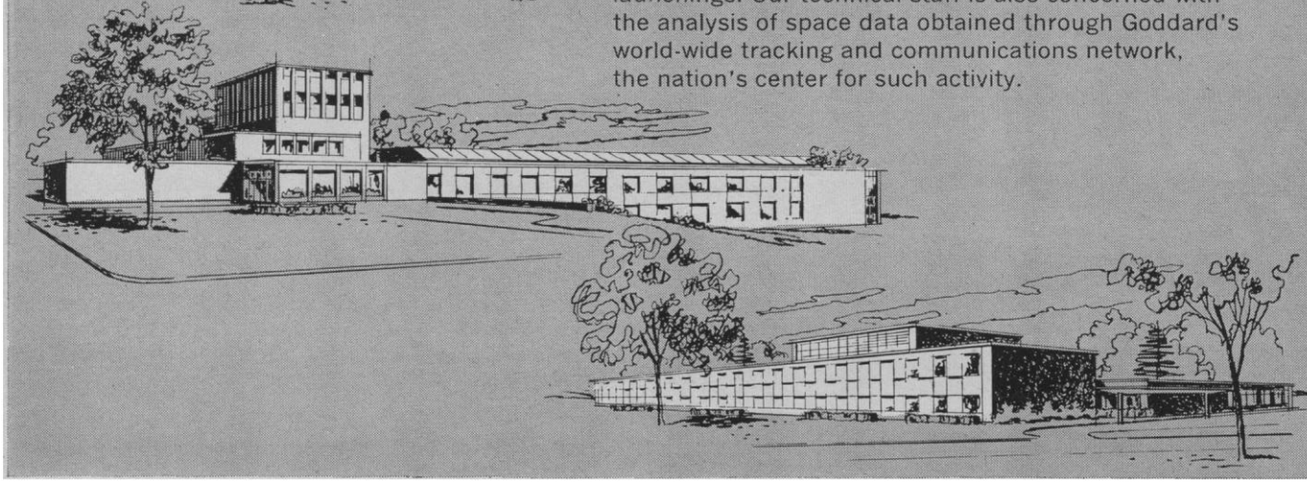
For deeper knowledge of our earth and nearby space, the moon and planets, interplanetary space and distant galaxies . . .

NASA introduces the new

GODDARD
Space Flight Center



The Goddard Space Flight Center has just occupied an ultra-modern research complex situated on 550 acres of rolling parkland in Greenbelt, Maryland, a residential suburb of Washington, D.C. Here, many of our scientists and engineers work to advance space science and technology through a broad program of theoretical study, while others design, develop and construct scientific payloads for space vehicles and supervise their launchings. Our technical staff is also concerned with the analysis of space data obtained through Goddard's world-wide tracking and communications network, the nation's center for such activity.



With Tiros, Echo, Pioneers IV and V, Explorer VII, and Project Mercury, Goddard has already written scientific history. Technical men who wish to work in the van of progress are invited to join Goddard or any of the other NASA research centers listed below. Address your inquiry to the Personnel Director.

National Aeronautics and Space Administration

NASA Goddard Space Flight Center, Greenbelt, Md. • NASA Flight Research Center, Edwards, Calif.
NASA George C. Marshall Space Flight Center, Huntsville, Ala. • NASA Wallops Station, Wallops Island, Va.

30 September 1960, Volume 132, Number 3431 **SCIENCE**

SCIENCE, which is 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. The joint journal is published in the SCIENCE format. SCIENCE is indexed in the *Reader's Guide to Periodical Literature*.

Editorial and personnel-placement 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 or for the opinions expressed by contributors. For detailed suggestions on the preparation of manuscripts and illustrations, see *Science* **125**, 16 (4 Jan. 1957).

Display-advertising correspondence should be addressed to SCIENCE, Room 740, 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. If possible, furnish an address label from a recent issue. Give both old and new addresses, including zone numbers, if any.

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

Who Calls the Tune?

One of the most effective ways for scientists to exchange information and keep abreast of new developments is by way of scientific meetings. International scientific meetings are of especial importance and pose peculiar difficulties because of national policies that interfere with the free movement of scientists from one country to another. Foreign scientists sometimes have trouble getting visas to come to this country, and sometimes they find it impossible. This is one problem, but it is not the only one. Some of our scientists—government scientists—find themselves subject to a special ruling that limits their freedom to attend meetings abroad. This special limitation applies to international meetings that will be attended by scientists from countries not recognized diplomatically by the United States. Before a government scientist can attend such a meeting as a participant or at government expense, the State Department must be satisfied that no scientist from any nonrecognized country will be present. If any scientist from a nonrecognized country plans to attend the meeting, then our government scientists may not go unless they pay their own way. Even if they do pay their own way they may not deliver a paper at the meeting.

The State Department justification for the policy is this: if scientists employed by the government should attend meetings along with scientists from, for example, East Germany or Communist China, our policy of nonrecognition would be weakened. The supporting argument is that nonrecognized countries would make the propaganda claim that our scientists are government officials and that consequently their attendance at meetings with representatives from these countries constitutes *de facto* recognition.

Whatever the merit of the diplomatic issue, it ought to be weighed against the losses that the ruling entails. It is not the individual government scientist alone who loses; the agency that assigns him to attend the meeting is acting in the national interest, and that also suffers. Do we stand to lose more than we gain by our policy? In one way we clearly do. By the simple expedient of sending a representative to a meeting, a nonrecognized country can block the attendance of our government scientists. We thus allow our participation to be governed by these countries rather than by our own national interest.

Another objection to the argument in support of the policy is that even though the scientists in question do work for our government, they do not represent us diplomatically. Thus the presence of government scientists at a meeting of the kind being discussed cannot reasonably be construed—despite the State Department's apprehensions—as a step toward recognition. The International Council of Scientific Unions in 1958 passed a resolution affirming the right of scientists to participate in international scientific activity "without regard to race, religion, or political philosophy" and added that such participation "has no implications with respect to recognition of the government of the country or territory concerned." In April 1960 the Governing Board of the National Academy of Sciences–National Research Council endorsed that resolution.

The next step is up to the State Department—G.DuS.

member, Mathematics Policy Committee, 1952–53; member, mathematics division, National Research Council, 1953–56, executive committee, 1954–56; member, general sciences advisory panel, Department of Defense, 1957–; member, advisory commission for mathematics, National Bureau of Standards, 1954–60, chairman, 1954–57; member, advisory panel for mathematical sciences, National Science Foundation, 1955–58; member, Council, New York Academy of Sciences, 1956–59; member, Conference Board of the Mathematical Sciences, 1960–.

AAAS activities: vice president and chairman, Section A, 1954; member, Board of Directors, 1958–60.

William C. Steere

William C. Steere, 53 (botany), instructor in biology, Temple University, 1929–31; instructor in botany, University of Michigan, 1931–36, assistant professor, 1936-42, associate professor, 1942–46, professor, 1946–50, chairman of the department, 1947–50; professor of biology, Stanford University, 1950–58, dean of the graduate division, 1955–58; director, New York Botanical Garden, 1958–; professor of botany, Columbia University, 1958–; exchange professor, University of Puerto Rico, 1939–40; senior botanist, U.S. Board of Economic Warfare Cinchona Missions, Colombia, 1942–43, Ecuador, 1943–44; senior botanist, Alaska Terrain and Permafrost Section, U.S. Geological Survey, 1949–54; program director, systematic biology, National Science Foundation, 1954–55; president, American Bryological Society, 1936–37; president, American Society of Naturalists, 1957–58; president, Botanical Society of America, 1959; president, American Society of Plant Taxonomists, 1959; editor-in-chief, *The Bryologist*, 1938–54; editor, *American Journal of Botany*, 1953–57.

AAAS activities: vice president and chairman, Section G, 1948; member, Committee on AAAS Meetings, 1959–; committeeman-at-large, Section G, 1959–.

Alan T. Waterman

Alan T. Waterman, 68 (physics), instructor in physics, University of Cincinnati, 1916–17; Yale University, 1919–23, assistant professor, 1923–30, associate professor, 1931–48; vice chairman, division D, National Defense Research Committee, 1942–43; deputy chief, office field service, Office of Scientific Research and Development, 1943–45, chief, 1945–46; chief scientist, planning division, Office of Research and Inventions, 1946; deputy chief and chief scientist, Office of Naval Research, 1947–51; director, National Science Foundation, 1951–; member, Editorial Board, *American Journal of Science;* awarded Presidential Medal for Merit, 1948; first annual Captain Robert Dexter Conrad Award by the Office of Naval Research, 1957; Public Welfare Medal of the National Academy of Sciences, 1960.

AAAS activities: vice president and chairman, Section B, 1955; member, Board of Directors, 1957–60.

Forthcoming Events

October

19–20. American Geophysical Union, Moscow, Idaho. (W. E. Smith, 1515 Massachusetts Ave., NW, Washington 5, D.C.)

19–21. Design of Experiments, 6th conf. (by invitation only), Aberdeen Proving Ground, Md. (F. G. Dressel, Office of Ordnance Research, Box CM, Duke Station, Durham, N.C.)

19–21. Space Navigation, symp., Columbus, Ohio. (Institute of Radio Engineers, 1 E. 79 St., New York 21)

20–21. Hypervelocity, symp., Denver, Colo. (R. R. Dexter, IAS, 2 E. 64 St., New York 21)

20–22. Acoustical Soc. of America, San Francisco, Calif. (V. Salmon, Stanford Research Institute, Menlo Park, Calif.)

20–22. Institute of Management Sciences, 7th intern., New York, N.Y. (J. Townsend, IMS, 30 E. 42 St., New York 17)

21–22. Association of Midwestern College Biology Teachers, 4th annual, Mankato, Minn. (L. Zell, Mankato State College, Mankato, Minn.)

21–22. Research Approaches to Psychiatric Problems, symp., Galesburg, Ill. (T. T. Tourlentes, Galesburg State Research Hospital, Galesburg)

21-23. American College of Cardiology, St. Louis, Mo. (G. F. Greco, 114–08 Linden Blvd., Ozone Park 16, N.Y.)

21–25. American Heart Assoc., annual, St. Louis, Mo. (AHA, 44 E. 23 St., New York 10)

22. Midwest Solid State Conf., 8th annual, Lincoln, Neb. (J. W. Weymouth, Physics Dept., Univ. of Nebraska, Lincoln)

23–26. American College of Gastroenterology, Philadelphia, Pa. (D. Weiss, 33 W. 60 St., New York 23)

24–26. Medical and Biological Aspects of the Energies of Space, symp. (School of Aviation Medicine, USAF Aerospace Medical Center), San Antonio, Tex. (J. Harmon, Symposium Coordinator, Southwest Research Inst., P.O. Box 2296, San Antonio 6)

24–27. Hot Atom Effects, symp., Prague, Czechoslovakia. (International Atomic Energy Agency, 11 Kärntner Ring, Vienna 1, Austria)

25–27. American Standards Assoc., natl. conf., New York, N.Y. (G. F. Hussey, Jr., AST, 70 E. 45 St., New York 17)

26–28. Animal Care Panel, 11th annual, St. Louis, Mo. (ACP, P.O. Box 299, Lemont, Ill.)

26–28. Society for Industrial Microbiology, Conf. on Antimicrobial Agents, Washington, D.C. (SIM, 2000 P St., NW, Washington 6)

GET YOUR ADVANCE COPY

of the General Program of the AAAS New York Meeting by first class mail – early in December

The General Program of the 127th Meeting of the AAAS in New York, 26–31 December 1960, will be available to you, at cost, within the first week in December—whether you can attend the Meeting or not.

Program Content

1. The two-session AAAS General Symposium, "Moving Frontiers of Science V"—Speakers: Edward Anders, H. W. Magoun, George Wald, and H. H. Goldstine; Thomas Park, presiding.
2. The "Challenge to Science" evening with Sir Charles P. Snow, Theodore M. Hesburgh, and W. O. Baker; Warren Weaver, presiding.
3. On "AAAS Day," the three broad, interdisciplinary symposia—Plasma: Fourth State of Matter; Life under Extreme Conditions; and Urban Renewal and Development, arranged by AAAS Sections jointly.
4. The Special Sessions: AAAS Presidential Address and Reception; Joint Address of Sigma Xi and Phi Beta Kappa by Polykarp Kusch; the Tau Beta Pi Address; National Geographic Society Illustrated Lecture; and the first George Sarton Memorial Address by René Dubos.
5. The programs of all 18 AAAS Sections (specialized symposia and contributed papers).
6. The programs of the national meetings of the American Astronomical Society, American Nature Study Society, American Society of Zoologists, History of Science Society, National Association of Biology Teachers, Scientific Research Society of America, Sigma Delta Epsilon, Society for General Systems Research, Society for the Study of Evolution, Society for the History of Technology, Society of Systematic Zoology, and the Society of the Sigma Xi.
7. The multi-sessioned special programs of the American Association of Clinical Chemists, American Astronautical Society, American Geophysical Union, American Physiological Society, American Psychiatric Association, American Society of Criminology, Association of American Geographers, Ecological Society of America, Mycological Society of America, National Science Teachers Association, New York Academy of Sciences—and still others, a total of some 90 participating organizations.
8. The four-session program of the Conference on Scientific Communication: The Sciences in Communist China, cosponsored by the AAAS, NSF, and ten societies.
9. The sessions of the Academy Conference, the Conference on Scientific Manpower, and the conference of the American Council on Women in Science.
10. The sessions of the AAAS Cooperative Committee on the Teaching of Science and Mathematics, and of the AAAS Committee on Science in the Promotion of Human Welfare.
11. Titles of the latest foreign and domestic scientific films to be shown in the AAAS Science Theatre.
12. Exhibitors in the 1960 Annual Exposition of Science and Industry—103 booths—and descriptions of their exhibits.

Advance Registration

Advance registration has these decided advantages: (1) You avoid delay at the Registration Center upon arrival; (2) You receive the General Program in ample time to decide, unhurriedly, which events and sessions you particularly wish to attend; (3) Your name is posted in the Visible Directory as the Meeting opens.

The following coupon may be used both by advance registrants and by those who wish only the advance copy of the General Program.

----------THIS IS YOUR COUPON FOR AN ADVANCE COPY OF THE GENERAL PROGRAM----------

1a. ☐ Enclosed is $3.50 for my advance Registration Fee which brings me the General Program, Convention Badge, and all privileges of the Meeting (50¢ is for first-class postage and handling).

1b. ☐ Enclosed is $2.50 for only the General Program. (It is understood that, if I should attend the Meeting later, the Badge–necessary for the privileges of the Meeting–will be secured for $1.00 more.)
(check 1a or 1b)

2. FULL NAME (Dr., Miss, etc.) .....
(Please print or typewrite) (Last) (First) (Initial)

3. ACADEMIC, PROFESSIONAL, OR BUSINESS CONNECTION .....

4. OFFICE OR HOME ADDRESS .....
(For receipt of General Program)
CITY ..... ZONE ..... STATE .....

5. FIELD OF INTEREST .....

6. CONVENTION ADDRESS .....
(May be added later, after arrival)

Please mail this Coupon and your check or money order for the total amount to the
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE
1515 Massachusetts Avenue, NW, Washington 5, D.C.

27–28. Cellulose Conf., 3rd, Syracuse, N.Y. (Cellulose Research Inst., State Univ. College of Forestry, Syracuse Univ., Syracuse 10)

27–28. Electron Devices, 6th annual, Washington, D.C. (J. Hornbeck, Bell Telephone Labs., Murray Hill, N.J.)

27–29. American Soc. for Aesthetics, Brooklyn, N.Y. (J. R. Johnson, Cleveland Museum of Art, Cleveland 6, Ohio)

27–29. International Assoc. of Milk and Food Sanitarians, Chicago, Ill. (V. T. Foley, Kansas City, Missouri, Health Dept., 21st Floor, City Hall, Kansas City, Mo.)

28–29. Society for the Scientific Study of Religion, 20th, New York, N.Y. (W. H. Clark, Hartford School of Religious Education, Hartford 5, Conn.)

29–3. Photoelasticity, intern. symp., Chicago, Ill. (P. D. Flynn, ISP, Illinois Inst. of Technology, Chicago 16)

31–2. Association of Military Surgeons of the U.S., Washington, D.C. (R. E. Bitner, Suite 718, New Medical Bldg., 1726 Eye St., NW, Washington)

31–2. Electrical Techniques in Medicine and Biology, 13th annual conf., Washington, D.C. (G. N. Webb, Room 547, CSB, Johns Hopkins Hospital, Baltimore 5, Md.)

31–2. Geochemical Soc., Denver, Colo. (K. B. Krauskopf, Geology Dept., Stanford Univ., Stanford, Calif.)

31–2. Geological Soc. of America, Denver, Colo. (F. Betz, Jr., 419 W. 117 St., New York 27)

31–2. Society of Economic Geologists, Denver, Colo. (H. M. Bannerman, U.S. Geological Survey, Washington 25, D.C.)

31–2. Society of Rheology, annual, Pittsburgh, Pa. (J. H. Dillon, Textile Research Inst., Princeton, N.J.)

31–4. American Public Health Assoc., San Francisco, Calif. (B. F. Mattison, APHA, 1790 Broadway, New York 19)

November

1–3. International Cong. on Experimental Mechanics, New York, N.Y. (R. Guernsey, Jr., Soc. of Experimental Stress Analysis, General Engineering Lab., General Electric Co., Schenectady 5, N.Y.)

1–16. International Electrochemical Commission, New Delhi, India. (American Standards Assoc., 70 E. 45 St., New York 17)

2–4. Plasma Physics, 2nd annual, Gatlinburg, Tenn. (A. H. Snell, Oak Ridge Natl. Lab., Oak Ridge, Tenn.)

2–4. Society for Experimental Stress Analysis, Berkeley, Calif. (W. W. Murray, Massachusetts Inst. of Technology, Cambridge)

2–5. American Soc. of Parasitologists, Los Angeles, Calif. (F. J. Kruidenier, Zoology Dept., Univ. of Illinois, Urbana)

2–5. American Soc. of Tropical Medicine and Hygiene, Los Angeles, Calif. (R. B. Hill, 3573 St. Gaudens Rd., Miami 33, Fla.)

2-5. American Speech and Hearing Assoc., Los Angeles, Calif. (K. O. Johnson, 1001 Connecticut Ave., NW, Washington 6)

3–4. Electrostatic Propulsion, conf., Monterey, Calif. (J. M. Sellen, Thompson Ramo-Wooldridge, Inc., 8433 Fallbrook Ave., Canoga Park, Calif.)

3–4. Muscle as a Tissue, conf., Philadelphia, Pa. (Division of Research, Lankenau Hospital, Philadelphia 31)

4–5. West-Central States Biochemical Conf., Lincoln, Neb. (J. H. Pazur, Dept. of Biochemistry and Nutrition, Univ. of Nebraska, Lincoln)

4–6. Assoc. of Clinical Scientists, Washington, D.C. (R. P. MacFate, 54 W. Hubbard St., Chicago 10, Ill.)

5. Society for Industrial and Applied Mathematics, Philadelphia, Pa. (G. Kaskey, Remington Rand Univac, 1900 W. Allegheny Ave., Philadelphia)

7–10. Society of Exploration Geophysicists, 30th annual intern., Galveston, Tex. (C. C. Campbell, Box 1536, Tulsa, Okla.)

8–10. Forensic Sciences, 2nd symp., Washington, D.C. (Director, Armed Forces Inst. of Pathology, Washington 25)

9–10. Use of Secondary Surfaces for Heat Transfer with Clean Gases, symp., London, England. (Secretary, Institution of Mechanical Engineers, 1 Birdcage Walk, London, S.W.1)

9–11. Clinical Chemistry Methods, symp., Cleveland, Ohio. (A. Hainline, Cleveland Clinic, 2020 E. 93 St., Cleveland 6)

10–12. Geological Soc. of America, 73rd conv., Denver, Colo. (H. R. Aldrich, GSA, 419 W. 117 St., New York 27)

10–12. National Assoc. of Geology Teachers, Denver, Colo. (F. Foote, Dept. of Geology, Williams College, Williamstown, Mass.)

(See issue of 16 September for comprehensive list.)