SCIENCE

29 May 1964

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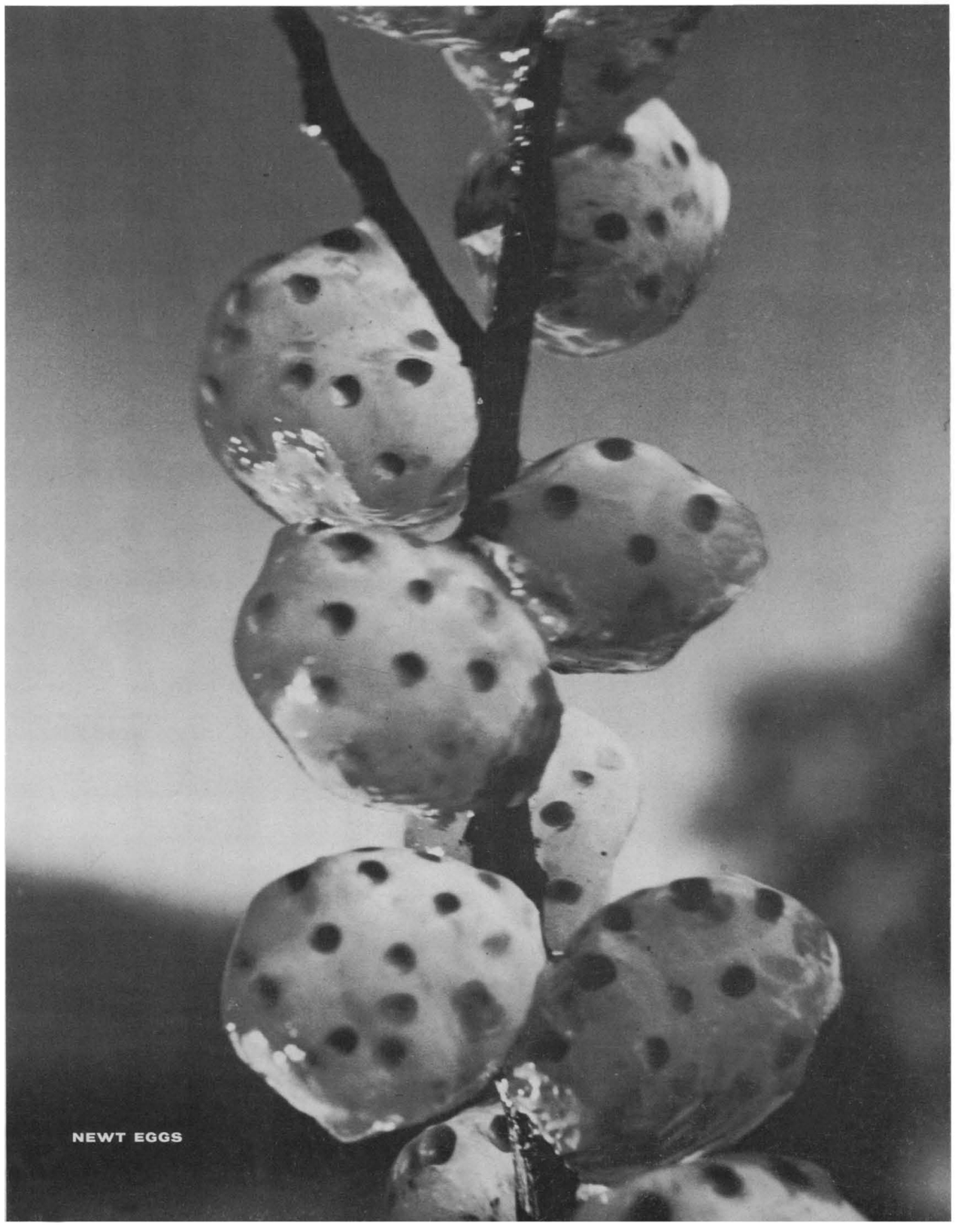
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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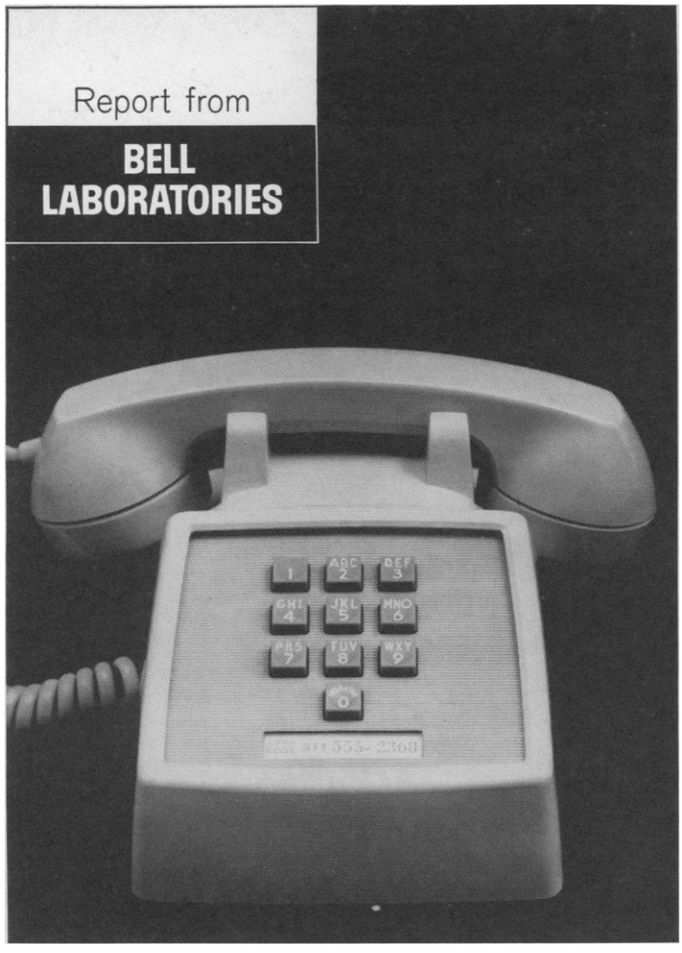
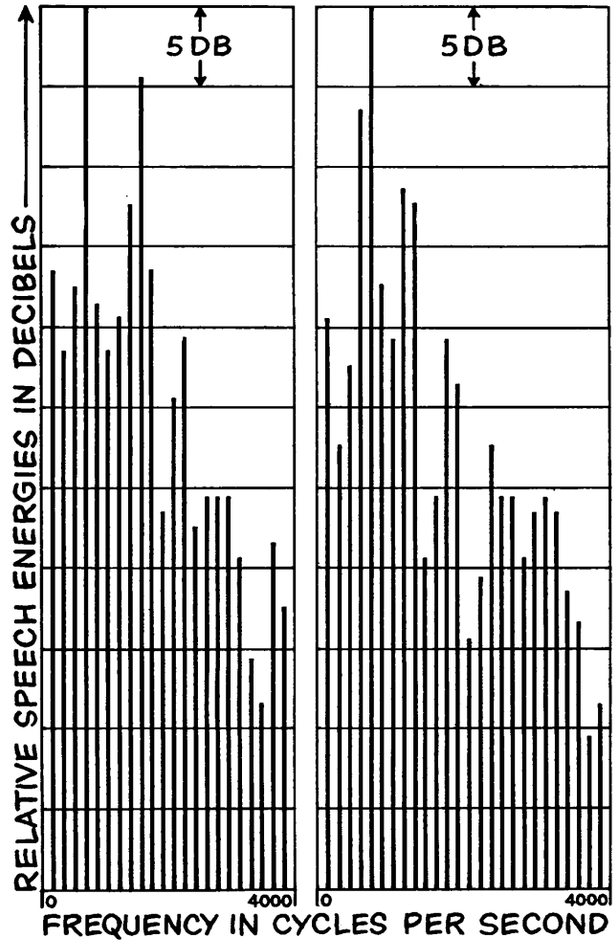


The new TOUCH-TONE® telephone designed by Bell Laboratories. Instead of direct-current pulses from a rotary dial, alternating-current tones are generated by a transistor oscillator within the set and sent, over the voice channel, to the central telephone office.



Fourier analyses of two 6-millisecond segments of male speech vowel sounds. Vertical bars show relative energies of successive harmonics of fundamental speech tones over approximate telephone transmission frequency band.

TONES FOR A TELEPHONE WITHOUT A DIAL

In developing the new TOUCH-TONE® pushbutton telephone (above, left), engineers at Bell Telephone Laboratories faced a challenging problem.

The pushbuttons on the new telephone trigger audio-frequency signals, or audible "musical tones," that register telephone-number digits in the central office. But human voices produce highly complex patterns of speech energy throughout this same range of frequencies (above, right). The problem was to arrange the pushbutton frequencies and design the central office receiver in such a way that automatic equipment would not misinterpret voices or room noises as digits.

Bell Laboratories people, drawing upon a fund of acoustical knowledge built up over years of research and development and upon the results of new experiments, found the solution in the use of multifrequency signaling tones for each digit.

The tones, selected from high and low frequency bands, are used in combinations that seldom occur in speech. In addition, compared to the tones, particular components of speech energy are usually much less stable in frequency and much less uniform in amplitude. Also, speech energy is always made up of many frequency components, whereas the tones used in the TOUCH-TONE® telephone set are substantially pure.

By taking advantage of these characteristics of speech, Bell Laboratories engineers were able to design the signaling system to meet Bell System standards of accuracy and reliability. BELL TELEPHONE LABORATORIES. World center of communications research and development.

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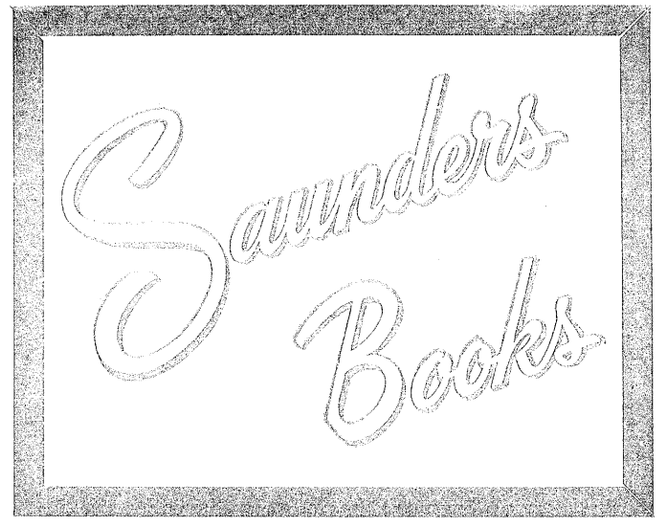

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COVER

Egg clusters of the California newt, *Taricha torosa*. These eggs are laid in shallow ponds and are either unattached or, as shown here, attached to twigs or reeds. Each embryo (black dot within an egg cluster) contains about 1 milligram of tarichatoxin; this amount is capable of killing eight 20-gram mice when it is injected subcutaneously (× 3). See page 1100.

Dr. Harold Edgerton had a fully developed positive and a negative just 20 seconds after he took this multiple exposure of a .22 caliber bullet cutting a single copper wire. He used his new EG&G Multiple Microflash® unit with a Speed Graphic loaded with **Polaroid P/N 4x5 film.**

is lost. Some of these compounds were labeled "chromatographically homogeneous" by manufacturers; others were listed as "99%." It should be pointed out that at least one manufacturer sells a special grade labeled "thymine-free." This indicates the vast difference between "chromatographically pure" and "purified by chromatography."

DAVID FREIFELDER

Donner Laboratory, University of California, Berkeley

Archives

Apropos of your recent discussions of the MURA problems (31 Jan., p. 450), I have resurrected the attached document.

AIUR never had the prestige of AMSOC, but it flourished at MIT shortly before World War II and briefly thereafter. Publication dates were irregular, and I think that this was the last. The occasion was the receipt of a letter of intent from Brookhaven for the design of the present Cambridge accelerator. I thought it might have at least historical interest for your readers.

PROCEEDINGS OF THE AMERICAN INSTITUTE FOR USELESS RESEARCH
FEBRUARY 3, 1953

Progress in the design of charged particle accelerators during the past two decades, has been marked by an exponential growth in the energies about to be achieved, of approximately 2.5 db per year. It is well established that the cost of the equipment increases at least linearly with the energy. Thoughtful scientists have been increasingly uneasy about the future because the national income has increased at the rate of only 0.5 db per year over the same period. This leads to the conclusion that there is danger the ultimate expected particle energies will be determined by the national income instead of scientifically acceptable natural laws.

Happily, the initial results of a long-range program sponsored by the Institute lay these fears to rest. Professor L. S. Coupling* reports that there is a limit to earthbound particle energies of 3×10^{15} ev. The result follows since particle energy

$$E = \frac{eb\,R\,E_0}{m_0\,c}$$

Professor Coupling assumes an iron core machine with a practically attainable flux density $B \approx 2$ webers/m^2 and a maximum radius of curvature equal to the earth's, $R \approx 6.4 \times 10^6$ meters.

At the going rate of 10^3 ev/$, the ultimate proton accelerator will cost about $3000 billion, which is only 10 db above present national income. Thus we can easily afford the machine by spreading the payments over 10 years, and a joint effort with Russia would make it even easier.

In addition to these welcome results, Professor Coupling finds that, by a fortunate coincidence, the recently established limiting rate of energy increase of 10^5 ev/cm means that the accelerator can be built to have a length very close to 36×10^6 meters, and will therefore just nicely go around the world once. Besides the economy of having the target and the injection system at the same latitude and longitude, he feels the scientific world will be esthetically gratified at this particularly elegant result. He suggests that the instrument be named the "Circumtron," although other members of the Institute feel that a Greek-derived name is more in keeping with the elegance of it, and prefer "Perimetron" or "Peritron."

* No relation to the notorious science fiction writer, J. J. Coupling.

STUART T. MARTIN

WCAX-TV, Burlington, Vermont

One-Tailed Test of Trivia

Mario Bunge is certainly correct in saying (27 Mar., p. 1394) that in research a clear statement of the problem is essential—not only to the reader of the final report but also to the researcher himself, since a careful statement of the problem often suggests the best way to attack it. But I should like to add a cautionary note to his statement that "scientific research does not begin with gathering data but with posing problems." Unfortunately, there are those who go farther and say that the gathering of data must be preceded by a specific "experimental hypothesis."

Many subjects of research involve steady accumulation of data even when the causal relations are so obscure or complex that elaborate hypotheses in advance are impossible, for example in the behavioral sciences or in meteorology. The proposition that one must always have a detailed hypothesis at the beginning and cling doggedly to it until the final bit of the Latin square falls into place is, in my opinion, responsible for many of the trivia that are cluttering our journals more and more. It also leads to that greatest abomination of all, the so-called "one-tailed test of significance," a ploy in which the researcher claims partial precognition and informs us that he knew in advance that treatment X could only produce either an increase in Y or no change, never a decrease.

W. DIXON WARD

Department of Otolaryngology, University of Minnesota, Minneapolis

29 May 1964, Volume 144, Number 3622

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Too Much Freedom of Information

The Federal Council for Science and Technology has instructed the grant-making agencies of the federal government to release successful proposals freely to the public media and, as far as seems appropriate, to any inquiring individual. This order imposes an undue burden on the agencies involved and should be reexamined with respect both to the amount of detail to be released and the policy of release to any inquiring individual.

Some kinds of information about each grant should certainly be made public, but not necessarily all details of the proposal. For example, it is understood that research plans are subject to change as the work proceeds. Why, then, require public access to these tentative plans? A request for a grant also gives individual salaries and other administrative and financial details that some institutions consider confidential. To meet some of these difficulties, the National Science Foundation warns applicants that information they consider confidential should be given in a separate statement accompanying the proposal. The National Institutes of Health saves trouble for itself and its grantees by instructing applicants to divide their proposals into two parts, a brief statement that will be made public and a more detailed one that will not.

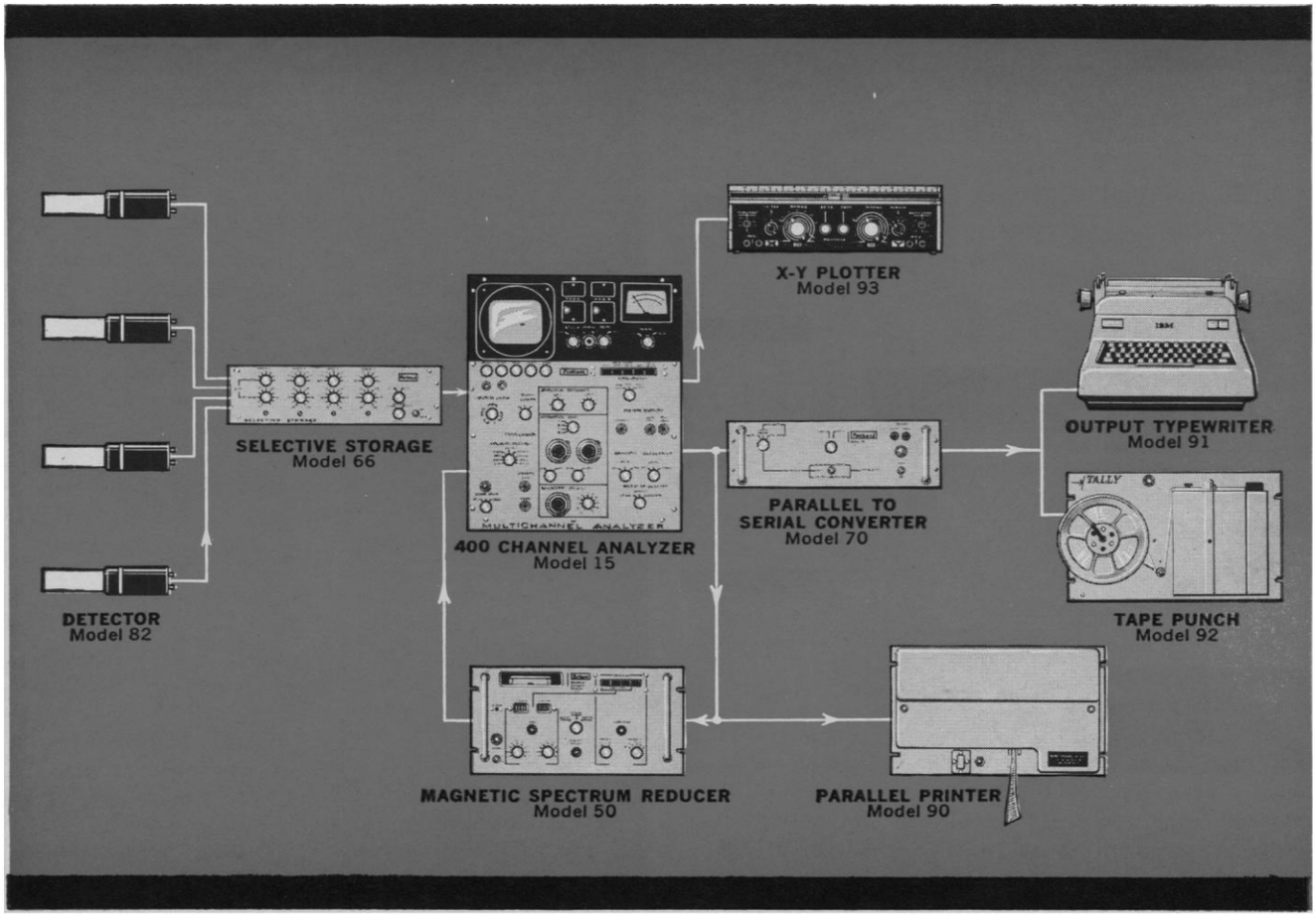
The federal agencies are trustees of public funds, and their methods of operation should be publicly known, but that objective is satisfactorily achieved by the routine publication of these essential items for each grant: the granting agency, the recipient, the principal investigator, the amount of money, and a brief description of the purpose. No more should be required, but agency and recipient should both be privileged to give out fuller information whenever that seems desirable. And it can be expected that the significant findings and procedures will later be described in detail if the work itself justifies publication.

The requirement that information be released to any inquiring individual raises other problems. Here are two specific examples.

An apparatus manufacturer wanted to examine all NSF proposals that might contain apparatus ideas of commercial interest. NSF offered to let the Scientific Apparatus Manufacturers Association examine such proposals if it would then distribute the information impartially among manufacturers. This offer was declined; each manufacturer can do his own searching. NSF has recently had to supply office space and clerical help for a week to the first manufacturer's representative while he examined 500 proposals, hunting for commercially interesting apparatus ideas.

A university representative copied a successful application for a grant to support a program of science education. The university then submitted an essentially duplicate proposal and demanded that, since the original had been granted, the duplicate must also be granted, for it obviously met the same standards.

The agencies should not be required to release tentative research plans, salaries, descriptions of equipment to be used, or other such details in advance of the work. Nor should they be at the mercy of any trouble-making, self-seeking, or merely curious individual. The public interest will be better served if the agencies can concentrate on deciding which grants should be made in the future instead of on answering miscellaneous questions about the ones that have already been made.—DAEL WOLFLE



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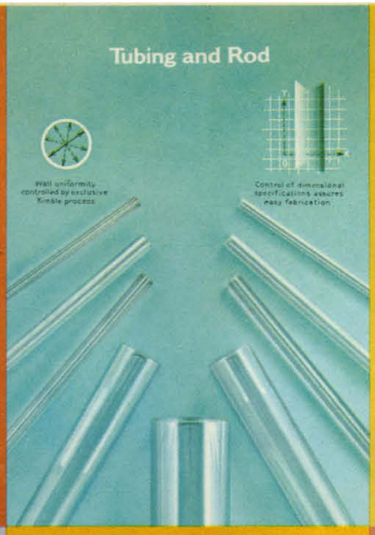

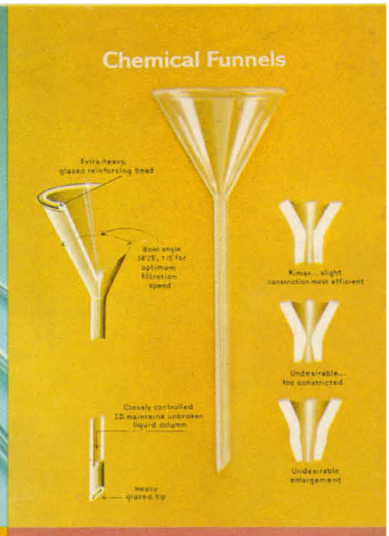

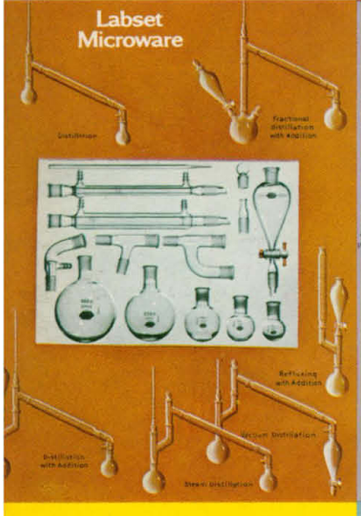

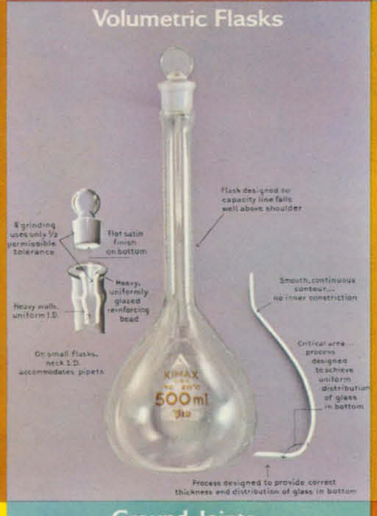

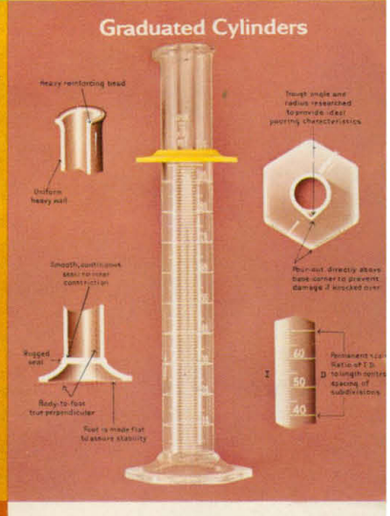

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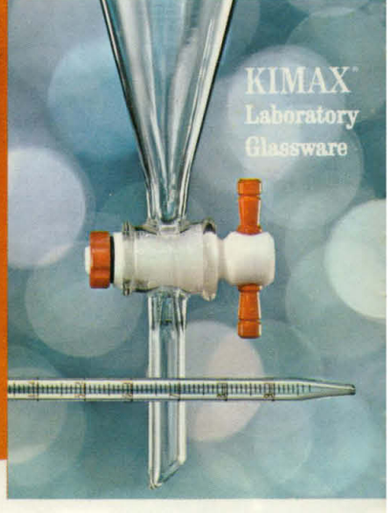

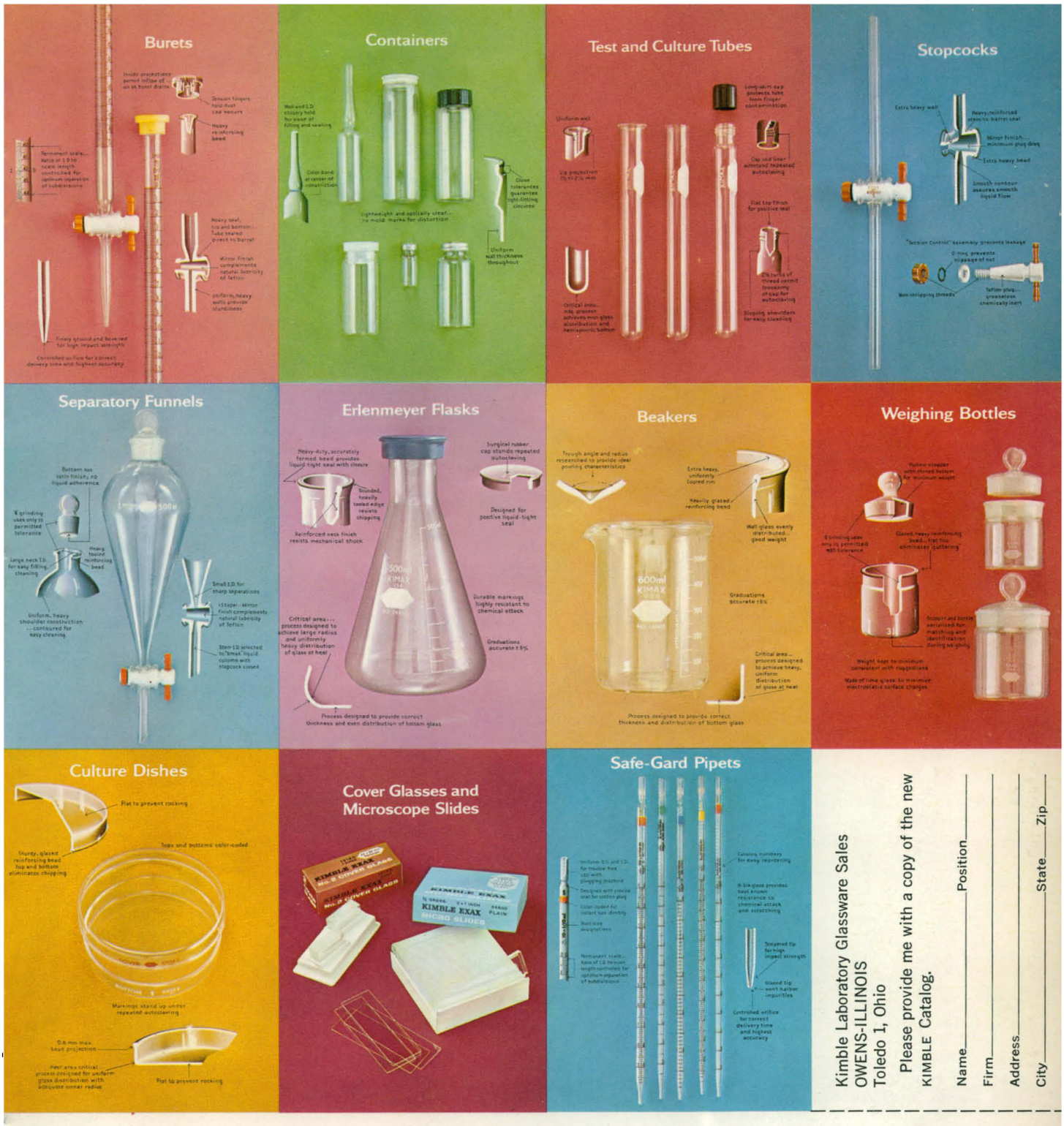

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en, these enzymes (or this enzyme) can bypass many clotting-factor deficiencies. Whether this may have practical application in the therapy of coagulation disorders is a matter for future investigation.

JOHN H. FERGUSON
University of North Carolina, Chapel Hill

Forthcoming Events

June

2–3. **Photovoltaic Specialists**, 4th annual conf., Cleveland, Ohio. (P. Rappaport, RCA Laboratories, Princeton, N.J.)

2–4. **Global Communications**, intern. symp. (Globcom VI), Philadelphia, Pa. (R. Guenther, RCA Communications Systems Div., Bldg. 1-3-1, Camden, N.J.)

2–4. **Telemetering**, natl. conf., Los Angeles, Calif. (W. S. Pope, 8420 Quinn St., Downey, Calif.)

2–5. **Food Microbiology**, 4th intern. symp., Göteborg, Sweden. (N. Molin, Swedish Inst. for Food Preservation Research, Göteborg 16)

2–6. **Acoustical** Conf., 3rd., Budapest, Hungary. (Acoustics Div., Hungarian Soc. of Optics, Acoustics, and Film Techniques, Szabadság tér 17, Budapest 5)

2–6. **Opthalmic-Optics**, intern. congr., Copenhagen, Denmark. (Danmark Special Optiker-Forening, Vesterbrogade 41B, Copenhagen 5)

3–5. Collaborative **Pesticides** Analytical Committee, 8th, Wageningen, Netherlands. (R. de B. Ashworth, c/o Plant Pathology Laboratory, Hatching Green, Harpenden, Hertfordshire, England)

3–10. American **Metalworking Technology** for the European Community (AMTEC), Brussels, Belgium. (E. L. Koester, ASTM, 10700 Puritan Ave., Detroit, Mich.)

7–9. National Public Relations Council of **Health and Welfare Services**, New York, N.Y. (The Council, 257 Park Ave. S., New York 10010)

7–9. **Isotopically Labeled Drugs** in Experimental Pharmacology, conf., Chicago, Ill. (L. J. Roth, Dept. of Pharmacology, Univ. of Chicago, Chicago 60637)

7–11. **Special Libraries** Assoc., St. Louis, Mo. (Mrs. J. North, Missile and Space Div., Lockheed Aircraft Corp., Palo Alto, Calif.)

7–12. **Mass Spectrometry** and Allied Topics, 12th annual conf., Montreal, Quebec, Canada. (N. D. Coggeshall, Gulf Research and Development Co., P.O. Drawer 2038, Pittsburgh, Pa. 15230)

7–13. European **Ophthalmological** Soc., 2nd congr., Vienna, Austria. (J. François, 15, Place de Smet de Naeyer, Ghent, Belgium)

8–9. Basic **Cancer Research**, 2nd Scandinavian symp., Stockholm, Sweden. (K. E. Hellström, c/o Riksföreningen mot Cancer, Postgiro 90 19 51, Stockholm)

8–10. **Quasi-Optics**, symp., Polytechnic Inst. of Brooklyn, 14th, New York, N.Y. (Polytechnic Inst. of Brooklyn, 55 Johnson St., Brooklyn 1)

8–11. **Cardiovascular** Conf., 2nd intern., St. Adele, Quebec, Canada. (D. F. M. Bunce, Dept. of Physiology, College of Osteopathic Medicine and Surgery, Des Moines, Iowa)

8–11. International **Planned Parenthood Federation**, conf. of region for Europe, Near East, and Africa, London, England. (J. Bettie, 6 Pembroke Rd., London, W.1)

8–12. **Surface Contamination**, intern. symp., Gatlinburg, Tenn. (B. R. Fish, Health Physics Div., Oak Ridge Natl. Laboratory, P.O. Box X, Oak Ridge, Tenn.)

9. International Assoc. for the **Prevention of Blindness**, Vienna, Austria. (J. P. Baillart, 47, rue de Bellechasse, Paris 7°, France)

9–11. **Cobalt Applications**, intern. meeting, Brussels, Belgium. (Cobalt Information Center, Battelle Memorial Inst., 505 King Ave., Columbus 1, Ohio)

9–11. **Electromagnetic Compatibility**, 6th natl. symp., Los Angeles, Calif. (J. A. Eckert, Dept. 3441/32, Northrop Norair, 3901 West Broadway, Hawthorne, Calif.)

9–12. Canadian Federation of **Biological Societies**, Halifax, N.S. (A. H. Neufeld, The Federation, Univ. of Western Ontario, London, Ont., Canada)

9–12. **Max Planck Soc. for the Furtherance of Science**, general meeting, Hamburg, Germany. (Max-Planck Gesellschaft zur Förderung des Wissenschaften e.V., Düsseldorf, Germany)

10–12. **Heat Transfer and Fluid Mechanics**, Berkeley, Calif., (S. Levy, General Electric Co., 150 Curtner Ave., San Jose, Calif.)

10–19. **Intergovernmental Oceanographic Commission**, 3rd session, Paris, France. (W. S. Wooster, Office of Oceanography, UNESCO, Place de Fontenoy, Paris 7°)

11–13. **Manufacturing Chemists'** Assoc., 92nd annual, White Sulphur Springs, W. Va. (MCA, 1825 Connecticut Ave., NW, Washington, D.C.)

11–13. **Population** Assoc. of America, San Francisco, Calif. (P. C. Glick, Bureau of Census, Washington, D.C. 20233)

13–19. **Medical Film Festival**, Helsinki, Finland. (W. M. A.-Film Finmedicas, Ullanlinnankatu 1, Helsinki)

13–19. **World Medical Assoc.**, 18th general assembly, Helsinki, Finland. (H. S. Gear, 10 Columbus Circle, New York, N.Y. 10019)

14–17. American Assoc. of **Feed Microscopists**, 12th annual, Hot Springs, Ark. (G. M. Barnhart, Missouri Dept. of Agriculture, State Office Bldg., Jefferson City)

14–17. American **Nuclear** Soc., 10th annual, Philadelphia, Pa. (O. J. DuTemple, 244 E. Ogden Ave., Hinsdale, Ill. 60502)

14–18. **Industrial Pharmaceutical Research**, 6th natl. conf., Land O'Lakes, Wis. (L. W. Busse, 190 Pharmacy Bldg., Univ. of Wisconsin, Madison 6)

14–18. **Health Physics** Soc., 9th annual, Cincinnati, Ohio. (H. F. Kolde, Taft Sanitary Engineering Center, Cincinnati)

14–19. **Alpha Chi Sigma** Fraternity, Greenvale, L.I., N.Y. (M. L. Griffin, 5503 E. Washington St., Indianapolis, Ind.)

14–19. **Cardiology**, 7th inter-American congr., Montreal, P.Q., Canada. (The Congress, 2052 St. Catherine St., W., Montreal 25)

14–20. National **Speleological** Soc., annual conv., New Braunfels, Tex. (J. H. Estes, 2818 S. 39 St., Abilene, Tex. 79605)

15–16. Association for **Applied Gnotobiotics**, 4th symp., East Lansing, Mich. (C. K Whitehair, Dept. of Pathology, Michigan State Univ., East Lansing)

15–17. **Lattice Defects in Quenched Metals**, intern. conf., Argonne, Ill. (The Conference, Bldg. 212, Argonne Natl. Laboratory, Argonne)

15–17. Institute of **Navigation**, 20th annual, New York, N.Y. (P. Rosenberg, 330 Fifth Ave., Pelham, N.Y. 10803)

15–17. American **Neurological** Assoc., 89th annual, Atlantic City, N.J. (M. D. Yahr, 710 West 168 St., New York, N.Y.)

15–18. American Soc. of **Limnology and Oceanography**, 27th annual, Miami Beach, Fla. (G. H. Lauff, ASLO, Sapelo Island Research Foundation, Sapelo Island, Ga.)

15–18. **Materials**, 2nd intern. symp., Berkeley, Calif. (T. H. Chenoweth, 276 Hearst Mining Bldg., Univ. of California, Berkeley 94720)

15–19. **Antibiotics**, intern. congr., Prague, Czechoslovakia. (V. Vlôek, Antibiotics Research Inst., Roztoky near Prague)

15–19. **Molecular Spectroscopy**, symp., Columbus, Ohio. (H. H. Nielsen, Dept. of Physics, Ohio State Univ., 174 W. 18 Ave., Columbus 43210)

15–19. **Technical Writers**, 12th annual inst., Troy, N.Y. (J. R. Gould, Rensselaer Polytechnic Inst., Troy)

15–21. **Women Engineers and Scientists**, 1st intern. conf., New York, N.Y. (E. Eaves, 18 Third Ave., Port Washington, N.Y. 11050)

15–3. **Relativity**, teaching at undergraduate level, Arlington, Tex. (J. Ellis, Dept. of Physics, Arlington State College, Arlington)

15–4 Sept. **Gordon Research Conf.**, New Hampshire. (W. G. Parks, Dept. of Chemistry, Univ. of Rhode Island, Kingston)

16–17. **Computer Augmentation of Human Reasoning**, symp., Washington, D.C. (W. D. Orr, TRW Computer Div., 8433 Fallbrook Ave., Canoga Park, Calif.)

16–18. **Entomological** Soc. of America, Pacific Branch, annual, Long Beach, Calif. (W. W. Allen, 112 Agric. Hall, Dept. of Entomology, Univ. of California, Berkeley)

17–19. **Microscopy**, 11th intern. symp., Chicago, Ill. (MICRO-64, McCrone Research Inst., 451 E. 31 St., Chicago 60616)

17–20. American College of **Angiology**, Las Vegas, Nev. (A. Halpern, 11 Hampton Court, Great Neck, N.Y.)

17–20. International Assoc. for the Study of the **Bronchi**, 14th congr., Vienna, Austria. (Secretariat, The Congress, c/o Wiener Medizinische Akademie für Arztliche Fortbildung, Aslerstr. 4, Vienna 9)

18–19. **Patent, Trademark, and Copyright Research** Inst., 8th annual conf., George Washington Univ., Washington, D.C. (PTCR Inst., George Washington Univ., Washington, D.C. 20006)

18–19. American **Rheumatism** Assoc., San Francisco, Calif. (J. A. Coss, Jr., 20 E. 76 St., New York, N.Y. 10021)

18–20. **Community Psychiatry**, conf., Univ. of Wisconsin, Madison. (L. M.

Roberts, 1300 University Ave., Madison)

18–20. **Endocrine** Soc., San Francisco, Calif. (H. H. Turner, 200 N. Walker, Oklahoma City, Okla.)

18–20. American Assoc. of **Physics Teachers**, summer meeting, Madison, Wis. (H. R. Crane, Dept. of Physics, Univ. of Michigan, Ann Arbor)

18–20. **Space Technology**, 4th European symp., Rome, Italy. (A. Eula, Associazzione Italiana Razzi, Piazzo Santo Bernardo 101, Rome)

18–20. **Sulfite Pulping**, conf., Chicago, Ill. (Technical Assoc. of the Pulp and Paper Industry, 360 Lexington Ave., New York, N.Y. 10017)

18–22. American College of **Chest Physicians**, San Francisco, Calif. (M. Kornfeld, 112 E. Chestnut, Chicago, Ill.)

19. **Parenteral Drug** Assoc., Philadelphia, Pa. (The Association, Broad and Chestnut Sts., Philadelphia 7)

19–20. American **Geriatrics** Soc., 21st annual, San Francisco, Calif. (AGS, 10 Columbus Circle, New York, N.Y. 10019)

19–27. **Chemical Engineering**, European conv., Frankfurt am Main, Germany (Chicago Section, American Chemical Soc., 86 E. Randolph St., Chicago 1, Ill.)

21. **Surface Physics**, Providence, R.I. (W. H. Brattain, Bell Telephone Laboratories, Murray Hill, N.J. 17971)

21–23. Society for **Investigative Dermatology**, 25th annual, San Francisco, Calif. (H. Beerman, SID, 255 S. 17 St., Philadelphia, Pa. 19103)

21–24. American Soc. of **Agricultural Engineers**, Fort Collins, Colo. (J. L. Butt, ASAE, 420 Main St., St. Joseph, Mich.)

21–25. **Air Pollution Control** Assoc., 57th annual, Houston, Tex. (The Association, 4400 Fifth Ave., Pittsburgh, Pa.)

21–25. **American Medical Assoc.**, San Francisco, Calif. (F. J. L. Blasingame, N. Dearborn, Chicago, Ill. 60610)

21–26. American Soc. for **Testing and Materials**, 67th annual, Chicago, Ill. (ASTM, 1916 Race St., Philadelphia 3, Pa.)

22–24. American **Dairy Science** Assoc., Tucson, Ariz. (H. F. Judkins, 32 Ridgeway Circle, White Plains, N.Y.)

22–24. **Medicinal Chemistry**, 9th natl. symp., Minneapolis, Minn. (A. T. Winstead, American Chemical Soc., 1155 16th St., NW, Washington, D.C. 20006)

22–24. Association for Research in **Ophthalmology**, San Francisco, Calif. (H. Kaufman, c/o Hillis Miller Health Center, Gainesville, Fla.)

22–24. **Photosensitization in Solids**, intern. conf., Chicago, Ill. (L. Grossweiner, Dept. of Physics, Illinois Inst. of Technology, Chicago)

22–24. American Assoc. of **Physical Anthropologists**, 33rd annual, Mexico City, Mexico. (T. D. Stewart, The Association, U.S. Natl. Museum, Washington, D.C.)

22–24. **Polymers**, 2nd biennial symp., American Chemical Soc., Durham, N.C. (H. N. Friedlander, Chemstrand Research Center, Inc., Box 731, Durham)

22–25. **Agricultural Pesticides** Technical Soc., Fredericton, N.B., Canada. (W. H. Minshall, University Substation P.O., London, Ont., Canada)

22–25. American Soc. of **Pharmacognosy**, annual, Pittsburgh, Pa. (R. Blomster, Univ. of Pittsburgh School of Pharmacy, Pittsburgh 15213)

22–26. American Soc. for **Engineering Education**, Orono, Maine. (W. L. Collins, Univ. of Illinois, Urbana)

22–26. **Nobel Prize Winners**, 14th meeting, Lindau im Bodensee, Germany. (H. F. Kinderlen, Standing Working Committee for the Nobel Prize Winners, Postfach 11, 899 Lindau im Bodensee)

22–26. Association of Official **Seed Analysts**, Rochester, N.Y. (E. W. Sundermeyer, 329 U.S. Court House, Kansas City 6, Mo.)

22–27. **AAAS Pacific Division**, 45th meeting, Vancouver, B.C., Canada. (R. C. Miller, California Acad. of Sciences, San Francisco)

22–27. International Organization for **Pure and Applied Physics**, 2nd general assembly, Paris, France. (J. Tonnelot, Laboratoire de Biologie Physico-Chimique, Orsay, Seine-et-Oise, France)

23. National Assoc. of **Science Writers**, San Francisco, Calif. (M. D. Spencer, Buffalo *Evening News*, Buffalo, N.Y.)

23–25. Precision **Electromagnetic Measurements**, conf., Boulder, Colo. (National Bureau of Standards, Boulder Labs., Boulder)

23–26. American **Home Economics** Assoc., 55th annual, Detroit, Mich. (AHEA, 1600 20th St. NW, Washington, D.C.)

24–25. **Computers and Data Processing**, 11th annual, symp., Estes Park, Colo. (W. H. Eichelberger, Denver Research Inst., Univ. of Denver, Denver, Colo. 80210)

24–26. Joint **Automatic Control** Conf., Stanford, Calif. (L. Zadeh, Univ. of California, Berkeley)

24–28. American Assoc. of **Bioanalysts**, annual, Las Vegas, Nev. (W. N. Reich, AAB, P.O. Box 607, Walnut Creek, Calif.)

24–1. **Air Pollution**, European conf., Strasbourg, Austria. (A. Stern, Div. of Air Pollution, U.S. Public Health Service, Washington, D.C. 20201)

25–26. Fundamental Phenomena in **Hypersonic Flow**, intern. symp., Buffalo, N.Y. (H. S. Tolley, Cornell Aeronautical Laboratory, P.O. Box 235, Buffalo 14221)

25–27. **American Physical Soc.**, Denver, Colo. (R. G. Sachs, Sterling Hall, Univ. of Wisconsin, Madison 53706)

25–28. **Rockets and Space Flight**, 13th symp., Darmstadt, Germany. (A. F. Staats, Hermann-Oberth-Gesellschaft, Fritz-Beindorff-Allee 9, Hanover, Germany)

28–4. American **Library** Assoc., St. Louis, Mo. (D. H. Clift, 50. E. Huron St., Chicago, Ill.)

29–30. **Vacuum Metallurgy**, conf., New York, N.Y. (M. A. Cocca, General Electric Laboratory, P.O. Box 1088, Schenectady, N.Y.)

29–1. American Soc. of **Heating, Refrigerating, and Air-Conditioning Engineers**, 71st annual, Cleveland, Ohio. (ASHRAE, 345 E. 47 St., New York, N.Y.)

29–1. Effects of **Radiation on the Hereditary Fitness** of Mammalian Populations, symp., Bar Harbor, Maine. (T. H. Roderick, Jackson Laboratory, Bar Harbor)

29–2. American Inst. of **Aeronautics and Astronautics**, 1st annual, Washington, D.C. (AIAA, 500 Fifth Ave., New York, N.Y. 10036)

(*Continued from page 1114*)

nies—L. E. Root heads Lockheed Missiles and Space Company and Thomas V. Jones is president of Northrop. Joseph A. Kershaw is provost of Williams College, and John L. Kennedy is head of the psychology department at Princeton. Charles J. Hitch, Assistant Secretary of Defense (comptroller), has played a prominent part in the McNamara regime, and in the Defense Department there are four deputy assistant secretaries with RAND in their backgrounds. Herman Kahn, author of *On Thermonuclear War*, who presides over the Hudson Institute, is perhaps the best known of the numerous former RAND staff members who have gone on to found or join other nonprofits or consulting firms.

RAND has had critics, mainly in the universities, who feel it is full of scholars obsessed with nuclear warfare. It also has its critics, mostly in the military, who think that RAND is too much like a university, and that too much detachment is dangerous.

RAND is like a university in some ways, but it is also like government and like industry in others, and it has something quintessential of its own thrown in. As a new kind of institution it filled a need created by events, and —to paraphase Voltaire—if RAND did not exist it would be necessary to invent it.

But RAND is changing as the problems of American security and the role of the Air Force alter; these changes will be discussed in another article in this space.—JOHN WALSH

Announcements

Overseas Educational Service (OES) was formed recently under the sponsorship of the National Academy of Sciences, the American Council on Education, and Education and World Affairs. Plans call for the new organization to supplement the efforts of other agencies which are recruiting American personnel for developing areas and, eventually, to serve as a central clearinghouse for American agencies and for representatives of educational institutions in the new nations. John Scott Everton, former U.S. ambassador to Burma, is executive director of the organization. Information on OES is available through its headquarters, 522 Fifth Ave., New York 10036.

A 2-year program in **laboratory animal medicine** has been established at Tulane University's medical school. It is open to persons who hold a doctor's degree in veterinary medicine, and will lead to the master's degree in public health. Participants will be encouraged to develop research projects, with emphasis on the detection and control of laboratory animal diseases, and experimental design. Kenneth F. Burns, professor and chairman of Tulane's department of vivarial science and research, will direct the program.

Scientists in the News

Hasmukh J. Mehta, assistant professor of anatomy at Western Reserve University, has been appointed professor and chairman of the department of anatomy in the recently organized St. John's Medical College, Bangalore, India, which is scheduled to open in July. He has been in charge of gross anatomy studies in the Western Reserve's dentistry school during the past year.

Paul R. Peabody, formerly supervisor of applied mathematics at the Jet Propulsion Laboratory, has been appointed manager of the new department of mathematical analysis at Computer Sciences Corporation, a data processing service organization in Los Angeles, Calif.

Earl R. Parker, professor of metallurgy and director of the Institute of Engineering Research at the University of California, Berkeley, has been named to receive the 1964 Albert Sauveur achievement award from the American Society for Metals. The prize, in recognition of "pioneering metallurgical achievements which have stimulated organized work" that has furthered knowledge in basic metallurgy, will be presented during the society's meeting in October.

Don D. Bushnell, a senior staff member of the System Development Corporation, has been elected president of the Association for Educational Data Systems.

Victor T. Tomberg, formerly with Kollsman Instrument Corp., New York, has been appointed senior research associate in the research department of neurosurgery, at the medical school of New York University.