NEW MAGNETIC DATA RECORDER

Especially designed for medical researchers, teachers and clinicians. Economical data storage... designed to instrumentation standards... precise repeatability for data processing... wide band width... time scale expansion or compression... economy and reusability of tape... these are some of the advantages of adding this magnetic data recorder to your recording facilities.

The Sanborn-Ampex Series 2000 Magnetic Data Recorder serves as an ideal companion to other Sanborn instruments for biophysical research. Any phenomena routinely recorded on a direct-writing or photographic recorder may be recorded on magnetic tape, using the same preamplifiers. Data thus stored can later be graphically recorded for detailed study or teaching purposes, displayed on a meter or 'scope, or fed into a computer for processing and statistical analysis.

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For complete information call the nearest Sanborn Branch Office or Service Agency — or write Manager, Research Instrument Sales.

SANBORNS-AMPEX SERIES 2000 MAGNETIC DATA RECORDER in mobile cabinet provides up to 7 recording channels, 4 tape speeds, power supply and Sanborn plug-in electronic circuits for either PM (DC to 6000 cps) or direct recording (50-50,000 cps). The system uses 1/2-inch tape on 1034-inch reels for up to 8.8 hours of continuous recording.

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Other features include all-transistorized circuitry and convenient mounting of all controls at eye level above the freezer. Width of the instrument is reduced to a space-saving 3½ feet.

Three models in various combinations offer a total of nine liquid scintillation counting systems—refrigerated or non-refrigerated ... for automatic or semi-automatic operation. From this selection you can readily meet the requirements of your budget and provide for present and future needs. You'll get the satisfaction and performance which only a Tri-Carb Spectrometer—with its world-wide reputation for accuracy and reliability—can provide. Call your Packard representative or write for Bulletin AD-1002.

INSTRUMENTS FOR RADIOACTIVITY MEASUREMENT AND CHROMATOGRAPHY

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to continued fractions" fulfill objective (b). Over and over again Kac exemplifies the old Italian saying: "A mathematician is like a lover—grant a mathematician the least concession and he will draw from it a consequence, and from that consequence another!"

A truly delightful book!  
— CHURCHILL EISENHART  
_National Bureau of Standards_

**Forerunner of Audubon**


If Audubon—Bartram—Catesby are the ABC's of American natural history, Catesby is certainly least known to Americans. This attractive book will help remedy that situation, but we shall not know Catesby well until his great work, *Natural History of Carolina, Florida, and the Bahama Islands,* is re-issued.

Eighth-century Catesby, subsidized by Sloane, Sherard, and others who had been eager for the contributions of John Banister, and by Governor Nicholson, displayed none of Audubon's showmanship as man or artist. Catesby illustrated North American birds in habitat backgrounds, a method brought to its fullest flowering by Audubon in the next century. Contrary to the authors, these backgrounds were not initiated by Catesby. Maria Sibyle Merian published her first work in 1679, and another on insects of Surinam in 1705, wherein plants fairly compete with insects in disciplined beauty.

We know little of Catesby's exact routes in Virginia and Carolina. He reached Fort Moore on the Savannah River some 300 miles from Charleston. There may be notes as to where the sketches were made on the original Catesby drawings in the Royal Library at Windsor. Catesby drew from the living plant, but faced with engraving costs, he took lessons from the French artist, Joseph Goupy, and engraved the plates himself. That Goupy's friend, the Duke of Chandos, was also Catesby's patron seems to have been overlooked. Although the text of his *Natural History* was published in parallel English and French columns, we do not know who prepared the French version, but the Franco-Philadelphia naturalist Du Simitiere left a 16-page manuscript subject "Catalogue" to Catesby's work, though there is no clear evidence he was in touch with Catesby.

Frick and Stearns' volume is an excellent chronicle of man and naturalist, and happily the price is most attractive! It must be said, however, that this is historians' and not naturalists' commentary. The naturalists' edition, which should be published, will embrace not only bird commentary but also notes on Catesby's mollusks (by Wilkins) and on his plants (by Dandy); it will align these subjects with the state of our knowledge rather more intimately.

— JOSEPH EWAN  
_Department of Botany, Tulane University_

**New Books**

**Mathematics, Physical Sciences, and Engineering**


molecular and functional evolution of neurohypophyseal principles associated with the names of W. H. Sawyer, H. Heller, and J. Maetz; on higher nervous centers as they impinge upon the hypothalamos-hypophyseal complex; and on the insect subesophageal ganglion as an endocrine structure. Crustacean neuroendocrinology, too, was only touched upon.

The 4th International Symposium will be held in Paris in 1964, under the leadership of Louis Gallien. It will face the challenge of maintaining the high quality of the first three symposia and of providing continued coverage of “frontier” areas in the growing field of comparative endocrinology.

HOWARD A. BERN
Department of Zoology,
University of California, Berkeley

Forthcoming Events

September

1–5. Danube Research, intern. symp., Budapest, Hungary. (Biological Sciences Group, Hungarian Acad. of Sciences, Roosevelt Tér 9, Budapest V)

1–9. Topology and Its Methods in Other Mathematical Disciplines, symp., Prague, Czechoslovakia. (Organizing Committee, Karlrovu 3, Prague 2)

1–10. International Pharmaceutical Students’ Federation, 7th congr., Munich, Germany. (U. Peto, 10 Groffstr., Munich 19)

2–7. International Assoc. for Quaternary Research, Warsaw, Poland. (R. Galon, Secretary General, INQUA, Geographical Inst. Univ., Torun, Poland)


3–10. Inter-American Congr. of Radiology, 7th, São Paulo, Brazil. (W. Bombim-Pontes, Rua Cesario Motta 112, São Paulo)


4–6. International Assoc. for Shell Structures, colloquium, Brussels, Belgium. (Prof. Dutron, 127 Avenue Adolphe Buyt, Brussels 5)

4-7. Neuropathology, 4th intern. congr., Munich, Germany, (W. Haymaker, Armed Forces Inst. of Pathology, Walter Reed Army Medical Center, Washington 25).

4-7. Rheumatology, 10th intern. congr., Rome, Italy. (C. B. Ballabio, Clinica Medica Generale, Via F. Sforza 35, Milan, Italy)

4-8. Low Energy Nuclear Physics, intern. conf., Manchester, England. (L. J. B. Goldfarb, Physics Dept., Univ. of Manchester, Manchester)


4-9. International Assoc. for Analog Computation, 3rd intern. sessions, Belgrade, Yugoslavia. (D. Strujic, Decanska 14/IV, Belgrade)

4-9. International Congr. of Angiology, 4th, Prague, Czechoslovakia. (Z. Reints, 4th Medical Clinic, Prague 2/499)


4-9. Laurentian Hormone Conf., Hoberg's Resort, Lake County, Calif. (Committee on Arrangement of the Laurentian Hormone Conference, 222 Maple Ave., Shrewsbury, Mass.)

4-13. Inter-African Conf. for Food and Nutrition, 4th, Bukavu, Congo Republic. (Commission for Technical Cooperation in Africa South of the Sahara, P. O. Box 2359, Lagos, Nigeria)


5-8. International Congr. of Homeopathic Medicine, 25th, Amsterdam, Netherlands. (J. L. Fontein, Westzijde 116, Zaandam, Netherlands)


5-8. National Chemical Exposition, 11th, Chicago, Ill. (Chicago Section, American Chemical Soc., 86 E. Randolph St., Chicago 1)

6-8. Effects of Ionizing Radiations on Immune Processes, intern. symp., Lawrence, Kan. (C. A. Leone, Dept. of Zoology, Univ. of Kansas, Lawrence)


6-12. Human Genetics, 2nd intern. conf., Rome, Italy. (L. Gedda, 5 Piazza Galeno, Rome)


7-9. International Cardiovascular Soc.,

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**Micro-Macro Instrumentation for Research**

High-precision engineering and design know-how bring you the rugged SERVALL Omni-Mixer for homogenizing, blending, mixing and disintegrating a wide range of materials in capacities from 0.5 ml to 2,000 ml (approx). Basic Macro Unit accepts a variety of stainless steel mixing chambers as well as inexpensive Mason jars, and the Micro-Homogenizer Attachment (optional).

All stainless steel chambers are seamless, fluted, and have "mirror-like" inner finish. Chambers, Covers, and Rotor-Knife Blade Assemblies are removable as units for loading and unloading, and are quickly disassembled for autoclaving. Chambers may be lowered easily into temperature-control baths. The SERVALL Omni-Mixer has convenient top drive with heavy-duty, high-torque motor. For Rotor-Knife Blade Assemblies, Teflon bearings are available and may be fitted in the field by the operator on all late-model Omni-Mixers. Speeds: to 16,000 rpm and above with Macro Units; to 50,000 rpm with Micro Unit. ASK FOR BULLETIN SCB-EMT

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AC CONTROLLER and Matching DC MOTOR
2760 ELECTRONIC CONTROLLER with matching 1/50 H.P. DC MOTOR

$87
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SPECIFICATIONS
- Thyatron tube operated controller gives stepless operation
- Input: 110-120 V., 60 cy., single phase
- Output: 0-120 V., 200 ma. DC to armature
- 1/50 H.P. ball bearing, right angle, gear head, shunt wound, DC motor
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18 AUGUST 1961

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26–30. European Congr. of Aviation Medicine, 6th, Paris, France. (CERMA, 5 bis Avenue de la Porte de Sèvres, Paris 15)


(Y. A. Mitropolsky, Scientific Committee, Kalinin pl. 6, Mathematical Inst., Kiev)

28–29. European Conf. of Chemical Engineers, Toulouse, France. (Soc. of Industrial Chemistry, 28 rue Saint-Dominique, Paris 7, France)

October

1–3. Council for Intern. Organizations of Medical Sciences, Paris, France. (CIOMS, 6 rue Franklin, Paris 16)

1–4. Process Engineers, annual, Vienna, Austria. (Oesterreichischer Intenieur-und Architektenverein, Eschenbachgasse 9, Vienna 1)


2–7. Inter-Regional Leprosy Conf., Istanbul, Turkey. (WHO, Regional Office for Europe and Regional Office for the Eastern Mediterranean, 8 Scherfigsvej, Copenhagen 0, Denmark)

2–7. Climatic Change, symp., Rome, Italy. (UNESCO, Place de Fontenoy, Paris 7, France)

2–11. International Council for the Exploration of the Sea, 49th annual, Copenhagen, Denmark (Charlottenlund Slot, Charlottenlund, Denmark)


3–8. Aerosol Congr., 3rd intern., Lucerne, Switzerland. (Federation of European Aerosol Assocs., Waisenhaustrasse 2, Zurich, Switzerland)

4–10. Latin America Congr. of Electroencephalography, 5th, Mexico, D.F. (J. Hernandez Panchè, Instituto Mexicano de Seguro Social, Hospital La Raza, Mexico, D.F.)

4–10. Latin American Congr. of Neurosurgery, 9th, Mexico, D.F. (J. H. Mateos, Tonalá No. 15, Mexico 7, D.F.)

6–7. American Medical Writers’ Assoc., New York, N.Y. (S. O. Wolfe, P.O. Box 1796, Indianapolis 6, Ind.)

6–8. Therapeutics, 7th intern. congr., Geneva, Switzerland (P. Rentchnick, Case Postale 229, Geneva 2)

8–10. Zooplankton Production, symp., Copenhagen, Denmark. (J. H. Frazer, Marine Laboratory, P.O. Box 101, Victoria Rd., Aberdeen, Scotland)

8–11. Society of American Foresters, Minneapolis, Minn. (H. Clepper, SAF, 425 Mills Bldg., Washington 6)


9–11. National Electronics Conference and Exhibition, 17th annual, Chicago, Ill. (NEC, 228 N. La Salle St., Chicago, 1)

9–12. Instrument Symp. and Research Equipment Exhibit, 11th annual, Bethesda, Md. (J. B. Davis, Natl. Institutes of Health, Bethesda 14)

9–12. Water Pollution Control Federation, 34th annual, Milwaukee, Wis. (R. E. Fuhrman, 4435 Wisconsin Ave., NW, Washington 16)


10–12. Nuclear Reactor Chemistry, 2nd
LOOKING FOR SOMETHING?

If whatever you are looking for is small enough, electron microscopy is sure to help. More power to you if you select a Norelco instrument—and this is why!

Beginning with the EM-75, Norelco offers a low priced screening and general service tool for use in areas requiring approximately 30 Angstroms resolution. No microscope is made which compares with the trouble-free workhorse features of this Instrument. And to add to its value—it is readily convertible into a projection X-ray microscope for morphological evaluations of opaque materials.

The EM-100 provides resolution in the area of 15 Angstroms and has had tremendous worldwide acceptance. It has many outstanding features like the Norelco immersion lens which alone makes possible many unusual techniques such as free manipulation and even deformation of the specimen while under observation.

Newest in the Norelco line is the EM-200 with a resolution of less than 10 Angstroms. This is the ultimate in highest possible performance—unsurpassed for organic and inorganic structural research studies. Information is readily available on this or any of the Norelco Electron Optical Instruments simply by writing Philips Electronic Instruments, Mount Vernon, New York.

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TABLE MODEL TO -30°C
CONSOLE MODELS TO -80°C

Introducing the world's first table model Kryomats for low temperature control—offered in two models. Range from -20 to -30°C.

A separate line of instruments, Ultra Kryostats, for variable control or measurements between -40 and -80°C, are also available. Air or water cooling, built-in timer and accuracy to ±0.02°C are just a few of the many outstanding features of these instruments.

Most important is the unique and exclusive use of a secondary cooling system instead of conventional compensating heaters.

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TODAY'S BEST BUY IN AUTOMATIC TEST-DATA INTEGRATION

IDEAL FOR USE WITH GAS CHROMATOGRAPHS

In just a few short months RIG's new Electronic Integrator PX 592 has won wide acclaim as the ideal answer to a long-standing need among users of analytical instruments: An inexpensive accessory instrument for use with standard recorders to automatically integrate test data with the inherent precision and accuracy of the recording instrument itself.

Check and compare the PX 592's remarkably low price and outstanding operating features...and you'll see why so many companies hail it as today's best buy.

- Can be used with any standard servo-drive recorder.
- Records both variable and integral with one pen (see chart above).
- Resets automatically at full-scale integral reading.
- Excellent long-term day after day repeatability.
- Built-in adjustable threshold minimizes noise and zero errors.
- Integral time constant is three days.
- Pipping pen may be used to display each reset.
- Continuous integral recording possible using 2nd pen.
- Special low-cost control unit available for automatic readout and reset.

For complete details, write for Bulletin No. 041.

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conf., and Analytical Chemistry in Nuclear Reactor Technology, 5th conf., Gatlinburg, Tenn. (Oak Ridge Natl. Laboratory, P.O. Box X, Oak Ridge, Tenn.)
10–20. International Committee for Biological Control, Tunis. [P. Grison, Laboratoire de Biocenotique et de Lette Biologique, La Miniere, par Versailles (S.-et-.) France]
11–14. Tau Beta Pi Assoc., Cincinnati, Ohio. (R. H. Nagel, Univ. of Tennessee, Knoxville)
11–14. Western Inst. on Epilepsy, 13th annual conf., San Antonio, Tex. (F. Risch, 3097 Manning Ave., Los Angeles, Calif.)
12–13. Congress of Neurological Surgeons, New York, N.Y. (E. Weford, 4706 Broadway, Kansas City 12, Mo.)
12–29. Pacific Intern. Trade Fair, 2nd, technical meetings, Lima, Peru. (PITF, P.O. Box 4900, Lima)
15. American College of Dentists, Philadelphia, Pa. (W. A. Brandenhorst, 4236 Lindell Blvd., St. Louis, Mo.)
15–21. Pan American Congr. of Endocrinology, 5th, Lima, Peru. (M. San Martin, Av. Central 325, San Isidro, Lima)
16–18. American Soc. of Safety Engineers, Chicago, Ill. (A. C. Blackman, 5 N. Wabash Ave., Chicago 2)
16–18. Entomological Soc. of Canada and Entomological Soc. of Quebec, Quebec, Canada. (L. L. Reed, ESC, Nebytt Blvd., Carling Ave., Ottawa, Canada)
18–20. Design of Experiments in Army Research, Development, and Testing, 7th conf. (by invitation only), Fort Monmouth, N.J. (F. G. Dressel, Army Research Office (Durham), Box CM, Duke Station, Durham, N.C.)
18–20. Optical Soc. of America, Los Angeles, Calif. (Miss M. E. Warga, 1155 16 St., NW, Washington 6)
19–21. Indiana Acad. of Science, Terre Haute. (E. D. Weinberg, Dept. of Bacteriology, Indiana Univ., Bloomington)
20–24. American Heart Assoc., annual, Miami Beach, Fla. (AHA, 44 E. 23 St., New York 10)
23–28. Congress of Chemical Engineering, 1st, San Juan, P.R. (R. Munoz, Apartado 47, Estacion de Río Piedras, San Juan)
24–26. Aerospace Nuclear Propulsion, intern. symp., Las Vegas, Nev. (P. M. Ulthe, Lawson Soc., Radiation Laboratory, Univ. of California, Box 808, Livermore)
24–27. American Dietetic Assoc., 44th annual meeting, St. Louis, Mo. (Mrs. T. Pollen, ADA, 620 N. Michigan Ave., Chicago 11, Ill.)
26–27. Instrumentation Facilities for Biomedical Research, symp., Omaha, Neb. (H. G. Beenken, Univ. of Nebraska College of Medicine, 42 and Dewey Ave., Omaha)
26–27. New Mexico Acad. of Science, Albuquerque. (K. G. Melgaard, P.O. Box 546, Mesilla Park N.M.)
26–30. American Soc. for Aesthetics, Detroit, Mich. (J. R. Johnson, Cleveland Museum of Art, Cleveland 6, Ohio)
stream thermometer measures the resultant temperature of the outside surface of the boundary layer; the upstream thermometer measures initial temperature. Minimum measurable flow is determined primarily by the internal tube diameter; maximum is determined by the effects of turbulence. Accuracy is said to depend on application with ±1 percent being achievable. Operating temperature range is up to 500°F. (Flow Measurements Corp., 10506 Wheatley St., Kensington, Md.)

Circle 8 on Readers' Service card

Wire bonder (Fig. 2) is designed to bond a wire 0.0002 in. in diameter to a transistor stripe measuring 0.001 in. by 0.003 in. The wire is positioned on the stripe by maneuvering in the horizontal plane with joystick assemblies and in the vertical plane with a lever. A binocular microscope enables the operator to see the target. Positioning precision of 10 to 15 µin. is said to be possible. (Kulicke and Soffa Manufacturing Co., 401 N. Broad St., Philadelphia, Pa.)

Circle 9 on Readers' Service card

High-pressure pump (Fig. 3) produces pressures up to 101 lb/in.2 from air at 80 to 100 lb/in.2. The pump is a reciprocating type with an output of just over 6 in.3/min at 101 lb/in.2, falling to just under 2 in.3/min at 9 x 101 lb/in.2. Pressure is adjusted by means of an air control valve. Pressure may be raised gradually or the control valve may be set to produce the required pressure. The pump is enclosed in a safety cabinet with electrically interlocked doors. The pressure gage is viewed through mirrors. (Charles S. Madan & Co., Ltd., Vortex Works Broadheath, Altrincham, England)

Circle 10 on Readers' Service card

Seismic timer and blaster permits determination of depth to bedrock. Determinations to 100 ft can be made with the timer when an instrumented sledge hammer is used to generate seismic shock waves. The blaster, which greatly extends the range, is a battery-operated, capacitor-discharge type. (Dynematic, Inc., 2965 E. Colorado Blvd., Pasadena, Calif.)

Circle 11 on Readers' Service card

Magnetic-memory drum, the size of a baseball, has a capacity of 358,000 bits with a storage density of 600 bits per inch. Magnetic heads used to store and pick up data are floated on a 0.0001-in. thick film of air on the surface of the drum. The drum, which rotates at about 10,000 rev/min, is suspended on air bearings. Access time is reduced by using a one-word loop. (Sperry Gyroscope Co., Great Neck, N.Y.)

Circle 12 on Readers' Service card

Ball and socket joints of glass use O-rings on the inner member to effect a vacuum-tight seal and are said to require no lubrication. Tubes may be joined within 10° of axial center and may be secured with a standard metal ball and socket clamp. The inner joint member can also be used in combination with standard ground sockets. (California Scientific Glass Co., 9811 E. Rush St., El Monte, Calif.)

Circle 13 on Readers' Service card

Automatic sampling machine (Fig. 4) withdraws a measured volume of the sample from a test tube placed in a locator and transfers the sample with a measured volume of reagent into an empty test tube. To prevent contamination, the sampling pipette automatically follows the lowered liquid level in its downward movement so that only the tip is wetted. As a further precaution, each sample is flushed from the pipette with the reagent. Both the volume of sample and the volume of reagent are preset by the operator. (National Instrument Co., Inc., 4119 Fordleigh Rd., Baltimore 15, Md.)

Circle 14 on Readers' Service card

Recorder control can be used with commercially available potentiometric recorders to set the recorder to any of 15 voltage ranges and any of 15 current ranges, and to change the setting while recording. Auxiliary circuits permit reversal of polarity and check of recorder zero without disturbing or disconnecting the input signal or the recorder. No modification or adjustment of the recorder or the control is required to change from one recorder to another. Ranges are 10 mv to 500 v, and 10 µa to 500 ma, full scale, on a 10-mv recorder. Output resistance as seen by the recorder is 1000 ohms (max.). Input resistance for voltage measurement is 100 kohm per volt of decade switch setting, 1 megohm/volt with a 1-mv recorder; for current measurement, input resistance is 1000, 100, or 10.0 ohms, depending on decade switch setting. (Cahn Instrument Co., 14511 Paramount Blvd., Paramount, Calif.)

Circle 15 on Readers' Service card
Differential conductivity meter is designed to measure, indicate, and transmit to a remote recorder the difference in solution conductivity at any two locations. Independent temperature compensation is provided for the cells at the two locations. The instrument incorporates two complete and independent self-balancing Wheatstone bridges. Three indicating scales are provided, two for the individual conductivities and one for conductivity difference. Electrical or pneumatic transmitters can be provided for remote recording. Temperature compensators may be manual or automatic. (Industrial Instruments, Inc., 89 Commerce Rd., Cedar Grove, N.J.)

Circle 16 on Readers’ Service card

Electromagnet (Fig. 5) provides a field of 51.5 kgauss with ½-in. gap and 1½-in. diameter pole pieces. Distance between coils as well as gap can be varied. Pole tips may have a maximum diameter of 18 in. A field of 40 kgauss is attained with 1-in. gap and 6-in. diameter tips; 35 kgauss with 2-in. gap and 6-in. tips; 10½ kgauss with 4-in. gap and 18-in. tips. Maximum power is 200 kw with low-impedance coils and 12 kw with high-impedance coils. Vertical and horizontal rotation are provided. (Pacific Electric Motor Co., 1009 66th Ave., Oakland, Calif.)

Circle 17 on Readers’ Service card

Strip-chart recorder of the moving-coil type is said to be accurate within ±1 percent. The writing system may be ink pen, hot wire, or electrosensitive paper. Standard chart speeds of ½, 1, 6, or 12 in./hr or in./min may be changed by replacing wheels in a gear train. Dual-speed chart mechanisms are also available. A variety of voltmeter and ammeter ranges are available for both a-c and d-c. Response time is said to be about 0.6 sec. (Atkins Technical Inc., 1276 W. Third St., Cleveland 13, Ohio)

Circle 18 on Readers’ Service card

Annunciator display has a capacity of 60 messages that may be displayed individually or in combination. The device operates on a rear-projection principle providing 60 lenses that are used for data or color background. The display features one-plane presentation. Overall size is 5¼ by 12 by 16½ in. (Industrial Electronic Engineers, Inc., North Hollywood, Calif.)

Circle 19 on Readers’ Service card

New Nalge techniques give you accuracy never before possible in plastic, or even in glass, because now for the first time graduates can be molded to absolute uniformity every time. You get finer calibration lines than ever before. Meniscus is flat, easy to read. Non-wetting walls contain and deliver the same amount of solution every time.

Corrosion resistant, of course. Virgin polypropylene throughout, with stable octagonal base. No more loss of valuable contents and no dangerous acid splash through breakage. So next time you break a glass graduate, replace it with Nalge—complete line of sizes from 25 to 2000 ml. Ask your laboratory supply dealer.

Accuracy tested, accuracy proved! A random sampling by a nationally-known testing laboratory* shows new Nalge graduates to be well within National Bureau of Standards Class A specifications for accuracy. Actual calibrations found in tests on 50 ml graduates:

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*Name and data on request.

New complete line catalog. WRITE Dept. 218.

THE NALGE CO., INC. ROCHESTER 2, NEW YORK The Quality Standard of Plastic Laboratory Ware
Temperature transducers designed to be resistant to damage by nuclear radiation use tungsten as the resistance element. Operating temperature range is $-325^\circ$ to $+500^\circ$F. Element resistances up to 1000 ohms at $+32^\circ$F are available. Accuracy is said to be $\pm 0.5^\circ$F, and repeatability to be within $\pm 0.05$ percent of resistance value measured at $77^\circ$F. Response time is approximately 0.4 sec for 63 percent of final resistance value. Transducer tube lengths up to 18 ft can be supplied, and sensing element diameters as small as 0.1 in. and sensitive length of 0.5 in. are available. Construction material in addition to tungsten includes alumina and 304 stainless steel. (Winson Instruments & Controls, 11789 W. Pico Blvd., Los Angeles 64, Calif.)

Circle 20 on Readers' Service card

Composite seal is a stainless-steel V-ring combined with a fluorocarbon-plastic seal. The composite is designed to operate at temperatures from $-65^\circ$ to $+600^\circ$F. The units are re-usable. (Pall Corp., 30 Sea Cliff Ave., Glen Cove, N.Y.)

Circle 21 on Readers' Service card

Microfilm recorder is actuated by information supplied by a computer to make multi-view drawings of parts to be fabricated. Once the engineering specifications for the part are fed in, the computer can be asked to produce drawings of any view or cross section of the part in three dimensions. The same computer code used to produce the drawings can also be used to produce tapes for operation of automatic production equipment. Information is recorded on 35-mm microfilm. Printing is accomplished by photographing displays on the face of a Charactron shaped-beam tube. An accessory unit permits automatic processing and projection of the film on a 2- by 2-ft screen within 8 sec. (Stromberg-Carlson Div., General Dynamics Corp., P.O. Box 2449, San Diego 12, Calif.)

Circle 22 on Readers' Service card

Binary-coded decimal-to-decimal converter is the first of a series of modular solid-state devices constructed by simultaneous fabrication of multi-element components. The device contains 40 silicon diodes and is designed to drive an indicator tube directly from binary-coded inputs. In the manufacture of the units, a single silicon wafer is diffused to form a large planar diode. From this wafer, as many elements as desired are simultaneously fabricated in a specific pattern. The resulting array is joined to a circuit plate. (Burrroughs Corp., Plainfield, N.J.)

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Strain-gage auxiliary instrument is a miniature device that contains a signal amplifier, power supply, bridge-balance circuits, and calibration circuits. The latter can be programmed from a remote source. Four reference points are provided, and polarity of the calibration can be reversed to simulate compression or tension of a strain gage. Signals are amplified to a maximum output of $\pm 5$ volts d-c., and output impedance is 350 ohms. (Video Instruments Co., 3002 Pennsylvania Ave., Santa Monica, Calif.)

Circle 24 on Readers' Service card

Cryogenic thermometer measures temperature in the range of $0.3^\circ$ to $25.0^\circ$K. The instrument operates by measuring mutual inductances as small as $2 \times 10^{-4}$ by use of an a-c bridge circuit and ruby crystals. Bridge current is supplied by a modular signal generator tuned to 155 cy/sec. Bridge output is amplified by a transistorized narrow-
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18 AUGUST 1961
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Cadmium-sulfide photoconductive cell features a dark current of 2.5 $\mu$A and an average cell current of 10 ma with 5.0 ft-cf illumination of 2700°K color temperature. Dissipation rating is 1 watt. The cell is a side-sensitive device mounted in a hermetically sealed glass envelope with conventional seven-pin miniature base. (Amperex Electronic Corp., 230 Duffy Ave., Hicksville, N.Y.)

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Solid-state radiation detectors are semi-conductor devices sensitive to protons, electrons, deuterons, alpha particles, and high-energy heavy particles. A shallow, reversed bias $p-n$ junction in silicon is used to attain high energy resolution, fast response, and linearity of pulse height with particle energy over a specified energy range. The width of the depletion area determines the sensitive volume of the detector. Output is proportional to the energy deposited within the depletion region and is independent of the mass of the particle. A variety of performance specifications is available in each of three sizes. (Hughes Aircraft Co., P.O. Box 90515, International Airport Station, Los Angeles 45, Calif.)

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Diode tester is a back-current and saturation-voltage tester with a voltage range from 0 to 3000 v in four steps and a current range from 0 to 100 $\mu$A in four steps. Regulation is said to be better than ±0.1 percent; ripple and noise, 0.05 percent. (Trans Electronics, Inc., 7349 Canoga Ave., Canoga Park, Calif.)

Circle 28 on Readers' Service card

Infrared spectrophotometer, model 421, uses two gratings to cover the spectral range from 4000 to 550 wave numbers. Each grating is used only in its first order. Overlapping orders are eliminated by four filters automatically inserted into the radiation beam. The two gratings are mounted back to back. At the crossover point, 2000 wave numbers, scanning halts briefly, and the second grating rotates into position. If desired, abscissa scale change may also occur automatically at this point. The crossover occurs without gaps or overlapping and without shift in wave-number indication. Scanning rate can be varied from 65 sec for the entire range to 4.5 min per wave number. Accessories developed for use with other instruments can be used with model 421. Wavelength coverage of the far infrared can be added by suitable prism interchanges. (Perkin-Elmer Corp., Norwalk, Conn.)

Circle 29 on Readers' Service card

Nuclear methods are used to measure soil moisture and density with equipment composed of a counting unit and a moisture or density probe which contains radioactive material and a detector system. Measurements are performed by inserting the probe in, or placing it on, the material being tested and reading the portable counter. The equipment does not require an AEC license. (Testlab Corp., 3398 N. Milwaukee Ave., Chicago 41, Ill.)

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Digital clock furnishes a binary-coded output of the day, hour, and minute, provided by contact closures. Visible readout is also provided. Basic timing pulses are formed by a cam-microswitch arrangement driven by a synchronous motor to produce minute counts. Stepping switches then form a logical time counter with appropriate carries. Each digital output consists of four binary bits that may be arranged in any desired code. Stepping the switches takes 2 sec of each minute during which an inhibit signal prevents ambiguous readings. (Electro-Logic Corp., 515 Boccacio Ave., Venice, Calif.)

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Coaxial tuner is designed for use in the frequency range 1.0 to 10 Gey/sec (kMc/sec). The tuner consists of a strip line section with a rail-guided carriage upon which an adjustable probe is mounted. Length of the tuner is 11.5 in.; carriage travel is 7.5 in. Voltage-standing wave ratio as high as 10:1, and of any phase, can be matched to 1.00. Radio-frequency leakage has been minimized by means of a poly-iron choke mounted along the tuner slot. Insertion loss is less than 1 db when a mismatch of 3:1 is corrected. (FXR, Inc., 25-26 50 St., Woodside 77, N.Y.)

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Joshua Stern
National Bureau of Standards, Washington, D.C.
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for Kotzebue was 19 mi/hr. Since wind velocity has a decisive effect on fallout distribution, the AEC estimates of the fallout pattern must be in error.

3) Although fallout on the ground in northern Alaska from past nuclear tests is very low compared to that in temperate zones, the Sr⁹⁰ levels of caribou and of the few Eskimo bones that have been analyzed thus far are much higher than the values for cattle and people in temperate United States. The CNI bulletin reports data which show that this is due to the unusual mineral nutrition of lichens. This remarkable situation is not mentioned in the AEC report, though we were pleased to learn recently that the responsible officials are now taking steps to institute a research program on the problem.

4) The CNI bulletin contains eight pages of detailed discussion, written by the biologists who investigated the problem for the AEC, of the unusual food chain in the Arctic (lichen-caribou-man). This discussion shows that predictions of biological Sr⁹⁰ distribution based on the temperate-zone food chain (grass-cow-milk-human) do not apply to Alaska. Nor is the ecological behavior of Sr⁹⁰ in tropical environments applicable to Alaska. Nevertheless, the AEC report on Project Chariot states that "possible radiation effects upon the biota of the Chariot site have been estimated from the Nevada Test site and the Pacific Proving ground data" (p. 55).
closed off from animals) and further downwind where it becomes accessible to the food chain. Of course, if the intensity downwind should rise the intensity at the site must drop accordingly, but for the reasons stated we are mainly concerned with some distances downwind from the site. It seems reasonable that these effects could increase the AEC estimate of the downwind deposition of fallout by a factor of 2, because the wind velocities at the Chariot site tend to be significantly higher than the value used in the AEC estimate.

Margolis states on his own authority that "As it happens, the exposure from habitual television watching, or from current levels of fallout, is roughly the same as the exposure the 700 Eskimos might receive if pessimistic assumptions about the absorption of Sr$^{90}$ are correct." Now, this sentence would be roughly correct if Margolis had added as an important condition, that the statement refers only to the effects of these three sources of radiation on the gonads. If Margolis were to amend his statement in this way it would then be technically correct, but still quite misleading to a reader interested in comparing the relative risks to his health from these three sources, because it fails to mention the risks to the bone marrow from these sources of radiation. It is an elementary fact now well established in the relevant literature that the risk from fallout radiation is of two kinds: (i) a genetic risk of deleterious mutations due to exposure to the gonads, and (ii) a somatic risk (from leukemia and other forms of cancer) due chiefly to irradiation of the bone marrow. The gonadal exposure is due to cesium-137; the marrow exposure is due to Sr$^{90}$. All published comparisons [see for example, the report of the British Medical Council, The Hazards to Man of Nuclear and Allied Radiations (Medical Research Council, HMSO, London, 1956)] of the radiation risk from television watching and from fallout refer only to gonadal exposure for the simple reason that while television watching may lead to a maximum of 1 mrem of exposure to the gonads per year, it has no measurable effect on the bone marrow, because the radiation is too soft to penetrate more than a few millimeters of body tissue. Hence any estimate of the risk from Sr$^{90}$, which necessarily refers to an effect on the marrow, will be incomparably greater than the hazard, to the bone marrow, of television...
watching. It will be noted that Margolis' comment also includes a statement of equality between exposure to Eskimos from current levels of fallout, and from Sr$^{90}$ that might result from the Chariot explosions. The exposure to Eskimos from present fallout is approximately known (about 1 to 3 $\mu$g of Sr$^{90}$ per gram of calcium in the bones; see Radiological Health Data, Jan. 1961, p. 21). We would expect Margolis to show, in support of his statement, that the Sr$^{90}$ that Cape Thompson Eskimos might absorb from the Chariot explosion also amounts to about 1 to 3 $\mu$g of Sr$^{90}$ per gram of calcium in the bones. We suggest that he produce such calculations. For our part, after careful study of the available data, we concluded, as stated in the CNI report, that there were not sufficient data about the relevant parameters (for example the mineral nutrition and feeding habits of the caribou; the total Sr$^{90}$ in the Eskimo diet) to warrant such a calculation.

None of the foregoing observations are adequately represented in Margolis' account of the CNI report on the Chariot Project. Nevertheless, Margolis had ample opportunity to become acquainted with these matters in advance of the preparation of his article. A few days after the CNI report had been made public, one of us received a long distance telephone call from Margolis. In this call he made several criticisms of the CNI report, and asked for comment on them. During this conversation Margolis acknowledged that he had not yet seen a copy of the CNI report. Accordingly, a copy of the report was sent to him immediately. After several days he called again. In this second conversation nearly all of the points which we have enumerated above (including an explanation of the so-called "technical error") were explained to Margolis at some length. We regret that they do not appear in his article. In particular, we believe that ordinary journalistic practice would recommend that the specific reply given to his query about the supposed technical error in the CNI report should appear in his article alongside his discussion of the AEC "complaint" about it.

We should also like to note that the quotations which Margolis attributes to "a spokesman for CNI" do not precisely reflect what was said to him, and it is pertinent that he neither asked for permission to quote (which would have readily been granted) nor checked the quotations with their source.

The foregoing comments explain why we believe that Margolis' article on the reports about Project Chariot is incomplete, misleading, and in some respects quite incorrect.

BARRY COMMONER
M. W. FRIEDLANDER
ERIC REISS

St. Louis Committee for Nuclear Information, St. Louis, Missouri

In reply to the CNI letter:

1) The bulk of my article, contrary to the impression given by CNI's letter, was not concerned with CNI's technical errors or with my own predictions of radiation levels, but with the likelihood that the CNI report would mislead rather than inform the public on the central question of the magnitude of the fallout risk.

2) With regard to the material dealt with in the letter, much of it is simply a recounting of parts of the CNI report, and this recounting does not conflict with the summary of the report I gave in my article. Other parts are attacks on the AEC, to which I assume the AEC will reply if they deem it worthwhile. I should point out, though, that
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3) On the technical points directly questioning the reliability of my article: I don’t see how CNI argues that it has not erred in its handling of the AEC fallout figures. The pertinent AEC report clearly states that its estimates are based on an assumed fivefold enrichment of Sr⁹ (not four- to five-fold, as stated in CNI’s letter). The AEC prediction for the most probable average venting of fallout was 5 percent, and for Sr⁹, 25 percent. Obviously CNI’s report, which postulated a further fivefold increase in Sr⁹, must be wrong, since the fallout can hardly contain more than 100 percent of all the Sr⁹ produced by the test. Further, Dr. Friedlander, in calculating CNI’s estimate of the average Sr⁹ deposit throughout the zone, simply multiplied the AEC estimate by 10, and although CNI might well argue that the deposit “some distance downwind” might be 10 times the AEC estimate, the average deposit throughout the zone can hardly, for the reason noted above, be off by more than a factor of 4.

CNI is correct in criticizing my handling of the television example, although if readers will refer to my article I think they will find that the error is not as significant as CNI implies. What is curious is that CNI itself has included a grosser form of this same error in its own report. CNI does not inform its readers that there is no danger of genetic damage from Sr⁹, but actually includes a reference to the possibility of genetic damage. Further, Dr. Commoner’s article in the CNI report, in giving figures on the generally recommended guide lines for Sr⁹ absorption in humans, does not give the figure for Sr⁹ (67 units) but instead gives the figure for whole body exposure (including, of course, the gonads) and announces that “this corresponds to about 17 strontium units in the bone.” Thus CNI misleads its readers into believing the generally accepted guide line is smaller by a factor of 4 than the actual figure, and this is done by applying the whole body rate; deliberately set this low because it includes genetically dangerous exposure, to calculate a rate for

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bone marrow, where the danger is solely somatic. This ties in with CNI's complaint about my statement that the probable increase in Sr⁰⁺ in the 700 Eskimos, under pessimistic assumptions, would be about equal to present levels. CNI gives the current level of strontium in Eskimos as 1 to 3 units. This is based on a total sample of six. The values are: an infant (2.42), a 7-year-old (3.35), and four adults (0.18; 1.94; 0.47; and 0.59). Aside from the small sample size, it is difficult to know what would be a fair average calculated from this data to compare with the National Committee on Radiation Protection guide line, which is 67 units for an average for individuals within a population, and three times this, 200 units, for a single individual within the population. The levels for very young children are higher since they have been exposed to a given level all their lives. If, as with the Chariot test, the level is not to be kept up by continued testing, the level in the children will fall as they grow. This makes the CNI calculation seem somewhat excessive, but if we accept their figure of 1 to 3 units as the range for the average figure and compare it with the relevant NCRP guide line (67 units), then the current levels would be about 1/67 to 1/22 of the guide line. Even under the assumptions in the CNI report this seems unlikely to be increased more than several times, if that much, and the increase, like the base, will be some small fraction of the guide line, in other words (to repeat my error) an increase "roughly the same" as current levels.

The point of my comparison of the potential increase, under pessimistic assumptions, with exposure from television and current levels of fallout was not to imply that the type or amount of radiation was precisely the same, but to give the reader a general idea of the magnitude of exposure involved, in contrast to the CNI report which talked repeatedly in terms of "great uncertainty" concerning the harm that might be done, of the fallout "sealing off Cape Hope," of "little margin for error," and which, in general, could not have been better phrased to scare the daylights out of the lay audience for which it was written.

4) Finally, I must insist that my article reflects quite precisely Dr. Commoner's responses to my questions concerning the misleading nature of the CNI report.—H.M.
Reprint Requests

Some years ago an article appeared in which the merits of printed "reprint-request" postcards were closely examined [J. Hedgpeth, *Am. Scientist* **42**, 497 (1954)]. Rather few of the cards' alleged merits withstood the author's critical scrutiny. The cards were adjudged discourteous, inconsiderate, and generally to be abhorred. In fact, I was sufficiently impressed by the fire of condemnation to forswear the use of such contemptible missives. Subsequently, each of my reprint requests was accompanied by a carefully worded letter of justification. Unfortunately, this habit was shattered by the disillusionment that resulted when I and several colleagues at Yale received smudged, printed reprint-request postcards from several of the same knights who had joined in challenging the boorish reprint collectors. Sad is the life of the idealists!

In recent months the need for renewed attack has become acute. To pass over, for the moment, the dozens of mailings to anonymous collectors that the cards demand, there are now appearing increasing numbers of cards requesting two reprints, "one for me and one for my library." When each of the two workers at an arctic research station sent me such a card the dam was breached, and this flow commenced. Perhaps these men were merely lonely and wanting to encourage correspondence. Perhaps their months of solitude in bitter arctic wastes had caused each to retreat from contact with the other (but two libraries?). In the face of such a pattern, however, it is clear that the most economical solution would be to abolish all journals and to offer all articles for sale as separates. Could the alternative proposed by Hedgpeth also be prayerfully reconsidered?

Peter H. Klopfers
Department of Zoology, Duke University, Durham, North Carolina

Repetitive Self-Stimulation

Since Olds and Milner described the repetitive self-stimulation by rats with electrodes implanted in their brain, there has been increasing acceptance of the concept that this self-stimulation is of a rewarding nature. Certainly it is understandable how this view has arisen, but I submit that this
is not quite the correct significance of the phenomena observed. To equate this self-stimulation with reward is to equate it with a consummatory act. A consummatory act is accompanied by gratification and is followed by quiescence and by cessation of appetitive or searching behavior. Prior to culmination of the consummatory act an animal continues to search incessantly for gratification. This is manifested as "repetition compulsion" in myriad forms resembling the self-stimulation phenomenon. A rat, for instance, may copulate 50 times in rapid succession but stops after ejaculation.

From the physiological as well as the psychological standpoint it would appear that this self-stimulation has to do with the "promise of a reward," with a productive phenomenon anticipating the consummatory act. The questions to be asked are: Does it lead to cessation of the specific behavior? Is it followed by relaxation and sleep? Does a new form of behavior develop upon awakening? If an animal were to be stimulated in such a way that this sequence of events were to occur, we could properly refer to such stimulation as involving a reward system. (For comparison, consider the case of the donkey with a carrot held out in front of it. The Olds-Milner system never allows the donkey to get the carrot.) Otherwise we should continue to employ the term first used by Olds and Milner: positive reinforcement system.

William J. Turner
Central Islip State Hospital,
Central Islip, New York

Letters in "Science"

I hope you will permit a reader from foreign parts to offer his thanks to Conway Zirkle for writing the letter on degrees and titles [Science 133, 1626 (1961)] and to you for publishing it. The activities of the Society for the Rationalization of the Title of Doctor cannot be too widely known. And while I am about it, thanks also to Kirby Walker for his letter, in the same issue (p. 1648), on books as prestige objects.

To those of us who spend our lives contemplating the dreary acres of scientific literature unrelieved by a spark of wit, it is a real joy to read such correspondence in a scientific journal.

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The Yellin Case

A recent editorial, "One in eighteen thousand" [Science, 133, 2037 (1961)], begins with the words: "For many scientific purposes an event that happens only once in ten or twenty thousand tries is statistically insignificant. . . . But in other cases, the focus of interest may be on the unusual event itself. . . ." That editorial represents for me just such an unusual event, since it is the first time that I have found an idea proposed by an editor of Science so repugnant and outrageous as to compel me to express myself in the form of a "letter to the editor."

I refer, of course, to the suggestion that: "To minimize the chance that so rare an event [the Edward Yellin case] will occur again the [National Science] Foundation need only include on its application form a question about the criminal record of the candidate."

I do not know what proportion of the members of the scientific community have criminal records, but I would guess that such individuals must be rare, indeed. Furthermore, to my knowledge, there is no evidence whatsoever that such persons, as a group, have demonstrated any lack of scientific ability, even if that term is interpreted to include such qualifications as "motivation, independence, objective judgment, accuracy, and integrity" in their scientific endeavors.

On the other hand, the National Science Foundation, and all other granting agencies, recognize that some small percentage of funds granted for scientific investigations is used illegally by scientific charlatans for their own furtherance or aggrandizement. Again however, there is no correlation, to my knowledge, between that group of persons engaging in such unfortunate activities, and the hypothetical group of investigators with previous criminal histories. Until such a significant, positive correlation has been demonstrated, it seems to me that the editor's suggestion is, at the very least, irrelevant.

Irrelevance is a sufficient reason not to accept a suggestion. However, I do not find this idea repugnant primarily because it is irrelevant, but because it is one more manifestation of a trend in present-day society to suggest, and sometimes even to accept, protestations and oaths of loyalty, purity, and moral righteousness in place of such qualities as capability, originality, and creative thought.

ROBERT L. DEHAAN
3003 North Calvert Street,
Baltimore, Maryland

Your proposal in the editorial, "One in eighteen thousand," that National Science Foundation fellowship application forms include a question concerning the candidate's record of criminal convictions is reasonable enough, but it fails to touch on the central issue raised by the Yellin case—freedom of the individual conscience and the privacy of ideas.

National Science Foundation officials would not have had to face the stern inquisitors of the House Un-American Activities Committee if they had awarded a fellowship to an individual previously convicted of the common crime of embezzlement or bigamy. Yellin's offense was to invite an indictment for contempt of Congress by refusing to answer the House Un-American Activities Committee's questions about his past political associations on the grounds that this committee's investigation was an encroach-
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ment of his constitutional rights of free speech and assembly guaranteed by the First Amendment.—Yellin could easily have avoided serious difficulty with the committee and the citation for contempt by refusing to cooperate with the committee as hundreds of others have done in recent years by standing on the Fifth Amendment.

Yellin's challenge of the committee's right to probe the political beliefs of our citizens was undertaken with the clear knowledge that this action could result in his imprisonment. His decision to undergo this risk is in the highest traditions of our nation. It was awareness of this, I am sure, that helped Yellin win his reinstatement as a student after a hearing by the investigating committee of the University of Illinois.

Several years ago, an application for financial support of a research project on leukemia was rejected by an agency of the Public Health Service because the principal investigator, Linus Pauling, had failed to obtain the necessary political clearance. Public opposition to this unwarranted interference in research now makes it unnecessary for an investigator to undergo political screening to obtain a federal grant for a project in the health sciences.

Protection of freedom of thought is particularly important to us as scientists. It would be harmful to all of us if political clearance became a necessary condition to obtaining a federally supported fellowship.

MONROE SCHNEIDER
Jewish Chronic Disease Hospital,
Brooklyn, New York

Krebiozen

We read with interest your notes on the Krebiozen trial [Science 133, 1345 (1961)], which included reference to the Citizens Emergency Committee for Krebiozen.

If any further proof were required as to the validity of your statement that "professional sentiment in the field is overwhelmingly against Krebiozen," it is furnished by your most liberal application of the noun scientist to George D. Stoddard in connection with his criticism of the work of Andrew C. Ivy. Indeed, a large question involved in the litigation of Ivy versus Stoddard is that of freedom of research and inquiry in America. But to imply that a "scientist" in the field of education is qualified to criticize the work...
of, and imply professional incompetence on the part of, a physiologist in the highly specialized field of cancer research is ludicrous, to say the least.

RHODA BOYKO
Citizens Emergency Committee for Krebiozen, New York, New York

According to American Men of Science, Stoddard is a former head of the department of psychology at the University of Iowa. In recent years he has held administrative posts, and he is now chancellor of New York University.—Ed.

Mathematics Degrees

I noted with interest the editorial on the proposed Doctor of Arts degree for noncreative mathematicians (Science 133, 1979 (1961)). I commend you for publishing it.

I would urge, however, that it may be equally productive to consider a more restricted designation than the current Ph.D. for programs which stress the creative aspects of a discipline more than a scholarly treatment of its substance, structure, and relation to other fields of knowledge. For the former group, the Doctor of Mathematics might be appropriate.

H. CRAIG SIPE
George Peabody College for Teachers, Nashville, Tennessee

Communication between Social and Physical Scientists

In the 12th to 14th paragraphs of the New York Times obituary of the Soviet physicist Kurchatov (8 February 1960), the following sentences appeared (p. 4).

"One of Dr. Kurchatov's most significant public statements came in early 1958 when he publicly asserted that it was the Soviet Union, not the United States, that invented the hydrogen bomb. . . .

"That the Academician's claim may be correct has been indicated by evidence published in this country that the Soviet 1953 thermonuclear explosion was accomplished with the use of a form of lithium deuteride as a solid. This evidence suggests that the November, 1952, American thermonuclear device had to be very bulky because it contained much refrigeration apparatus.
needed to keep the heavy hydrogen employed in liquid form. Not until March, 1954, a half year after the Russian explosion, the evidence suggests, did the United States explode a real hydrogen bomb utilizing lithium deuteride."

If it was news that the Russians had the first hydrogen bomb and that there was a period of 6 months in which a hydrogen-bomb gap existed, then, as the following comments suggest, the news was—and remains—quite well hidden.

An informal survey was conducted among social and physical scientists in the Cambridge, Massachusetts, area. Quite universally social scientists had not previously known that there had been an apparent 6-month hydrogen-bomb gap in Russia's favor, and what is more, although they professed to having read the Times story, they (again quite universally) had not appreciated what was being reported. Some of these persons, it might be noted, teach and write about international (and particularly military) policy.

Physical scientists, on the other hand, did not see the matter as news. Quite universally they had "here or there" picked up the information given in the story, and, what is more, they expressed surprise that it was, in some quarters, news.

At least two points are worthy of further consideration. First, the story, which if news was surely one of the most important stories of the postwar period, was not picked up, given headline status, or made any sort of national issue by those (congressmen, commentators, and so on) who make national issues. Indeed, when more recently Khrushchev repeated the assertion, reports of his speech indicated not that he was apparently correct but that this was a typical Soviet claim. Second, if social scientists are to concern themselves with offering advice and evaluating national policies, then some means must be found by which they are given at least that information which the community of physical scientists has acquired.

Suggestions for the regular transmission of such information certainly seem in order.

Harvey Sacks
Department of Sociology,
University of California, Berkeley

David Zipser
Department of Biology, Harvard
University, Cambridge, Massachusetts

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