Editorial  Scholars in Spite of Ourselves .................................................. 1627

Articles  Animal Domestication in the Prehistoric Near East: C. A. Reed ................. 1629
The origins and history of domestication are beginning to emerge from
archeological excavations

Basic Research at State Stations: H. C. Knoblauch .................................. 1639
Twenty-two percent of federal-grant payments to state agricultural experiment
stations support basic science.

Science in the News  Antarctic Treaty Signed by IGY Nations; Minneapolis Newsman and Fortune Editor
Win Science Writing Awards; United States and Soviet Union Sign Exchange Pact 1641

Book Reviews  A. Inkeles and Raymond A. Bauer, The Soviet Citizen, reviewed by W. Schramm;
other reviews ........................................................ 1648


Stimulation of Amino Acid Transport in Isolated Diaphragm by Growth Hormone
Added in vitro: J. L. Kostyo, J. Hotchkiss, E. Knobil ................................ 1653

Stimulation of Striga asiatica (Witchweed) Seed Germination by 6-Substituted Purines:
A. D. Worsham, D. E. Moreland, G. C. Klingman .................................. 1654

New Permian Insects Discovered in Kansas and Oklahoma:
P. Tasch and J. R. Zimmerman ......................................................... 1656

All-Female Strains of the Teleost Fishes of the Genus Poeciliopsis:
R. R. Miller and R. J. Schultz ....................................................... 1656

Wave-Riding Dolphins: W. D. Hayes; P. F. Scholander ............................... 1657

Carbon Isotope Fractionation in Bacterial Production of Methane:
W. D. Rosenfeld and S. R. Silverman ............................................... 1658

Departments  Letters ............................................................................. 1822

Glucuronic Acid Research; Forthcoming Events; New Products ....................... 1660

Cover  Typical midsummer storm over the Gulf of Mexico, from Madeira Beach (St. Petersburg,
Fla.), about 10:00 p.m., 23 July 1959. This was one of five separate storm systems
parading northward through the Gulf. This time exposure (approximately 15
seconds), made with a Rolleiflex (2¼ inch square), includes four or five separate
flashes, only the last of which was “grounded” into the water. [W. R. Stewart]
The New Ramo-Wooldridge Laboratories in Canoga Park

...an environment dedicated to technological research and development

The new Ramo-Wooldridge Laboratories in Canoga Park, California, will provide an excellent environment for scientists and engineers engaged in technological research and development. Because of the high degree of scientific and engineering effort involved in Ramo-Wooldridge programs, technically trained people are assigned a more dominant role in the management of the organization than is customary.

The ninety-acre landscaped site, with modern buildings grouped around a central mall, contributes to the academic environment necessary for creative work. The new Laboratories will be the West Coast headquarters of Thompson Ramo Wooldridge Inc. as well as house the Ramo-Wooldridge division of TRW.

The Ramo-Wooldridge Laboratories are engaged in the broad fields of electronic systems technology, computers, and data processing. Outstanding opportunities exist for scientists and engineers.

For specific information on current openings write to Mr. D. L. Pyke.
Explorer VI is a space laboratory orbiting around the earth with paddles capturing sunlight for power.

The scientific data that will some day enable us to probe successfully to the very fringes of the universe is being recorded and transmitted at this moment by the space laboratory Explorer VI, a satellite now in orbit around the earth. This project, carried out by Space Technology Laboratories for the National Aeronautics and Space Administration under the direction of the Air Force Ballistic Missile Division, will advance man's knowledge of:

- The earth and the solar system
- The magnetic field strengths in space
- The cosmic ray intensities away from earth
- The micrometeorite density encountered in inter-planetary travel

Explorer VI is the most sensitive and unique achievement ever launched into space. The 29" payload, STL designed and instrumented by STL in cooperation with the universities, will remain "vocal" for its anticipated one year life.

How? Because Explorer VI's 132 pounds of electronic components are powered by storage batteries kept charged by the impingement of solar radiation on 8,000 cells in the four sails or paddles equivalent to 12.2 square feet in area. Many more of the scientific and technological miracles of Explorer VI will be reported to the world as it continues its epic flight. The STL technical staff brings to this space research the same talents which have provided systems engineering and over-all direction since 1954 to the Air Force Missile Programs including Atlas, Thor, Titan, Minuteman, and the Pioneer I space probe.

Important staff positions in connection with these activities are now available for scientists and engineers with outstanding capabilities in propulsion, electronics, thermodynamics, aerodynamics, structures, astrophysics, computer technology, and other related fields and disciplines.

Inquiries and resumes are invited.

P.O. Box 95004
Los Angeles 45, California
for SINGLE and DIFFERENTIAL PRESSURE MEASUREMENTS, SANBORN TRANSDUCERS provide

CHOICE OF SENSITIVITIES

Sanborn Physiologic Pressure Transducers, in two sensitivity series — 1 cm/mm Hg or 1 cm/0.1 mm Hg — provide models for both differential (difference between two variable pressures) and single-ended (difference between a variable pressure and atmospheric pressure) measurement.

<table>
<thead>
<tr>
<th>Model</th>
<th>Sensitivity</th>
<th>Nominal Working Range</th>
<th>Volume Displacement</th>
</tr>
</thead>
<tbody>
<tr>
<td>267</td>
<td>1 cm/1 mm Hg</td>
<td>-100 to +400 mm Hg</td>
<td>0.05 mm³/100 mm Hg</td>
</tr>
<tr>
<td>268</td>
<td>1 cm/0.1 mm Hg</td>
<td>-40 to +40 mm Hg</td>
<td>0.5 mm³/100 mm Hg</td>
</tr>
</tbody>
</table>

Compact, Precision Construction

Durable, non-corrosive Monel construction resists normal saline, alcohol and other standard physiologic and sterilization solutions. Chamber design permits flushing liquid to sweep the entire pressure chamber, removing all bubbles. Standard luer female type connections accept all needle and catheter fittings. Extremely small size (1¼" high x 1½" wide x 1" deep) allows transducers to be easily supported by ring stand clamp or similar method for use close to the subject under test.

Complete data on the pressure transducers, as well as compatible amplifying, monitoring and recording instruments, is available in a new 42-page "Biophysical Instrument" catalog. Copies are available on request from Inquiry Director, Waltham, Mass.

SANBORN COMPANY
Medical Division • 175 Wyman Street, Waltham 54, Mass.
Scholars in Spite of Ourselves

There is fear these days that Soviet foreign policy is now the determining force in American educational practice, and that the East-West struggle is compelling us more and more to emphasize science at the expense of the humanities. Admittedly, science and technology are becoming increasingly important in international relations, not only as the underpinning of military and economic strength, but also as symbols of power in their own right. The fear is, however, that our efforts to provide an educational basis for our national need will turn us into a country whose citizens will possess no more vision that the machines they soon will all be operating.

At the risk of seeming to find good in everything, may one say in reply that a kick from behind can propel you ahead? The fact is that if we are being pushed by Soviet action, then at least some parts of our educational system are being pushed in the right direction. If we consider the issue of the proper curriculum not as one of science versus the humanities, but as one of fundamentals versus applications, of gaining understanding versus memorizing rules, then we are presented with a happy paradox. In the present efforts at redesigning high-school science and mathematics programs, the more a course is revised to meet the Soviet scientific and technological challenge, the more it becomes a course appropriate to a liberal arts education.

One of the first and most publicized efforts at reclaiming high-school science teaching, for example, is that of the Physical Science Study Group, based at the Massachusetts Institute of Technology. The group has received considerable support from the federal government, as well as from private foundations, but the physics course it is producing puts more emphasis than is generally found on those concepts like wave motion that are necessary for understanding modern physics, and plays down inquiry into such matters as how a refrigerator works. In its third year of classroom use, the course is now being taught in 600 schools and next year will be made generally available. Other efforts at reform are being developed for courses in other sciences, and the realization is growing that the distinction between teaching underlying concepts and teaching applications applies even to such subjects as arithmetic in elementary school. As Max Beberman of the University of Illinois School Mathematics Project points out in his introduction to a pamphlet issued recently by the Council for Basic Education, children are as interested to learn that the sum of each two odd numbers is an even number as they are to learn that you can cut a yard of ribbon into so many pieces of such and such length.

To study science and mathematics even in the deepest fashion, of course, is not to study the humanities. And if we are happy about the support now available for redesigning science courses, we should be ecstatic if equally large sums were forthcoming for reworking some of the humanities courses. But there is hope that emphasis on science will aid the humanities, if only indirectly, by helping eliminate another kind of specialization. Increased emphasis on science may mean less stress on what the headmistress of a school in a recent novel by Vladimir Nabokov called the four D's—Dramatics, Dance, Debating, and Dating.—J.T.
Tri-Carb® Liquid Scintillation Spectrometers

Sensitive, versatile, simple to operate... accurately count low-level tritium and carbon-14 and all other beta- and alpha-emitting isotopes.

These instruments are completely automatic—no staff time is required for counting. Both handle up to 100 samples and record all data in digital form on paper tape. They can be operated on a 24-hour basis.

Auto-Gamma® Spectrometer Systems

Flexible and accurate... complete transistorized automatic systems for counting gamma-emitting isotopes.

NEW IN METABOLISM STUDIES

CO2 ANALYZER

Measures ratio of carbon-12 dioxide to carbon-14 dioxide as well as respiration rate for research and clinical tests. Gives an on-the-spot visible recording. Also automatically punches out all data (including patient's previous medical history) on computer cards for future statistical study.

NEW IN CHROMATOGRAM SCANNING

BI-DIMENSIONAL SCANNER

One-step operation... quantitatively locates and prints out counts per minute for radioactive zones on sheets or strips. Eliminates radioautography and need for separate counting.

SCALER

In geiger, proportional and scintillation counting, this transistorized instrument provides preset time to 100 minutes or preset count to 1 million. Has provision for automatic readout. Compact—no hot electron tubes.

Request literature giving full details.
Meetings

Glucuronic Acid Research

The study of glucuronic acid in relation to many fields of biology and medicine has been a major continuing activity of Japanese investigators. This interest developed first from the work on the metabolism of drugs in which glucuronic acid conjugation is a frequently encountered feature, and then, with the ready availability of pure glucuronic acid (Chugai Pharmaceutical Company, Tokyo), from a widespread curiosity to examine its biological properties in almost every living situation. A measure of the magnitude of this research effort is the fact that for the last 4 years a research conference on this subject has taken place. I was privileged to be invited to attend the fifth Glucuronic Acid Research Conference which was held 2 and 3 June at Sankei Kaikan, Tokyo. At this conference and on a number of other visits in June to research laboratories in Japan, it was possible to exchange views and to acquire information regarding biochemical studies on glucuronic acid. My present purpose is to transmit this knowledge to American investigators who are working in this area of research.

The conference was opened by M. Ishidate, dean of the faculty of pharmaceutical sciences, University of Tokyo. It was attended by some 250 investigators invited from many research centers of Japan. Two novel features of the meeting were, first, the simultaneous use of two slide projectors and two screens to expedite illustration of the data, and second, the provision of a pocket radio transmitter which not only freed the speaker from the electrical wires which ordinarily chain him to the podium but gave pleasing sound amplification.

Forty-four original papers were presented. Thirteen were concerned with the biochemistry and physiology of glucuronic acid, four with its growth-promoting effect, twelve with detoxication of drugs, viruses, and toxins, and the remainder with the clinical use of glucuronic acid.

Biochemistry and Physiology

The conjugation of amines with glucuronic acid and the significance of this process was reported by Ishidate. Aromatic and aliphatic primary amines easily form N-glucuronides at room temperature in the presence of aqueous solutions of glucuronic acid or its alkali salts. Crystalline N-glucuronides have been obtained of the following: aniline, toluidine, p-chloroaniline, mono-acetyl-p-phenylenediamine, p-dimethylaminoaniline, p-phenylenediamine, sulfanilamide, sulfapyridine, benzylamine, p-phenylethylamine, ethylamine, isopro- pylamine, isobutylamine, and cyclohexylamine. A quantitative relation between amine metabolism and glucuronic acid excretion was observed when rabbits were given aniline, sulfanilamide, or sulfapyridine. Also, after the administration of p-dimethylaminooazobenzene to dogs, one of the urinary metabolites appeared to be the N-glucuronide of p-mono-methylaminooazobenzene. The studies have included the property of amino acids to form N-glucuronides. These can be detected by paper chromatography but, because of their lability, they have not yet been isolated. A reaction of glucuronic acid with diphereria toxin takes place at pH 7.0 and 38°C with the gradual disappearance of toxicity. The formation of antiserum from the injection of this material was no different than in the case of formalin-inactivated toxin. It was therefore suggested that an amino group is the functional group of toxin and that this reaction depends upon formation of an N-glucuronide.

Ishidate then reviewed the two mechanisms which can explain glucuronic acid conjugation (UDPGA, β-glucuronidase) and found that information regarding the enzymatic mechanism of formation of N-glucuronide is incomplete.

Shimazono et al., (department of biochemistry, University of Tokyo) reported that incorporation of phosphate into rat liver tissues was increased by the injection of D-glucuronate. From an analysis of fractions containing nucleotides and sugar phosphates, it was stated that this incorporation was most marked in the case of glucose-6-phosphate and d-glycerophosphate. In a carefully done enzymatic study of glucuronic acid, the following observations were made. D-Glucuronate was reduced to L-gulonate by TPN-gulonic dehydrogenase, and L-gulonate was oxidized following de-carboxylation to L-xylulose by DPN-gulonic dehydrogenase. The formation of lactone from D-glucuronate or L-gulonate by soluble lactonase from cell supernatant was observed with the aid of hydroxylamine. The lactonase which acts on D-glucuronolactone was present in liver microsomes of various animals but not in human and monkey liver. L-Gulonolactone was formed easily from D-glucuronolactone by the action of TPN-gulonic dehydrogenase. A dehydrogenase present in microsomes produces ascorbate from L-gulonolactone.

Much discussion centered around in vivo effects of administered glucuronic acid in relation to carbohydrate metabolism, particularly in the liver. Thus,
Kodak reports on:

“Ektalith,” a word which will catch on... the stable basis of photography...

four views of a 1920 Bavarian postage stamp... the nylon rope trick

Camera wed dupicator

There are many thousands of offset duplicators in offices. We have worked out new materials and equipment which enable them to start in two minutes turning out in quantity first-rate enlargements or reductions of anything drawn, written, or printed, including microfilm records. If you require relatively few copies, you don’t even need an offset duplicator. Write a note to Eastman Kodak Company, Graphic Reproduction Division, Rochester 4, N. Y., and ask where in your locality you can see a demonstration of the Kodak Ektalith Method.

Wall Street cheery

Factory Photos

Firms Spur Camera Use
To Solve Test, Sales, Production Problems

headlined the first column of The Wall Street Journal on the penultimate morning of last summer.

"Industry sources expect retail sales of equipment and supplies for industrial photographic use will reach some $250 million this year, up from about $100 million five years ago," the story said. (That’s a very short time ago. These very discourses have been appearing for six years in this periodical.)

Feeling well disposed toward The Wall Street Journal, we laid it aside and took action to maintain the trend. Of "supplies" that The Wall Street Journal mentioned, none is older than photographic plates—our original product. For the love of challenge, we decided to get ready for the printer a chart that would put the photographic plate right into the spearhead of photography's onslaught on current technology.

The chart is now ready. You may have a copy with our compliments for your photo department wall. Indicate interest to Eastman Kodak Company, Special Sensitive Products Division, Rochester 4, N. Y. It takes 29" x 16½" to set out enough information about our 75 species of plates to permit industry and technology some intelligent basis for choice. You will receive the chart accompanied by a little pamphlet on dimensional stability entitled "Physical Characteristics of Kodak Glass Plates." gist of the pamphlet's message: if there were no such thing as the glass photographic plate, it would be necessary to invent it.

About the new x-ray films

Bavarian stamp of 1920 (Scott No. 552). A. Visible light photograph. The design is green and the "Deutsches Reich" overprint is black. B. Soft x-ray radiograph. Details of both design and paper visible. Design is "negative," indicating absorption of x-rays by the ink. C. Electron radiograph. Only the details of the paper are shown. D. Electron-emission radiograph. The design is "positive," indicating a relatively high electron emission from some heavy element in the ink. The overprint cannot be seen.

This is a clever scheme to snare the attention of those who use philitely for a hobby and radiation for a livelihood. Having gained your attention, we must reward you for it. The reward takes the form of a handsome 24-page book which contains not only a discussion of the above illustrations but (much more important) of general techniques for radiography by emitted electrons, transmitted electrons, soft x-rays, hard x-rays, and gamma rays; and (most important) operating data about the several new and newly improved Kodak films for all manner of radiography and x-ray diffraction.

Request a copy of the Second Supplement to "Radiography in Modern Industry" from Eastman Kodak Company, X-ray Division, Rochester 4, N. Y. To have it make full sense, it helps to have a copy of the book that the supplement supplements. This hard-cover, thoroughly indexed, 136-page affair is sold by x-ray dealers for $5.

If you already own it and have sent in the postcard that came with it, you doubtless have already received and read the supplement and have been wasting your time for the past 90 seconds.

A polyamide condensation for the kids to watch but keep their little hands off

Du Pont, which doesn’t ordinarily manufacture its nylon this way, was kind enough to publish this in J. Chem. Education 36, 182. We have been kind enough to prepare an abstract. Price for our minimum package quantities of the two reactants comes to $6.05. Teachers and Yuletide-bent daddies are reminded of the insidious nature of chlorinated hydrocarbons. Anyone inspired to commercial thoughts is advised to consult with his lawyer about U. S. Patent No. 2,708,617. Everyone who wants these or any of the approximately 3700 organic chemicals we stock (and catalog in Eastman Organic Chemicals, List No. 41) should get in touch with Distillation Products Industries, Eastman Organic Chemicals Department, Rochester 3, N. Y. (Division of Eastman Kodak Company).

Prices quoted are subject to change without notice.

Du Pont, which doesn’t ordinarily manufacture its nylon this way, was kind enough to publish this in J. Chem. Education 36, 182. We have been kind enough to prepare an abstract. Price for our minimum package quantities of the two reactants comes to $6.05. Teachers and Yuletide-bent daddies are reminded of the insidious nature of chlorinated hydrocarbons. Anyone inspired to commercial thoughts is advised to consult with his lawyer about U. S. Patent No. 2,708,617. Everyone who wants these or any of the approximately 3700 organic chemicals we stock (and catalog in Eastman Organic Chemicals, List No. 41) should get in touch with Distillation Products Industries, Eastman Organic Chemicals Department, Rochester 3, N. Y. (Division of Eastman Kodak Company).

Prices quoted are subject to change without notice.

11 DECEMBER 1959
Obara et al. drew attention to effects on the adrenal gland; Oda and Hara observed an increase in liver glycogen following glucuronolactone or xylulose injection; Imanaga stated that the increase in blood ammonia in patients with a portacaval shunt can be controlled with exogenous glucuronic acid; Oji studied urinary pentose in patients with liver disease and in animals with CCl₄ poisoning; Kobayashi et al. investigated the effect of glucuronic acid on experimental diabetes mellitus; Kurokawa and Yamagata reported experimental and clinical studies on a beneficial effect of glucuronic acid in diabetes; Masuda et al. investigated phosphorus metabolism in the liver of rabbits given carbon tetrachloride; and Kusuya et al. studied the effect of glucuronic acid on sugar assimilation.

With regard to β-glucuronidase, Tsukamoto et al. of Kyushu University proposed the use of p-nitrophenyl glucuronide as a substrate for both the hydrolytic and transfer activities of the enzyme. The enzyme was stated to catalyze the formation of m-aminophenyl glucuronide in a system in which benzoyl glucuronide was the donor substrate, and m-aminophenol, the acceptor molecule.

Growth-Promoting Effects

Several papers were presented which illustrate the variety of investigations into growth-promoting effects. Thus, Ogawa (National Institute of Genetics) observed that sodium glucuronate and glucuronic acid showed a significant growth-promoting effect on the early development of the embryo (Triturus pyrrhogaster) which was most prominent on the 13th day after fertilization (stage 32); Tamura (Tokyo Dental College) noted that the growth of chicks on a vitamin-B-deficient diet was promoted by glucuronolactone; and Wada et al. (Sapporo Medical College) reported that the prior administration of glucuronolactone to rats significantly promoted the growth of intraperitoneally transplanted Yoshida sarcoma cells, whereas the opposite effect occurred on the growth of subcutaneously transplanted Yoshida sarcoma.

Experimental and Clinical Studies on "Detoxication"

Although the papers on clinical and detoxication studies were the most numerous, yet, because of the great variety of conditions investigated they were not amenable to generalization.

The effect of exogenous glucuronic acid on the excretion of morphine glucuronide was thoroughly investigated by Hosoya and Otohe (Keio University School of Medicine). Thus, during the first 2 hours after administration of morphine, bound morphine appears earlier and in larger amounts in the urine of rabbits receiving glucuronic acid and morphine. Hosoya stated that these results seemed to indicate that exogenous glucuronic acid accelerates conjugation of morphine with glucuronic acid in the living body although it was by no means clear whether the exogenous glucuronic acid did conjugate with endogenous glucuronic acid by some unknown mechanism.

Shirai et al. (Kobe Medical College) extended his observations on the ethyl ester of glucuronic acid which augmented the formation of anthranilic acid glucuronide in the rabbit. He observed that the glucuronic acid ester is excreted in the urine more slowly than glucuronolactone.

Sawada (Kyushu University) stated that the direct-reacting bilirubin in cat bile was the glucuronide but that this substance was not produced by cat liver microsomes fortified with UDPGA.

Examples of the experiments and of the toxic compounds studied are Takahashi's (Kyoto) perfusion studies of conjugation by livers damaged with carbon tetrachloride; Tsumoo's (Showa Medical College) study of the effect of 1-phenyl-2-methylaminopropane and ephedrine on blood pressure and respiration in the urethanized rabbit; Tanuora's
Clinical studies included work on the effects of glucuronic acid on steroid hormone excretion during pregnancy (Moriyama et al.); studies on glucuronic acid metabolism of newborn infants (Iwanami et al.); three separate investigations on glucuronic acid interrelationships with adrenal cortical function (Tokita et al., Oshima et al., and Kawai et al.); two reports on a therapeutic effect of glucuronolactone in diabetes mellitus (Katsuki et al. and Matsuoka et al.); the treatment of epidemic hepatitis with glucuronic acid (Kosaka et al.); and the influence of glucuronolactone on experimental liver injury induced by *Penicillium islandicum* Sopp poisons (Suzuki et al. and Uraguchi et al.).

It appears that with glucuronolactone occupying a central position in the glucuronic acid pathway of glucose metabolism, the basis of interpretation of the results of experimental and clinical work with exogenous glucuronolactone is to be found mainly in the field of carbohydrate metabolism. Nevertheless, “detoxifying” effects of glucuronolactone or glucuronic acid may be explained on a direct basis, such as in N-glucuronide formation, or may result indirectly from alterations in the dynamics of the glucuronic acid pathway. The evidence indicates that glucuronolactone is indeed a physiological nutrient or metabolite and its study provides many indications of rewarding further critical investigation.

The address by W. H. Fishman (Tufts University School of Medicine) was published in monograph form (Biochemistry of Glucuronic Acid Lectures in Japan, published by the Glucuronic Acid Research Conference, University of Tokyo, 1959). Worthy of mention was the report of the discovery of a new 3-ketoheptose phosphate by Sie, Nigam, and Fishman, and the presentation of a concept of the role of β-glucuronidase in which the enzyme is believed to be associated with processes of cell and tissue differentiation rather than with cell division or growth per se.

I recall with great pleasure both the many enjoyable events of the conference and the lectures which it was my privilege to deliver at a number of Japanese institutions of higher learning. The kind and sincere hospitality of my hosts are herewith acknowledged with many thanks. My appreciation is expressed also to the National Science Foundation for granting a travel award.

WILLIAM H. FISHMAN
Tufts University School of Medicine and New England Center Hospital, Boston, Massachusetts
Accurate sheets simultaneously Chromatograms Paper of four laboratory research. Easily be able. Refractive ETER.INTERFERO METER NOW! View, Full 1666 solvent overall Dimensions: 27" with less evaporation. This instrument is ingeniously designed to provide .25% accuracy at minimum cost. Directly calibrated in inches. Clear, well defined fringes are observable and measurable. Refractive properties of transparent materials can be easily studied. Sturdily constructed for classroom or laboratory research. Complete with monochromatic mercury light and illustrated experiment manual... only $209.95.

Central Scientific Co.
A Subsidiary of Cenco Instruments Corporation
1710M Irving Park Road • Chicago 12, Ill. Branches and Warehouses—Mountainside, N. J. Boston • Birmingham • Santa Clara • Los Angeles • Tulsa Houston • Toronto • Montreal • Vancouver • Ottawa

Now! a low cost Michelson INTERFEROMETER

Volume of liquid delivered is precisely measured with a micrometer—down to 0.0001 ml.

Total capacity 0.25 ml.

Volume setting can be maintained for repeated deliveries of identical volumes.

Quickly converted from micro-syringe to micro-burette.

Teflon, glass, and stainless steel construction.

Write for Brochure SM

American Association for the Advancement of Science
1515 Massachusetts Avenue, NW, Washington 5, D.C.
New Products

The information reported here is obtained from manufacturers and from other sources considered to be reliable. Neither Science nor the writer assumes responsibility for the accuracy of the information. All inquiries concerning items listed should be addressed to the manufacturer. Include the department number in your inquiry.

MAGNETIC-TAPE CONVERTER makes possible direct use of digital magnetic tape as input to automatic graphical plotters. Solid-state switching circuitry is used with patchboard programing. Provision is included for omitting records that contain specified characters.

RATIO STANDARD combines a d-c divider and a ratio transformer. Model 1001 handles a-c input voltages of 0.35 times the frequency from 50 to 10,000 cycles/sec. Model 1002 handles inputs of 2.5 cycles/sec, 2.5 times frequency from 50 to 1000 cycles/sec. Input resistance of the d-c section is 10,000 ohms, and power rating is 5 watts. Linearity is said to be 0.0001 percent for a-c and 0.001 percent for d-c.

FREQUENCY CALIBRATOR furnishes standard frequencies from 10 cycles/sec to 1000 Mhz/sec with short time stability of 1/100. The instrument also provides timing marks at decade intervals from 0.1 to 100 usec. An internal crystal oscillator is coupled to a 2-to-1 multiplier followed by a 10 Mc/sec buffer that drives a series of multivibrators with fundamentals of 1 Mhz/sec and 100 and 1 kc/sec. (General Radio Co., Dept. Sci259, West Concord, Mass.)

RESISTORS of radial-lead and axial-lead encapsulated types are said to be available with absolute accuracies from ±0.005 to ±0.1 percent and stability ±0.003 percent per year. Accuracy over the temperature range -30° to +85°C is said to be ±0.02 percent, and matched sets which track within ±0.005 percent from -45° to +85°C can be provided. Resistances from 1 ohm to 4 megohm are available. (Julie Research Laboratories, Dept. Sci260, 556 W. 168 St., New York 32, N.Y.)

AIR MONITORING SYSTEM is said to eliminate interference of natural radon with measurement of long-half-life emitters by measuring the ratio of beta-gamma to alpha activity. Change in this ratio, essentially constant in natural radon-thoron progeny, indicates presence of other than normal background. Ratio rise indicates long-half-life predominantly beta activity; ratio fall, pre-