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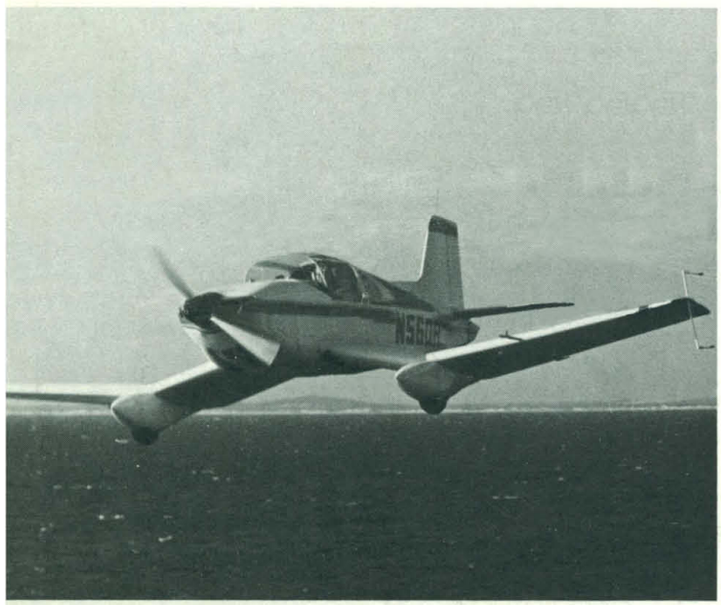
20 June 1975

Volume 188, No. 4194

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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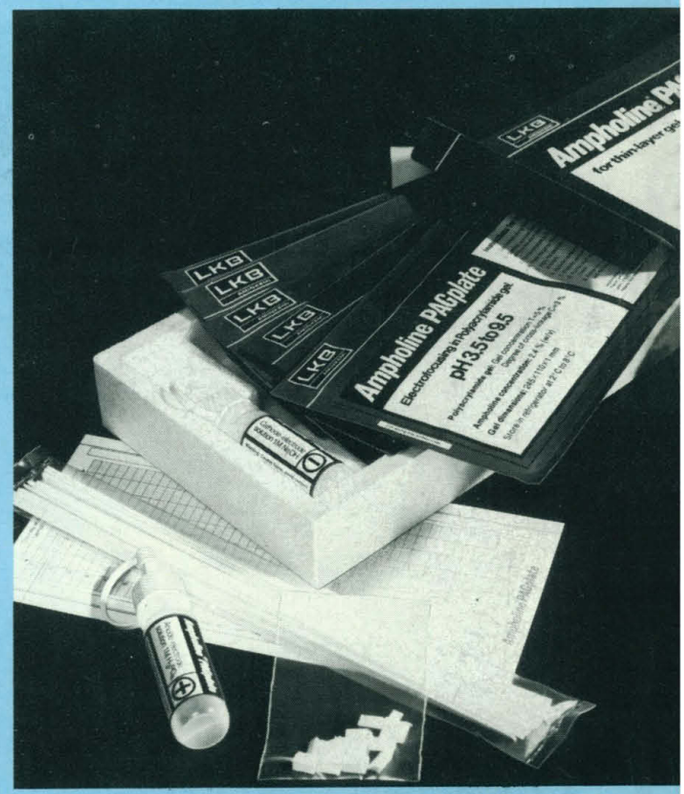

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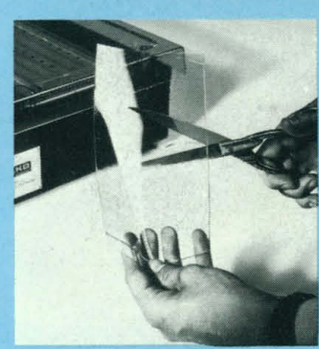

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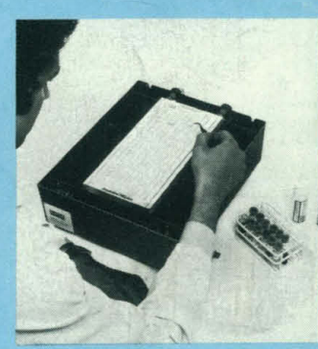

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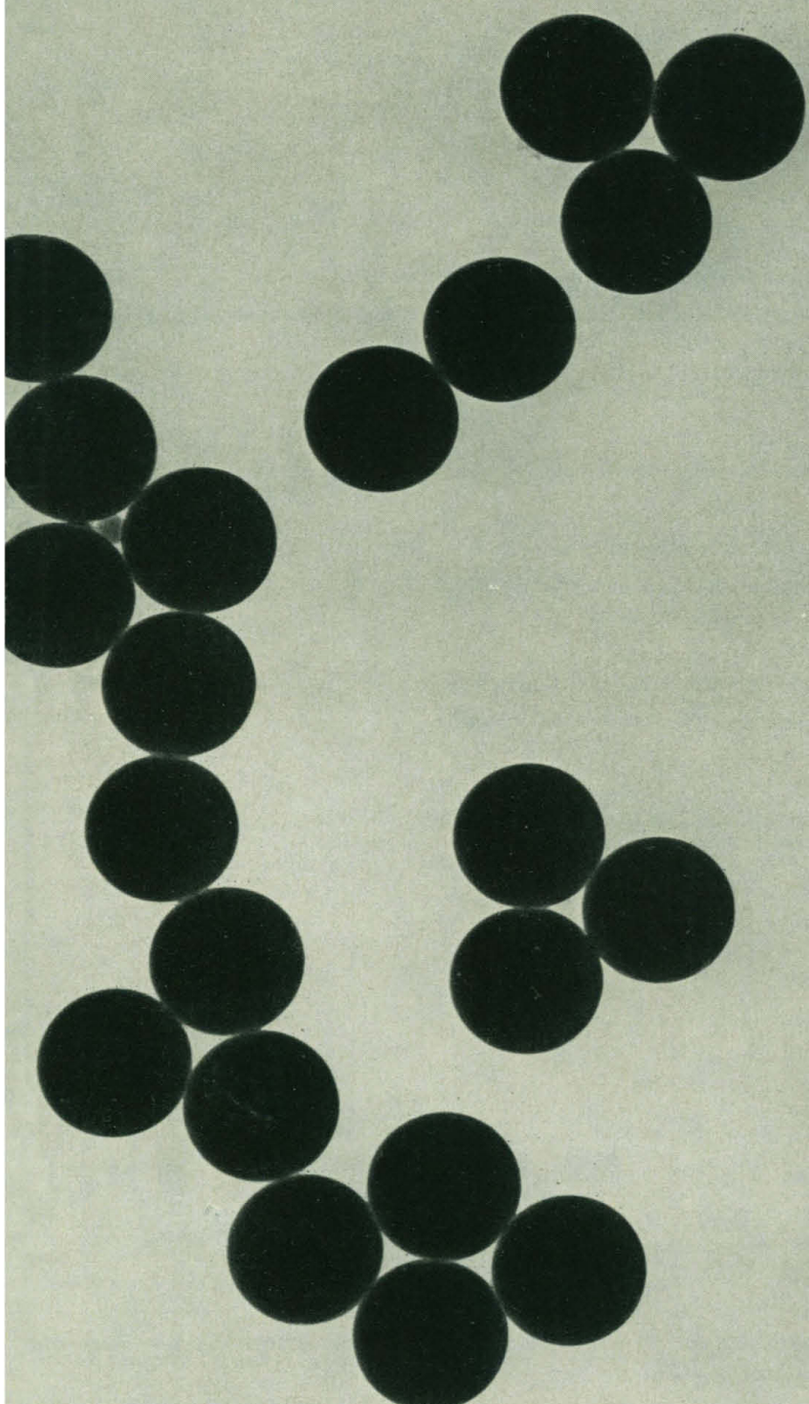

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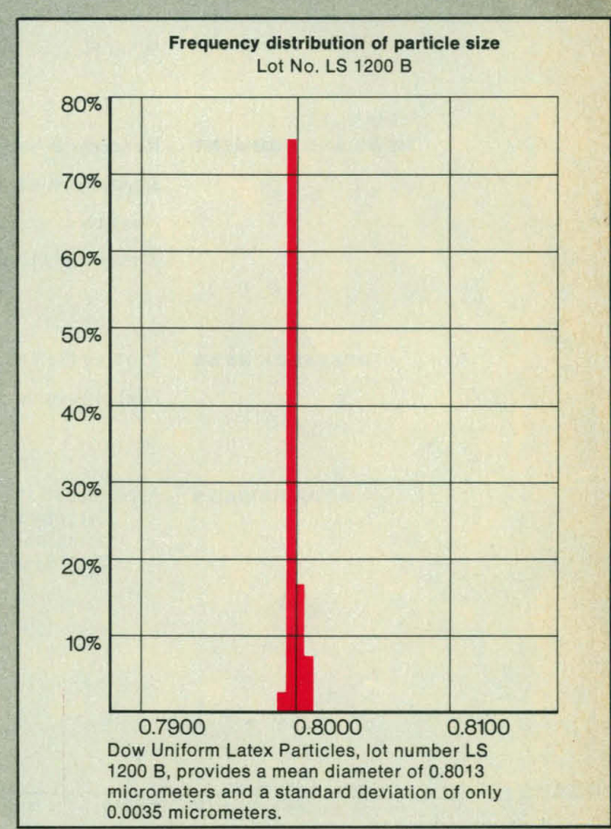

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COVER

Aircraft used in atmospheric electrical research for detection of organized convection (top left). The vertical electric field was measured between radioactive probes above and below the left wing tip. Much of the data were gathered during extended duration passes 5 meters above the ocean (bottom left). Layers of positive space charge exist at the top of the atmospheric haze layer (right) and within 150 meters of the ocean. See page 1171. [B. J. Kaplan, Newton, Massachusetts]

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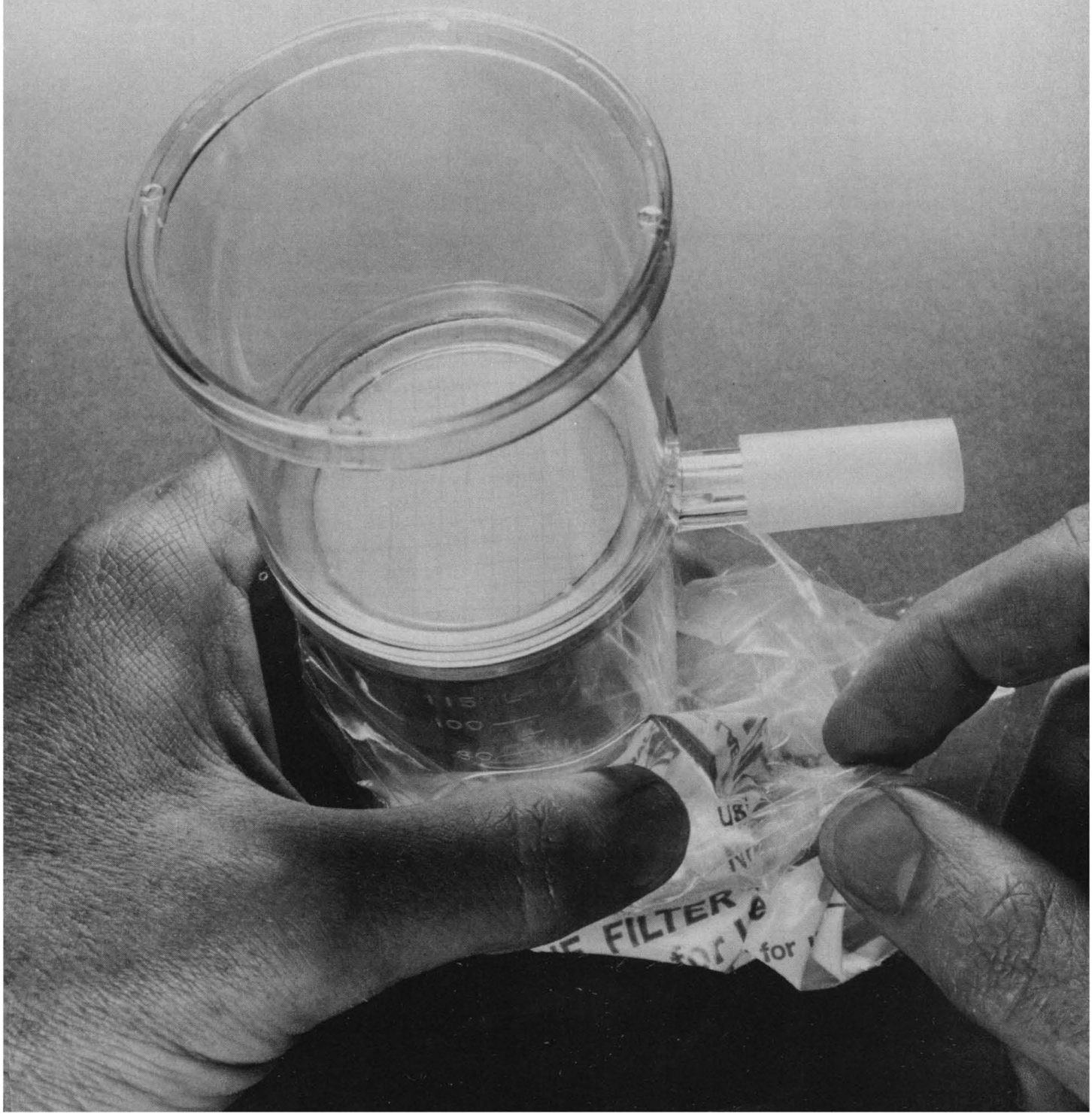

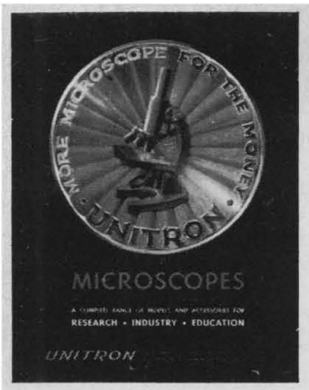

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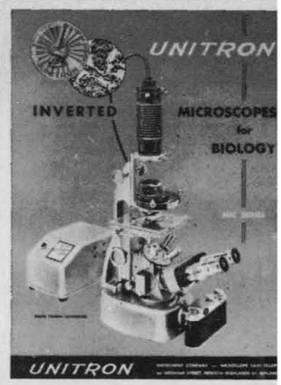

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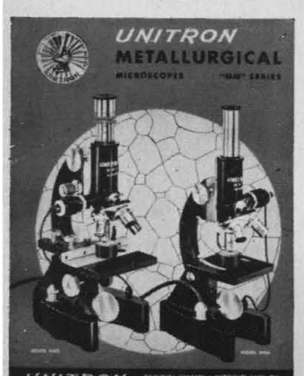

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Rapid processing of kidney biopsies for electron microscopy

by Jan Vincents Johannessen
The Gade Institute, Department of Pathology and Laboratory for Clinical Electron Microscopy, University of Bergen, 5000 Bergen, Norway.

The widespread use of kidney biopsy has contributed to the explosive expansion of clinical nephrology in the last 20 years.[1-3] This is now an established procedure in the investigation and management of patients with kidney disease and the only method of making an exact and morphological evaluation of diffuse renal disease during life.[4] Several forms of kidney disease in which the prognosis and response to therapy differ, cannot be distinguished clinically.[5,6] Their lesions may have an almost identical appearance on light microscopy[3,6], although they are readily differentiated by electron microscopy. Light microscopy is, therefore, not an entirely reliable means of differentiating renal lesions.[5,7-9]

A major obstacle to the use of electron microscopy in the routine evaluation of kidney biopsies has been the long processive time that is usually employed. However, rapid methods have been successfully used in electron microscopy of normal tissues from different animal species.[10-14] Therefore, the aim of the present study was to adapt and evaluate a rapid method of preparation of kidney biopsies for electron microscopy. The quality of the sec-

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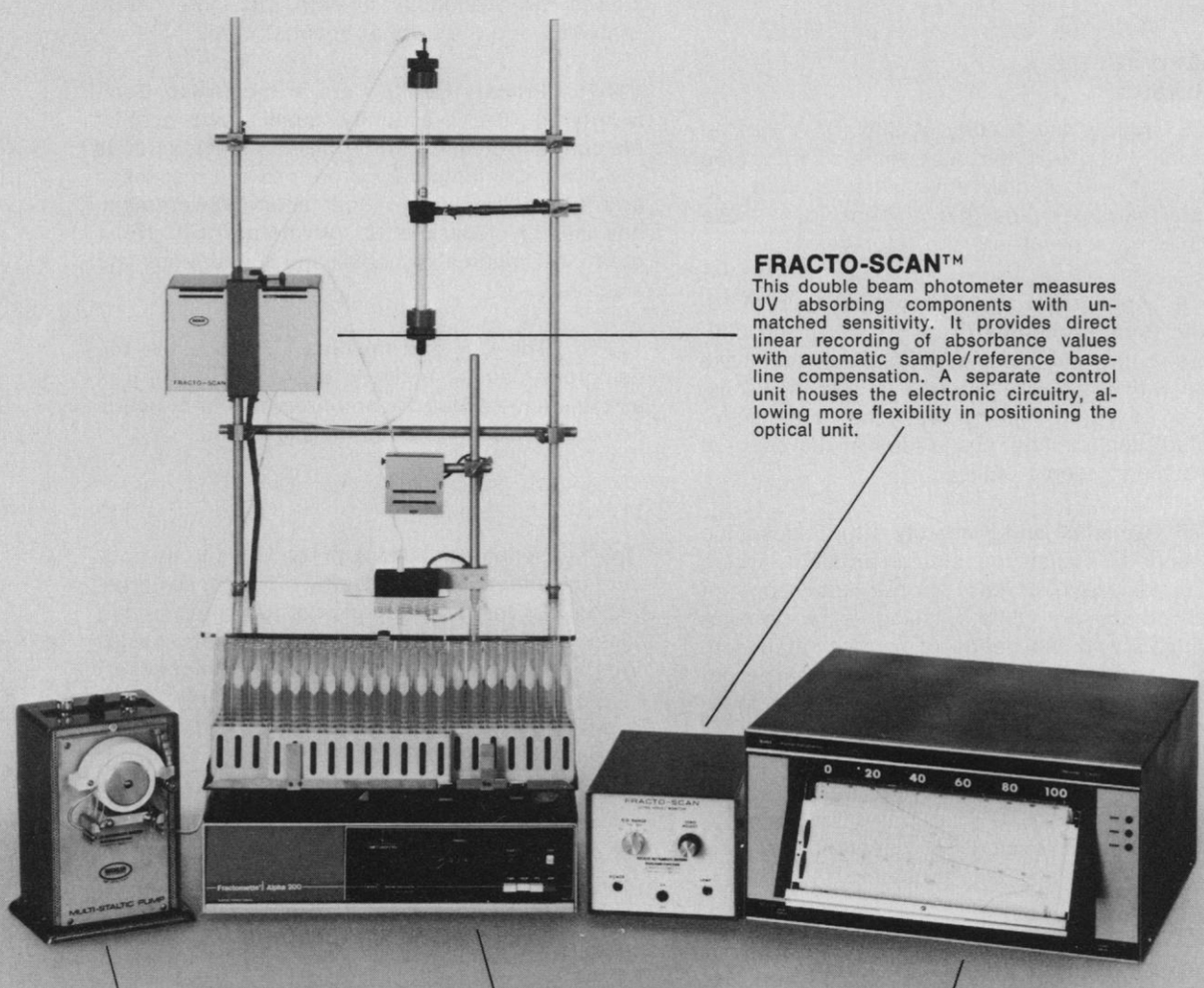

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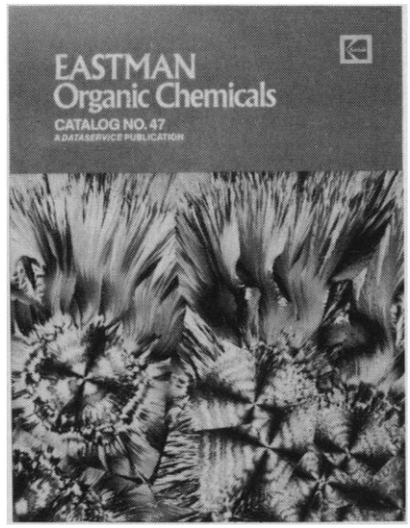

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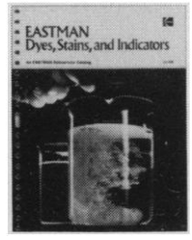

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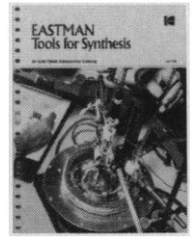

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LETTERS

Soviet Arrests Continue

The Soviet physicist Andrei Tverdokhlebov has been arrested. In 1970, he, together with A. Sakharov and V. Chalidze, founded the Moscow Human Rights Committee. More recently he became the secretary of the Soviet group of Amnesty International. The biologist S. Kovalev, another member of this group, was arrested last December.

Sakharov and Shasarevich (a distinguished Moscow mathematician) applied for the release of these men. In an "Appeal to American scientists" Chalidze wrote:

> . . . these repressions involve serious scientists who, despite their public activity and pressure from the regime, have continued scientific work . . . persecuted Soviet scientists have no defense other than to hope for the support of the international scientific community.

We initiate the creation of a Scientists' Committee for Tverdokhlebov. Interested colleagues are asked to write to one of us.

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Graduate Astronomy Programs

The recent recommendation by the National Academy of Sciences' Astronomy Manpower Committee to discourage graduate education in astronomy was reported in the 18 April issue of *Science* (Research News, p. 246). It is clear from reading the full report (*1*) that the intentions of the committee were good. Nevertheless I feel that, as chairman of a department that carries the name of astronomy, I must register my disagreement with that recommendation.

First, the recommendation may backfire. If the graduate program is reduced, so is need for faculty to maintain that program. With the present strong financial pressures on colleges and universities, the total faculty pool may well be cut. Thus the recommendation threatens to set off a vicious cycle that will exacerbate, not abate, the shrinking job market.

Second, a problem exists only if astronomy programs are set up to produce narrow specialists who are unfit, at least psychologically, for any other work. In that case the problem lies in those programs and not in the trivially obvious fact that one cannot have zero population growth in a population that attempts to replicate itself once every year or two. The solution we have adopted is to create a broader interdisciplinary approach so that a degree in astronomy does not restrict its recipient to work only as an astronomer. A few of the best and the luckiest remain in astronomy. The others are able, and feel that they are able, to use their ability and training in problem-solving in the physical sciences to work productively in government or industry. Our graduates are all finding good, useful jobs in which they are successful. They are not overly concerned that these jobs often do not involve a simple extension of their thesis research. There are undoubtedly other approaches to the problem, but the interdisciplinary one has worked well at Rice University.

F. CURTIS MICHEL
Department of Space Physics and Astronomy, Rice University, Houston, Texas 77001

References

1. Astronomy Manpower Committee, Committee on Science and Public Policy, *Employment Problems in Astronomy* (National Academy of Sciences, Washington, D.C., 1975).

Far-Out Diets

The Point of View "Stamp out food faddism" (News and Comment, 16 May, p. 714) is a curious mixture of emotion and inaccuracy. It says that "[o]ur far-out diet—almost 20 percent refined sugar and 45 percent fat—is new to human experience." New indeed, as anyone who has ever mixed or analyzed a laboratory diet could tell the anonymous author. American diets commonly supply about 42 percent of food energy as fat (*1*). Fat has a caloric content 2.25 times that of carbohydrate or protein, so this is equivalent to 25 percent, not 45 percent, of the diet, not counting roughage and minerals, which bring the fat content down to 20 percent or less.

The author implies that our great-grandparents ate diets of raw broccoli, wheat germ, and yogurt, but does not mention

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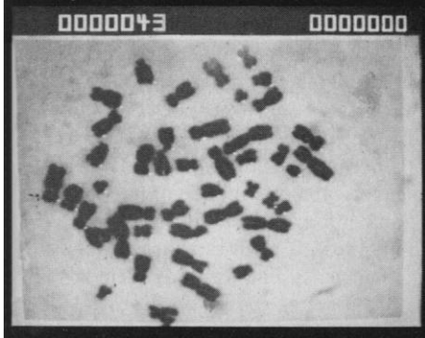
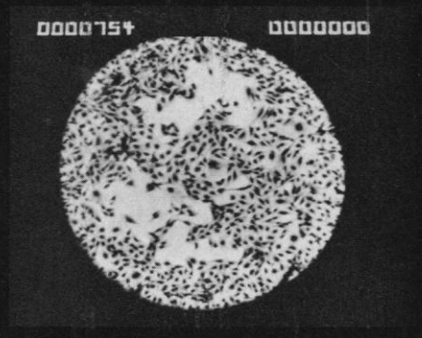
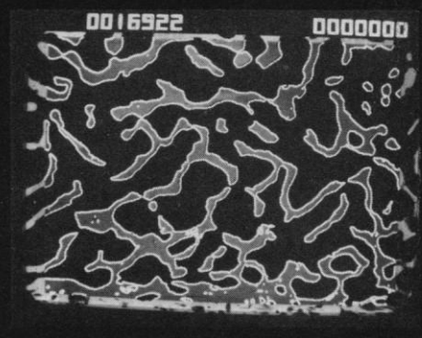


CHROMOSOME ANALYSIS. Metaphase spreads automatically located and recalled for analysis.

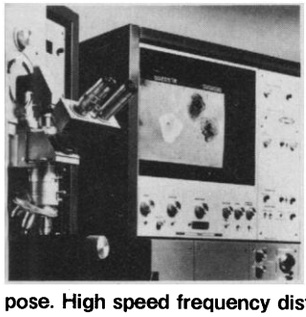


TARGET CELLS COUNTED IN TISSUE CULTURES. Cell preparations can be quantitated using slides or culture trays.



QUANTITATIVE ASSESSMENT OF BONE STRUCTURE. Perimeter measurement of trabecular bone.

THE QUANTIMET 720 SYSTEM COUNTS, MEASURES AND CLASSIFIES FEATURES BY SHAPE, OPTICAL DENSITY, AREA, PERIMETER, LENGTH AND WIDTH.



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that their life expectancy was less than ours. Actually, the rejection of saturated fats is a recent fashion; our great-grandparents were great consumers of butter, cream, fat pork, lard, suet, and beef drippings. They ate starch, which, like refined sugar, is converted to glucose in vivo. If they ate broccoli, they had enough sense to cook it so it would be digestible. Wheat germ is a great food, even though it contains an estrogen that gives it a potency equivalent biologically to about 400 parts per billion of diethylstilbestrol as measured by the mouse uterine response (*2*). Yogurt is milk is yogurt. It is easy to use the term "junk food" in a subjective manner.

The statement that the "standard" diet "can contribute to obesity, tooth decay, heart disease, intestinal cancer, and diabetes" is an erroneous oversimplification. These are complex problems, involving heredity, hormonal balance, fluoride deficiency, dental hygiene, and even virus diseases. Overeating is paramount to obesity, but, alas, the degenerative diseases will not be arrested by going on a diet of cracked wheat, pumpkin seeds, and dried seaweed.

THOMAS H. JUKES
Space Sciences Laboratory and
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Berkeley 94720

References

1. Committee on Dietary Allowances, Food and Nutrition Board, National Research Council, *Recommended Dietary Allowances* (National Academy of Sciences, Washington, D.C., ed. 8, 1974), p. 33.
2. A. N. Booth, E. M. Bickoff, G. M. Kohler, *Science* **131**, 1807 (1960).

AGRIS

One rather unfortunate misunderstanding might arise from the otherwise excellent article "AGRIS" by Joseph F. Caponio and Leila Moran (24 Jan., p. 233). In the section entitled "Discussion," the authors state, "AGRIS represents the first big international effort to coordinate and to consolidate a spectrum of information activities." This does less than justice to the work of the International Atomic Energy Agency (IAEA) and its member states in their creation of the International Nuclear Information System (INIS).

INIS came into operation in May 1970 and was the world's first computer-based documentation service for which input is prepared on an internationally decentralized basis. The first discussions in the IAEA secretariat, which ultimately led to the implementation of INIS, were initiated by the United States and the Soviet Union in the summer of 1966. R. K. Wakerling of the United States and L. L. Issaev of the Soviet Union, acting as consultants, drew up the first description of the system. Their report was reviewed in December of that year by a working group consisting of experts from 16 countries and three international organizations. Agreement was reached in 1966 on a number of important aspects of INIS which have endured through subsequent years.

In particular, it was decided to adopt a "network" concept for the organization of INIS. Each country or regional organization would scan the literature for the area for which it was responsible and prepare the input data for the system; the IAEA would merge this data to create a master file and would distribute the file in agreed forms (conventional printing, microform, and magnetic tape) for the use of national and regional information services.

INIS is now a well-established and highly efficient system. It has demonstrated that a system based on decentralized input can produce timely and consistent information services.

It may be of some interest to note that the implementation of the AGRIS Level One system—which became operational this year—has been achieved in close collaboration with INIS, making use both of the experience and computer software of the latter system. Further, all computer processing of AGRIS input is being performed as a joint operation with the computer section of the IAEA in Vienna. That this collaborative effort is working smoothly is a further tribute to INIS "know-how."

HARRY EAST
AGRIS Coordinating Centre,
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of the United Nations,
Q0100-Rome, Italy

Miles-per-Gallon Indicator

In his review of energy conservation (Research News, 23 May, p. 820), William D. Metz should have used the indicative rather than the subjunctive mood in referring to a miles-per-gallon indicator for automobiles. Such an instrument has been available for some time from SpaceKom, Inc., a small company in Santa Barbara, California. It costs about as much as 70 gallons of gasoline.

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20 June 1975, Volume 188, Number 4194

SCIENCE

International Cooperation in Geology

Relationships between the developed countries and the less developed countries (LDC's) are evolving. Some changes that are not so dramatic as the shifting behavior with respect to energy and materials may have equally important long-term consequences. One is a growing realization of the role of science and technology as determinants of standards of living. This awareness has only been partially acted on. Nevertheless, competence in science has been growing in some of the LDC's, and in some fields, notably the earth sciences, the gap between the two worlds has been closing. In proportion to their populations the LDC's do not have as many geologists as the advanced countries. However, the quality of their best is excellent.

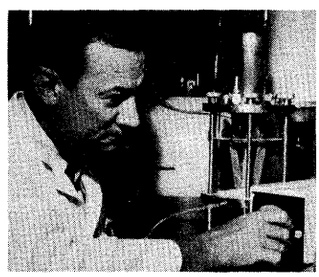
Existence of widespread competence in geology has made feasible a major program which is likely to facilitate development while aiding in further transfer of geologic capabilities. The new enterprise has organizational aspects that reflect evolving attitudes and realities. First, it is a child of two parents—the International Union of Geological Sciences (IUGS) and the United Nations Educational, Scientific and Cultural Organization (UNESCO). Second, the program is guided by a Board on which the developing countries are solidly represented.

The enterprise, called the International Geological Correlation Programme (IGCP), includes 73 countries that have begun active participation or have indicated intention to do so. The program consists of more than 30 projects and additional ones will likely be approved by the Board. The projects must meet the following criteria: (i) be relevant to the major scientific and practical objectives of the program; (ii) fill a world-wide, continental, or regional need; (iii) preferably involve various branches of geology and their applications and require interdisciplinary cooperation; (iv) require coordinated international action and facilitate common understanding between specialists from different countries; and (v) result not only in long-term benefits but also, whenever possible, yield tangible short-term practical results for the participants.

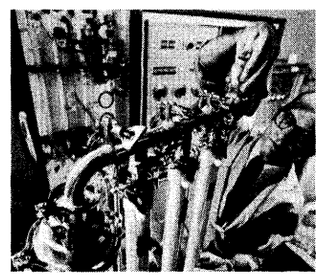
Examples of projects include Holocene changes in sea level, circum-Pacific plutonism, and a number of projects on Precambrian geology and geochemistry. The project on sea-level movements has important world-wide applied aspects since many millions of people live in low-lying coastal regions. The project on circum-Pacific plutonism includes studies of phenomena related to the collisions of tectonic plates and will surely lead to better understanding of geochemical processes giving rise to ore formation. The projects on Precambrian geology and geochemistry will exploit major opportunities for studies. Earlier Precambrian investigations were handicapped by lack of accurate dating. Thus about six-sevenths of Earth history was incompletely accessible. More than half the world's mineral wealth comes from Precambrian formations and crucial information about origin and evolution of life remains buried in those rocks.

While the joint program is only in its initial phases and definitive results are few, indications are that it will be a success. It has already generated widespread international cooperation and interest and has involved developed and less developed countries in joint enterprises. The magnitude of accomplishments will depend on the extent to which supporting funds become available. Thus far the total expenditures by UNESCO and IUGS have amounted to about $400,000. It has been used to provide for a Secretariat and to cover expenses of organizational, working group, and regional meetings. To facilitate broader participation, especially by the poorer LDC's, additional funds must be found. Involvement in projects relevant to their own country's needs, in cooperation with experts from other lands, would serve as an ideal training experience. This principle was proved in practice during the 1950's and 1960's by the Agency for International Development and the U.S. Geological Survey which together participated in the upgrading of geological competence in some 80 countries. The present IGCP represents a program that builds on a solid foundation of previous constructive effort with an organizational arrangement reflecting changed international realities. —PHILIP H. ABELSON

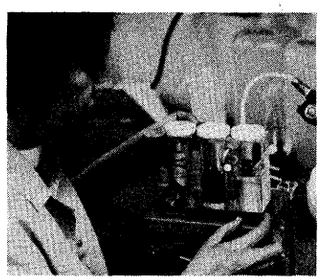
Innovations in Ultrafiltration for Concentration, Desalting, and Fractionation



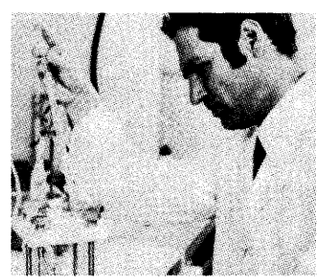
Research chemist adjusts speed control on Amicon high-flow stirred cell in preparation for reconcentration of an antiserum purified by column chromatography.



Pharmacologist checks inlet pressure on Amicon high-yield hollow fiber dialyzer/concentrator during vaccine production run.



Senior technician controls stirring of Amicon micro-ultrafiltration system during protein binding study.



Biochemist samples concentrate from reservoir of Amicon thin-channel ultrafiltration system during enzyme purification process.

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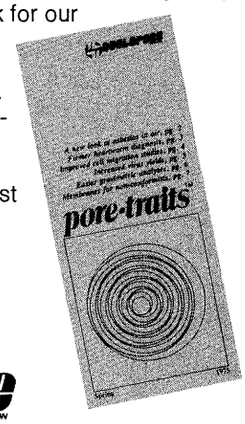

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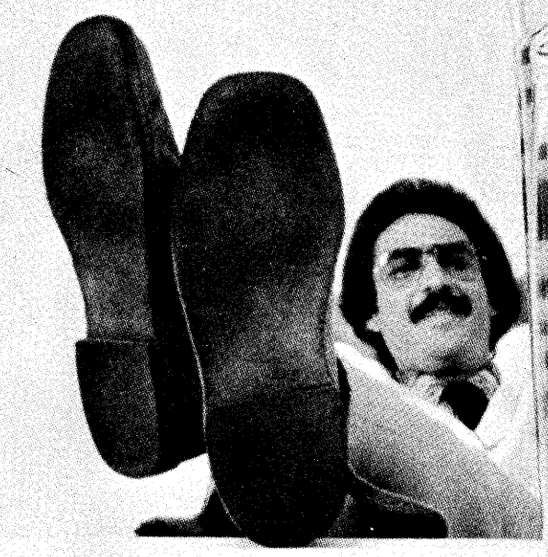

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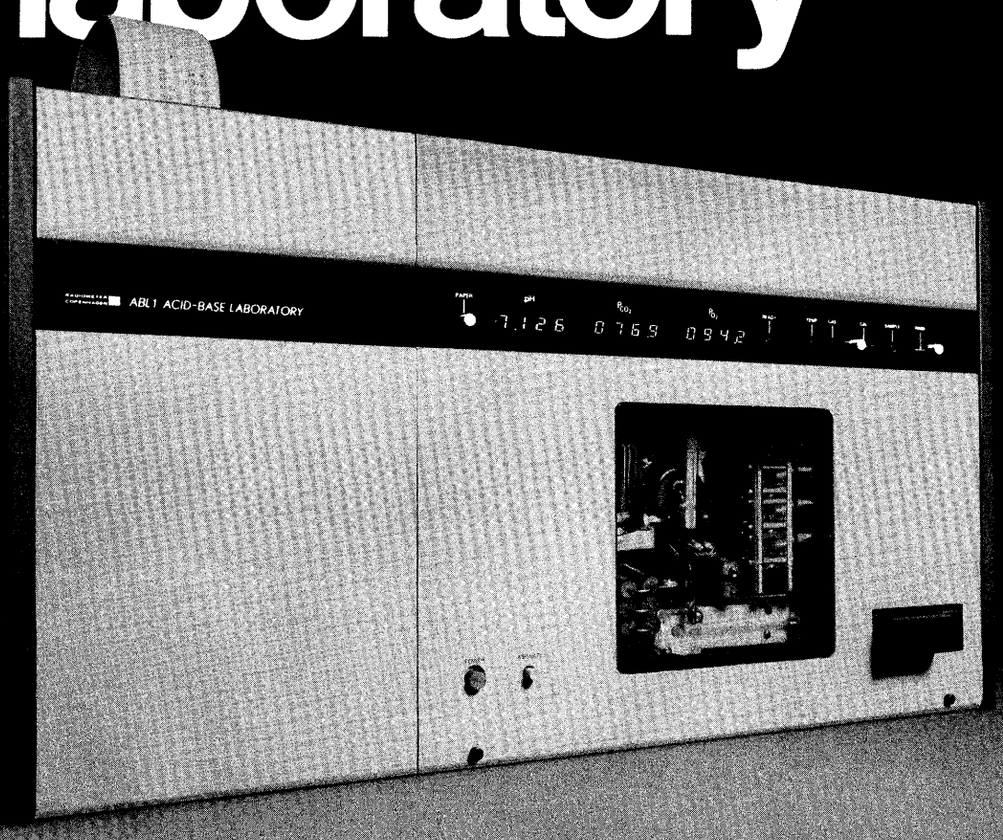

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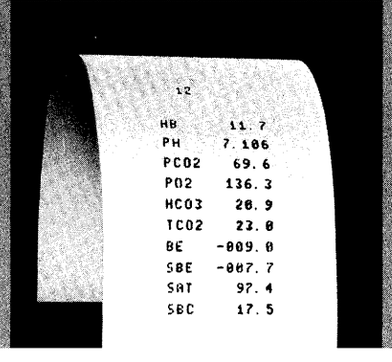

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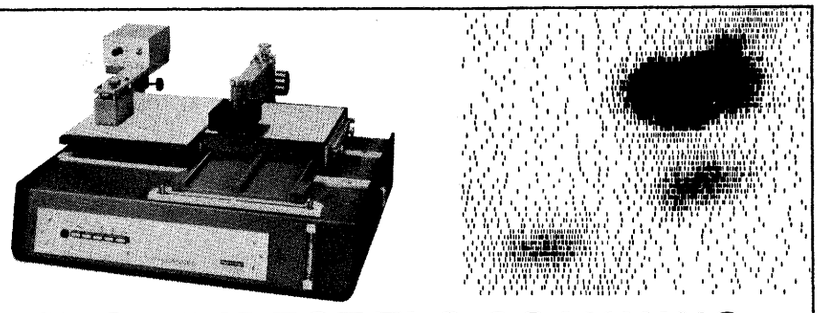

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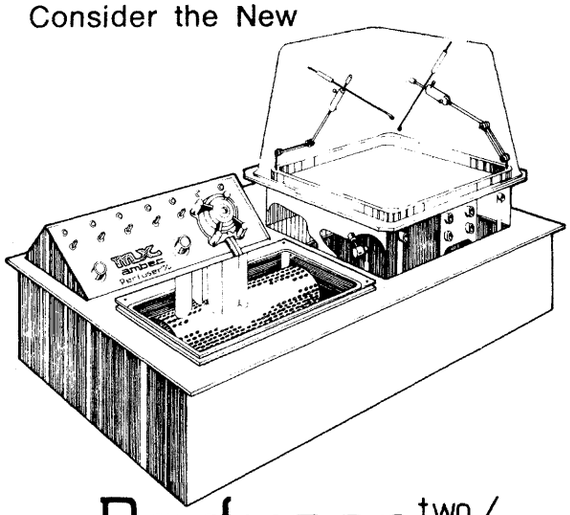

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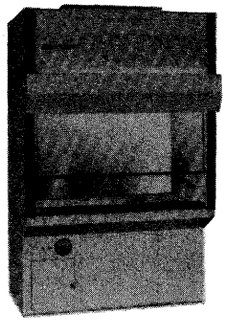

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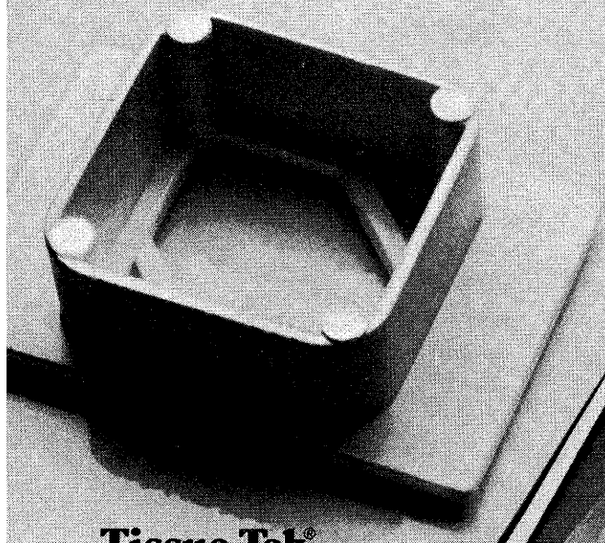

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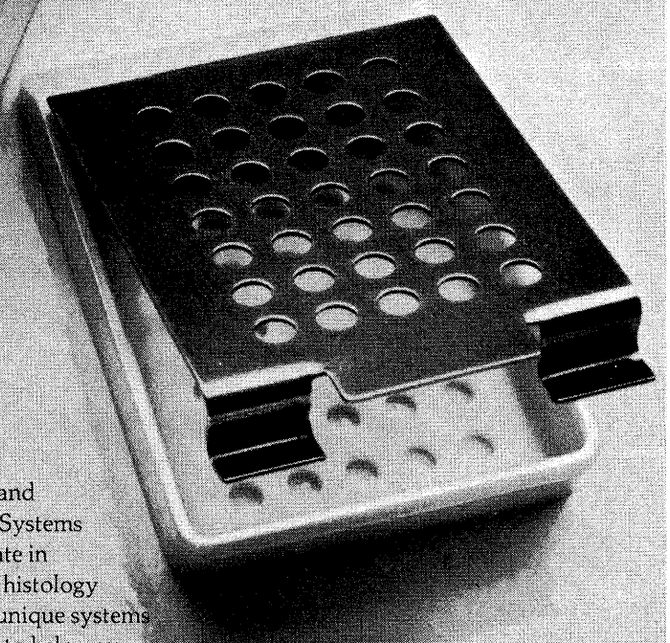

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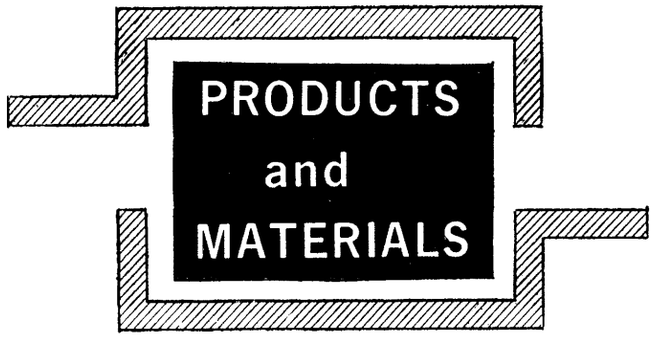

Blood Glucose Analyzer

Model 23A utilizes 25-microliter plasma samples and detects glucose in the range of 0 to 500 milligrams per deciliter. Operator pushes a button to prepare the instrument, injects the sample, reads the value within 45 seconds, and then clears the instrument for the next sample. Calibration is done the same way except that a standard is substituted for the sample. Principle of operation is the reaction of glucose with glucose oxidase to yield gluconic acid and hydrogen peroxide. The analyzer detects the peroxide. Yellow Springs Instrument Company, Incorporated. Circle 784.

Pipette Tip-Loading System

Sampler 810Q Organized Tips eliminate cross contamination, save preparation time, and eliminate the risks of mouth-pipetting when used with hand-operated systems. The tips come in trays of 240 tips each, five trays to a box. The tips do not need to be touched prior to use; the operator merely places a tray at a time nearby. The tips accommodate volumes of 0.005 to 0.2 milliliter. Oxford Laboratories Incorporated. Circle 780.

Ionized Calcium Analyzer

The SS-20 measures ionized calcium in whole blood in less than 3 minutes. First, 500 microliters of serum or heparinized blood is introduced through a sample injection port, then the operator activates the device. Analysis, restandardization, measurement, and clean out are performed and the result is displayed as milliequivalents of calcium ion per liter of sample. The device contains materials sufficient for 200 analyses. Usual values in normal patients are around 2 milliequivalents per liter; the SS-20 results are readable to 0.01 milliequivalent and the standard deviation on normal replicate samples is 2 percent. Orion Biomedical Division, Orion Research, Incorporated. Circle 783.

Hematology Standard

Haem-C is a stable reference and control that simulates human blood for use in automated and other clinical analyses. The product contains human erythrocytes and simulated leukocytes. Haem-C is packaged in six 7-milliliter vials per set. The vials are designed to be handled like patient samples; printed assay values are available for a variety of instrument systems and procedures. J. T. Baker Chemical Company. Circle 781.

Disposable Thermometers

The Single Use devices consist of 45 chemical dots debossed on an aluminum strip. The dots are activated by temperatures between 96.0° and 104.8°F. Each dot is sensitive to a specific temperature 0.2°F higher or lower than the next or preceding dot, respectively. The device is placed under the patient's tongue for 30 to 45 seconds; the operator reads the last dot to have fired. The device may then be discarded. Biomedical Sciences, Incorporated. Circle 779.

Blood and Tissue pO_2 Monitor

The SM7001 module accepts oxygen tension signals from a catheter and conditions them for display. A digital readout of values from 0 to 800 millimeters of mercury appears on a front panel. The module also provides a standard signal output for potentiometric recording. Minimum and maximum alarm limits may be set and telemetry is also an option. Gould, Incorporated, Statham Instruments Division. Circle 782.

Cyclic Adenosine Monophosphate Assay

Kits are now available for assay of cyclic AMP. Sensitivity is 0.11 to 27 picomoles per tube. Assay may be prepared for counting in approximately 2 hours. Accuracy is enhanced by presentation of results in the form of a log-logit plot. Assay procedure involves extraction of sample of tissue, urine, or plasma; competition of tritiated and free cyclic AMP; adsorption of free cyclic AMP on Dextran-coated charcoal, and liquid scintillation counting. Diagnostic Products Corporation. Circle 785.

Peroxidase-Conjugated Antisera

Twelve different products are available to provide a specific method for the localization of tissue antigens. All are prepared from the immunoglobulin G fraction of the corresponding antiserum after fractionation with DEAE cellulose. These soluble bound-protein complexes retain their enzymatic and immunological activity. Products include human immunoglobulins G, A, M, and E and rabbit, mouse, rat, and guinea pig immunoglobulin G all produced in goat; also mouse, rat, and guinea pig IgG produced in rabbit. Miles Laboratories, Research Division. Circle 777.

Thyroxine Radioimmunoassay

Immo-Phase T_4 is a solid-phase assay system for thyroxine. Antibody is bound to porous glass in a diluted, measured, and ready-to-use form. The operator performs a single step to separate the bound antibody/antigen after a single incubation and centrifugation. The iodine-labeled T_4 has a guaranteed shelf life of 120 days. Available in kit form, the system can provide up to 20 determinations in 90 minutes in disposable work trays. Total radioactivity of less than 2 microcuries per vial means that the waste may be disposed of without special handling. Corning Diagnostics, Corning Glass Works. Circle 778.

Literature

Carbon Dioxide Incubators are featured in a four-page brochure. Photographs, specifications, and design features are included. Hotpack Corporation. Circle 786.

Instructional Aids lists items pertinent to the medical-diagnostic fields of radioimmunoassay, hepatitis and thyroid function testing, nuclear medicine, and others. Abbott Laboratories, Diagnostics Division. Circle 789.

Newly offered instrumentation, apparatus, and laboratory materials of interest to researchers in all disciplines in academic, industrial, and government organizations are featured in this space. Emphasis is given to purpose, chief characteristics, and availability of products and materials. Endorsement by *Science* or AAAS is not implied. Additional information may be obtained from the manufacturers or suppliers named by circling the appropriate number on the Readers' Service Card (on pages 1166A and 1222A) and placing it in the mailbox. Postage is free.—RICHARD G. SOMMER

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(Continued from page 1202)

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