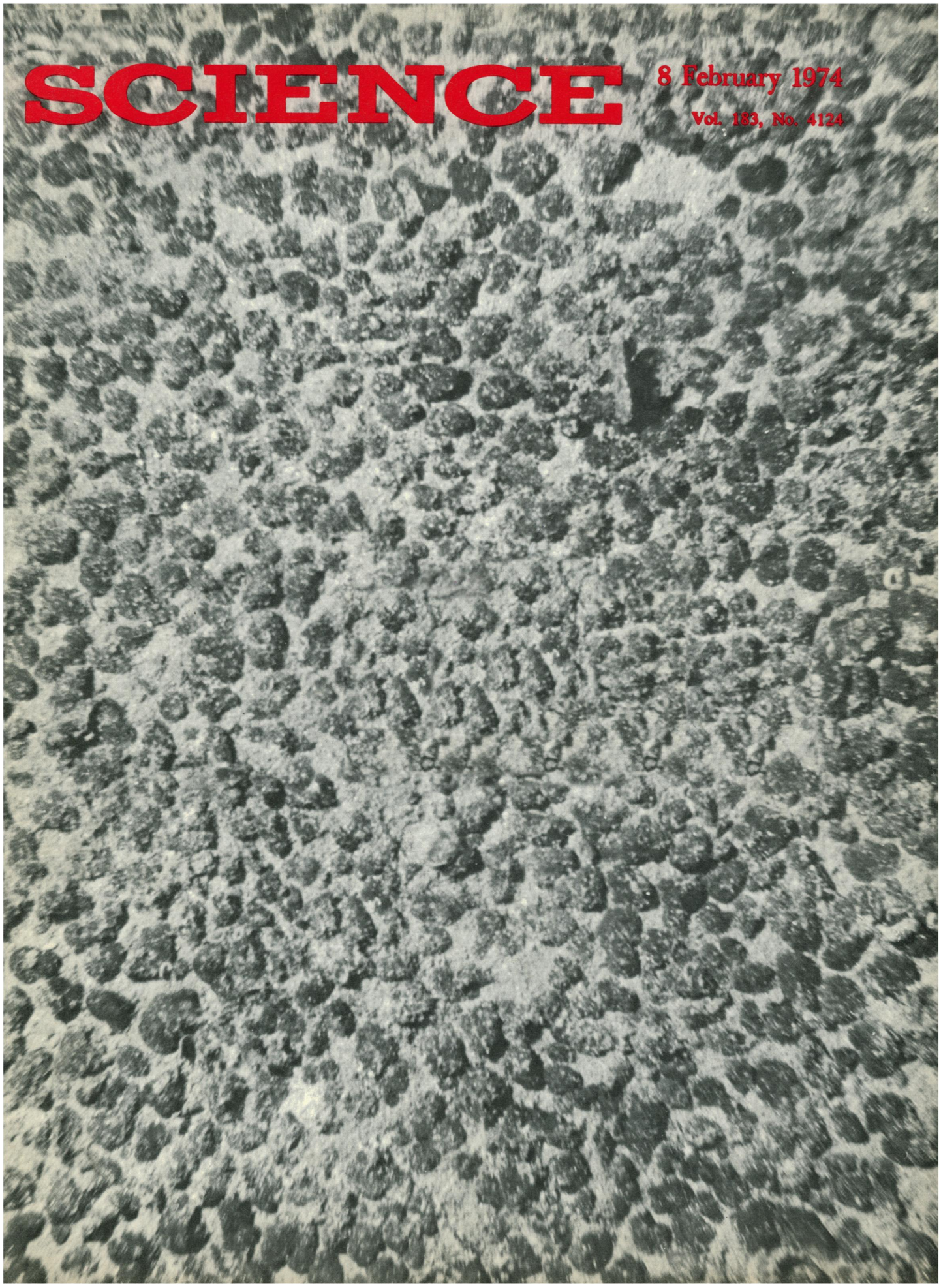
SCIENCE
8 February 1974
Vol. 183, No. 4124



25 years in nuclear analysis

Over 25 years ago LKB was designing and building instruments for nuclear research. In fact, one of the earliest instruments developed for advanced work in the nuclear field was LKB's 200 million electron-volt synchrocyclotron, installed at Uppsala University in 1947.

Since that time LKB has always been in the forefront with equipment for tracing and counting radioactive isotopes in the clinical field. Some of the LKB innovations of earlier years: whole-body scanners for radioactive tracing in human patients; beta-comparators; scalers, counters and automatic sample-changers; and radio-chromatogram scanners. This wealth of nuclear experience stands behind the current range of LKB-Wallac Gamma and Liquid Scintillation Counters.

LKB

LKB Instruments Inc.

12221 Parklawn Drive, Rockville MD. 20852
11744 Wilshire Blvd. Los Angeles Calif. 90025
6600 West Irving Park Road, Chicago Ill. 60634
260 North Broadway, Hicksville N.Y. 11801

Circle No. 9 on Readers' Service Card

1947: LKB's 200MeV synchrocyclotron being installed at Uppsala University, Sweden.

The Only Gamma Systems With A Full 2 YEAR WARRANTY!

Our new secretin may be synthetic. But to a rat's pancreas, it's the real McCoy.

In recent tests, our synthetic secretin was found to achieve maximum secretory response in rats and dogs. This material currently has a potency of 1.5 to 2.0 Units per microgram with no inhibition of maximum secretory response. (1)* (2)**

This is good news for researchers who've had previous problems in obtaining and using commercial secretin. Especially since Schwarz/Mann is able to produce this new synthetic in virtually unlimited quantities.

Now research facilities can expand investigations into this important hormone, particularly as it relates to such areas as peptic ulcer management, diagnosis of pancreatic disorders, and other clinical areas.

Secretin is widely acknowledged to be a key in the understanding of peptic ulcers, a disorder that afflicts approximately four million people in the United States alone. Secretin has been shown to be an effective inhibitor of gastric acid secretion, a primary factor in the development of peptic ulcer.

If you'd like literature on Schwarz/Mann synthetic secretin including product data analyses, write: Schwarz/Mann, Mountain View Avenue, Orangeburg, New York 10962, Division of Becton, Dickinson and Company. BD

*(1) Chey, W. Y., Recent advances in Gastrointestinal Hormone Research, Rochester, New York. August 25, 1973.

**(2) Jorpes, J. E., Mutt. V., On the Bioassay of Secretin Reference Standard, ACTA PHYSIOLOGICA SCANDINAVICA, Vol. 66, pgs. 316-325, 1966.

8 February 1974

Volume 183, No. 4124

SCIENCE

SCIENCE is published weekly, except the last week in December, but with an extra issue on the fourth Tuesday in November, by the American Association for the Advancement of Science, 1515 Massachusetts Ave., NW, Washington, D.C. 20005. Now combined with The Scientific Monthly®. Second-class postage paid at Washington, D.C. Member rates on request. Annual subscription $30; foreign postage: Americas $4, overseas $6, air lift to Europe $18. Single copies $1 (back issues, $2) except Guide to Scientific Instruments which is $4. School year subscriptions: 9 months $22.50; 10 months $25. Provide 6 weeks notice for change of address, giving new and old address and zip codes. Send a recent address label. Science is indexed in the Reader's Guide to Periodical Literature.

COVER

Manganese nodules on the ocean floor in the prime North Pacific mining area where deposits are rich in copper and nickel. See page 502. [Deepsea Ventures, Inc., Gloucester Point, Virginia]

The Right Text at the Right Time!

Turk et al:

ENVIRONMENTAL SCIENCE

Here's the first text of its kind for an important new discipline—*Environmental Science*. Its authors have adhered to the highest standards of pedagogic excellence in their logical dissection of ecological problems. Biological, chemical, physical, geological and engineering principles unfold for the student, through the book's carefully designed sequences, thus allowing the reader's knowledge to build upon itself. Significant social and economic issues are incorporated within each separate topic, and a complete overview of this nation's and the world's economic and social policy is examined in the final chapter.

An Instructor's Manual is available.

By Amos Turk, *City College of the City University of New York;* Jonathan Turk, *Naturalist; and* Janet Turk Wittes, *Columbia University School of Public Health; and* Robert E. Wittes, *Memorial Sloan Kettering Cancer Center.*

About 550 pages, 290 illustrations. About $12.75.
Ready February. Order code 8928.

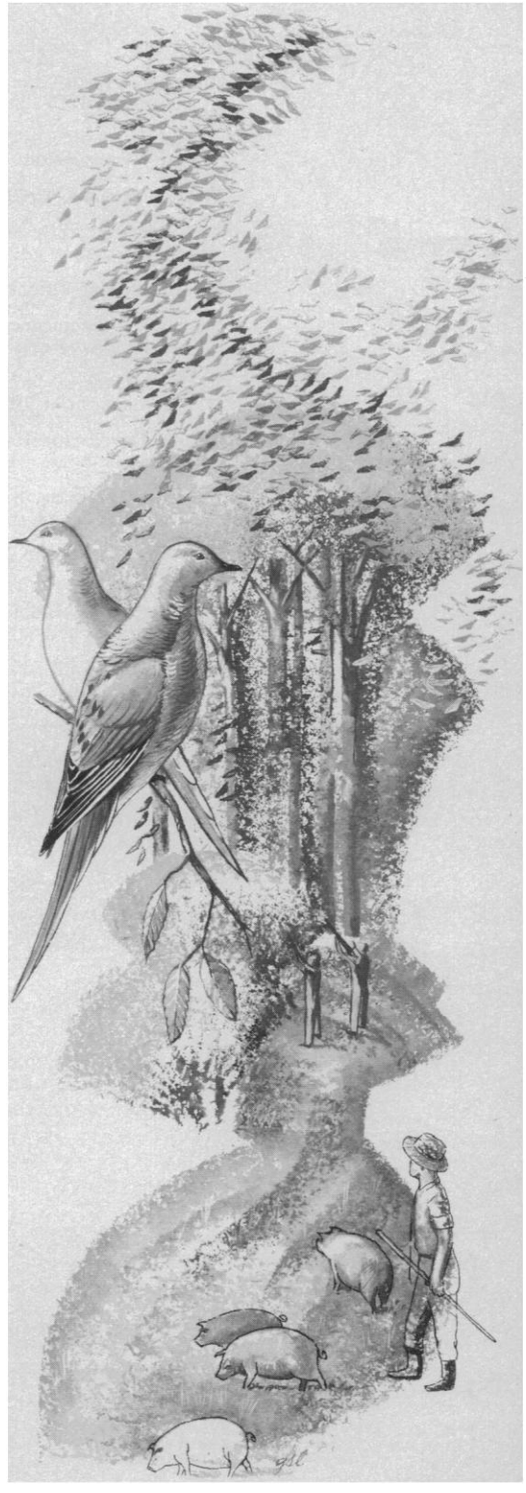
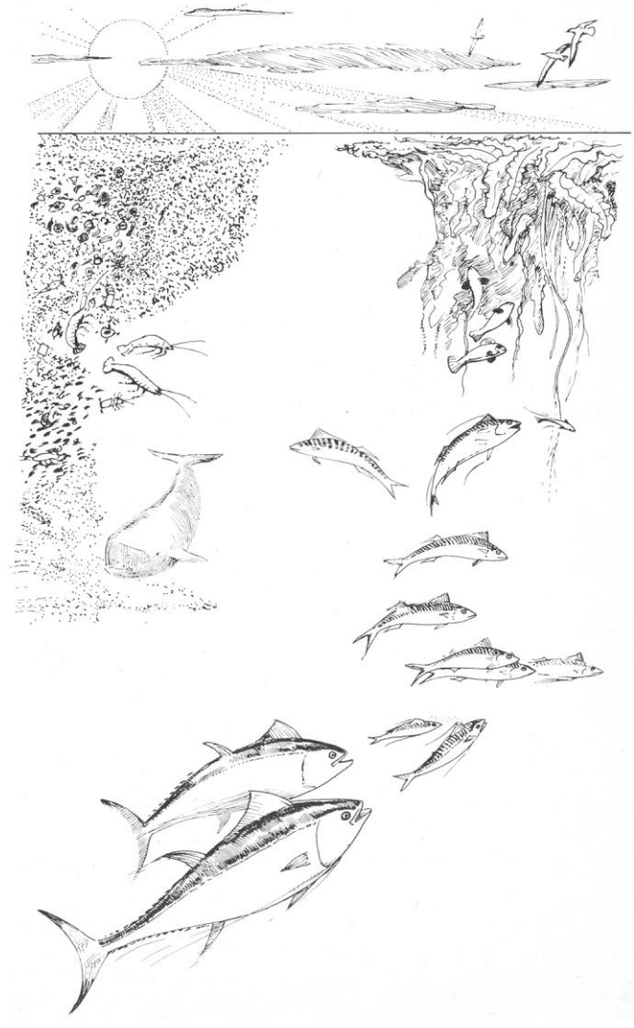


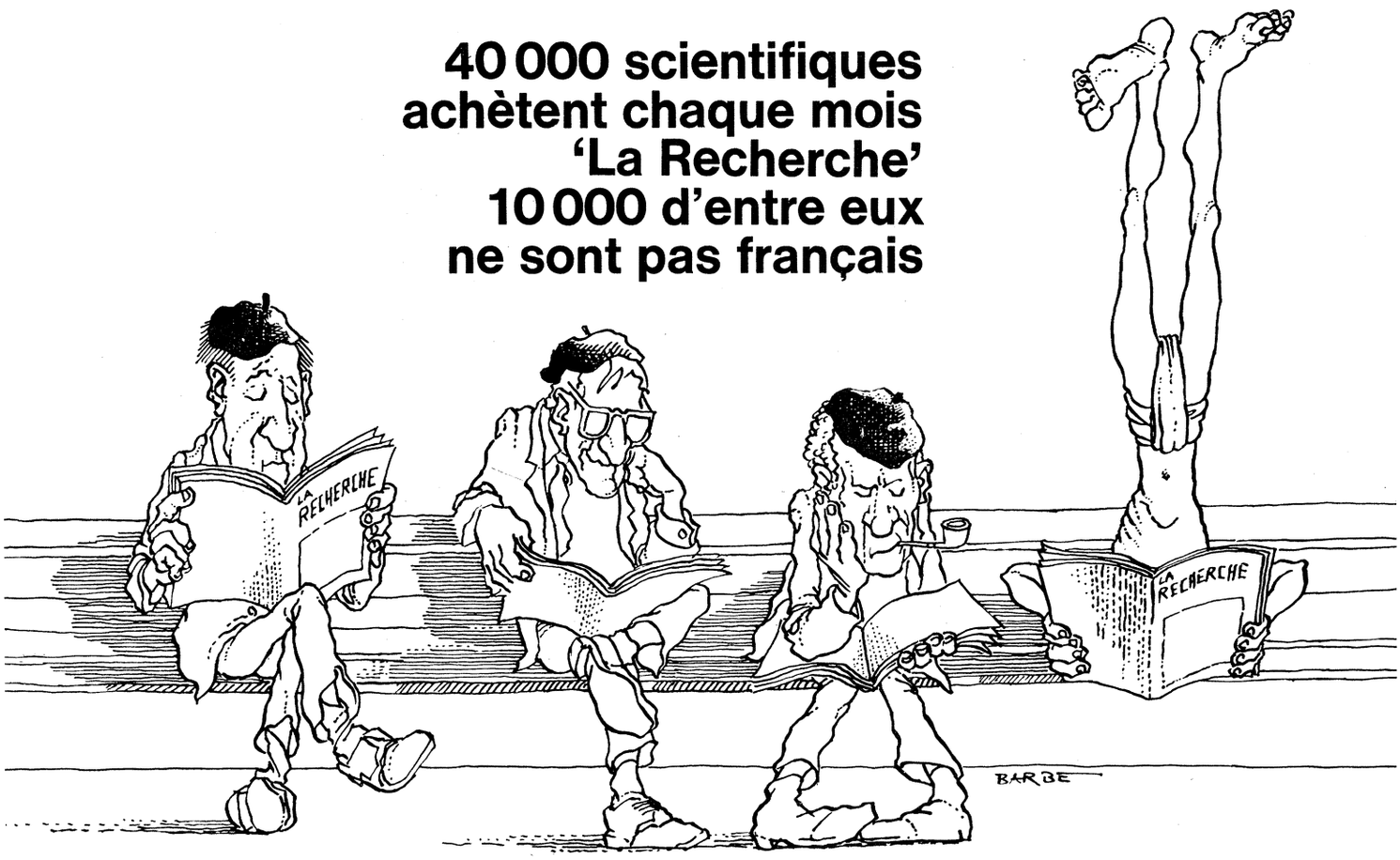
TABLE OF CONTENTS (Abridged)

Saunders Golden Series in Chemistry

Turk et al: **TABLE OF CONTENTS** (continued)



40 000 scientifiques achètent chaque mois 'La Recherche' 10 000 d'entre eux ne sont pas français



If LA RECHERCHE has an international readership, it's probably simply because its contents is international. You'll find well known French authors in LA RECHERCHE : E. Baulieu, F. Jacob, P. Jacquinot, F. Morel, X. Le Pichon, A. Leroi-Gourhan, L. Llboutry, J. Monod, C. Ropartz, Ch. Thibault among many others. But you'll also find articles by H. Alfvén, J.E. Cleaver, Hong Yee Chiu, Th. Dobzhansky, G. Natta, O. Morgenstern, C. Ponnamperuma, D.W. Sciama, J. Tuck, S. Uyeda...

Enough name-dropping. Distinguished names are not sufficient to make a good publication. (Some of our predecessors prove this.) Written by scientists for scientists, LA RECHERCHE covers everything from biochemistry to astrophysics. But it does not stop at doling out monthly slices of a cake baked of arbitrarily selected "good" articles.

You see, we think that LA RECHERCHE is the best interdisciplinary monthly. But, as its publishers, we have our prejudices.

What do you think? Even if your French is a little rusty, you can judge for yourself - free of charge - over a period of 3 months. All you need to do is fill in and return the coupon below.

Special offer
limited to residents of United States

Name _____

Address _____

_____

Mail to LA RECHERCHE, 4, place de l'Odéon, 75006 Paris, France.

EUSN

I wish to receive the next 3 issues of LA RECHERCHE on a trial basis. If interested, I'll settle your invoice on receipt of the third issue and benefit from the special subscription rate of $ 17 instead of the usual $ 23 for a year's volume of 11 issues. Otherwise I'll keep the 3 issues received at no charge to me.

Circle No. 7 on Readers' Service Card

Whatever range you're weighing in, Sartorius top-loaders are best to weigh it on.

Meet the top-loaders that carry a lot of weight, particularly with people who have important weighing work to do — the Sartorius Series 2250 Balances.

These dependable, extremely accurate instruments have net capacities ranging from 160 g to 5000 g, with accuracies from 1 mg to 0.1 g. All 2250's have all-digital readout and huge optical scales with large numerals for easy reading, even under adverse lighting. They have no discernible swing or deviation from the indicated weight, and all models in this series provide mechanical taring. Some models even feature automatic leveling systems, electrical output for external control or print out of results, and special tolerance weighing facilities. In short, there is a Sartorius 2250 top-loader to meet virtually every non-analytical laboratory weighing situation, including direct weighing of unknowns and animals; rapid weighing-in of powders, liquids, granulated materials or fabricated parts; tolerance weighings; even below-balance weighings.

Choosing which model best suits your particular weighing requirements is probably the most serious problem you'll ever encounter with a Sartorius top-loader. The solution to that one is in our comprehensive new balance catalog. For your free copy, just write: Sartorius Division, Brinkmann Instruments, Cantiague Road, Westbury, N.Y. 11590.

sartorius balances

Circle No. 6 on Readers' Service Card

Germ free controlled environment equipment

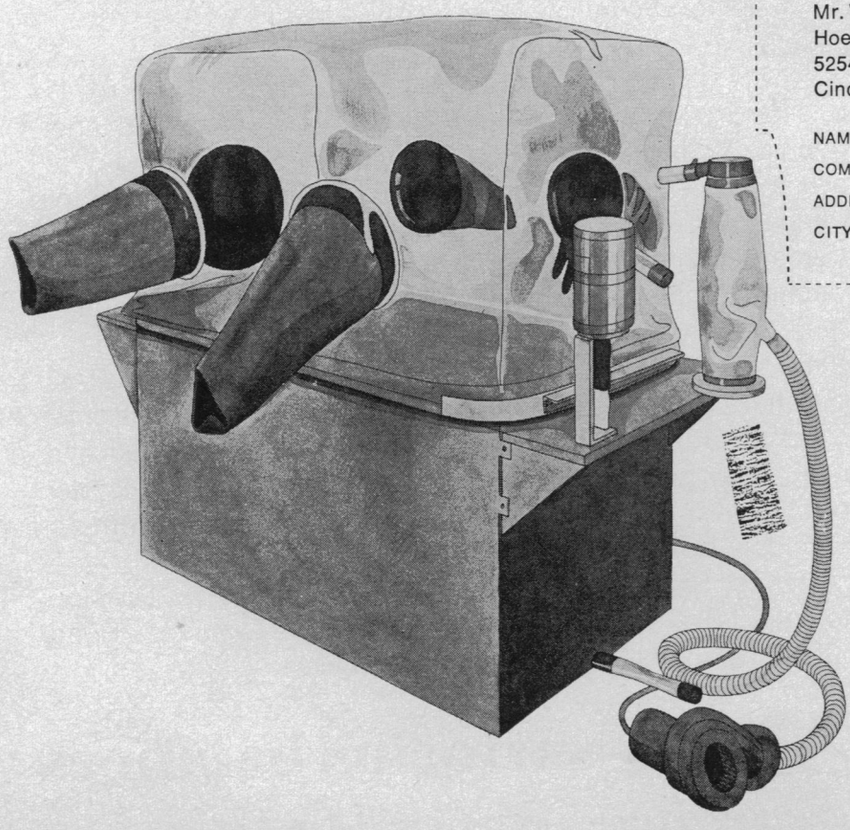
Hoeltge introduces precision-engineered germ free laboratory research equipment for use where controlled environment is an absolute must.

Hoeltge germ free equipment has been thoroughly tested in leading research laboratories. Hospitals, clinical labs, and research labs of all sizes specify Hoeltge germ free equipment for work with tissue cultures, contaminating gases and in the care and reproduction of research animals.

Hoeltge equipment includes multi-purpose isolation units, surgical and transfer units, and custom germ free units of all sizes that are used in the study of viruses, infectious agents and in tightly controlled, extended research projects.

Hoeltge also offers bulk sterilizing chambers and a complete line of germ free equipment accessories. Hoeltge engineers are ready to work with you to provide the very best in germ free research equipment. Write for the Hoeltge Germ Free Equipment catalog or give us a call at (513) 922-4300.

from Hoeltge



Mr. William Holohan, Sales Manager
Hoeltge, Inc.
5254 Crookshank Road
Cincinnati, Ohio 45238

NAME & TITLE_____
COMPANY_____
ADDRESS_____
CITY_____ STATE_____ ZIP_____

HOELTGE

A subsidiary of Environmental Sciences Corporation

Circle No. 12 on Readers' Service Card

Here are a few problems Olivetti is ready to solve for you on its newest, fastest, most powerful P-652 microcomputer.

How many are on your list? Check them off and send to us.

STATISTICAL SIGNIFICANCE AND REGRESSION ANALYSIS:

- ☐ Regression coefficients with standard errors
- ☐ Paired data analysis with transformations and confidence limits
- ☐ Multiple linear regression
- ☐ Polynomial regression
- ☐ Stepwise linear regression
- ☐ Multiple correlation coefficients
- ☐ Partial correlation coefficients
- ☐ F-statistic with significance levels
- ☐ t-statistic with significance levels
- ☐ Confidence limits on statistics
- ☐ Curve fitting (we have a wide range of models)
- ☐ Test for linearity
- ☐ Test for outliers
- ☐ Test for normality
- ☐ Distribution studies (Poisson, Beta, Binomial, Erlang, Weibull, etc.)
- ☐ Biserial and point biserial correlation coefficients
- ☐ Contingency tables
- ☐ Non-parametric statistics
- ☐ Moments and statistics of frequency distributions
- ☐ Moving averages
- ☐ Smoothing
- ☐ Trend analysis (Quadratic, Exponential, Logistic, Gompertz, etc.)

ANALYSIS OF VARIANCE:

- ☐ One-way ANOVA
- ☐ Two-way ANOVA
- ☐ Three-way ANOVA
- ☐ Analysis of Covariance

(We have a wide range of models.)

- ☐ Latin Square
- ☐ Factorial design
- ☐ Nested (hierarchical) design
- ☐ Randomized Block design
- ☐ Bartlett's Test
- ☐ Scheffe's Test
- ☐ Newman-Keuls Test
- ☐ Tukey's Test
- ☐ Least significance difference
- ☐ Comparisons among class means

BIOSTATISTICS:

- ☐ Quantitative log-dose response
- ☐ Quantal log-dose response

(We have both single and parallel line assays.)

- ☐ Slope-ratio assays
- ☐ Logit, NED, or Probit transformations
- ☐ Variance-weighted Radioimmunoassay data reduction
- ☐ RIA kit data reduction

(We have systems for most major protocols.)

OTHER _____

_____

_____

_____

_____

ARE YOU MAINLY INTERESTED IN:

- ☐ Hypothesis testing?
- ☐ Parameter estimating?
- ☐ Forecasting?
- ☐ Quality control?
- ☐ Determining significant variables?

WOULD OFF-LINE PROCESSING OF DATA FROM ANALYTIC INSTRUMENTS BE IMPORTANT?

☐ Yes ☐ No

Olivetti Corporation of America, 500 Park Avenue, New York City 10022
Attn: Microcomputer Systems

I've checked what I need. Please send me the specifics.

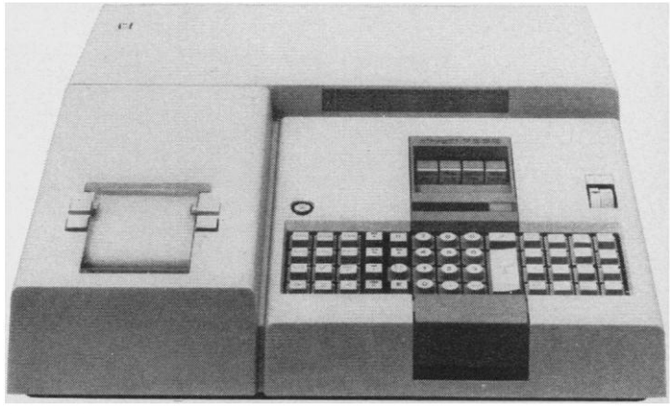
☐ I'm already using an Olivetti P-101 or P-602

NAME _____ TITLE _____

COMPANY _____ ADDRESS _____

CITY _____ STATE _____ ZIP _____ PHONE _____ S-2

This, without a doubt, is the ultimate system for statistical analysis on a small data base. It utilizes the newest, most advanced hardware—Olivetti's P-652 microcomputer (fifty times faster than our P-101, the famous statistical desk top computer used in labs and schools all over the world). And a comprehensive library of detailed, documented software offering all sorts of options for different running modes with special emphasis on error correction procedures. Take a look, there's nothing like it on the market. And, of course, it's backed by that famed reliable Olivetti service. Want to know more? Send the coupon.



olivetti

OLIVETTI CORPORATION OF AMERICA, 500 PARK AVE., NEW YORK CITY 10022

Circle No. 21 on Readers' Service Card

Zeiss Microscope Photometers are not expensive...not for what you get:

The most accurate Quantitative Microscopy—photometrically, via absorbance, transmittance, reflectance, and fluorescence. Starting with a Zeiss Research Microscope, you select a photometer system as inexpensive or as sophisticated as your requirements demand and your funds permit. With or without automated scanning stage and small desk or laboratory computer, Zeiss Microscope Photometers give you the best value of all photometric systems.

Great Zeiss optics, superior electronics and modular design make the difference . . . for both research and routine applications in life and material sciences. The world's most precise Scanning Stages with 0.5 μ or 10 μ minimum step sizes can be driven over areas up to 25 x 75 mm in on-line or off-line mode. Rectangular or circular measuring diaphragms are variable to suit any object regardless of shape or size. Only Zeiss has fully corrected refractive optics for U. V. and visible ranges for up to 100x magnification. (With a single objective and condenser you can cover both ranges.) And the highly accurate and stable Photometer-Indicator features 4-digit display, 0-3A range, scale expansion, zero-suppression, analog and BCD output.

Extensive data processing capabilities. Programs for automatic scan control, photometric printout, histograms, tabulations, morphological information and other parameters.

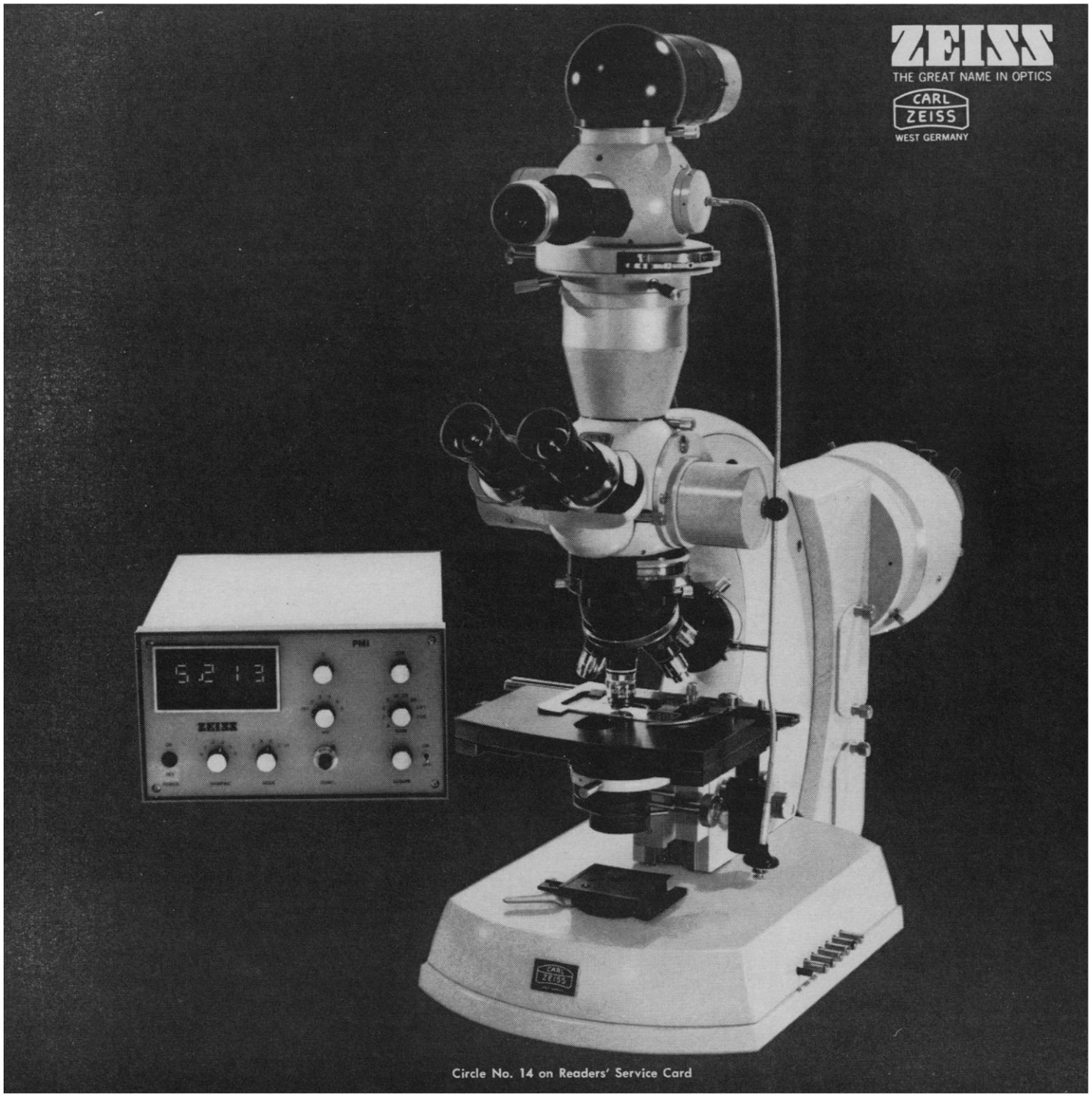
For complete data, write: Carl Zeiss, Inc., 444 Fifth Ave., New York, N.Y. 10018. Or call (212) 736-6070.

In Canada: 45 Valleybrook Drive, Don Mills 405, Ontario. Or call (416) 449-4660.

Circle No. 6 on Readers' Service Card

Nationwide service.

SHOWROOMS IN: BOSTON, CHICAGO, COLUMBUS, HOUSTON, LOS ANGELES, SAN FRANCISCO, WASHINGTON, D.C., MONTREAL, TORONTO, VANCOUVER



Circle No. 14 on Readers' Service Card

ducted much research and development in the LDC's [less developed countries]" makes all sorts of sense. Furthermore, as recent political events in the United States have shown, economic dominance and political dominance go together, and there are ample indications that some multinational corporations have been meddling in the internal affairs of less developed countries. This was brought up during the 22nd Pugwash Conference on Science and World Affairs in Oxford, England, in 1972. The Pugwash Continuing Committee stated then that "there are continuing threats to the security of other Latin American countries arising from activities of industrial monopolies owned and controlled by external interests" (*2*).

JUAN DE DIOS POZO-OLANO
21 Webber Avenue,
Bedford, Massachusetts 01730

References

1. See J. Rotblat, *Scientists in the Quest for Peace: A History of the Pugwash Conferences* (MIT Press, Cambridge, Mass., 1972), pp. 246–252.
2. *Scientists and World Affairs, Proceedings of the Twenty-second Pugwash Conference on Science and World Affairs* (Pugwash Continuing Committee, Oxford, England, 1972), pp. 29–35.

Abelson states in his editorial of 30 November 1973, that the less developed countries (LDC's) need the skills and know-how which the multinational corporations often are unwilling to provide.

My experience is confined to the petroleum industry, but I am convinced that many, if not all, multinational oil companies have been wholeheartedly giving know-how and training on a large scale to nationals of the LDC's. At the University of Tulsa alone, we have 300 students from Venezuela and the Middle East studying petroleum technology. Most multinational companies are staffed almost entirely by nationals. Newly formed government oil companies in the LDC's have no difficulty obtaining information about highly sophisticated exploration and production techniques by contracting American service companies and hiring experienced Americans. I am a member of a group that offers advanced continuing education courses around the world, and many of our students have been nationals of LDC's who have been sent by their companies.

The big lack in the LDC's is capital, but with their current nationalist and socialist politics they are unlikely to acquire any. Foreign capital is either rejected outright by the LDC's, or foreign companies are admitted and then harassed if they show a profit. Local capital accumulates very slowly because of high taxes and social legislation. Savings that should be invested are siphoned off into government bureaucracies. Inept and money-losing government enterprises, politically managed and loaded with surplus employees, turn what should be contributions to the economy into a drain on the public treasury.

PARKE A. DICKEY
Department of Earth Sciences,
University of Tulsa,
Tulsa, Oklahoma 74104

While the observations in Abelson's editorial are accurate, the conclusions he draws from them are rather beside the point.

The notion that "LDC's wish to achieve full independence from technological dominance" implies that creation of competitive national economies in the 19th and early 20th century sense is possible; that the governments of LDC's think in such terms; and that the multinational corporations can be considered "U.S. international firms," as in the title of Abelson's cited source (*1*). None of these implications will stand up under analysis.

The multinational corporation is not merely an American, British, French, or Dutch concern with operations in a number of foreign countries. The multinational corporation seeks assiduously to extricate itself from the political control and direction of the country of its origin, to pursue its own goals (growth and profit) without reference to the policies of either its country of origin or of the country within which it carries out its operations. Such neo-mercantile concepts as "balance of trade" have no meaning for it. It seeks to cosmopolitanize the directorate of its headquarters and its major field operations as well. It seeks to create, both within its country of origin and within the countries—LDC's or other—in which operations are carried out, a corporate citizenry whose first loyalty is to the firm and not to the political entity of the nation. Political leaders, whether in the country of origin or in the other countries in which it operates, are, insofar as possible, to be controlled by enrollment in or identification with the corporate citizenry. Where they cannot be controlled there are options

ranging from pullout (after all, IBM typewriters can be assembled as easily in Ecuador as in Colombia) to the initiation or support of their overthrow.

To whom is the technological know-how to be transferred in the LDC's? Surely not to the governments of the countries; certainly not to any eager group of local entrepreneurs anxious to develop a competing, national electric typewriter firm. The experience of past decades indicates that the Latin American managers who work for multinational corporations see their futures in terms of rising in the managerial hierarchies of these firms and not as participating in some turn-key operation resulting in the creation of a nationally controlled, modern industrial segment of their country's economy.

The multinational corporation increasingly is viewed as a novel entity, not only possessing economic and political power, but possibly capable of assuming actual political identity. If there is truth to this view, the real question, then, is, what is the relationship that will finally emerge between nation states, developed or not, and the multinational corporations?

DAVID C. MACMICHAEL
Stanford Research Institute,
Menlo Park, California 94025

References

1. *U.S. International Firms and R, D & E in Developing Countries,* report of an ad hoc panel of the Board on Science and Technology for International Development (National Academy of Sciences, Washington, D.C., 1973).

Cancer and Adventists

The reference to "cancer incidence" among Seventh-day Adventists in Philip Abelson's editorial "Prevention of cancer" (7 Dec. 1973, p. 973) requires some clarification. Lifetime Adventists age 35 and over who live in California experience a cancer mortality rate (not incidence) that is 41 percent of that of all Californians. However, for all Adventists age 35 and over, the cancer mortality rate is 59 percent of the rate of all Californians. At present, there are no data available on "devout" Adventists, but an investigation of how components of the Adventist life-style relate to cancer incidence is now under way.

ROLAND L. PHILLIPS
Department of Biostatistics
and Epidemiology,
Loma Linda University,
Loma Linda, California 92354

Homogenized Milk and Atherosclerosis

In the article "Atherosclerosis and the arterial smooth muscle cell" (29 June 1973, p. 1332) Russell Ross and John A. Glomset give an excellent presentation of the role the arterial smooth muscle cell plays in the genesis of lesions of atherosclerosis. In addition, they discuss such factors as lipids and cholesterol being important in the development of atherosclerosis in experiments with various laboratory animals.

Although they make it clear that "relatively little is known about the genesis of the disease," they do not mention other, less popular, hypotheses about the genesis of atherosclerosis. For instance, the hypothesis presented by K. Oster (*1*) offers a fresh approach to the cause and prevention of this disease. Oster proposed that the enzyme xanthine oxidase (XO) in homogenized milk may be involved in atherosclerosis and other cardiovascular diseases in humans.

Briefly, XO is an oxidizing enzyme in milk and is synthesized in liver and mammary gland. Besides being present in relatively large amounts in bovine milk, XO is also present in the milk of other ruminants, such as sheep and goats, but is not present in human, sow, and mare milk (*2*). This enzyme controls the last stages of purine catabolism by removing hypoxanthine and xanthine in the form of uric acid from the general pool of purines. Because of its low substrate specificity, XO also oxidizes several other purines (*3*) and many aldehydes (*4*) to their respective acids. Pasteurization of milk as is done in the United States (a holding time of 62°C for 30 minutes or 71°C for 15 seconds) leaves approximately 42 percent of the enzyme in its active state (*5*). This is understandable, as heat sensitivity studies of milk indicate that XO is completely inactivated at about 82° to 84°C (*6*). This enzyme in milk is closely associated with the fat globule (*7*). The fat globules in nonhomogenized cow's milk vary in size from about 0.1 to 15 micrometers. They average about 3.5 μm, with 80 percent in the range of 2.0 to 5.0 μm. During homogenization, the fat globules are reduced in size from an average diameter of about 3.5 μm to about 1 μm (*8*). As a result of this unnatural micronization, the following alterations occur in homogenized milk: (i) a large increase in the number of fat globules; (ii) a large

expansion of the fat globule surface area; (iii) as a consequence of (i) and (ii), an increase in the biological availability of XO by a factor of at least 3.5; and (iv) an increase in the potential of XO to pass undigested through the intestinal mucosa. Once it passes through the intestinal mucosa, it eventually reaches the bloodstream (via the lymph system) and is deposited ectopically, first in the heart muscle and then in the arterial wall.

Oster proposed that, inside the body, XO (on the fat globule) finds large quantities of the substrate, plasmal [the aldehydic moiety of plasmologens which is essential in maintaining the elasticity in the arterial wall (*9*)] in situ in the outline of the arterial wall and in the myocardium. The enzyme would then, by oxidizing these aldehydes, create a histochemical change in the site, which could be overcome either by the formation of more substrate or by scar formation. This healing process in the vessel wall would be the initiation of atherosclerosis. It is at the site of such tissue destruction that cholesterol deposition begins.

This hypothesis is in sharp contrast to the prevailing ideas about avoidance of saturated fat and cholesterol in the diet to reduce atherosclerotic lesions and the incidence of myocardial infarction. The Masai, an East African tribe with an extremely large intake of nonhomogenized milk (about 7 liters per day) and saturated fatty acids (about 60 percent of their diet), rarely develop atherosclerosis (*10*). Also, epidemiological data on the consumption of fluid milk, cream, butter, and cheese in selected countries indicate a high correlation between the death rate from heart disease and the consumption of homogenized milk (*10, 11*).

Oster's hypothesis and the accumulated evidence supporting it should be carefully examined before being rejected.

JOHN P. ZIKAKIS
Department of Animal Science and Agricultural Biochemistry, College of Agricultural Sciences, University of Delaware, Newark 19711

References

1. K. A. Oster, *Am. J. Clin. Res.* **2**, 30 (1971); in *Recent Advances in Studies on Cardiac Structure and Metabolism*, vol. 1, *Myocardiology*, E. Bajusz and G. Rona, Eds. (University Park Press, Baltimore, Md., 1972), p. 803.
2. V. V. Modi, E. C. Owen, R. Proudfoot, *Proc Nutr Soc.* **18**, i (1959); J. P. Zikakis, unpublished data.
3. F. Bergmann, H. Kwietny, G. Levin, D. J. Brown, *J. Am. Chem. Soc.* **82**, 598 (1960).
4. V. H. Booth, *Biochem. J.* **32**, 503 (1938).
5. G. R. Greenback and M. J. Pallansch, *J. Dairy Sci.* **45**, 958 (1962).
6. K. A. Oster, Canadian Patent No. 919,000 (1973); J. P. Zikakis, unpublished data.
7. G. V. Gudnason and W. F. Shipe, *J. Dairy Sci.* **45**, 1440 (1962); J. P. Zikakis and J. M. Treece, *ibid.* **53**, 644 (1970).
8. F. J. Doan, *Q. Rev. Pediatr* **8**, 194 (1953).
9. R. A. Milch, *Gerontologica* **7**, 129 (1963).
10. K. A. Oster, *St. Vincent's Park City Hosp. Med. Bull.* **14**, 1 (March 1973).
11. ———, *Med. World News* **13**, 68 (18 February 1972).

The "Relevance" of Basic Science

Herbert Simon's editorial "Relevance—there and here" (17 Aug. 1973, p. 163) comes at a very interesting time —not so much because of the current political détente, but because we are at the end of the relevance dogma which was prevalent in certain academic circles, say 5 years ago.

There has never been purely basic science, science predicated solely on "a thirst for knowledge," just as there is no completely relevant endeavor (whatever that would mean). Science, per se, is a question-answering process; and questions, whether aimed at descriptive or prescriptive issues, arise from a combination of interests, abstract and pragmatic. The advances in computer science are responses not solely to developments in automata theory, but to some very real questions about information storage and processing. Similarly, the investigation of human learning is not simply an inquiry into the properties of memory, but a desire to understand how knowledge can be acquired and used. Of course, knowledge can be integrated into theories, but this is not what makes "us" scientists; it is the desire to deal with questions in a structured way.

Questions, then, are relevant because that is what questions are—issues of interest. Societal funds may be allocated so as to promote certain interests; but not so much to exclude "nonrelevant" concerns as to focus on immediate problems. And even here, there is always at least a little left over for long-range problems.

The issue of cross-cultural neglect of basic sciences thus appears to me to be a straw man. The danger is that such an argument will lead to a form of elitism and intellectual isolationism in science.

STEPHEN GALE
Peace Science Unit, University of Pennsylvania, Philadelphia 19174

finger-printing

separate:

POLYPEPTIDES

ALL AMINO ACIDS

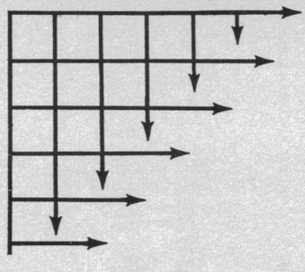
NUCLEOTIDES

MANY OTHER COMPOUNDS

MODEL D

high-voltage

ELECTROPHORATOR



ELECTROPHORESIS IN ONE DIMENSION

on 18¼" x 22½" sheets of filter paper (Chromatography may be done in second dimension). Many complex mixtures can be rapidly resolved by electrophoresis in one dimension on papers up to 4 feet long.

Developed in the Laboratory of Cellular Physiology and Metabolism, National Heart Institute, National Institutes of Health, Bethesda, Maryland. Special thanks are due to Dr. William J. Dreyer, whose co-operation and suggestions are gratefully acknowledged by Gilson Medical Electronics.

- ★ Easy loading with folding rack
- ★ 5,000 volts at 300 ma.
- ★ Paper immersed in bifurcated fiberglass tank containing Varsol
- ★ Varsol, a light petroleum fraction, has a high flash point (over 100° F.), does not conduct electricity, and has the proper degree of volatility
- ★ Cold tap water run through stainless steel coils at top of tank is only coolant necessary

★ **Safety features:**

- ✓ Strong, joint-free fiberglass tank eliminates electrical and fluid leaks
- ✓ High voltage connected to inside of tank by Nylon and stainless steel plugs attached to edge of tank
- ✓ Highly reliable interlock provided by an extension of the cover handle
- ✓ When cover is removed, high voltage is ipso facto turned off
- ✓ No capacitors to sneakily store electricity in apparatus

GILSON

GILSON MEDICAL ELECTRONICS
Middleton, Wisconsin 53562 • Telephone 608/836-1551

GILSON products are also manufactured in Europe:
GME • 69, Rue Gambetta — 95, Villiers-Le-Bel, **FRANCE**

8 February 1974, Volume 183, Number 4124

SCIENCE

No Easy Way Out of Energy Crisis

All over the world, peoples and governments have been unable to respond realistically to the sudden changes in the availability and price of energy. In the United States, a search for scapegoats is being conducted on the assumption that if the culprits can be identified and chastised, the problem will go away. On the international scene, the consuming nations have been adopting an every-man-for-himself approach that guarantees additional hardship for all.

Many stories in the mass media have the common thread that the crisis was created and is continuing because oil companies are withholding oil in order to get higher profits. Thus, the solution to our problems is simple: Force the companies to disgorge! Escape from the current travail will not be so easy, nor will it be rapid. There is solid evidence that the major sins of the oil companies are not underproduction and overstorage today, but an earlier, opposite shortcoming. For decades, oil was generally produced at the maximum allowable rate. At the same time, the industry did not create substantial storage facilities or inventories when we were becoming dependent on foreign oil.

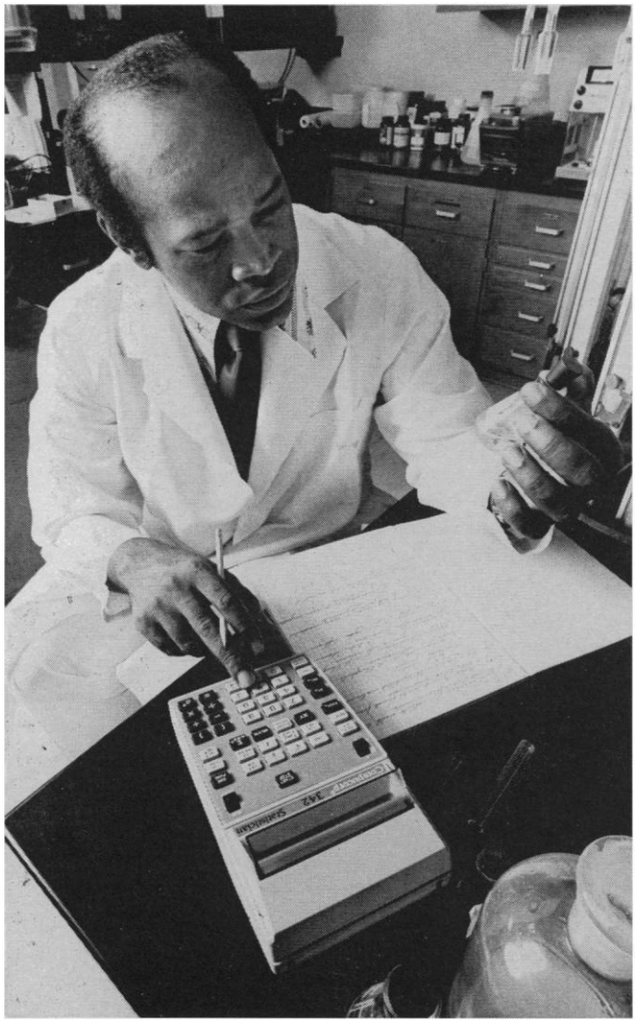
The American Petroleum Institute has long compiled weekly data on the production, refining, and distribution of oil. The patterns of reporting were established at a time when there was no incentive to be other than honest. Moreover, the figures were corroborated by surveys of the U.S. Bureau of Mines. These figures showed that U.S. production of crude petroleum reached its peak in 1970, at 10.0 million barrels per day, and has been slowly diminishing since. Prior to the present crisis, it had dropped to 9.3 million barrels per day; recently production has been 9.1 million barrels per day.

In their policies with respect to storage facilities and inventories, the oil companies have been largely guided by an attempt to hold down costs. It is expensive to maintain large inventories. So assiduous have the companies been in this respect that they have endangered the national security. Inventories of some of the products, such as gasoline, would, if fully available, last about 30 days. However, only a part is available. Some is in pipelines, some is in tankers, and some is being processed. The companies do not have the huge excess storage capacity to hide significant amounts of oil. Recently, there have been tales of speculators' storing gasoline in vacant filling stations. A typical older filling station has a capacity of 12,000 to 15,000 gallons. Weekly U.S. consumption is 1,750 million gallons. The reported hoardings are little more than drops in the bucket in comparison.

Others who have searched for an easy way out of the energy crisis have pointed to the possibility of a quick end to the Arab oil embargo. This may or may not come soon, and when it does, it may or may not lead to substantially greater supplies of oil. If production is to be increased rapidly, the increase must come largely from the Arabian Peninsula. There, in Saudi Arabia, Kuwait, and some smaller states, is about half the free world's oil. These states, with a total population of less than 10 million, are enjoying unprecedented power. With return per barrel having quadrupled over that of a year ago, they have far more income than they can use. Kuwait, with a population of 900,000, will receive about $7 billion this year. An increase in production would not appear to serve any useful purpose for them.

More than a month has passed since the big price increases were announced. The lack of concerted, constructive response by the billions of people who must pay can only encourage the producing countries to tighten the screws again and again.—PHILIP H. ABELSON

Most of your Bio Med problems can be solved by an unknown.



Say goodbye to time sharing. Give the pocket calculator to your kids. Stop wasting your time doing math with a pencil.

If you've got statistical problems, we've got a solution. The Compucorp Micro Statistician. The professional's machine.

The Statistician is a hand-held, battery operable Micro Computer that thinks the way you think.

It does blood gas analyses. Works chemistry problems. Breezes through medical calculations. Cures pathological headaches. Separates medical facts from fiction.

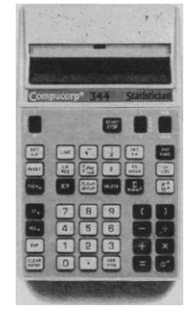
The Micro Statistician is the first and only hand-held Micro Computer with built-in standard deviation (grouped or ungrouped), linear regression, z-score, t-dependent and independent, logs and anti-logs, coefficient or correlation, expected y from regression coefficients, slope and intercept.

The Micro Statistician is also the first hand-held statistical machine that's programmable. It allows you to have two 80-step programs in memory at the same time. Which means repetitive calculations are a snap. You can do register arithmetic in and out of all ten storage registers. And you can set the decimal point anywhere you want it. And change it whenever you want to.

The Compucorp Statistician is the first hand-held machine with 13-digit accuracy and a big, bright 10-digit display. It's also the first one with an algebraic keyboard and nested parentheses.

Get all the facts on Compucorp Micro Computers. We may be an unknown to you, but we're already solving tough Bio Med problems around the world.

See your local Compucorp dealer. Or write Computer Design Corporation, 12401 Olympic Boulevard, Los Angeles, California 90064.

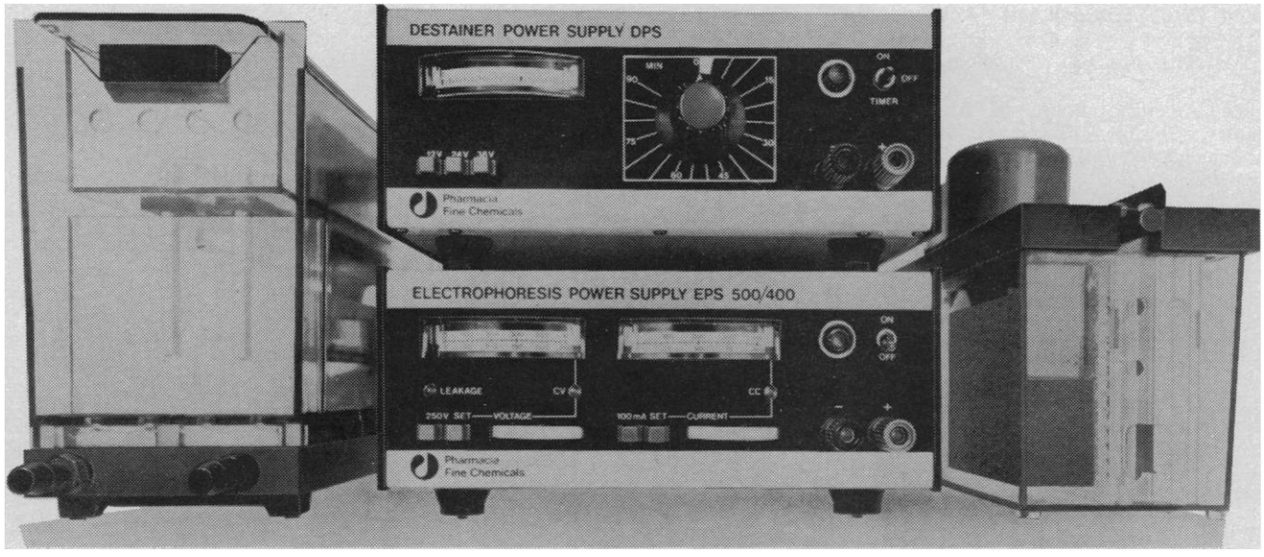


Compucorp®

The Unknown Factor in 63 countries.

Circle No. 2 on Readers' Service Card

This is a new P.A.G.E.



Pharmacia Gel Electrophoresis System

for polyacrylamide gradient electrophoresis and other P.A.G.E. techniques

The complete system
Full capabilities for the new pore gradient electrophoresis technique, two dimensional studies, gel rod electrophoresis.

Polyacrylamide gradient gels PAA 4/30
Convenient ready-to-use gradient gel slabs give extreme resolution over the whole range 50,000–2 million MW. Self-limiting migration concentrates the zones after separation by molecular size.

Gel electrophoresis apparatus GE-4
4 gel slabs, 12 samples on each, or 16 gel rod capacity. Robust moulded construction with built-in cooling system. Full range of accessories for all applications.

Electrophoresis power supply EPS 500/400
Compact, all solid state. 0–400 mA constant current, 0–500 V constant voltage with automatic cross-over. Maximum effect 60 W. Full personnel and instrument protection. Available 1974.

Gel destainer GD-4
Electrophoretic or diffusion destaining of slabs or rods in a single operation. Twin cells. Active dye removal and solvent circulation. Results can be inspected at any time.

Destainer power supply DPS
Compact, reliable, all solid state. Push-button selected constant voltages 12, 24, or 36 V. Timer controls electrophoretic destaining up to 90 minutes.

Find out more about the Pharmacia Gel Electrophoresis System from your usual supplier of Sephadex® and Sepharose®.

Pharmacia Fine Chemicals Inc.
800 Centennial Avenue
PISCATAWAY
New Jersey 08854
Phone (201) 469-1222

Pharmacia (Canada) Ltd.
2044 St. Regis Boulevard
Dorval, Quebec, Canada
(514) 684-8881

Pharmacia Fine Chemicals

Circle No. 3 on Readers' Service Card

3600 Wilshire Blvd., Los Angeles, Calif. 90010)

27. American Soc. of **Clinical Oncology**, Houston, Tex. (A. Evans, Children's Hospital of Philadelphia, 1740 Bainbridge St., Philadelphia, Pa. 19146)

27–29. **Nuclear Structure and High Energy Physics** Conf., Inst. of Physics, Glasgow, Scotland. (IP, 47 Belgrave Sq., London, SW1X 8QX, England)

27–29. **Textile Research** Inst., 44th annual, New York, N.Y. (TRI, 601 Prospect Ave., P.O. Box 625, Princeton, N.J. 08540)

28–29. American Board of **Medical Specialties**, Chicago, Ill. (J. C. Nunemaker, Suite 1160, 1603 Orrington, Evanston 60201)

28–30. American Assoc. for **Cancer Research**, 65th annual, Houston, Tex. (H. J. Creech, AACR, Inst. for Cancer Research, Fox Chase, Philadelphia, Pa. 19111)

28–30. South Carolina **Acad. of Science**, Hartsville. (J. M. Barry, College of General Studies, Univ. of South Carolina, Columbia 29208)

29–30. New England **Bioengineering** Conf., 2nd annual, American Soc. of Engineering Education and the Inst. of Electrical and Electronics Engineers, Worcester, Mass. (R. A. Peura, Worcester Polytechnic Inst., Worcester 01609)

29–31. American **Psychosomatic** Soc., 31st, Philadelphia, Pa. (D. Oken, 265 Nassau Rd., Roosevelt, N.Y. 11575)

29–31. **Seismological** Soc. of America, Las Vegas, Nev. (W. K. Cloud, SSA, P.O. Box 826, Berkeley, Calif. 94701)

29–31. National **Wildlife Federation**, Denver, Colo. (T. L. Kimball, NWF, 1412 16th St., NW, Washington, D.C. 20036)

29–3. American Soc. of **Abdominal Surgeons**, Las Vegas, Nev. (B. F. Alfano, 675 Main St., Melrose, Mass. 02176)

30–1. National **Drug Abuse** Conf., Chicago, Ill. (E. C. Senay, Museum of Science and Industry, 57th St. and Lake Shore Dr., Chicago 60637)

30–4. **Gas Turbine** Conf., American Soc. of Mechanical Engineers, Zurich, Switzerland. (M. Churchill, ASME, 345 E. 47 St., New York 10017)

31–3. International Soc. for **Experimental Hematology**, 3rd, Houston, Tex. (J. J. Trentin, Div. of Experimental Biology, College of Medicine, Texas Medical Center, Houston 77025)

31–5. American College of **Physicians**, New York, N.Y. (E. C. Rosenow, Jr., 4200 Pine St., Philadelphia, Pa. 19104)

April

1–2. **Synchrotron Radiation and Its Applications to the Analysis of Problems in Scientific Investigation** Conf., Inst. of Physics, Reading, England. (Meetings Officer, IP, 47 Belgrave Sq. London, SW1X 8QX, England)

1–3. American Assoc. of **Petroleum Geologists**, San Antonio, Tex. (T. L. Bear, Bear & Kistler, 1052 W. 6 St., Los Angeles, Calif. 90017)

1–3. Society of **Economic Paleontologists and Mineralogists**, San Antonio, Tex. (R. Tener, Box 979, Tulsa, Okla. 74101)

1–4. American Assoc. of **Anatomists**, Cleveland, Ohio. (J. E. Pauly, Univ. of Arkansas, School of Medicine, Little Rock 72201)

1–4. **Industrial Water and Pollution** Conf., Water and Wastewater Equipment Manufacturers Assoc., Detroit, Mich. (R. C. Hughes, WWEMA, 744 Broad St., Newark, N.J. 07102)

1–4. **Geochemical Exploration**, 5th intern. symp., Vancouver, B.C., Canada. (J. J. Barakso, Mineral Environment Labs. Ltd., 705 W. 15 St., North Vancouver)

1–5. International Symp. on **Advances in Polymer Friction and Wear**, American Chemical Soc., Los Angeles, Calif. (L.-H. Lee, Wilson Center of Technology, Xerox Corp., Webster, N.Y. 14580)

1–5. **Farm and Agricultural Industries**, 11th intern. conf., Intern. Commission of Agriculture and Food Industries and the Greek Chemists' Assoc., Athens. (L. de Saint Rat, ICAFI, 24, rue de Teheran, 75008 Paris, France)

1–5. American College of **Radiology**, New Orleans, La. (W. C. Stronach, ACR, 20 N. Wacker Dr., Chicago, Ill. 60606)

2–4. **Fast Reactor Safety** Conf., American Nuclear Soc., Beverly Hills, Calif. (J. B. Moore, Southern California Edison, P.O. Box 800, Rosemead, Calif. 91770)

2–4. **Mechanical Properties of Materials at High Rates of Strain**, Inst. of Physics, Oxford, England. (J. Harding, Dept. of Engineering Science, Parks Rd., Oxford, OX1 3PJ)

2–5. American **Astronomical** Soc., Palo

The Forma Fury Glassware Washer. We loaded it.

With a dual spray system, with two rotary arms and interchangeable spindle racks and flat baskets. With three separate pumps, one wash and two rinse. With low maintenance hydro-drive operation. With stainless steel. With a steam eliminator. With a programing system for pre-set operation. With an automatic detergent dispenser. With three models; rack sizes 13" x 13", 18" x 18", and 26" x 26".

The only thing we didn't load up on was price. It's lower than any comparably equipped model.

Washer step: Check the Forma Fury before you buy.

Forma Scientific

BOX 649 • MARIETTA, OHIO 45750 • AREA CODE 614/373-4763

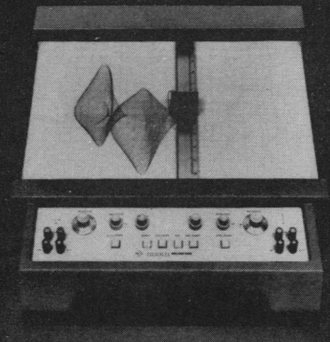
Circle No. 75 on Readers' Service Card

The Brush XY recorder. You get your money's worth.

You'll have a hard time finding another XY recorder that offers you so much for so little.

Like pressurized ink writing that assures crisp clear traces at pen speeds to 40 in/sec. Our Metrisite® servo-loop feedback system that assures 99.85% linearity. Built-in preamps, and electrostatic paper holddown.

Write Gould Inc., Instrument Systems Division, 3631 Perkins Avenue, Cleveland, Ohio 44114. Or Kouterveldstraat Z/N, B 1920 Diegem, Belgium.

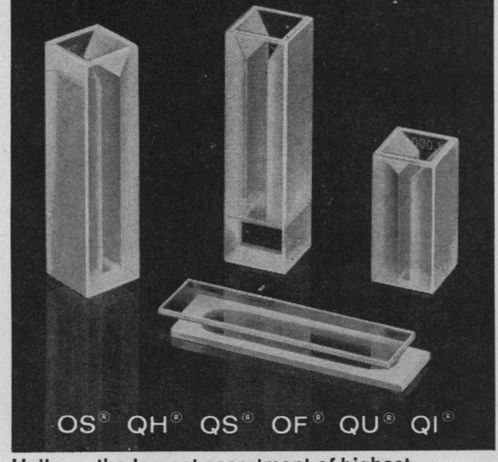


GOULD

Circle No. 82 on Readers' Service Card

HELLMA

... tomorrow's designs today!



Hellma—the largest assortment of highest precision glass and quartz cells.
Standard · Flow-through · Constant-temperature
Anaerobic · Special Designs
Also available—ULTRAVIOLET LIGHT SOURCES
Deuterium Lamps · Mercury Vapor Lamps
Hollow Cathode Lamps · Power Supplies

HELLMA CELLS, INC.

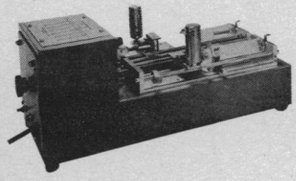
Write for literature
Box 544
Borough Hall Station
Jamaica, New York 11424
Phone (212) 544-9534

Circle No. 76 on Readers' Service Card

FREE CATALOG

Describes world's largest single source of constant flow, precision syringe pumps. 48 Models in eight series: single- to 4-channel, parallel and reciprocal pumping, synchronous and variable speed motors, outputs to 150 psi. For µl to 200 ml. glass, plastic or ss syringes. Extremely wide range of flow rates.

SYRINGE PUMPS



Mail coupon to:
Harvard Apparatus
Dept. B-59, P.O. Box 24,
Millis, Mass. 02054.
Or call (617) 376-2987.

Please send Syringe Pumps Bulletin 900 to:

Name_____

Dept._____

Institution_____

Address_____

City_____ State_____ Zip_____

HARVARD APPARATUS

Circle No. 78 on Readers' Service Card

Alto, Calif. (J. Veverka, Center for Radiophysics and Space Research, Space Sciences Bldg., Cornell Univ., Ithaca, N.Y. 14850)

2–5. American **College Health** Assoc., Dallas, Tex. (J. W. Dilley, 2807 Central St., Evanston, Ill. 60201)

3–4. National Conf. on **New Systems in Health and Welfare Management**, Chicago, Ill. (R. E. Gitelman, Dept. W-37, Div. of Business and Management, New York Univ., 600 Third Ave., New York 10016)

3–4. **Railroad** Conf., American Soc. of Mechanical Engineers and Inst. of Electrical & Electronics Engineers, Pittsburgh, Pa. (E. K. Farrelly, Port Authority of New York and New Jersey, World Trade Center, New York 10047)

3–4. **Metal Semiconductor Contacts** Conf., Inst. of Physics, Manchester, England. (Meetings Officer, IP, 47 Belgrave Sq., London, SW1X 8QX, England)

3–5. American Soc. for **Artificial Internal Organs**, Chicago, Ill. (K. K. Burke, ASA10, Box 777, Boca Raton, Fla. 33432)

3–7. International Union of **Angiology** Congr., 9th, Florence, Italy. (F. Pratesi, Via della Robbia 5, Florence 50132)

4–5. **Biomedical Applications of the Scanning Electron Microscope** Conf., Rockville, Md. (J. M. Wehrung, EMventions Microanalysis Lab., 2351 Shady Grove Rd., Rockville 20850)

4–7. American **Fertility** Soc., Miami, Fla. (H. H. Thomas, 1801 Ninth Ave., S. Birmingham, Ala. 35205)

4–7. Missouri State **Medical** Assoc., Kansas City. (R. McIntyre, P.O. Box 1028, Jefferson City, Mo. 65101)

5–6. Alabama **Acad. of Science**, Birmingham. (D. Costes, Science Dept., Troy State Univ., Troy, Ala. 36081)

5–6. American **Burn** Assoc., Cincinnati, Ohio. (A. R. Dimick, Dept. of Surgery, Univ. of Alabama, University Station, Birmingham 35294)

7–10. Conference on **Environmental Acoustics**, American Soc. for Testing and Materials, Columbus, Ohio. (J. McFadden, ASTM, 1916 Race St., Philadelphia, Pa. 19103)

7–12. American Assoc. of **Immunologists**, Atlantic City, N.J. (H. Metzger, AAI, 9650 Rockville Pike, Bethesda, Md. 20014)

7–12. American **Physiological** Soc., Atlantic City, N.J. (R. G. Daggs, APS, 9650 Rockville Pike, Bethesda, Md. 20014)

8–10. **Engineering Aspects of Magnetohydrodynamics** Symp., Tullahoma, Tenn. (Y. C. L. Wu, Energy Conversion Research Div., Univ. of Tennessee Space Inst., Tullahoma 37388)

8–10. Symposium on **Identification and Transformation of Aquatic Pollutants**, Environmental Protection Agency, Univ. of Georgia, American Soc. for Microbiology, and American Chemical Soc., Athens, Ga. (G. Baughman, EPA, Southeast Environmental Research Lab., College Station Rd., Athens 30601)

8–11. European **Sleep Research** Soc., 2nd congr., Rome, Italy. (W. P. Koella, Ciba-Geigy AG, K 125/1109, 4002 Basel, Switzerland)

8–12. American Soc. for **Experimental Pathology**, Atlantic City, N.J. (G. B. Mider, ASEP, 9650 Rockville Pike, Bethesda, Md. 20014)

8–12. International Symp. on **Wound Healing**, Rotterdam, Netherlands. (Secretary, Holland Organizing Centre, 16 Lange Voorhout, The Hague, Netherlands)

8–12. American **Orthopsychiatric** Assoc.,

San Francisco, Calif. (M. F. Langer, AOA, 1790 Broadway, New York 10019)

8–12. American Soc. for **Pharmacology and Experimental Therapeutics,** Atlantic City, N.J. (E. B. Cook, ASPET, 9650 Rockville Pike, Bethesda, Md. 20014)

9–11. **Thin Films,** 8th conf., Inst. of Physics, Sussex, England. (Meetings Officer, IP, 47 Belgrave Sq., London, SW1X 8QX, England)

9–13. **James Ewing** Soc., Honolulu, Hawaii. (A. S. Ketcham, Clinical Center 10N116, Natl. Cancer Inst., Bethesda, Md. 20014)

9–14. Conference on **Industrial Problems in Source Sampling and Monitoring,** Engineering Foundation, Pacific Grove, Calif. (EF, 345 E. 47 St., New York 10017)

10–13. Tennessee **Medical** Assoc., Gatlinburg. (J. E. Ballentine, TMA, 112 Louise Ave., Nashville 37203)

11–13. Southern Soc. for **Philosophy and Psychology,** Tampa, Fla. (M. Loeb, Psychology Dept., Univ. of Louisville, Louisville, Ky. 40208)

11–13. American Assoc. of **Physical Anthropologists,** Amherst, Mass. (G. J. Armelagos, Dept. of Anthropology, Univ. of Massachusetts, Amherst 01002)

12. Utah Acad. of **Sciences, Arts, and Letters,** Salt Lake City. (H. Buchanan, Dept of Botany, Weber State College, Ogden, Utah 84403)

12–13. Colorado-Wyoming **Acad. of Science,** Laramie, Wyo. (J. T. Windell, Dept. of Biology, Univ. of Colorado, Boulder 80302)

14. Conference on **Structure and Cognition: The Mutual Relevance of Structural Anthropology and Cognitive Anthropology,** Geneseo, N.Y. (G. Erchak, Dept. of Anthropology, State University of New York College at Geneseo, Geneseo 14454)

15–17. Rocky Mountain **Bioengineering** and the Intern. **Biomedical Sciences Instrumentation,** 11th annual jointly, Instrument Soc. of America, Colorado Springs, Colo. (C. D. Ferris, Office of the Dean, Univ. of Wyoming, College of Engineering, Box 3295, Laramie 82070)

15–17. **Biomedical Symp.,** 2nd, Natl. Inst. of Health Minority Biomedical Support Program, New Orleans, La. (J. H. Corrington, Dept. of Chemistry, Xavier Univ., New Orleans 70125)

15–17. American Assoc. of **Planned Parenthood Physicians,** Memphis, Tenn. (G. Covington, AAPPP, 810 Seventh Ave., New York 10019)

15–17. Society of **Head and Neck Surgeons,** Honolulu, Hawaii. (W. A. Maddox, 944 S. 18 St., Birmingham, Ala. 35205)

15–18. **Pharmacology of Thermoregulation,** 2nd intern. symp., Paris, France. (P. Lomax, Dept. of Pharmacology, Univ. of California Medical School, Los Angeles 90024)

15–19. American **Education Research** Assoc., Chicago, Ill. (R. A. Dershimer, AERA, 1126 16th St., NW, Washington, D.C. 20036)

15–20. National Council of **Teachers of Mathematics,** Atlantic City, N.J. (J. D. Gates, NCTM, 1201 16th St., NW, Washington, D.C. 20036)

16–18. **Optical and Acoustical Micro-Electronics,** 23rd intern. symp., Inst. of Electrical and Electronics Engineers and Optical Soc. of America, New York, N.Y. (J. Fox, Polytechnic Inst. of Brooklyn, 333 Jay St., Brooklyn, N.Y. 11201)

16–18. **Technology of Controlled Nuclear Fusion** Conf., American Nuclear Soc., San Diego, Calif. (G. R. Hopkins, Gulf General Atomic, P.O. Box 608, San Diego 92112)

16–19. International Conf. on **Electron Spectroscopy,** Namur, Belgium. (Conf. Office, Lab. de Spectroscopie Electronique, Facultes Univ., rue de Bruxelles, 61, B-500 Namur)

16–21. American College of **Allergists,** Paris, France. (E. Bauers, 2100 Dain Tower, Minneapolis, Minn. 55402)

17–18. American **Geriatrics** Soc., Toronto, Ont., Canada. (E. Henderson, AGS, Room 1470, 10 Columbus Circle, New York 10019)

17–19. International **Livestock Environment** Symp., American Soc. of Agricultural Engineers, Lincoln, Neb. (R. R. Castenson, ASAE, 2950 Niles Rd., St. Joseph, Mich. 49085)

17–19. **Negative Ions** Conf., Inst. of Physics, Liverpool, England. (J. A. Rees, Dept. of Electrical Engineering and Electronics, Univ. of Liverpool, P.O. Box 147, Liverpool, L69 3BX)

17–19. Symposium on **Neuroendocrine Integration: Basic and Applied Aspects,** Ann Arbor, Mich. (L. Fisher, Towsley Center, Univ. of Michigan Medical Center, Ann Arbor 48104)

17–20. International **Communication** Assoc., New Orleans, La. (M. Z. Sincoff, Center for Communication Studies, Ohio Univ., Athens 45201)

18–19. Pennsylvania **Acad. of Science,** Bloomsburg. (G. C. Shoffstall, Jr., 214 Whitmore Lab., Pennsylvania State Univ., University Park 16802)

18–20. American **Cleft Palate** Assoc., Boston, Mass. (G. R. Smiley, School of Dentistry, Univ. of North Carolina, Chapel Hill 27514)

18–20. **Medical** Assoc. of the State of Alabama, Huntsville. (L. P. Patterson, 18 S. Jackson St., Montgomery, Ala. 36104)

18–20. Eastern **Psychological** Assoc., Philadelphia, Pa. (M. Benimoff, Dept. of Psychology, Glassboro State College, Glassboro, N.J. 08028)

18–20. Association for the Advancement of **Medical Instrumentation,** 9th annual, New Orleans, La. (J. Skillin, Suite 417, AAMI, 1500 Wilson Blvd., Arlington, Va. 22209)

18–20. **Population** Assoc. of America, New York, N.Y. (J. W. Brackett, Box 14182, Benjamin Franklin Sta., Washington, D.C. 20044)

19. Kansas **Acad. of Science,** Pittsburg. (L. C. Anderson, Div. of Biology, Kansas State Univ., Manhattan 66506)

19–20. Nebraska **Acad. of Sciences,** Lincoln. (C. B. Schultz, 212 Morrill Hall, Univ. of Nebraska, Lincoln 68508)

19–21. Oklahoma **Acad. of Science,** Woodward. (J. F. Lovell, Dept. of Biological Sciences, Southwestern State College, Weatherford, Okla. 73096)