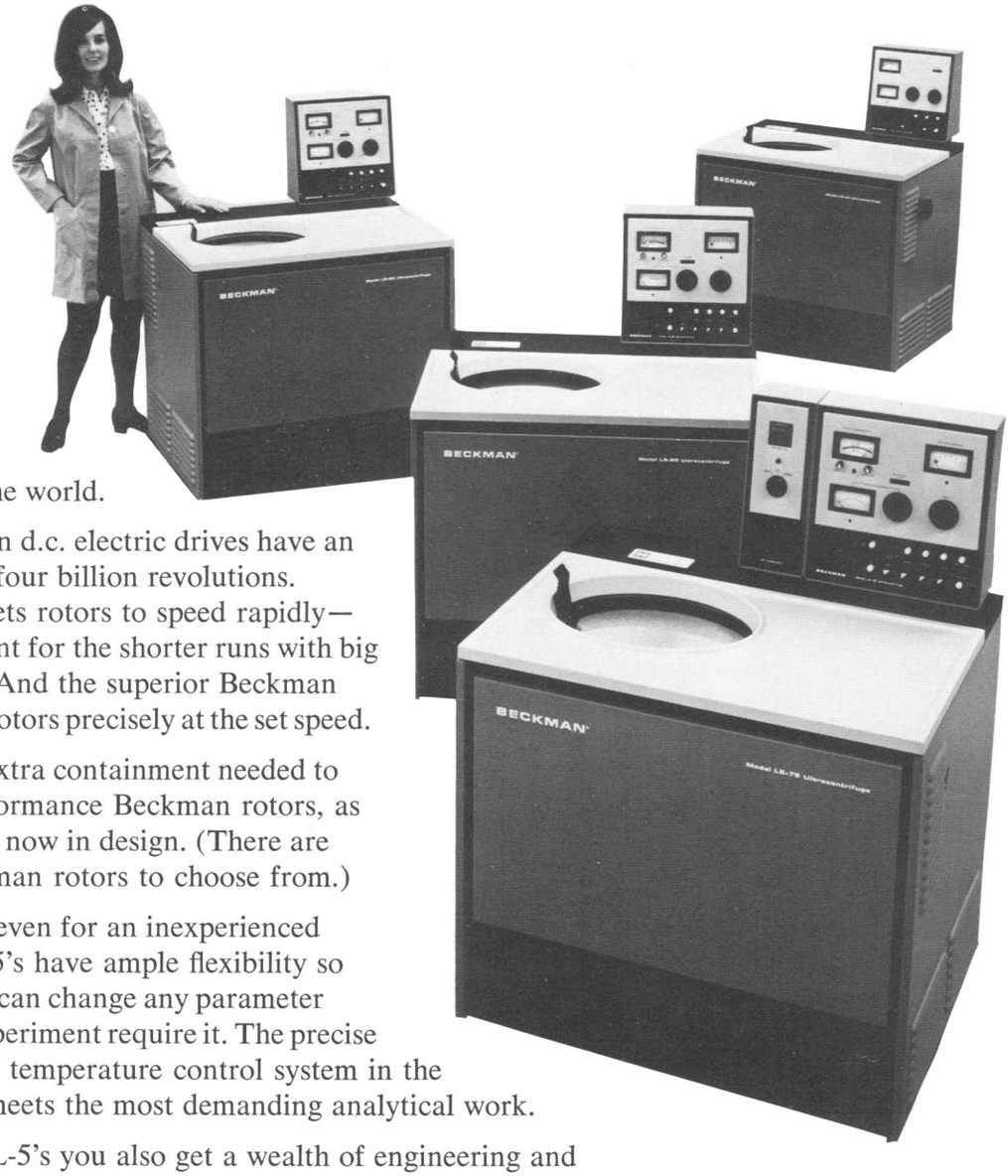
SCIENCE

22 March 1974

Vol. 183, No. 4130

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

The Beckman L-5's are the Four Best Ultracentrifuges in the World.



From every standpoint, the new Beckman L-5's offer you more than any other preparative ultracentrifuges in the world.

The proven Beckman d.c. electric drives have an average life of over four billion revolutions. Their high torque gets rotors to speed rapidly—particularly important for the shorter runs with big volumes of sample. And the superior Beckman speed control holds rotors precisely at the set speed.

The L-5's have the extra containment needed to run the highest performance Beckman rotors, as well as the new ones now in design. (There are more than 30 Beckman rotors to choose from.)

Operation is simple even for an inexperienced operator, yet the L-5's have ample flexibility so that the investigator can change any parameter at will, should his experiment require it. The precise infrared radiometric temperature control system in the L5-50, 65, and 75 meets the most demanding analytical work.

With the Beckman L-5's you also get a wealth of engineering and applications experience developed through years of research and field contact. And no matter where you are there is a Beckman ultracentrifuge service specialist near you; there are 166 in the U.S. alone.

We'd like to tell you more about the L-5's—the four best ultracentrifuge values in the world. Write for brochure SB-400 to Beckman Instruments, Inc., Spinco Division, 1117 California Avenue, Palo Alto, California 94304.

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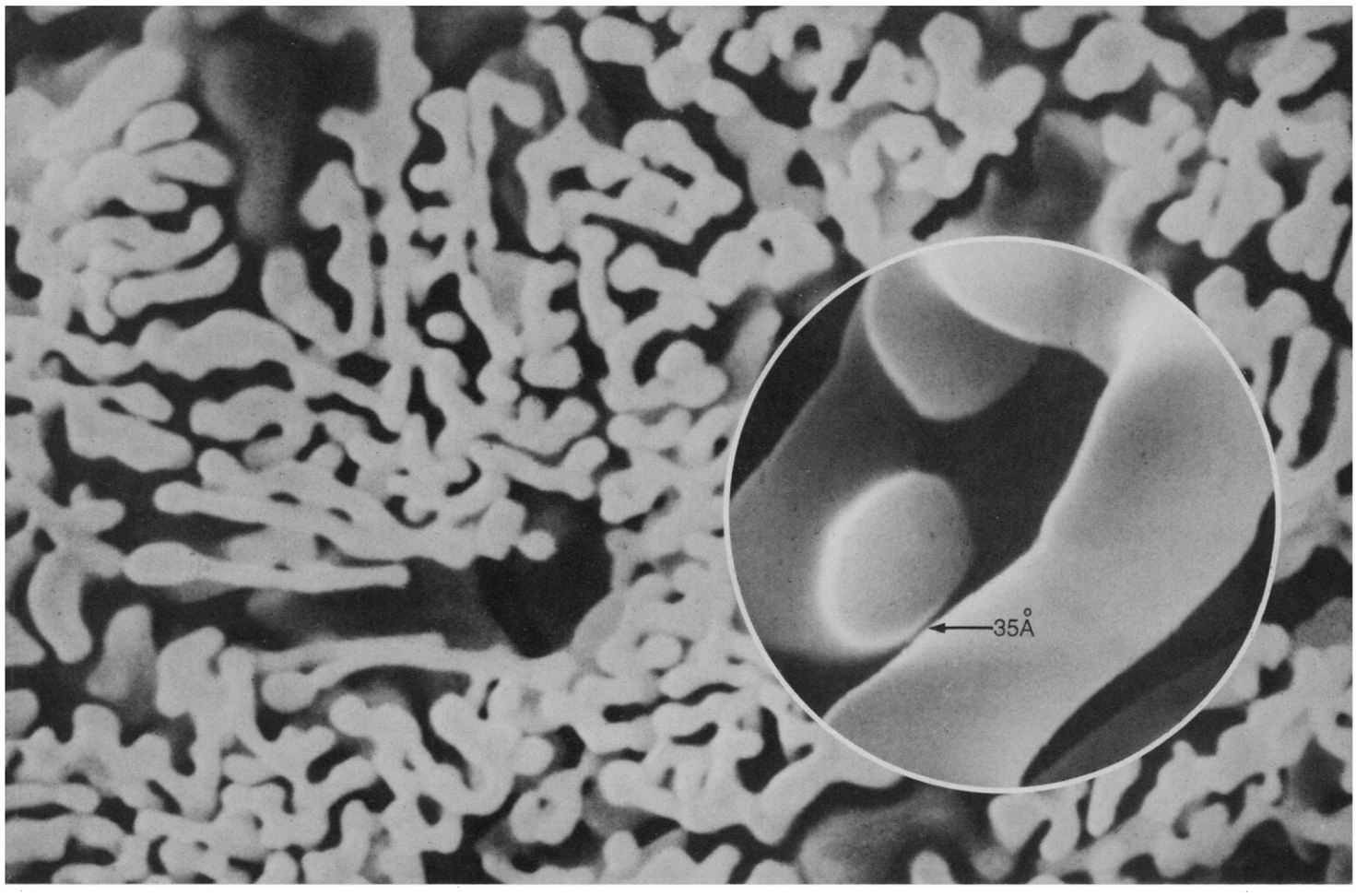


Specimen: Aluminum-tungsten dendrite structures. 24,000X magnification (insert 100,000X). 14KV accelerating voltage. Resolution standard proposed by Dr. S. Ballard, National Bureau of Standards.

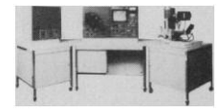
We Here Highly Resolve

Things are getting brighter all the time. Take these two remarkable photomicrographs, for instance. They happen to be 1000 times brighter than those images created from thermionic sources.

What's the secret?

Simple. We introduced the world's first commercial Field Emission Scanning Electron Microscope. And we're still in the business of bringing the seekers and searchers the brightest, high-resolution images in microscopy today.
A major difference lies in our revolutionary field emission electron gun. It really delivers. Fast scanning and dynamic viewing of even the finest microstructures. Coated or uncoated. And then there's our totally new system design that lets you scan specimens free from worry about damage, contamination, charging, or other elements that mess up your micrographs.

Each SEM in our growing family features reliable, all-solid-state electronics. Just plug one in, and start examining your own specimen. The same way more and more laboratory researchers throughout the world are doing day-after-day. Let Coates & Welter brighten up your life. Write us for a current brochure: Coates & Welter Instrument Corporation, 777 North Pastoria Avenue, Sunnyvale, CA 94086, (408) 732-8200. A subsidiary of American Optical Corporation.



See us at the 7th Annual Scanning Electron Microscope Symposium, April 8-12, (Booths 25 & 26)

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22 March 1974

Volume 183, No. 4130

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 subscription: 9 months $22.50; 10 months $25. New rates will become effective 1 May 1974. 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.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

COVER

A young rhesus monkey clings to its canine companion. Young monkeys differing in age and social history developed strong and specific attachments when housed individually with dogs. These results raise questions concerning critical periods in primate attachments and the irreversibility of filial bonds. See page 1209 [Jeff Fricker, University of California, Davis]

Heavy READING

Our 1974 Enzyme Catalog contains some pretty heavy reading—important reading. That's why we're making this lighthearted (but serious) offer to you: a new 1974 Enzyme Catalog. Great, you say, but what's in it for me? Lots. You get over 150 enzymes listed, both usual and unusual. To save your time, the brief, yet complete descriptions are included with method and units of assay and up-to-date references. The fast-finding groupings list enzymes both alphabetically and by type. We've lightened the burden of finding just what you want! One more thing: You'll be kept up-to-date on new enzyme listings as they are developed and made available. This service is provided on a periodic basis for all those on our mailing list. A request from you is all we need to make this offer complete. Call or write:

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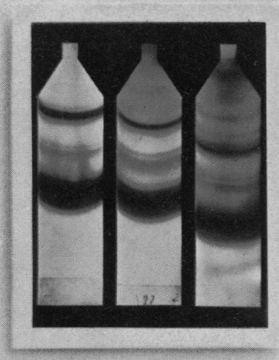
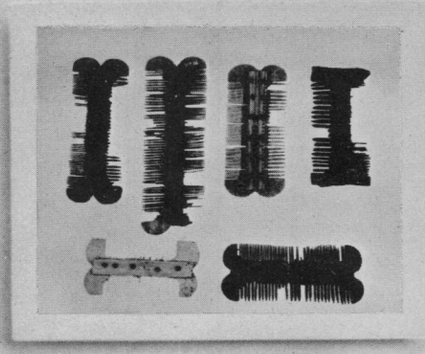
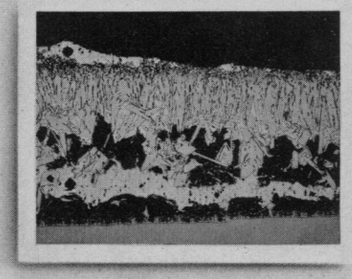
One camera took all of these pictures and delivered them in seconds.



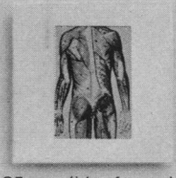
Chromatogram of urological specimen. Type 108.



Bone combs from Middle Ages. Type 52.

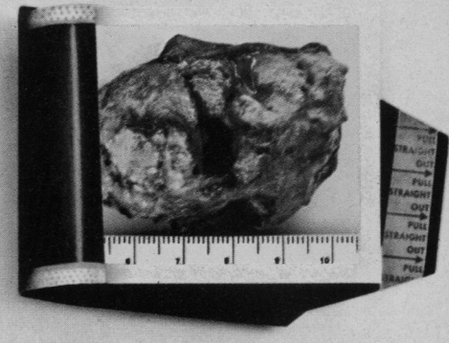


Photomicrograph of experimental galvanized coating. X100. Type 107.



35mm slide of muscle structure. Type 46L.

Damaged automobile piston. Type 55 positive/negative.



Lung with tumor. Type 108.

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It's the one camera that couples speed with flexibility.

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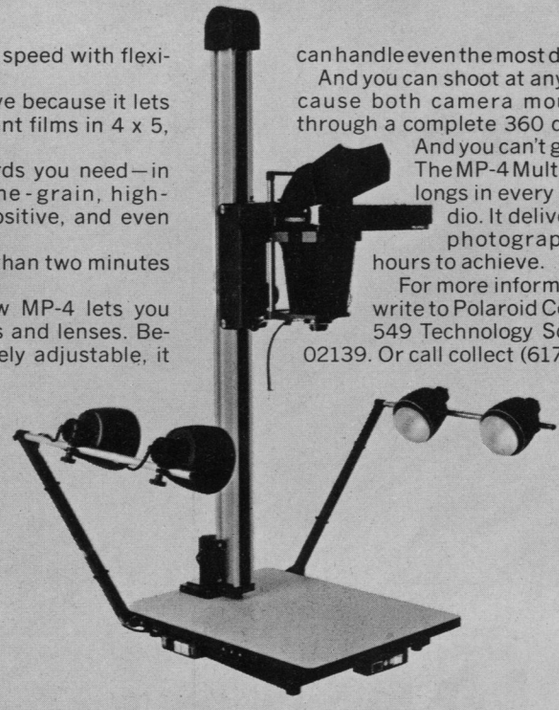
The modular design of the new MP-4 lets you interchange cameras, film holders and lenses. Because the light arms are completely adjustable, it can handle even the most difficult lighting situations.

And you can shoot at any angle or perspective because both camera mount and column rotate through a complete 360 degrees.

And you can't go much further than that. The MP-4 Multipurpose Land camera belongs in every laboratory and photo studio. It delivers in seconds what other photographic processes can take hours to achieve.

For more information or a demonstration, write to Polaroid Corporation, Dept. 26-254, 549 Technology Square, Cambridge, Mass. 02139. Or call collect (617) 547-5176.



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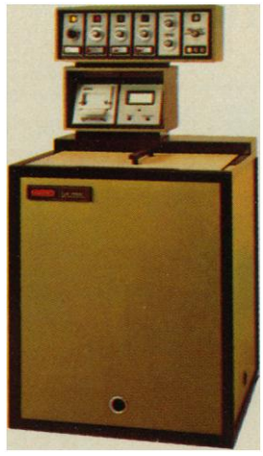
Bill Miller is hard to please.



Bill Miller talks the liquid scintillation language. And we listen. Like any other serious LS user, he wants instruments of proven long-term reliability. And functional flexibility. Instruments of maximum simplicity, but with no sacrifice in state-of-the-art parameters.

That's why Bill Miller, Ph.D., is our devil's advocate at Beckman. A hard-to-please "in-house" customer. He supervises biomedical applications and research, working from a user's standpoint. And he symbolizes the powerful technical support behind the Beckman LS line.

As Dr. Miller puts it:

"First, of course, Beckman offers the broadest single-source line of instrumentation, accessories and supplies. Instruments for every budget, every level of investigation ... from low-cost 100-sample models to 300-sample models and a half-dozen true multiple-user systems.

"Next — and very important — is that these highly efficient instruments are so simple to operate. We've eliminated a lot of unneeded complexity. Yet you can handle virtually everything in today's LS technology, and what we can foresee as well. With less chance of errors, too, because of features like the on-line log ratemeter and our exclusive Automatic Quench Compensation.

"And what counts most heavily is that you get all this backup. We publish and make available more LS documentation, clinical briefs, data sheets and procedures than anyone else. We have three regional applications support centers. And they really operate. Training courses, workshops, seminars — even in-lab assistance for our customers. And our 425 field men are really on-call when you need them, out of 28 sales and service offices around the country.

"Being on the inside of this field, I know what problems can crop up. And I don't see why anyone in LS would settle for less than the Beckman combination of reliability, simplicity, and technical support.

"I know I wouldn't."

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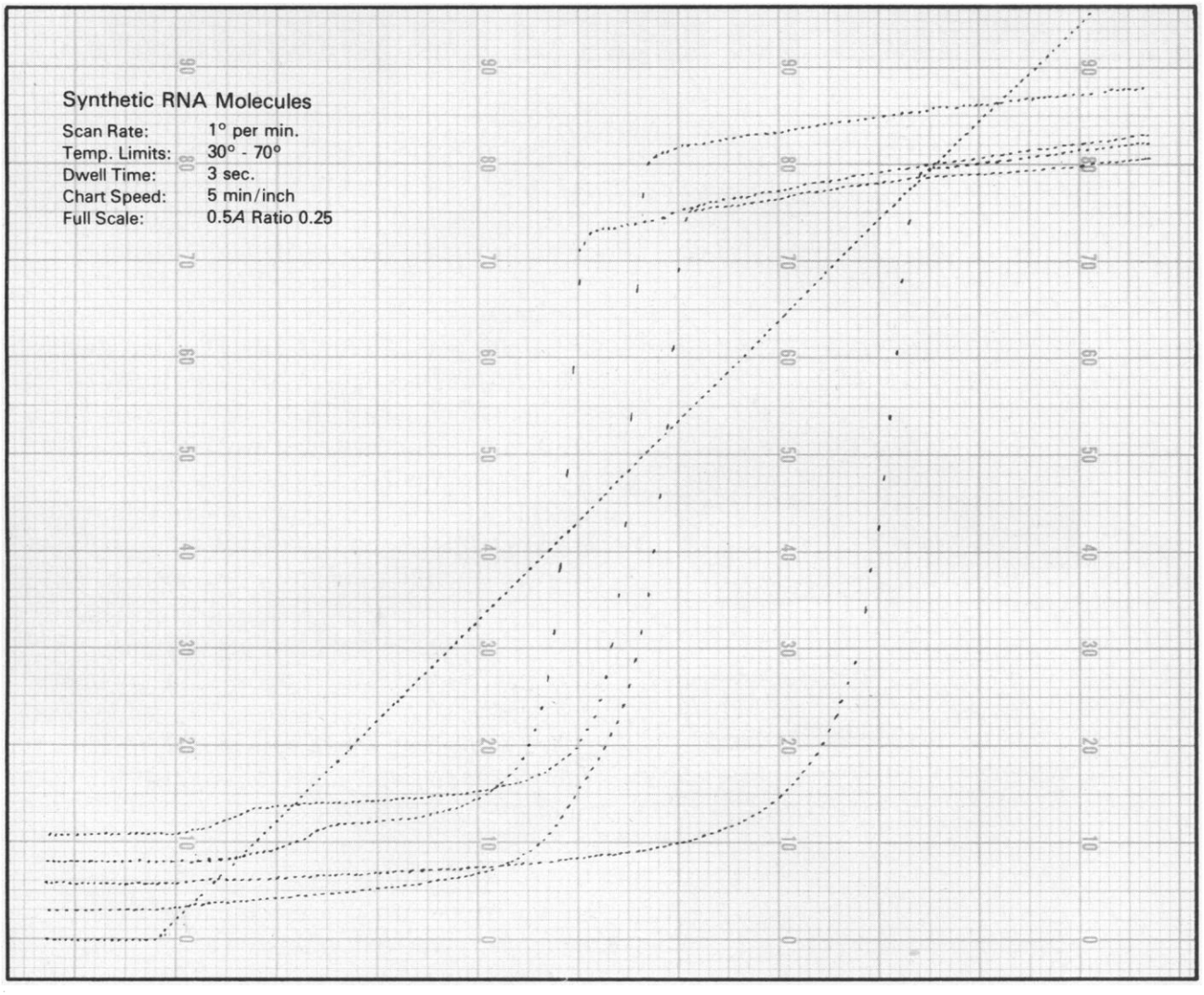

Now have thermo-electric temperature control for all your thermal-absorption studies.

The Gilford Thermo-Programmer thermoelectrically heats or *cools* four 0.25 ml samples to any preset temperature from 0-100° regardless of ambient temperature. It provides three linearally programmed heating rates of 0.25, 0.5, and 1.0 degrees/minute. The model 2427 is ideally suited for DNA, RNA, protein, and other polymer denaturation or renaturation studies.

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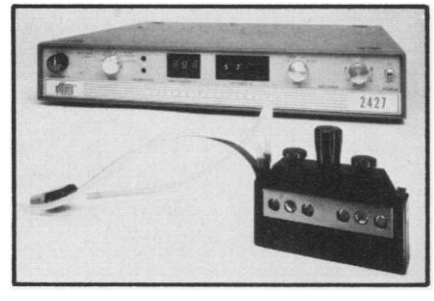

- Digital temperature display.
- Absorption-temperature data may be multiplexed to chart recorder and printer.

- Avoids inconvenient, time consuming water baths.
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- Compatible with all Gilford research spectrophotometers.

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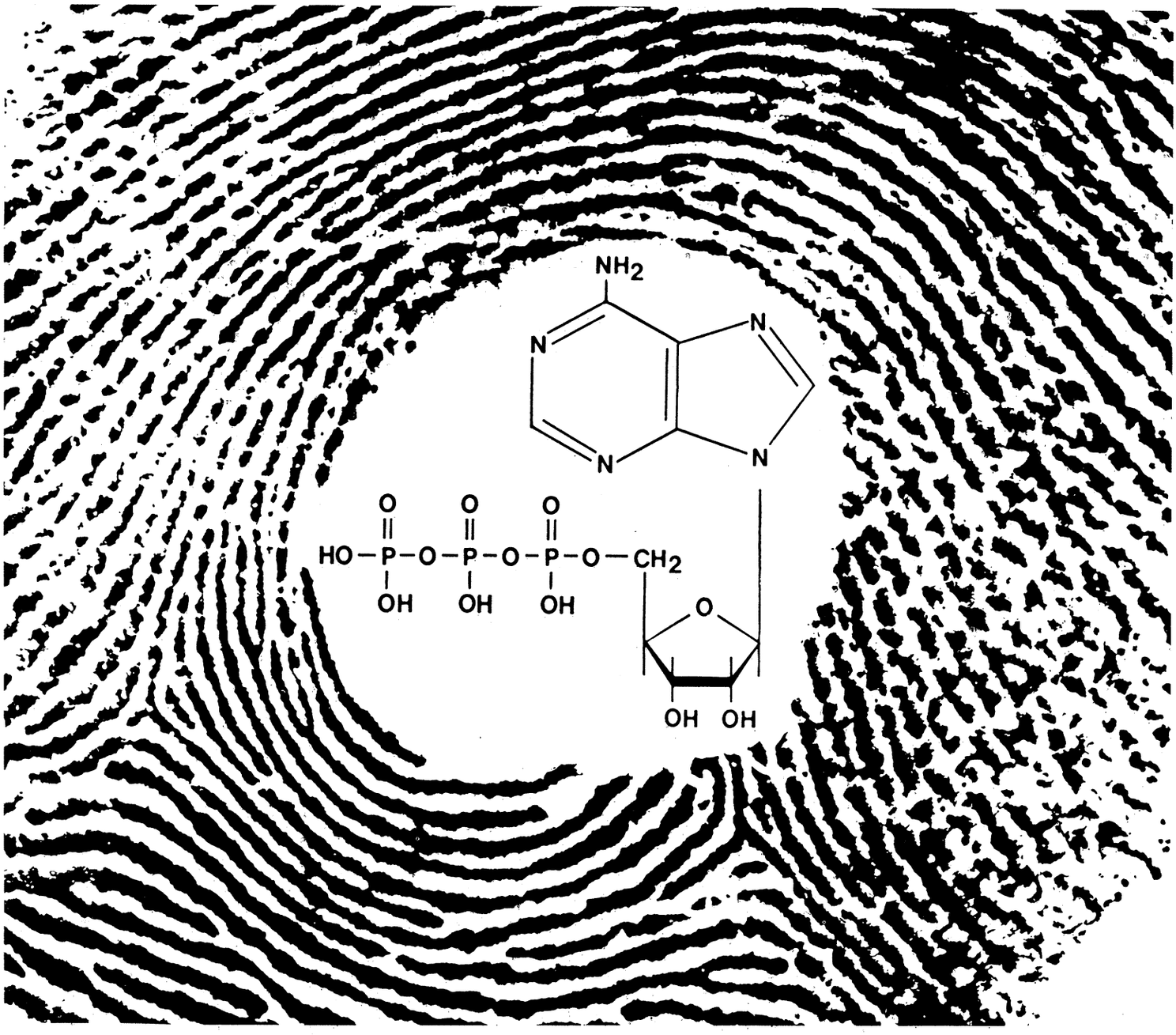

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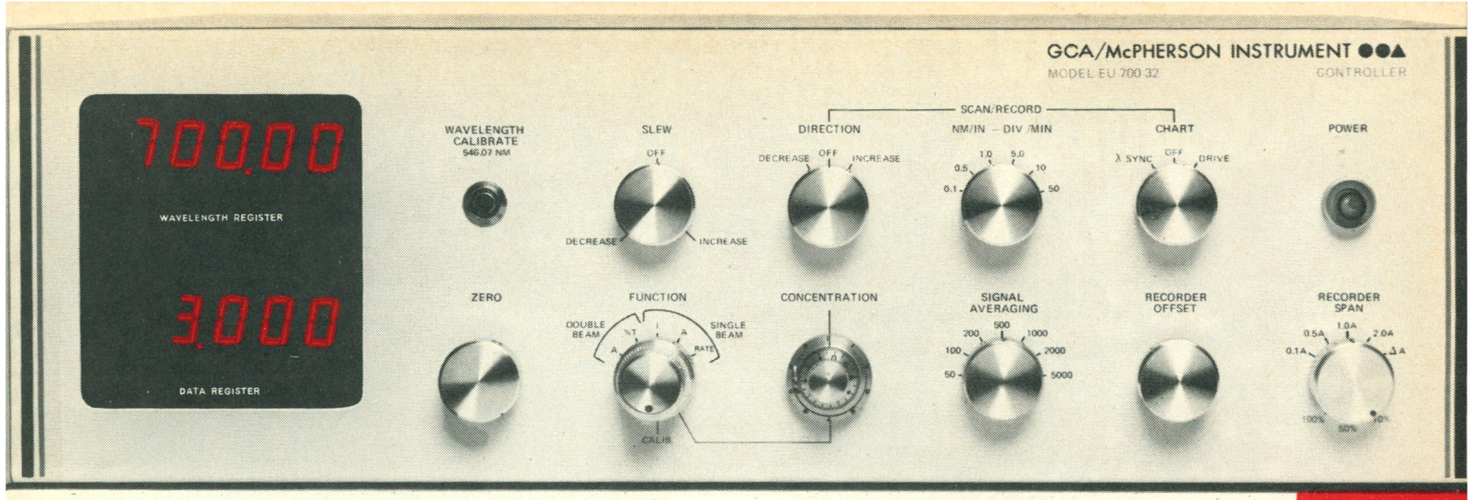

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4000 Particles per minute identified, counted, measured, classified by computerized microscope

Whether making direct microscopic measurements on particulate materials, or being used in conjunction with non-microscopic techniques, the Quantimet 720 Image Analysing Computer adds capability, accuracy and speed. The Quantimet recognizes, counts, measures and classifies particulates in images from light microscopes, transmission and scanning electron microscopes, probes and photomicrographs.

True Area and Other Parameters Measured for Each Particle and the Total Field

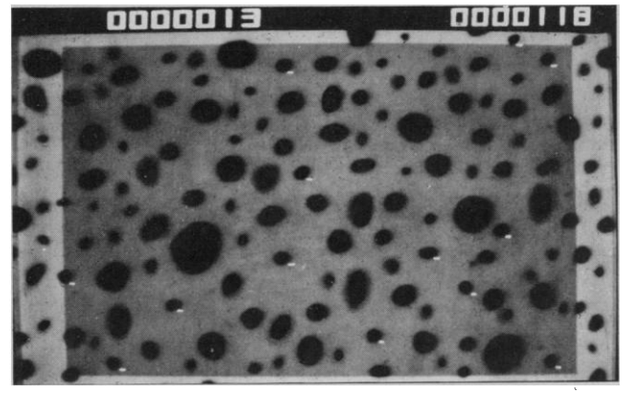
Entire field measurements such as the total number of particles, mean particle size or interparticle spacing and percent of field area occupied can be made on the Quantimet. These measurements are more objective and accurate than manual measurements and are instantaneously available.

Distributional measurements, almost impossible by manual and non-microscopic methods, are also provided by the Quantimet. Each particle can be classified by it's projected area, perimeter, height and width, longest dimension and optical density.

Quantimet 720 Particle Analysis System with automatic microscope focusing and stage movement. The operator can make selected particle measurements via light pen or can count and measure all particles automatically.

Shape Recognition and Agglomerate Rejection

The Quantimet's pattern recognition capability allows it to separate particles by shape, or by virtue of other features within their boundaries, such as nuclei in cells. Recognition is based on non-dimensional shape factors combining parameters of each particle. The Quantimet can also recognize and eliminate agglomerates from particle analyses, thus preventing the distortion of results which could occur in automatic operation.



Count-flags in the Quantimet's TV monitor indicate the 13 particles having a projected area between 200 and 300 square microns. There are a total of 118 particles in the measuring frame.

Geometric and Elemental Analyses Combined

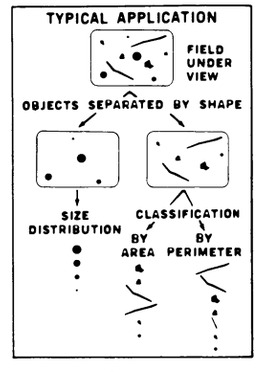
Mating the Quantimet with an SEM or probe adds geometric measurement to their elemental X-ray analysis capability. Counting, measuring and classifying particles in the SEM or probe field can be limited to those having a specific elemental composition. Alternatively, X-ray analysis can be much faster since it can be limited to particles having certain geometric properties.

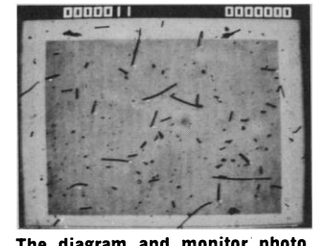
High Speed Adds Accuracy — Lowers Cost

The Quantimet couples high resolution T.V. scanning with full automation of microscopes, data acquisition and processing. 10,000 particles can be separated and size classified, using data from 100 separate fields of view, all within 150 seconds—an overall speed of 4000 particles per minute.

The Quantimet monitor shows exactly what is being measured, and data can be fed simultaneously to printers, calculators, mini-computers and magnetic tapes.

With a Quantimet, you will obtain statistically better particle data, more types of information, in less time and at lower cost than ever before.





The diagram and monitor photo illustrate the Quantimet's pattern recognition capability. The Quantimet selects and measures asbestos fibers in this airborne dust sample . . . and rejects all agglomerated and non-fibrous particulates from the analysis.

Write or call for comprehensive technical brochure and application information.

IMANCO **Image Analysing Computers, Inc.**

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Science

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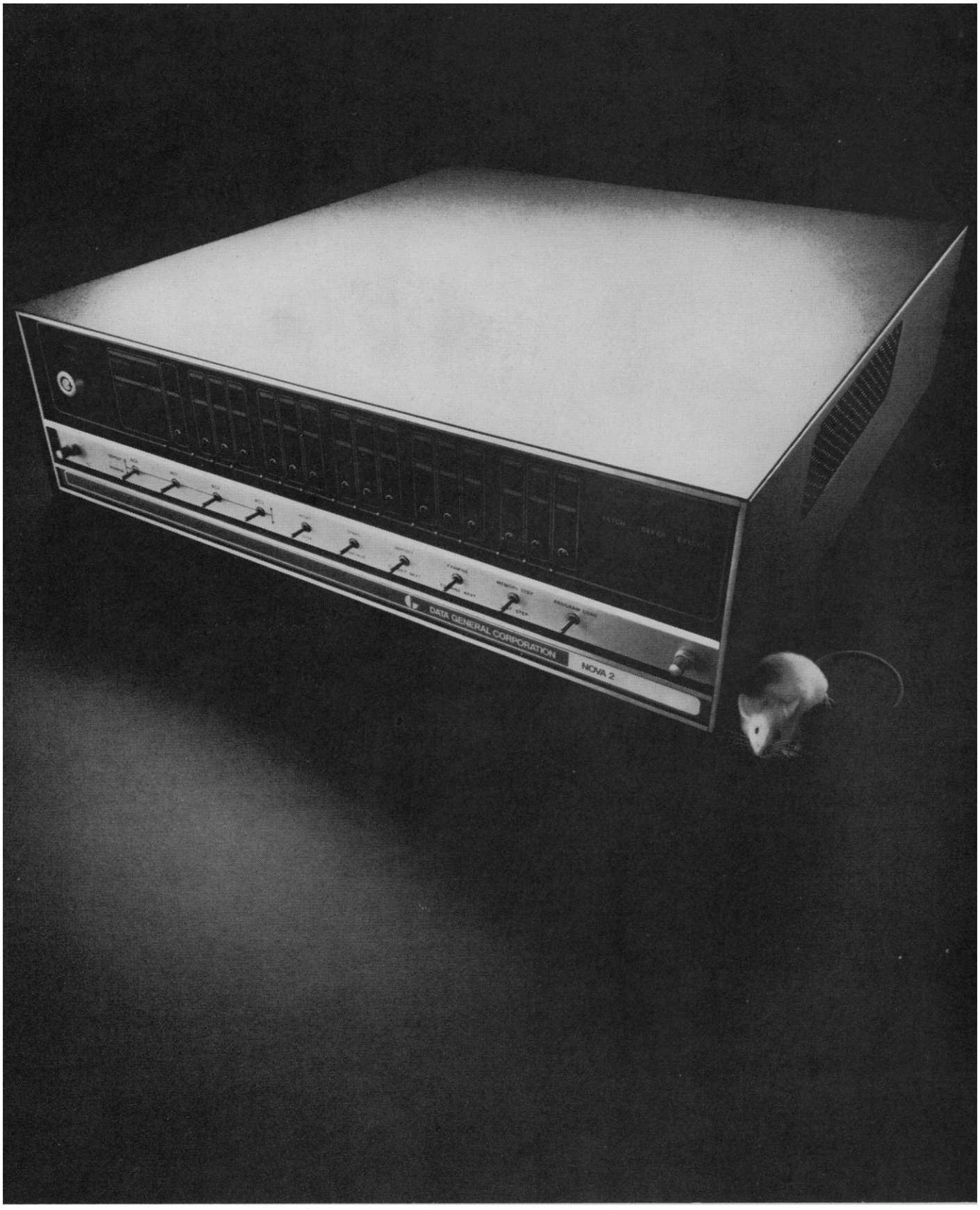

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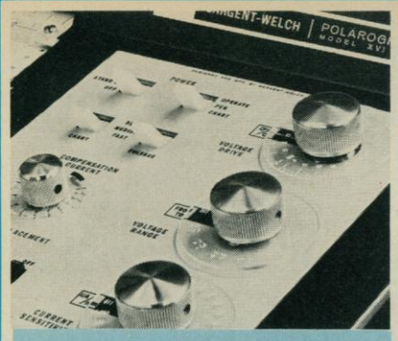

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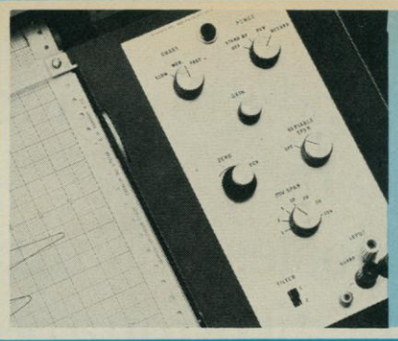

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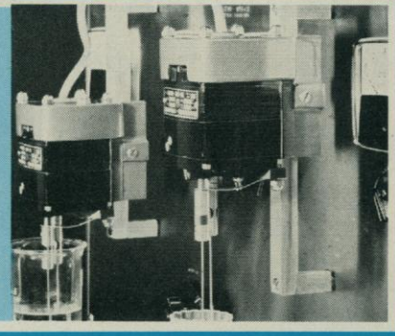

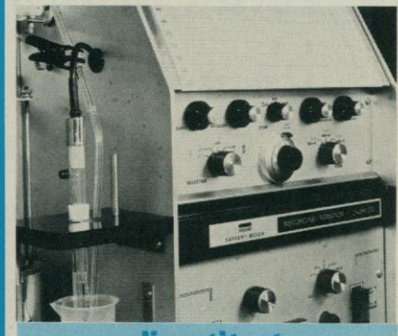

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SCIENCE 19 April 1974

SPECIAL ENERGY ISSUE

Conservation in homes, schools, and industry — Solar energy —

Sociological impact of energy crisis — Economic strategy —

Geothermal electricity — Impact on balance of payments —

Federal energy policy — Academic community involvement —

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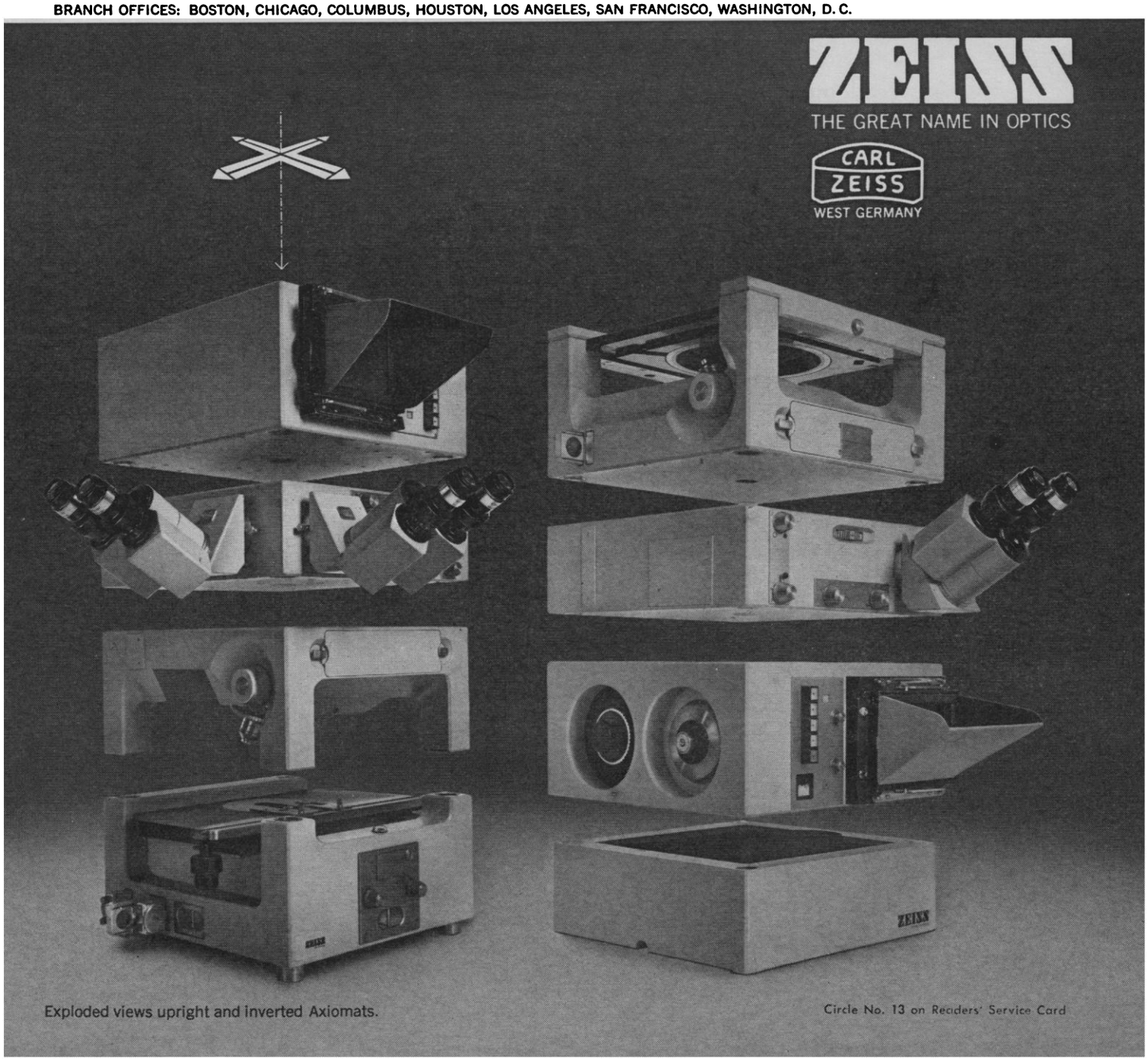

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Wildavsky's comment that technology assessment (TA) and other management information systems are being "established without a single successful demonstration, . . . are tried everywhere, and . . . do not work anywhere" triggers a question: How do we know whether or not TA works? I am troubled not so much by the performance of TA to date as by the dim prospects of rationally evaluating and improving performance in the future (*1*).

Such prospects would be enhanced by the performance of *multiple* (for example, three) TA's of given topics. Multiple TA's would enable comparison of usefulness to various parties, post hoc evaluation of the accuracy of forecasts, and estimation of the relative value per dollar invested—each as a function of who the assessors were, methods employed, and topics assessed. Users would be better able to gauge reliability and would be ensured a broader perspective.

While it has been asserted that a TA realistically costs about $200,000 (*2*), the lack of TA evaluations makes it difficult to determine whether a project costing $5,000 is less worthy than a $500,000 venture (*3*). Performance of multiple, coterminous TA's at different funding levels could clarify this issue. One could surmise that the cost would properly be a function of the technological complexity involved and the needs of the users.

ALAN L. PORTER
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1. This relates to the basic question of social experimentation. See A. M. Rivlin, *Science* **183**, 35 (1974).
2. V. T. Coates, *Technology and Public Policy* (George Washington University, Washington, D.C., 1972), vol. 1, pp. 2–12.
3. This cost range is suggested in U.S. Senate, Committee on Rules and Administration, *Report on the Technology Assessment Act of 1972* (Government Printing Office, Washington, D.C., 1972), p. 21.

Exchanges with China

The informative article by Harrison Brown, "Scholarly exchanges with the People's Republic of China [PRC]" (11 Jan., p. 52), makes it clear that the Committee on Scholarly Communication has a tremendous task in the development of scientific exchanges between the United States and the PRC. As Brown states, the committee obviously cannot expedite exchanges in every field. However, I wonder about a system of priorities that resulted in the selection of a group of Americans to discuss the eradication of schistosomiasis, but not a group to discuss the eradication of venereal diseases.

Epidemic gonorrhea and communicable syphilis currently rank first and fourth, respectively, among reportable diseases in the United States, and the incidences are rising. It has been reported (*1*) that venereal diseases have, for all practical purposes, been eradicated in China. So far, there has been no evidence to refute such reports. Therefore it would seem that, in the order of priorities, one of the "particular areas in which Americans potentially have a great deal to learn from the Chinese" would be venereal disease control.

U. S. GRANT KUHN, III
3355 Juhan Road,
Stone Mountain, Georgia 30083

References

1. E. G. Dimond, *J. Am. Med. Assoc.* **218**, 1552 (1971).

I completely agree with Kuhn that the eradication of venereal disease in China is a great accomplishment. However, it may be attributed, not to advances in medical science unknown in the United States, but to China's very effective social mobilization and public education campaigns. The Committee on Scholarly Communication with the PRC has expressed considerable interest in sending scholars to China to study social organization in city neighborhoods and communes, but these programs have not yet been accepted by the PRC.

HARRISON BROWN
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Drug Education Conference

Nicholas Wade (News and Comment, 14 Dec. 1973, p. 1114) reports on a travel program which was presented to the participants of the International Congress on Drug Education, held in Montreux, Switzerland, in October 1973. This travel program, which

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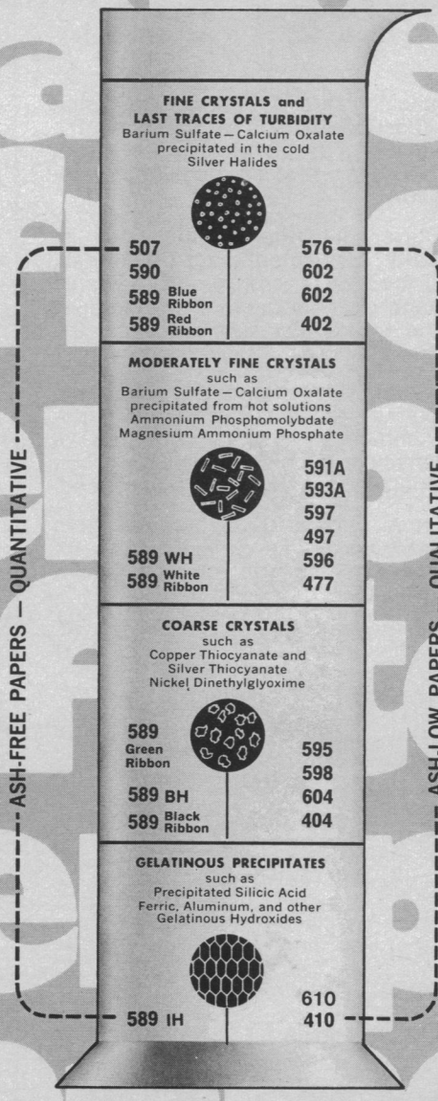

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is described as having been of inferior quality by Wade, offered absolutely everything to accommodate each participant at the lowest possible cost. The people responsible for the program provided more services than would be considered normal. Every individual received exactly what he paid for. The arrangements were clearly indicated and spelled out in the travel brochure received by the participants. Some people received what they did not pay for, since they left their hotels without checking with the cashier. Because prices were cut to the bone, it was not the U.S. taxpayer who was the "innocent victim" but the people in charge of the travel program.

Wade makes little mention of the scientific implications of this congress. Some leading industries apparently thought its value was great enough to underwrite the financial loss that resulted from insufficient participation.

CLAUDIUS A. CHORUS

International Congress on Drug Education, Secretariat, Rue de la Paix 11, Post Office Box 236, 1820 Montreux, Vaud, Switzerland

Pathologic Evaluation and the Blind Technique

At the Conference on Carcinogenesis Testing in the Development of Drugs, held by the National Academy of Sciences–National Research Council (23 to 25 May 1973), Robert Elashoff suggested that, in carcinogenesis tests, the pathology slides should be sent to the pathologist blind (unidentified). Morris A. Weinberger (Letters, 23 July 1973, p. 219) comments on that suggestion.

While several of Weinberger's comments might be relevant to human pathology, Elashoff's suggestion referred to carcinogenesis testing with animals, and it is only in that context that we discuss Weinberger's letter.

A carcinogenesis test is performed in order to determine if a treated group is associated with a higher incidence of cancer than an untreated control group. The control group must be handled in exactly the same manner as the treated group. By sending unlabeled slides to the pathologist we ensure that the integrity of the control group is maintained during the pathologic evaluation.

Weinberger asserts that histopathologic diagnoses are considerably less influenced by subjective factors (for example, knowledge of the treatment given to each specimen) than by other factors. However, a carcinogenesis test is conducted to investigate carcinogenic properties of the treatment in question and not to determine the biases, no matter how small, of a particular pathologist. The prudent investigator should therefore give serious consideration to the blind technique as a means of avoiding errors associated with the influence of subjective factors.

The blind technique can be incorporated into most methods of evaluation. Weinberger points out that the pathologist often wants to review the control slides to establish a basis or orientation for the examination of the slides from the treated group. One method by which this could be done using the blind technique would be to make up extra control slides, select a portion of them by a random process, review these with full knowledge that they are control slides, and then put them aside; finally, the remaining treated and control slides could be examined in a random order using the blind technique. Thus, the pathologist's orientation would be established, and a reduction in bias would be achieved.

Weinberger implies that good pathology is objective. The good pathologist should therefore consider the blind technique as a simple means of control to help prevent systematic errors from being introduced when labeled slides are examined. He should also appreciate that use of the blind technique is an assurance of the lack of bias in the pathologic diagnosis made in an experiment.

There is nothing in the blind technique to preclude a pathologist's exploring "interesting new research clues," as Weinberger fears. Notes can be made on slides that show interesting or unusual findings. After the slides have been identified, the findings can be associated with the treatments received and the pathologist can explore his interests. By using the blind technique he may even avoid wandering down some blind alleys.

The blind technique does not require that the pathologist be kept ignorant of experimental information. Good pathology, like good statistics, requires that the professional partici-

pate extensively in all phases of the experiment. The only ignorance required when the blind technique is used is ignorance of the specific treatment given to the animal whose tissues are being examined.

Weinberger points out that bias can unconsciously creep into observations when the pathologist concentrates on treatment groups (overreading), and that a blind pathologic examination is a useful means to reduce this bias. We agree.

The real issue raised by Weinberger is whether the blind technique is worth the effort necessary for its proper implementation. We believe that the blind technique helps reduce bias and, in so doing, increases the repeatability of a study, protects those reading the slides from charges of bias, and increases the validity of the results. The blind technique is therefore worth a great deal of effort, but how much is too much? We look forward to elucidation of the conditions where blind techniques are important and where they are not important and to results of studies carried out partially with the blind technique and partially not. Such reports would help us and others make recommendations on protocol design in these large-scale animal studies. We also look forward to the development of any other techniques that reduce bias.

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The Confusion over Bacteriophage ϕX-174

In 1935 Sertic and Boulgakov (*1*) analyzed a large number of *Enterobacteriaceae* phages and classified them into 14 antigenic types. They designated these types with the Roman numerals I through XIV. The lowercase Greek letter ϕ indicated that the phage was virulent for several bacterial species, and Arabic numbers identified the particular isolate. One of these phages, ϕX-174, later became quite prominent in the field of molecular biology as a model virus containing single-stranded DNA, and a wave of papers emerged in the late 1950's (*2*). And that is when the real confusion started, because many workers in the field incorrectly called it "phi ex," instead of "phi ten" as originally proposed by Sertic and Boulgakov (*1*). But to top off the confusion, a recent book (*3*) uses still another erroneous denotation $\phi\chi$174 ("phi chi" 174). The symbols γ (*4*) and $\times$ (*5*) instead of Roman numeral ten have also been used in the past. I wonder how many new designations the ϕX-174 phage may yet acquire, because of the unfortunate original choice of the Roman numeral ten and the carelessness of authors or printers.

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Humidifiers and Energy Conservation

The use of home humidifiers has recently been promoted in advertisements as a means of providing more comfort in houses with the thermostat turned down. I grant the value of humidification for personal health and for prolonging the life of furniture. However, many advertisers erroneously describe the humidifier as an energy-saving device because it allows lower temperatures with comfort.

These advertisers and even some heating engineers appear to overlook latent heat of vaporization. The evaporation of 10 gallons of water a day (modest for the humidification of most houses) requires more than 80,000 British thermal units, or the consumption of about 80 cubic feet of natural gas per day. This is approximately 10 percent of the natural gas needed to heat a modest home in an average winter day. Either the furnace or an auxiliary source must provide this heat, even if humidification is accomplished merely by placing pans of water on radiators.

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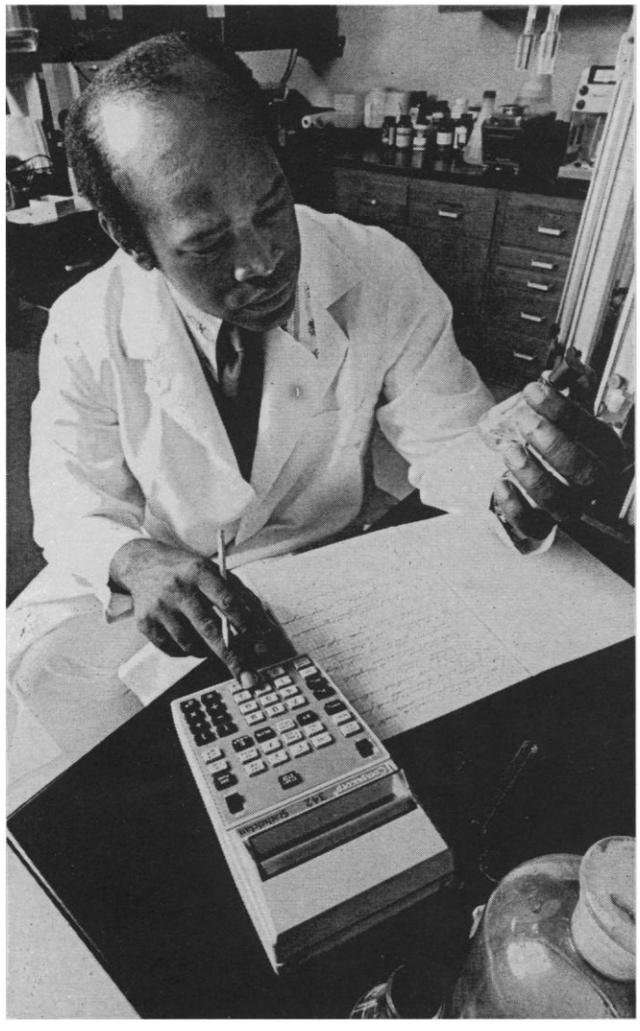

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22 March 1974, Volume 183, Number 4130 **SCIENCE**

Global Science Policy

To suggest that world wisdom be incorporated into decisions about the directions and the uses of science and technology is like proposing that our modern gods be installed on Mount Olympus, with no assurance that they would better handle Prometheus or Pandora. Our predicament as mortals, however, compels the question of whether a global science policy—inside, outside, or in conjunction with the United Nations—is desirable, possible, or practical.

The Center for the Study of Democratic Institutions has broached the subject in a seminar reconnoitering the salient problems and pathways and looking for a detour around the roadblocks of national sovereignty, as exercised by 135 member states of the United Nations.

The seminar followed a report (U.N. E/5238 Add. 1) prepared for the secretary general of the United Nations on the role of science and technology in development during the past 27 years. That report on international cooperation in the handling of threats and opportunities created by science revealed, with encouraging exceptions, regrettable shortcomings. The one coherent institution we have—the United Nations—has never been given, nor has its specialized agencies been given, adequate money, high-caliber personnel, facilities, or authority. In the wake of each climacteric development, it has had to improvise and prompt from the wings. The present structure of the United Nations does not provide a nodal point for determining policy, either in terms of science and technology for development or for the development of science. The preoccupation has been with less developed countries, which at the moment are increasingly disenchanted by the nature of that aid because, having no scientific infrastructure, they could not properly evaluate the choices they were constrained to make. How they are going to be helped by shopping in what Lord Blackett called "the supermarket of science" needs rethinking. The advanced countries might wisely reflect in their national science policies a proper concern for the specific needs of those countries lacking scientific education or research facilities.

Whether a "global science policy" could ever be merely the sum of national science policies is questionable. "Global" is a carry-all word. It might imply "intergovernmental," but it also means developments in science that affect the whole of mankind and its living space and that are beyond the competence of a nation or nations, no matter how advanced. It also includes the "commonwealth of science"—the academies, the professional societies, and the movements like Pugwash, which are transnational instruments. That was why the rubric of the seminar was "inside, outside, or in conjunction with the United Nations." The term "science policy" raised questions of constraints on or control of science and technology. No one suggested that there could or should be a moratorium on scientific research, but a case can be made for establishing wise priorities in the technological use of scientific knowledge and, indeed, for offering caveats on trends in science that are raising profound ethical questions.

One structural proposal was that the now redundant Trusteeship Council be replaced by a Scientific Council on the level of the Security and Economic and Social Councils so that the issues would be aired and continually reviewed. At least the world ought to know what is going on.—The Right Honourable LORD RITCHIE-CALDER, *Senior Fellow, Center for the Study of Democratic Institutions, Box 4068, Santa Barbara, California 93103*

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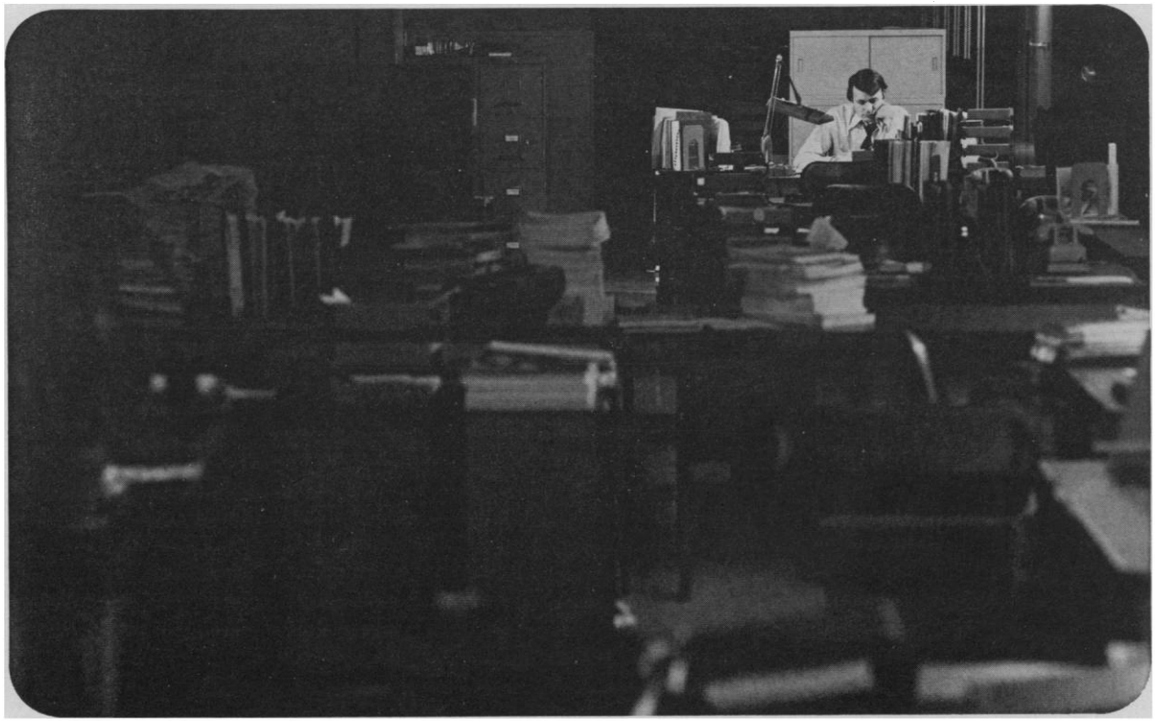

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carboxylic acid in vivo; rodents were unable to form the hydroxymethyl product. The metabolism of some drugs yielded multiple products. A good example is 17α-ethynylestradiol, which is converted to about eight different metabolites, varying markedly in relative amounts in rat and dog (beagle). One product, *d*-homoestrone, was formed by dog, but not by rat, liver microsomes.

Studies of drug interactions continue to yield important information. Drugs like ephedrine were shown to speed the rate of blood clearance of other drugs like dexamethasone, possibly by altering its rate of biotransformation. Other drugs have similar effects but may act, like phenobarbital, by altering hepatic blood flow. Phenobarbital was reported to increase hepatic blood flow up to 30 percent, thereby increasing hepatic drug clearance and altering body distribution and metabolism of almost any drug present in the patient's blood.

The importance of knowing all drug metabolites and their biological significance was stressed by many studies. Overdoses of glutethimide, for example, caused toxic manifestations that did not correlate well with the concentrations of glutethimide in the plasma. Upon examination, it was found that a hydroxy metabolite is formed, with a potency twice that of the parent drug. It can reach much higher concentrations than those of glutethimide when large doses are administered, thereby causing toxic manifestations. However, when normal doses are given, the concentrations of the metabolite are very low.

The objective of clinical pharmacology and toxicology is better patient care. Research efforts in this area are directed toward improving the safety of drugs by recognizing and eliminating the causes of undesirable drug effects. In addition, biochemical studies of pathways of drug metabolism have generated ingenious new treatments for previously untreatable diseases.

Immunoglobulin D antibodies to penicillin may be important mediators of nonanaphylactoid but serious reactions to penicillin, such as exfoliative dermatitis, serum sickness, and the potentially fatal Stevens-Johnson syndrome, according to J. R. Caldwell (University of Florida).

Hematologic toxicity has severely limited the use of chloramphenicol, an otherwise effective antibiotic. Adel A. Yunis (University of Miami) and his colleagues have studied the reversible and irreversible effects of this drug on bone marrow cultures. Chloramphenicol and its sulfur-containing analog exert a dose-related but reversible suppression of bone marrow cells by inhibiting synthesis of mitochondrial proteins. An irreversible suppression of mitochondrial protein synthesis in bone marrow cells is thought to be caused by an alteration of DNA synthesis in genetically predisposed patients that is caused by the para-nitro group of chloramphenicol.

Treatment for the porphyrias in man has been lacking. T. R. Tephly (University of Iowa) and his colleagues reported results of research that may lead to the prevention of serious and painful attacks of this disease. Metabolic studies have indicated that all porphyrias are associated with a derangement of the heme biosynthetic pathway. This results in an accumulation of various intermediates instead of the end product, which should be hemoprotein. Using sodium benzoate and para-aminobenzoic acid, Tephly and his associates diverted glycine away from heme biosynthesis to hippurate synthesis. The clinical and biochemical manifestations of porphyria in animals were thus ameliorated. Both sodium benzoate and para-aminobenzoic acid have been safely used in humans for other disorders. Based on a firm biochemical foundation, this clever and apparently safe pharmacologic method of control of porphyria may soon be used to treat humans.

This was a unique symposium in that all of the research was supported by grants from the Pharmacology-Toxicology Program of the National Institute of General Medical Sciences.

GEORGE J. COSMIDES
National Institute of General Medical Sciences, Bethesda, Maryland 20014

Forthcoming Events

April

22–25. American Acad. of **Pediatrics**, Bal Harbour, Fla. (R. G. Frazier, 1801 Hinman Ave., Evanston, Ill. 60204)

22–26. Conference on **Anomalous Scattering**, Intern. Union of Crystallography and Commission on Crystallographic Apparatus, Madrid, Spain. (S. C. Abrahams, Bell Labs., Murray Hill, N.J. 07974)

22–26. European Conf. on **Electrotechnics**, Inst. of Electrical and Electronics Engineers and Natl. Societies of Electrical

Engineers of Western Europe, Amsterdam, Netherlands. (W. E. Noller, Digital Telephone Systems, 85 Mitchell Blvd., P.O. Box 4222, San Rafael, Calif. 94903)

23–24. **Water Quality**, 7th intern. symp., Water Quality Research Council, Washington, D.C. (David X. Manners Co., Inc., 237 E. Rocks Rd., Norwalk, Conn. 06851)

23–25. Society for the **Advancement of Material and Process Engineering**, 19th natl. symp., Buena Park, Calif. (M. Smith, SAMPE, P.O. Box 613, Azusa, Calif. 91702)

23–26. **Acoustical** Soc. of America, New York, N.Y. (B. H. Goodfriend, ASA, 335 E. 45 St., New York 10017)

23–27. Arizona **Medical** Assn., Scottsdale. (B. E. Robinson, AMA, 810 W. Bethany Home Rd., Phoenix 85013)

24–26. Pittsburgh Conf. on **Modeling and Simulation**, 5th annual, Pittsburgh, Pa. (W. G. Vogt, 231 Benedum Engineering Hall, Univ. of Pittsburgh, Pittsburgh 15213)

24–26. North Carolina Acad. of **Science**, Boone. (J. A. Yarbrough, Dept. of Biology, Meredith College, Raleigh, N.C. 27602)

24–27. American Assoc. for the **Advancement of Science**, Southwestern and Rocky Mountain Div., Laramie, Wyo. (M. P. Dunford, P.O. Box 3AF, Las Cruces, N.M. 88003)

24–27. **Biological Rhythms in the Marine Environment** Symp., Georgetown, S.C. (P. J. DeCoursey, Baruch Inst., Univ. of South Carolina, Columbia 29208)

25–26. American **Broncho-Esophagological** Assoc., Palm Beach, Fla. (W. H. Maloney, ABEA, 2065 Adelbert Rd., Cleveland, Ohio 44106)

25–27. Ohio Acad. of **Science**, Wooster. (J. H. Melvin, OAS, 445 King Ave., Columbus 43201)

25–27. Louisiana Acad. of **Sciences**, Lafayette. (R. Smith, Dept. of Physics, Northeast Louisiana Univ., Monroe 71201)

25–29. Association for **Research in Vision and Ophthalmology**, Dallas, Tex. (R. D. Reinecke, Dept. of Ophthalmology, Albany Medical College, Albany, N.Y. 12208)

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26–27. Wisconsin Acad. of **Sciences, Arts and Letters**, Green Bay. (J. R. Batt, WASAL, 5001 University Ave., Madison 53706)

26–27. American Assoc. of **University Professors**, Washington, D.C. (B. H. Davis, AAUP, Suite 500, 1 Dupont Circle, NW, Washington, D.C. 20036)

26–28. National Assoc. for **Research in Science Teaching**, Chicago, Ill. (R. W. Lefler, Dept. of Physics, Purdue Univ., Lafayette, Ind. 37907)

26–28. International Symp. on the

World's Cats, 3rd, Woodland Park Zoological Gardens, Seattle, Wash. (R. L. Eaton, Zoology Dept., Univ. of Washington, Seattle 98105)

27–3. American **Pediatric** Soc., Washington, D.C. (C. D. Cook, Yale Univ. School of Medicine, 333 Cedar St., New Haven, Conn. 06510)

28–1. Association of **American Geographers**, Seattle, Wash. (J. W. Nystrom, AAG, 1710 16th St., NW, Washington, D.C. 20009)

28–1. Institute of **Environmental Sciences**, 20th annual, Washington, D.C. (B. L. Peterson, IES, 940 E. Northwest Highway, Mount Prospect, Ill. 60056)

28–1. Arkansas **Medical** Soc., Little Rock. (P. C. Schaefer, AMS, P.O. Box 1208, Fort Smith 72901)

28–1. Nebraska **Medical** Assoc., Omaha. (K. E. Neff, 1901 First National Bank, Lincoln 68508)

28–2. American **Ceramic** Soc., 76th annual, Chicago, Ill. (F. P. Reid, ACS, Inc., 65 Ceramic Dr., Columbus, Ohio 43214)

28–2. **Diesel and Gas Engine Power** Conf., American Soc. of Mechanical Engineers, Houston, Tex. (M. Churchill, ASME, 345 E. 47 St., New York 10017)

28–2. American **Oil Chemists'** Soc., Mexico City, Mexico. (J. C. Lyon, AOCS, 508 S. 6 St., Champaign, Ill. 61820)

28–3. Society of **Photographic Science and Engineering**, 27th annual, Boston, Mass. (R. A. Eynard, SPSE, P.O. Box 2001, Teterboro, N.J. 07608)

29–30. **Ambulatory Pediatric** Assoc., Washington, D.C. (E. Hillman, Montreal Children's Hospital, 2300 Tupper St., Montreal 108, Canada)

29–1. Institute of **Electrical and Electronic Engineers** and Intern. Soc. for **Hybrid Microelectronics**, Orlando, Fla. (C. E. Jones, Mail Joint 47, Martin Marietta Corp., P.O. Box 5837, Orlando 32805)

29–1. American **Power** Conf., American Soc. of Mechanical Engineers, Chicago, Ill. (M. Churchill, ASME, 345 E. 47 St., New York 10017)

29–2. American College of **Obstetricians and Gynecologists**, Las Vegas, Nev. (M. Newton, 1 E. Wacker Dr., Chicago, Ill., 60601)

29–2. **Physical Organic Chemistry**, 2nd Conf., Intern. Union of Pure and Applied Chemistry, Noordwijkerhout, Netherlands. (Th. J. de Boer, Lab. for Organic Chemistry, Nieuwe Achtergracht 129, Amsterdam, Netherlands)

29–3. Society of **Manufacturing Engineers**, Philadelphia, Pa. (R. W. Taylor, SME, 20501 Ford Rd., Dearborn, Mich. 48128)

29–3. American Assoc. of **Workers for Children**, 8th congr., Intern. Assoc. of Workers for Maladjusted Children, Fribourg, Switzerland. (S. B. Ross, Jr., AAWC, 26 E. 31 St., New York 10016)

30. American Assoc. of **Scientific Workers**, New York, N.Y. (I. Goodman, College of Physicians & Surgeons, Columbia Univ., 630 W. 168 St., New York 10032)

30–2. Conference on **Electrodeposited Metallic Coatings**, American Soc. for Testing and Materials, Philadelphia, Pa. (J. McFadden, ASTM, 1916 Race St., Philadelphia 19103)

30–2. Connecticut State **Medical** Soc., Hartford. (W. R. Richards, 160 St. Ronan St., New Haven 06511)

30–3. Virginia Acad. of **Science**, Norfolk, Va. (B. M. Bruner, Box 8454, Richmond 23226)

30–4. Mexican **Pediatric** Assoc., 4th, Mexico City. (G. S. Santibanez, José Ma Izizaga 70, 2° Piso, Mexico 1, D.F.)

May

1–3. Conference on **Metal Powders and Metal Powder Products**, Committee B-9, American Soc. for Testing and Materials, Fort Lauderdale, Fla. (J. McFadden, Meetings Dept., ASTM, 1916 Race St., Philadelphia, Pa. 19103)

1–3. American **Surgical** Assoc., Colorado Springs, Colo. (G. T. Shires, ASA, 5323 Harry Hines Blvd., Dallas, Tex. 75235)

1–3. International Conf. on **Transport of Persistent Chemicals in Aquatic Ecosystems**, Natl. Research Council of Canada, Ottawa. (M. K. Ward, Natl. Research Council of Canada, Ottawa K1A OR6)

1–4. International Symp. on **Flammability and Fire Retardants**, Cornwall, Ont., Canada. (V. M. Bhatnagar, 209 Dover Rd.. Cornwall, Ont.)

1–6. American **Psychoanalytic** Assoc., Detroit, Mich. (M. A. Berezin, 90 Forest Ave., West Newton, Mass. 02165)

2–3. **Fiber** Soc., Inc., Williamsburg, Va. (L. Rebenfeld, Textile Research Inst., P.O. Box 625, Princeton, N.J.)

2–3. American Soc. of **Naval Engineers**, Washington, D.C. (ASNE, Suite 807, 1012 14th St., NW, Washington, D.C. 20005)

2–4. Society for American **Archaeology**, Washington, D.C. (R. E. W. Adams, College of Humanities and Social Sciences, Univ. of Texas, 4242 Piedras E, San Antonio 78284)

2–4. Midwestern **Psychological** Assoc., Chicago, Ill. (R. W. Schulz, Dept. of Psychology, Univ. of Iowa, Iowa City 52240)

2–5. Christian **Medical** Soc., Ann Arbor, Mich. (H. W. Robinson, CMS, 3909 Swiss Ave., Dallas, Tex. 75214)

2–6. North Dakota **Medical** Assoc., Fargo. (L. A. Limond, Box 1198, Bismarck, N.D. 58501)

3–4. American College of **Clinical Pharmacology**, Atlantic City, N.J. (W. D. Sharpe, ACCP, 100 Bergen St., Newark, N.J. 07103)

3–4. **Drug-Induced Carcinogenesis** Symp., American College of Clinical Pharmacology, Atlantic City, N.J. (ACCP, 2 E. 103 St., New York 10029)

3–4. Minnesota Acad. of **Science**, St. Paul. (M. I. Harrigan, MAS, 3100 38th Ave., S, Minneapolis 55406)

3–4. Southern California Acad. of **Sciences**, Fullerton. (S. L. Warter, Dept. of Biology, California State Univ., Long Beach 90840)

3–5. American Soc. of **Internal Medicine**, San Francisco, Calif. (W. R. Ramsey, ASIM, 525 Hearst Bldg., 3rd at Market, San Francisco 94103)

3–5. American Acad. of **Psychoanalysis**, Detroit, Mich. (J. Barnett, AAP, 40