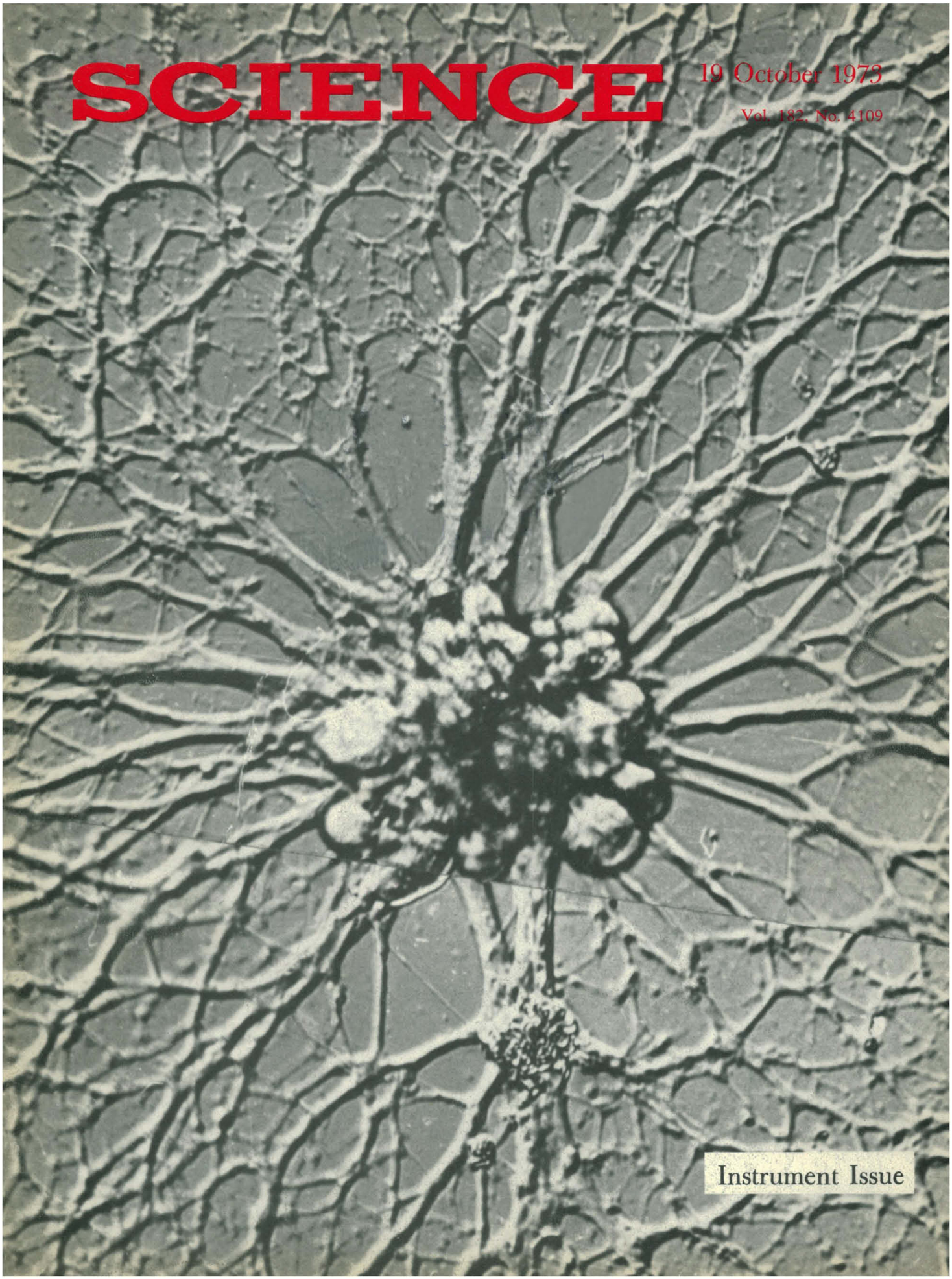
SCIENCE
19 October 1973
Vol. 182, No. 4109



Instrument Issue

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The big, 500-sample capacity of the LKB-Wallac Automatic Gamma Sample Counter means that you, too, could set up for long uninterrupted runs overnight or on weekends. Come back in the morning and find a complete printout of results in digital form, with every sample positively identified. And with sample transfer taking as little as 10 seconds, you get fast results.

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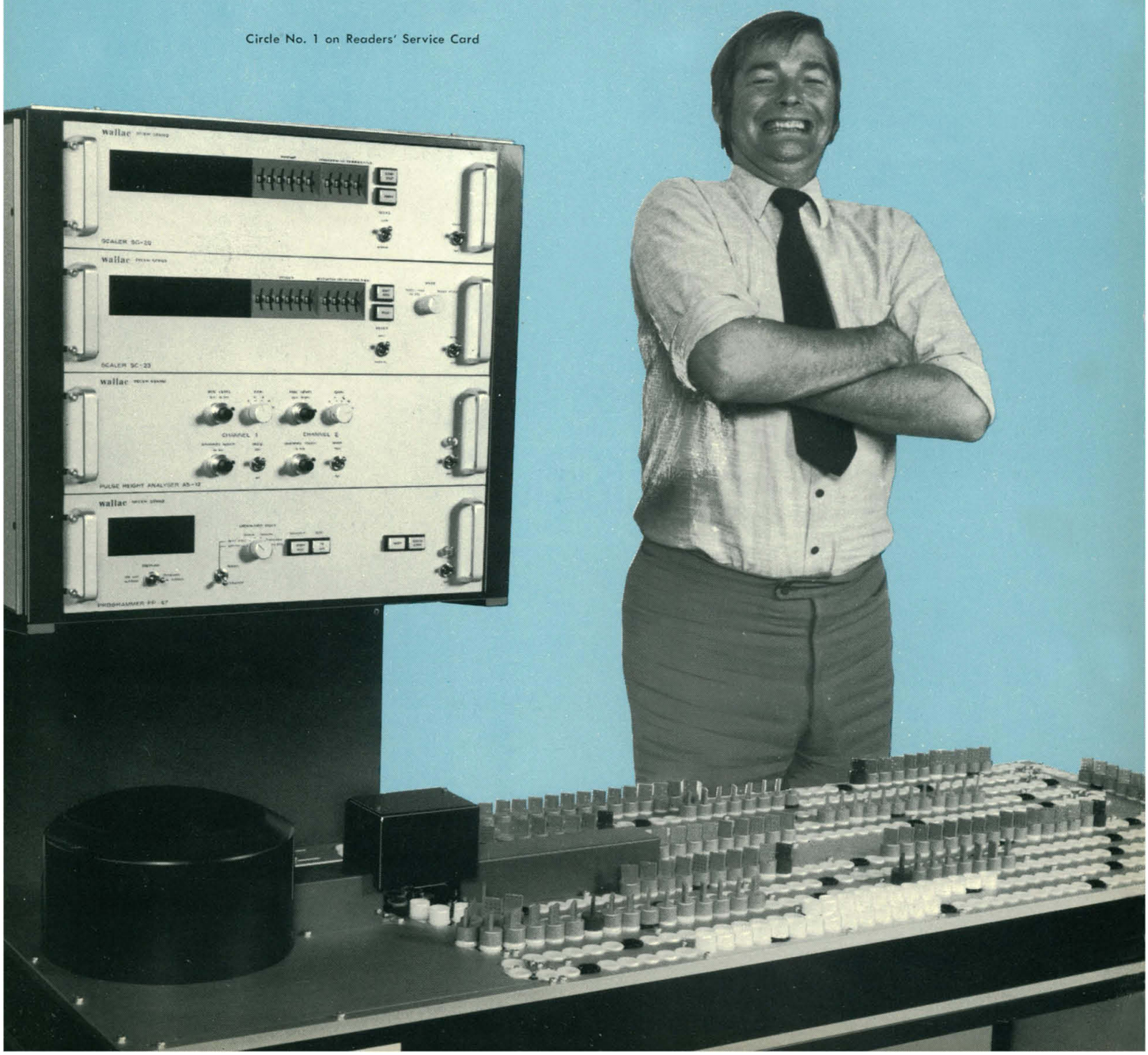

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19 October 1973

Volume 182, No. 4109

SCIENCE

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COVER

Photomicrograph (Nomarski interference microscope) of 18 neurosecretory cells from the pars intercerebralis of the brain of an adult cockroach (*Periplaneta americana*) after 3 weeks of culture in a chemically defined medium. Nerve fibers of a considerably large size branch out profusely from the neurosecretory cells and make multiple interconnections (about × 640). See page 291. [K. R. Seshan and R. Levi-Montalcini, Washington University, St. Louis, Missouri]

How to use Gaertner optical/ instrument benches for

lab set-ups, alignment, and vibration isolation.

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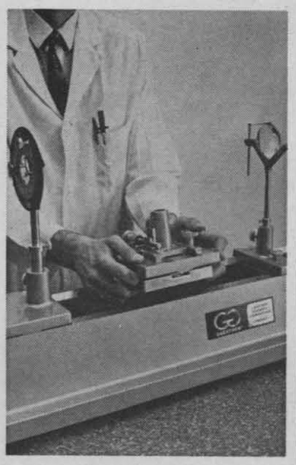

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You can select these Gaertner benches in three basic sizes, all with or without vibration isolation air-suspension systems: 2 meters x 57cm; 3'x4' or 4'x6'. They provide a large stable magnetic surface, yet are reasonably portable. With a variety of magnetic carriages and other accessories, these benches give you great flexibility for positioning, breadboarding and prototype set-ups—for holographic work, instrument experiment and design arrangements using folded optical paths, and more . . .

Vibration isolation. With the vibration isolation system you can support sensitive instruments such as spectroscopic systems, interferometers, a micro balance, etc. Also useful in photography and photogrammetry. The benches are used for many industrial applications as well as research. Example: in a steel mill to isolate delicate equipment for monitoring the chemical composition of the melt inside a blast furnace.

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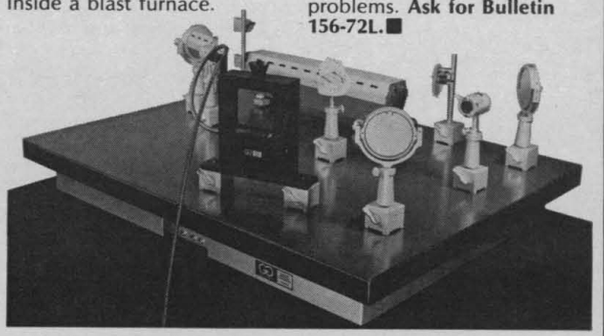

Double rod benches: inexpensive and versatile.

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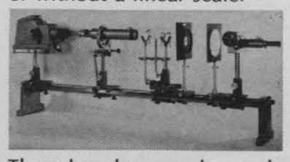

These benches may be used for lens testing, determination of conjugate focii of lenses, or with microscopes for the measurement of dimensional changes of materials such as floor tile, paper, etc., in various environments. Medical researchers have used a double rod bench in developing special transducers for use in open heart surgery. With the bench supported over an aquarium, they were able to precisely position samples and transducers within the tank.

Accessories. There's a complete selection of Gaertner optical/instrument bench accessories for all kinds of set-ups requiring alignment, positioning, linear and rotational movement of test pieces or components. Included are calibrated fine x-y and x-y-z motion stages, lift-off carriages, microscopes, light sources, holders, slits, collimators, and others.

For information on Gaertner lathe bed and double rod optical/ instrument benches, **ask for Bulletin 156-73.**■

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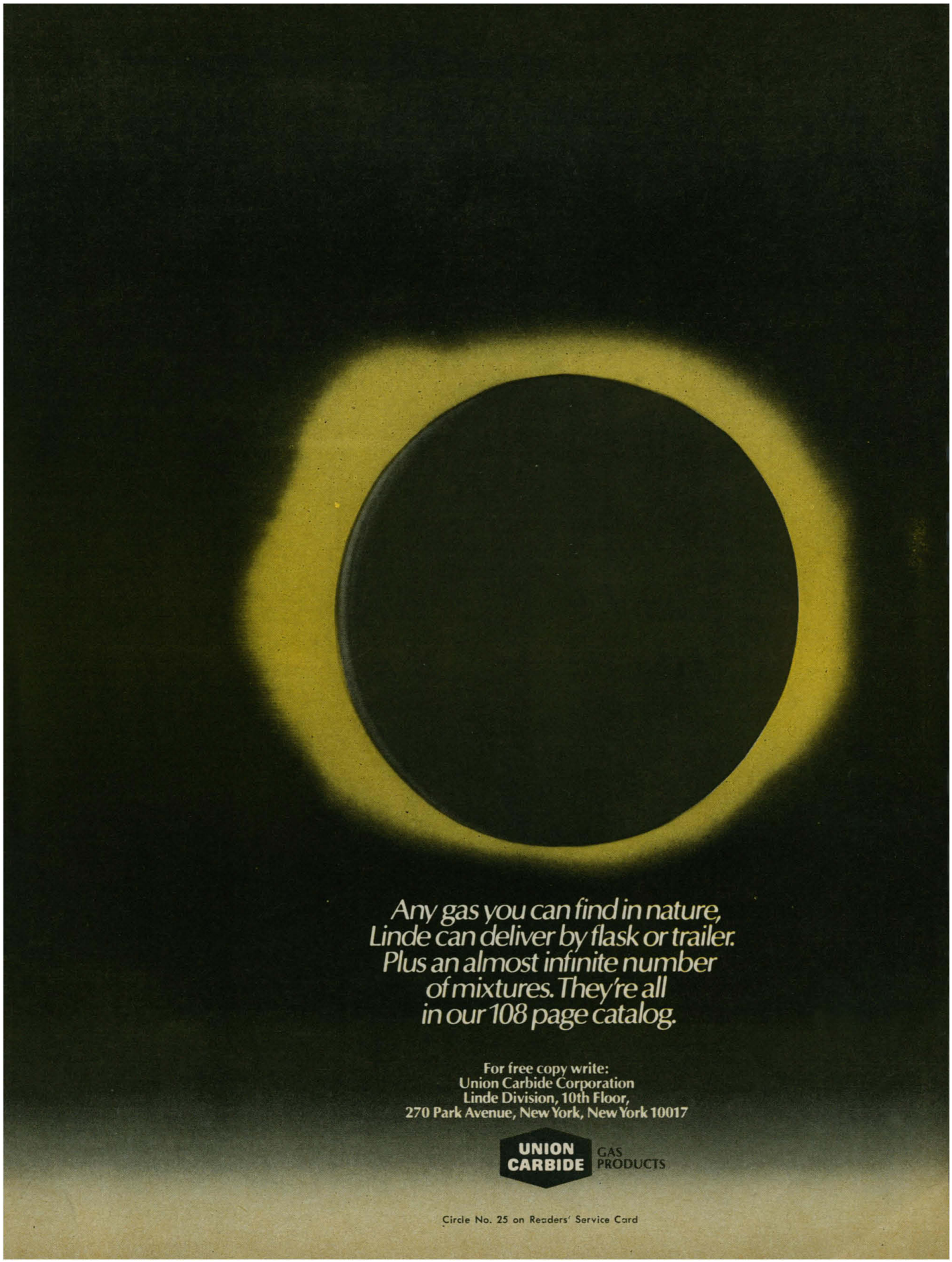

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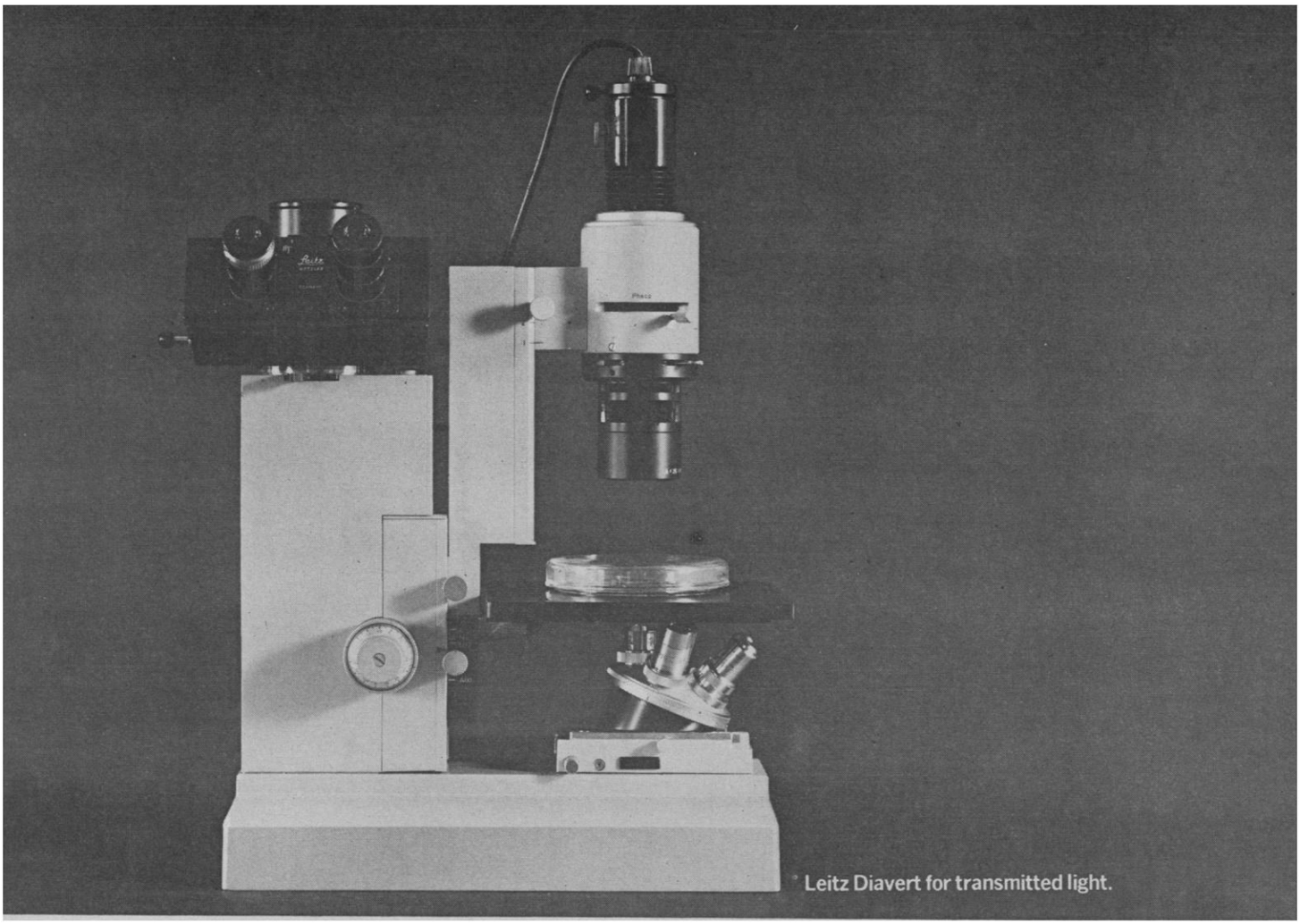
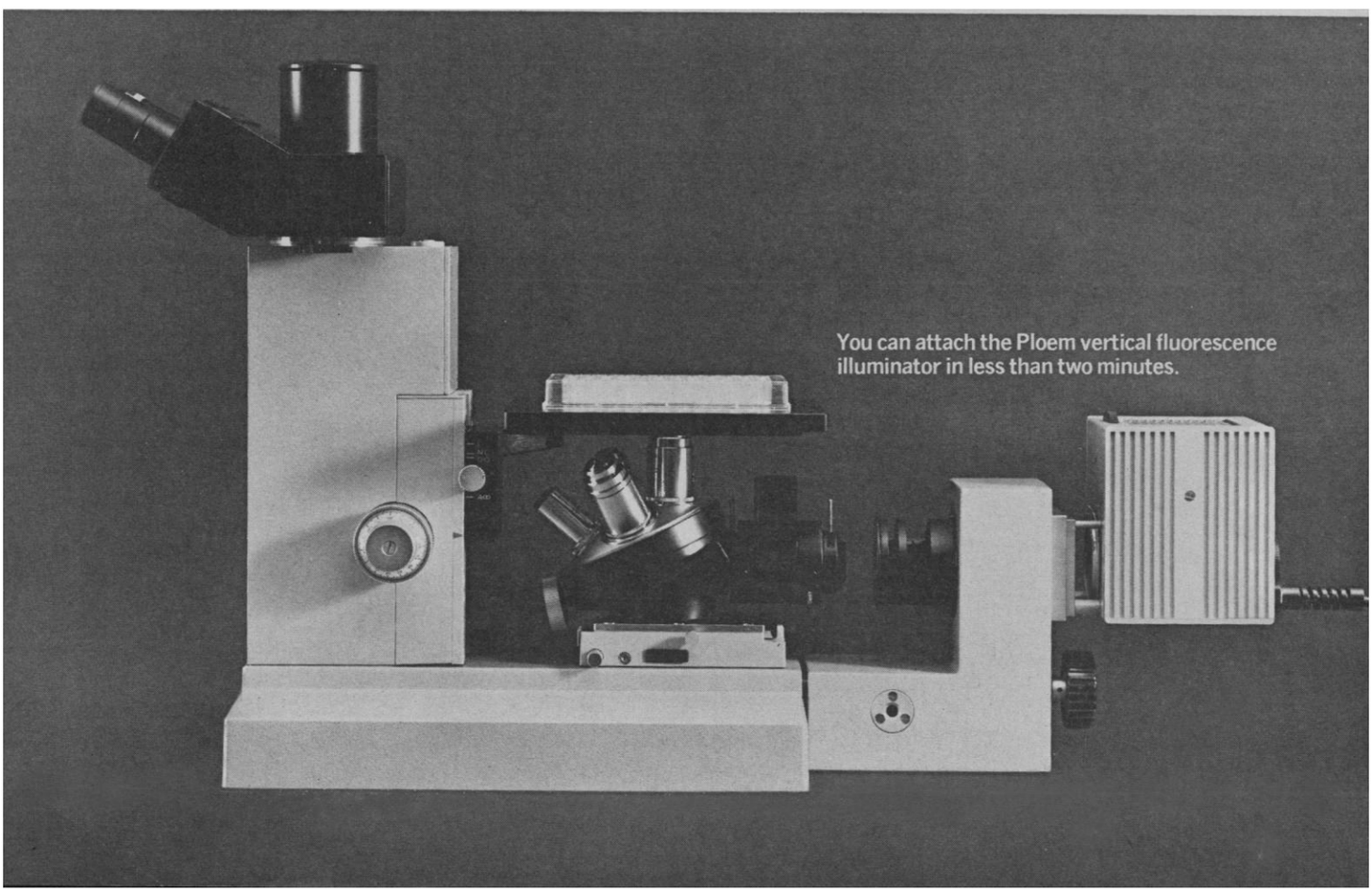


Leitz Diavert for transmitted light.



You can attach the Ploem vertical fluorescence illuminator in less than two minutes.

Introducing the first inverted microscope designed as an inverted microscope.

The new Diavert was engineered from the base up as a system designed to meet the special requirements of inverted microscope applications.

Leitz, in nearly a decade of development, made no compromises with the objectives of stability, convenience and versatility.

To begin with, the Diavert is exceptionally stable. That square shape is as solid as it looks. The base area is 627 cm^2 The basic mechanical structure consists of rigid aluminum castings.

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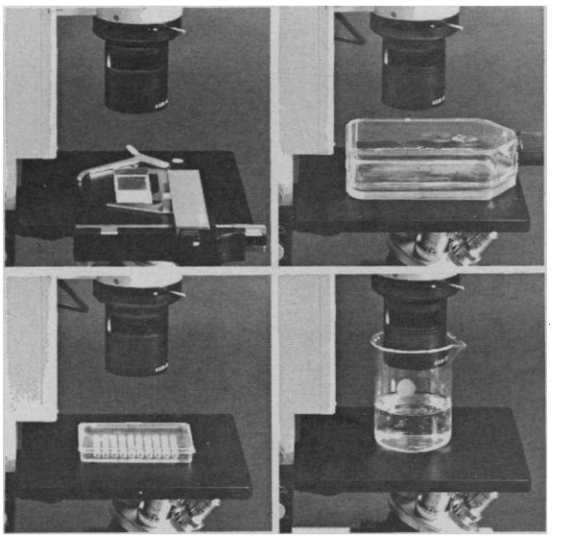
The image moves in the same direction as the specimen. Reason: image-erecting optics. The transmitted light lamp moves with the stage so it doesn't have to be refocused when you change the specimen plane.

And long working-distance condensers, up to 64mm, give you plenty of room above the stage.

As for versatility, the Diavert is a building block system so you can add or remove or exchange any accessory in a matter of seconds.

As the result you can readily employ all the techniques of light microscopy: brightfield, darkfield, phase contrast, polarized light, differential interference contrast. It can also be used with the Ploem vertical fluorescence illuminator. The Diavert accepts a full range of photomicrographic equipment.



You can conveniently use any type of culture vessel with the Leitz inverted microscope.

If you own a Leitz Ortholux II research microscope, you can interchange all Ortholux accessories. And you save the cost of buying them for the Diavert.

If an inverted microscope would be useful in your investigations, you should investigate the Diavert.

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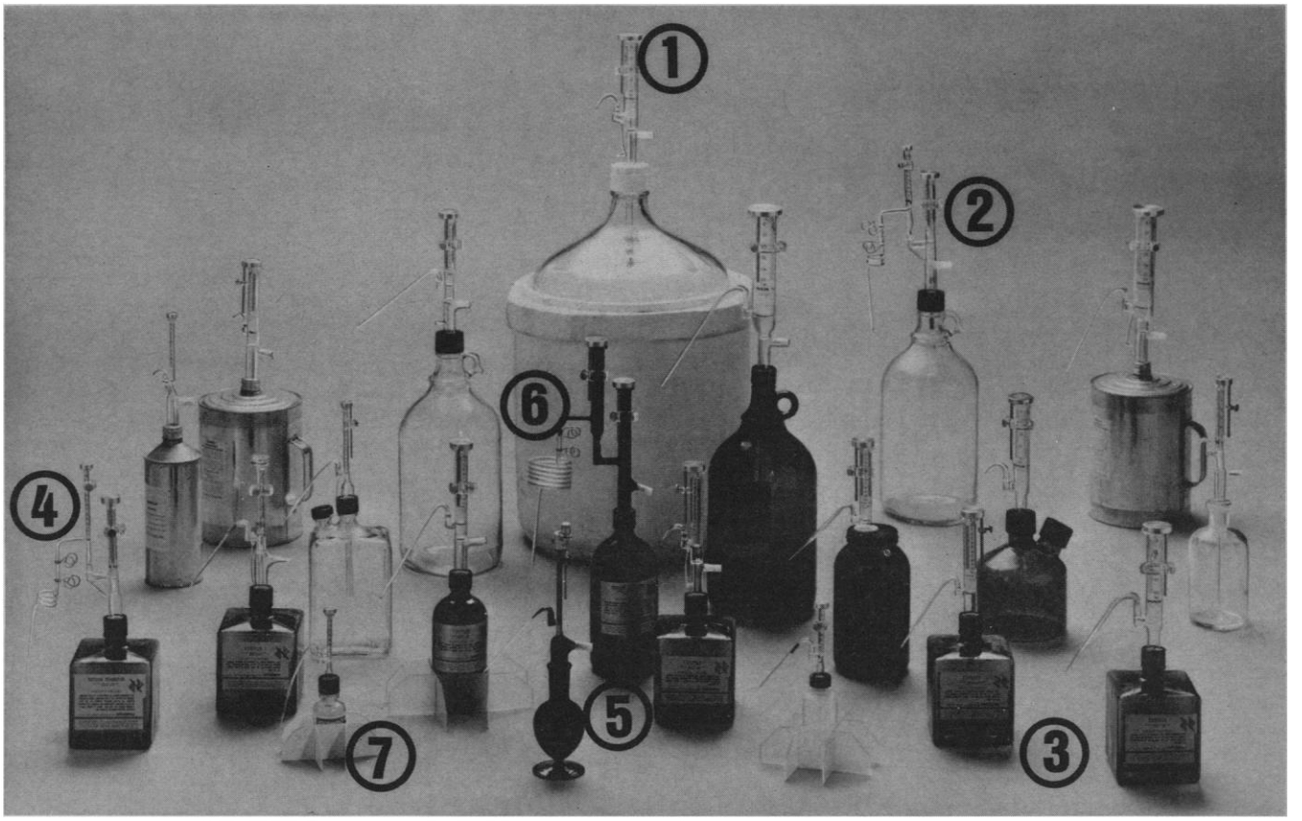

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N-Methyl-(7-dimethylcarbamoxy) quinolinium Iodide (EASTMAN 11864). Fluorescent probe for acetylcholinesterase, sensitive to concentrations in the nanomolar range. Active sites of the enzyme can be titrated, since the first-order carbamoylation reaction rate is much higher than the concentration-independent decarbamoylation reaction. The number of active sites per molecule can be calculated from the turnover number and the enzyme normality. [*Biochemistry, 10,* 4114 (1971).]

Phenazine Methosulfate (EASTMAN 11509).
The combination of phenazine methosulfate and nitro BT (EASTMAN 11350) forms an activity stain for enzymes. Has been used for the *in situ* identification after acrylamide gel electrophoresis of threonine deaminase [*Science, 170,* 1414 (1970)] and of bovine LDH [*Biochemistry, 9,* 4372 (1970)].

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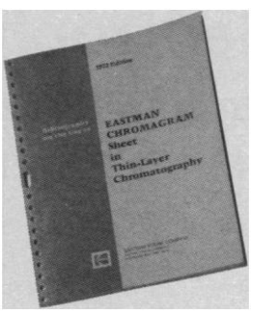
For TLC

Kodak Publication No. JJ-7, *Bibliography on the Use of EASTMAN CHROMAGRAM Sheet in Thin-Layer Chromatography,* has been revised and updated. With the addition of many new abstracts, the current edition contains 213 references to the use of EASTMAN CHROMAGRAM Sheet in TLC. References are divided into 34 categories, from "alcohols" to "vitamins," and from "apparatus" to "techniques and methods." If you have an earlier version of JJ-7, let us bring you up to date. If you are involved in TLC and don't yet have a copy, use the coupon to request Kodak Publication No. JJ-7.



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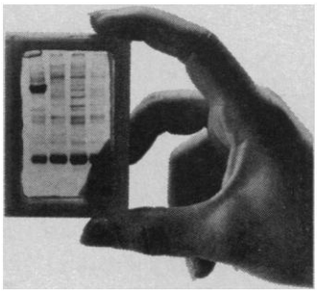
For a complete list of these products including prices and package sizes, request Kodak Publication No. JJ-11, *Reagents for Acrylamide Gel Electrophoresis.*



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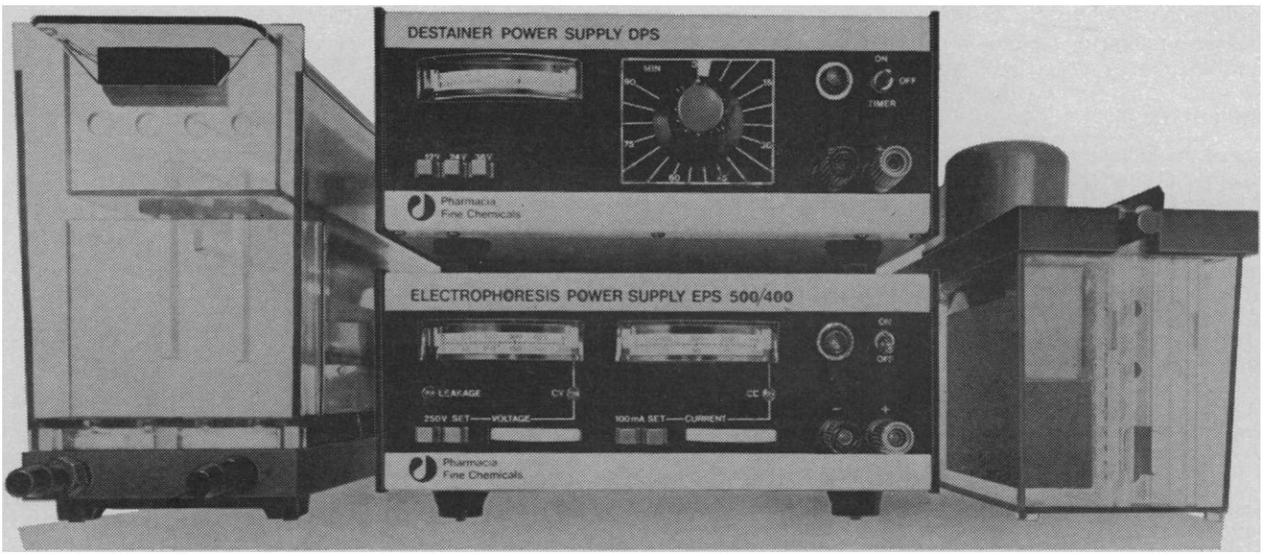

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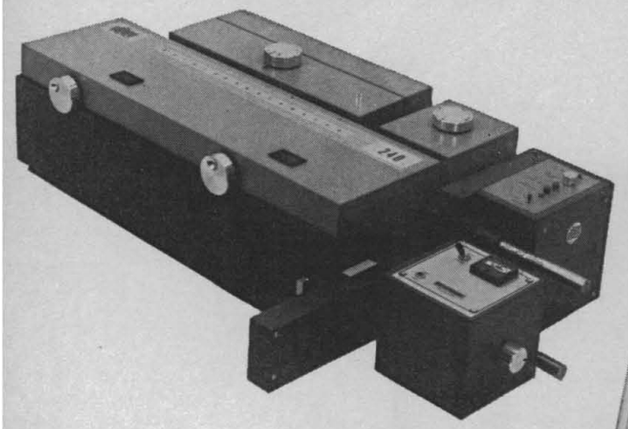

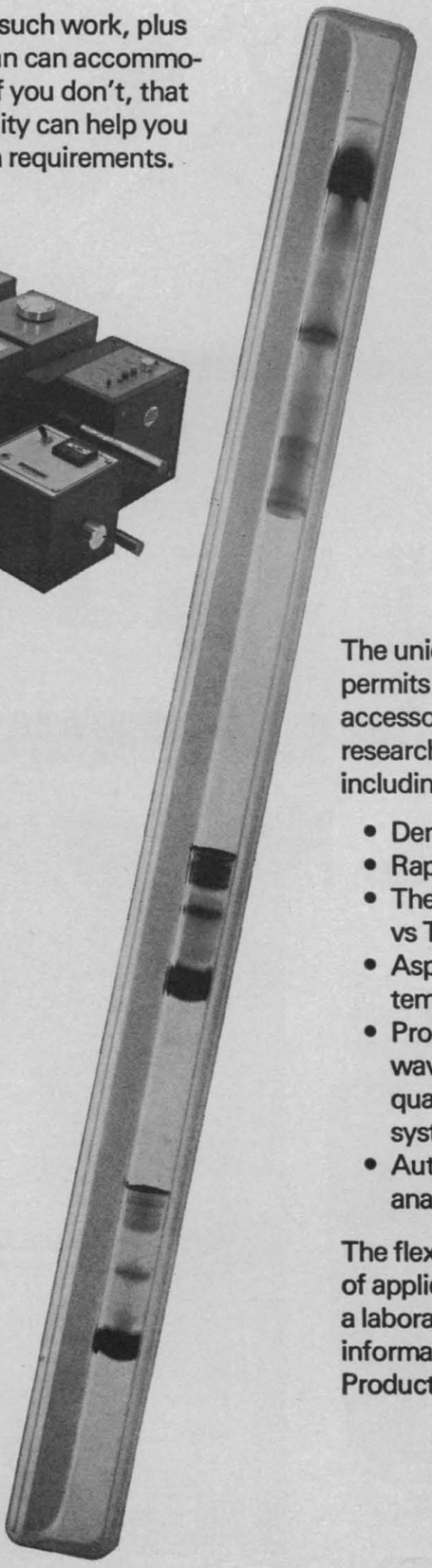

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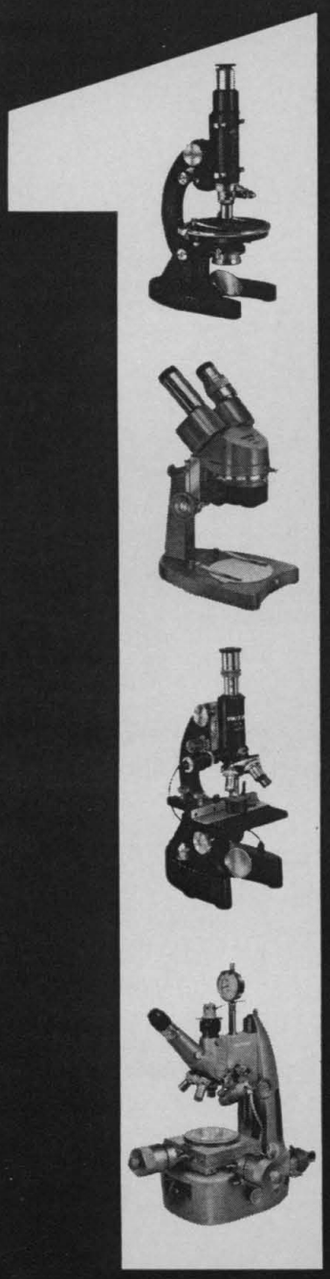

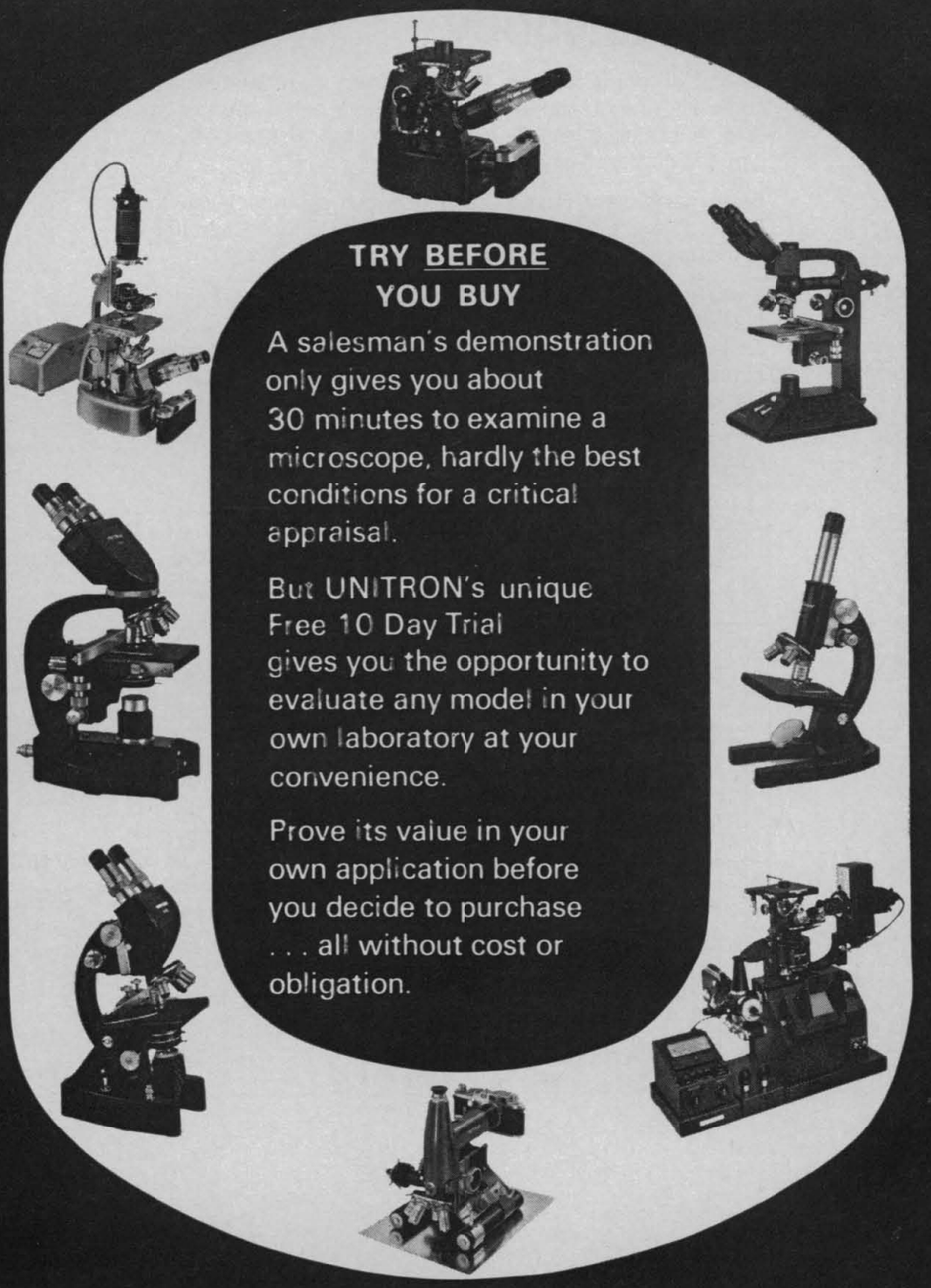

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	●	●				Series 10	11x8½x6	Available in polystyrene, polypropylene and polycarbonate	60
●		●		●	●	Series 20	11½x7¼x5		84
●					●	Series 30	19x10½x5⅛		36
	●	●		●		Series 40	19x10½x6⅛		30
	●	●		●		Series 50	14⅞x12⅞x6⅝		20
●				●	●	Series 60	13⅞x8⅝x5⅛		72
	●	●	●			Series 70	20x16x8½		15
●				●	●	Series 80	19x8⅞x5⅝		36
●				●	●	Series 120	11½x5¼x5⅛		132
	●	●	●			Series 140	19x10x8		30
●				●	●	Disposable Cage	11½x7¼x5	polystyrene	84
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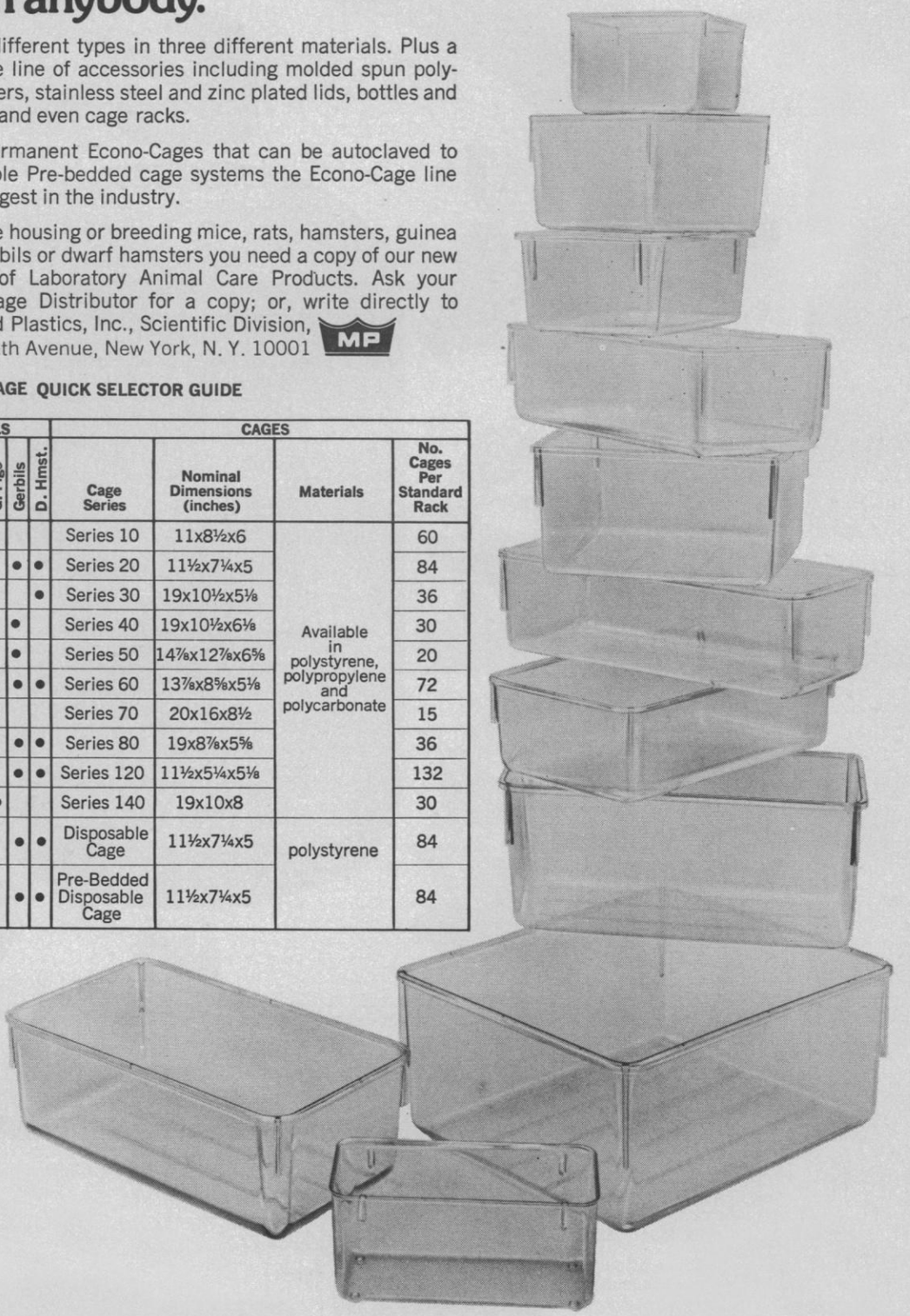

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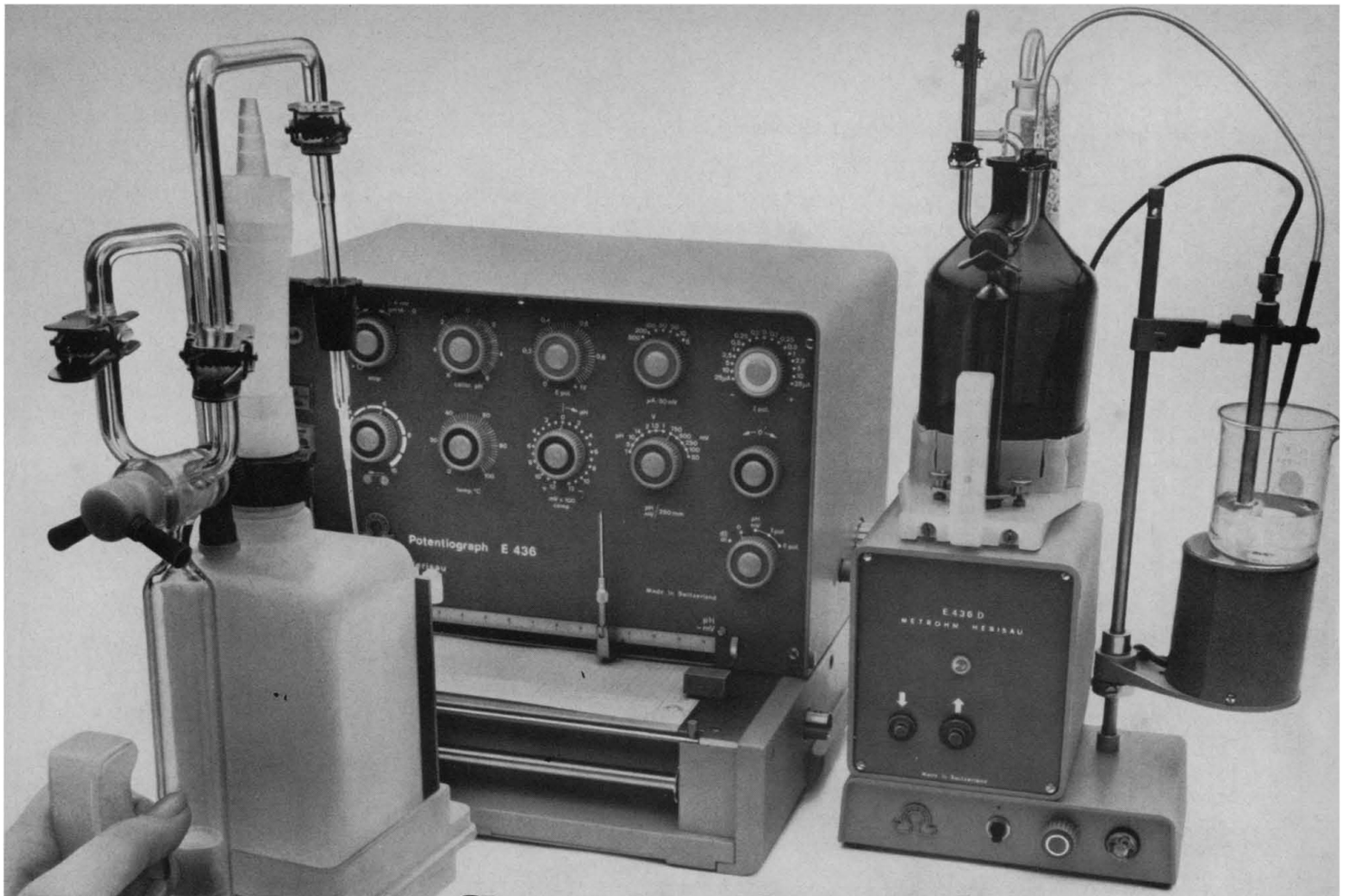

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Appointments to Working Government Councils

In December 1972, Frank Sinatra was appointed a member of the National Advisory Heart and Lung Council, to fill a 1-year unexpired term. This council, by law, consists of 5 ex officio members and 18 members appointed by the secretary of the Department of Health, Education, and Welfare (HEW). The National Heart, Blood Vessel, Lung and Blood Act of 1972 states that 5 of the 18 "shall be selected from members of the general public who are leaders in the fields of fundamental or medical sciences or in public affairs." Neither I nor any other council member questions the principle of appointing nonscientists to the council, or the wisdom shown by the secretary of HEW in the appointment of any individual. However, the scientists on the council do have a right to expect full participation of all members in the heavy work load of the council, and to expect that the nonscientists will bring new concepts and fresh points of view to the council's discussions—and express these effectively. The council must meet from four to six times a year, and members must spend much time between meetings on the council's business.

Mr. Sinatra accepted appointment to the council but did not attend even part of the four council meetings held since then (15 to 17 March, 29 and 30 March, 13 to 15 June, and 17 and 18 September), nor did he contribute to the council's work between meetings. Since his term has now expired, why bring the matter to public attention? Simply in the hope that the public may ask the secretary of HEW that there be no more honorary or courtesy appointments to working councils whose responsibilities require the dedicated efforts of all its members. Surely the government can find ways to honor those whose special talents or contributions deserve recognition without lessening the effectiveness and prestige of its working councils.

JULIUS H. COMROE, JR.
Cardiovascular Research Institute, School of Medicine, University of California, San Francisco 94122

The Albatross Award

In the cover story (News and Comment, 7 Sept., p. 926) on giving the bird to Roger Revelle, Robert Gillette approaches, but doesn't quite manage, Coleridge's

> Instead of the cross, the Albatross
> About my neck was hung.

An ancient Oceanographer, wishing to be rid of "that damned dusty creature" and its attendant drought, might shift from "slimy things did crawl with legs upon a slimy sea" to blessing the water snakes:

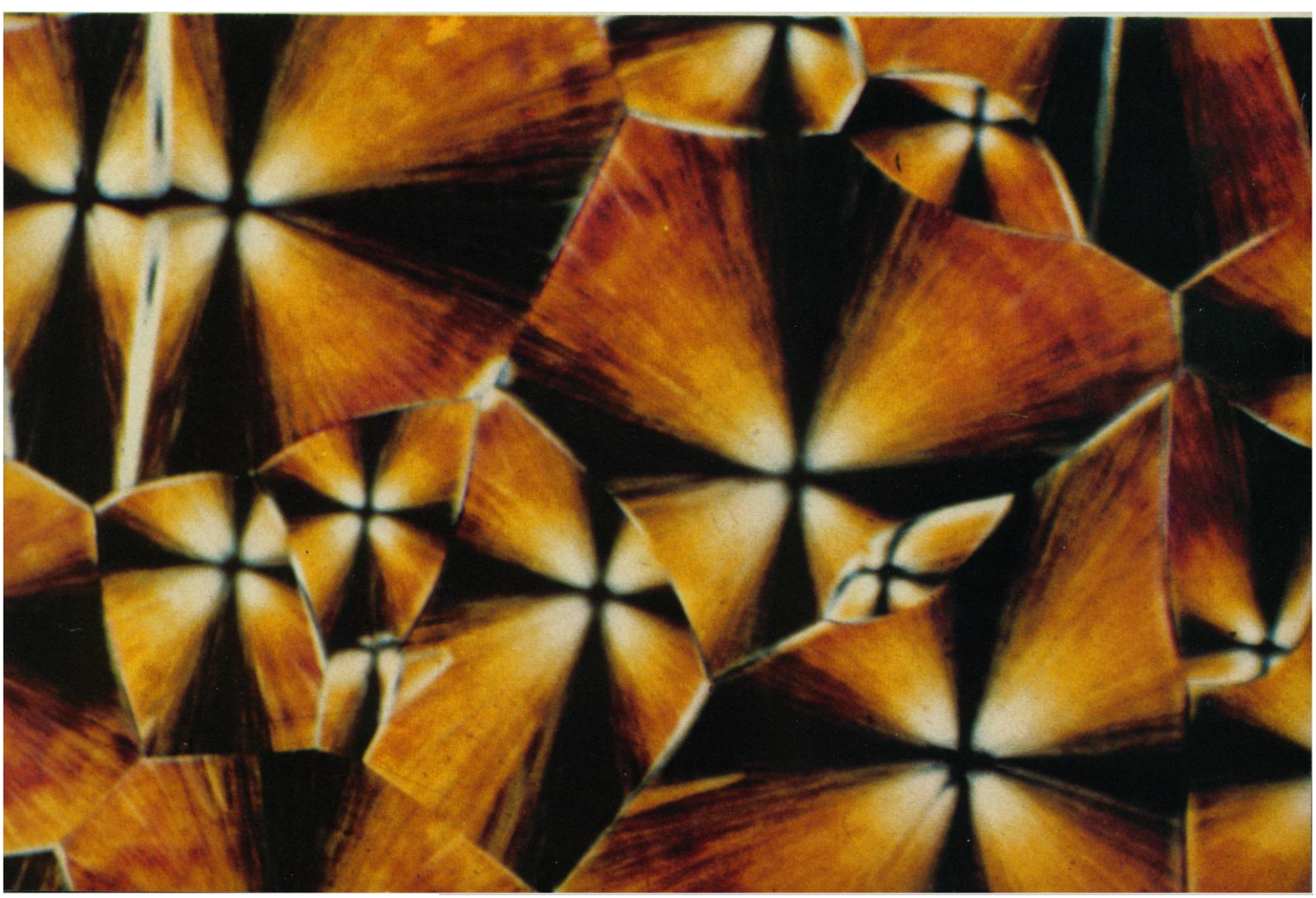
> O happy living things! no tongue
> Their beauty might declare.

For that inward grace no award is needed.

Who killed *this* albatross?

ROLAND WALKER
Department of Biology, Rensselaer Polytechnic Institute, Troy, New York 12181

The story on the Albatross award, would-be Nobelists, and AMSOC (American Miscellaneous Society) reminds me of our own system of



awards. When we moved into our three-story laboratory, we inherited a modern communications system—a pull cord attached to a bell which could be heard at all three levels. We now use it for ingenious approaches to the solution of problems, and, as yet, no one has achieved the ultimate—the five-bell award. However, when an original stupidity is perpetrated, we issue the no-bell award.

J. J. MARCUS
Missouri Analytical Laboratories, Inc., 1820 Delmar Boulevard, St. Louis

Knowledge Factory

The following excerpt from Sinclair Lewis's novel *Arrowsmith* (*1*) is an interesting addition to Harold L. Enarson's editorial "University or knowledge factory?" (7 Sept., p. 897).

The University of Winnemac is at Mohalis, fifteen miles from Zenith. There are twelve thousand students; beside this prodigy Oxford is a tiny theological school and Harvard a select college for young gentlemen. The University has a baseball field under glass; its buildings are measured by the mile; it hires hundreds of young Doctors of Philosophy to give rapid instruction in Sanskrit, navigation, accountancy, spectacle-fitting, sanitary engineering, Provençal poetry, tariff schedules, rutabaga-growing, motor-car designing, the history of Voronezh, the style of Matthew Arnold, the diagnosis of myohypertrophia kymoparalytica, and department-store advertising. Its president is the best moneyraiser and the best after-dinner speaker in the United States; and Winnemac was the first school in the world to conduct its extension courses by radio.

It is not a snobbish rich-man's college, devoted to leisurely nonsense. It is the property of the people of the state, and what they want—or what they are told they want—is a mill to turn out men and women who will lead moral lives, play bridge, mention books, though they are not expected to have time to read them. It is a Ford Motor Factory, and if its products rattle, they are beautifully standardized, with perfectly interchangeable parts. Hourly the University of Winnemac grows in numbers and influence, and by 1950 one may expect it to have created an entirely new world-civilization, a civilization larger and brisker and purer.

DEAN TROYER
440 North Winona Street, Indianapolis, Indiana 46202

References

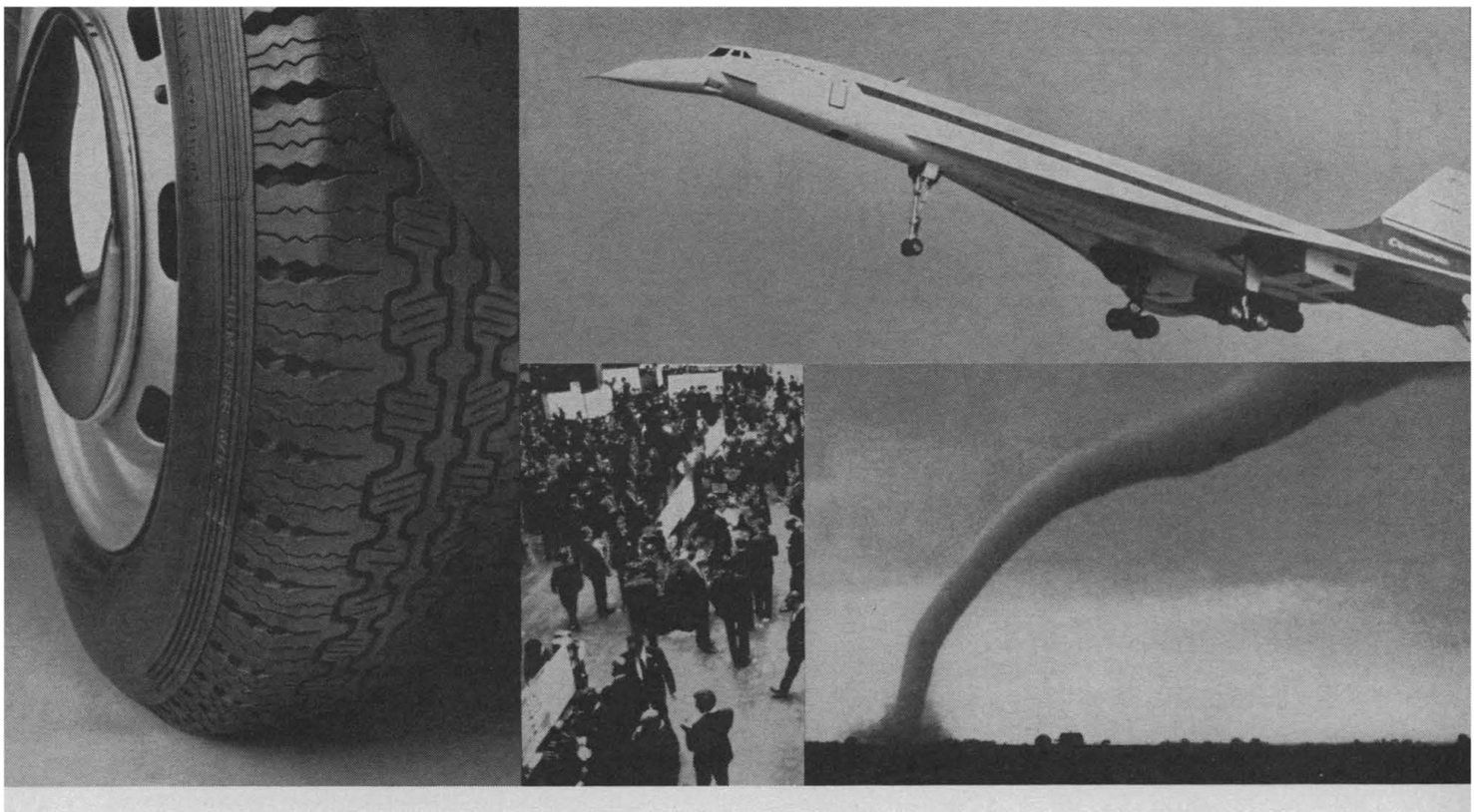
1. S. Lewis, *Arrowsmith* (Harcourt Brace, New York, 1949), chap. 2, sect. 1.

Marital Status and Mobility

Beverley R. Green (Letters, 10 Aug. p. 496) reports that only 5 percent of the applicants for a biochemistry position and 3 percent of the applicants for a botany position at the University of British Columbia were women. She implies that, since between 10 and 20 percent of those receiving Ph.D.'s in these fields are women, women are giving up without trying; that women make up a small proportion of faculty because they do not apply for jobs; and that men cannot be blamed for this.

We analyzed the applications received for five positions in the department of biology at Michigan Technological University as a result of an advertisement in the 2 March issue of *Science*. We found that the percentages of women applicants compared well with the percentages reported by Green. However, our interpretation of these results is quite different from Green's.

In addition to classifying applicants according to sex, we also noted marital status. We found that more than 90 percent of the male applicants were married, while all but one (93 percent) of the female applicants were single.



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veloped in one strain of mice after administration of dieldrin. They did not develop in other strains of mice, nor in dogs, rats, or primates. The susceptible mouse strain was one in which an unusually high incidence of tumors had already been found. The committee did not feel that the balance of data indicated a carcinogenicity hazard.

R. D. O'BRIEN

Division of Biological Sciences, Cornell University, Ithaca, New York 14850

A Visit to Bulgaria

In 1971, D. E. Hathaway (Letters, 17 Dec., p. 1182) reported bureaucratic foul-ups and other unfavorable experiences that led to a forced cancellation of an exchange trip to eastern Europe. I should like to report the opposite experience in Bulgaria in late 1972, which may be of interest to those planning to apply for NAS (National Academy of Sciences) exchange visits to the Soviet Union and eastern European countries.

As an earth scientist, I visited Bulgaria for 1 month in October and November 1972. Officials at NAS were efficient and helpful. I was not impressed with American Embassy staffers in Sofia, but Bulgarians were the salt of the earth. Few kinder or more generous people can be found anywhere. They have bureaucratic difficulties but make a vigorous effort to minimize them for their guests. I was even allowed to return alone at night to an office in the Geological Institute of the Bulgarian Academy of Sciences (Sofia), something which I am given to understand would not be likely in the Soviet Union.

Bulgarian earth science is poorly known in the United States, but R. M. Foose (a coparticipant in the U.S.–Bulgarian exchange program) and I were impressed by its quality and scope. Unexpectedly, we found that Bulgarian articles and books tend to be succinct, unlike many Soviet and Western counterparts. If this is due in part to a serious paper shortage, as Bulgarian academy officials indicated (publications must be "defended" before appointed publication committees), then some benefit has come from adversity.

Those interested in exchange visits and wishing more detail may write to me for a copy of my report to NAS.

FRANK T. MANHEIM

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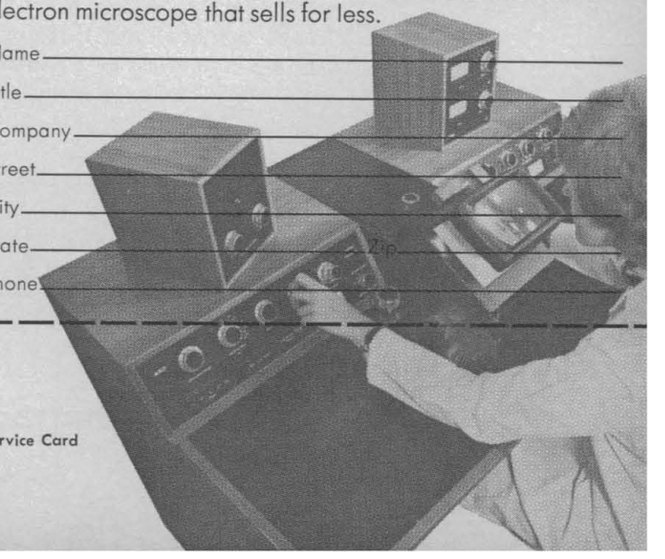

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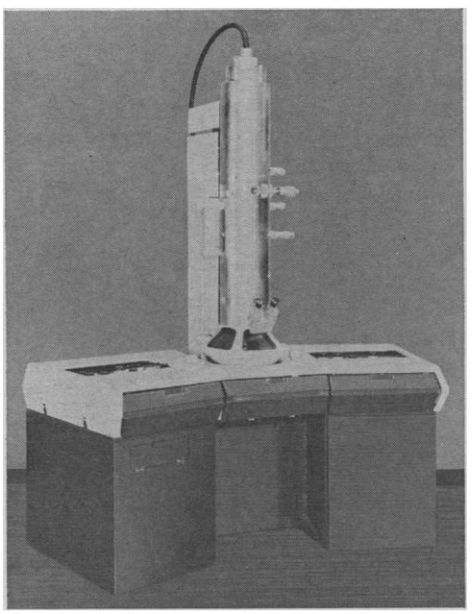

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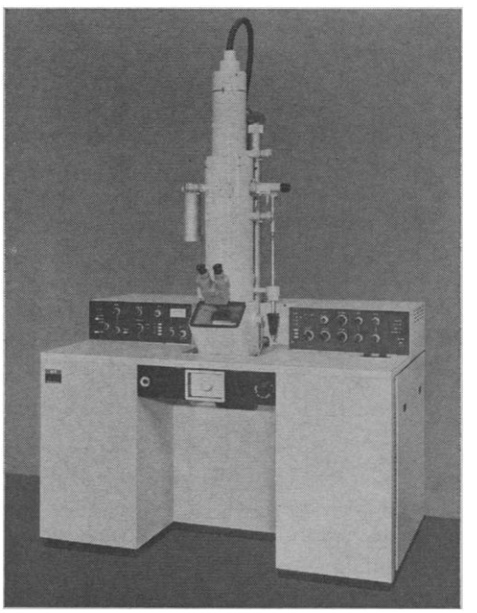

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19 October 1973, Volume 182, Number 4109

SCIENCE

A Sino-American Soybean Research Institute

Over the past quarter-century, soybeans have emerged as one of the world's leading sources of protein. In recent years, world demand for soybeans has been expanding by nearly 7 percent annually. If sustained, this rate of growth doubles consumption every 11 years. For a billion people in East Asia, soybeans are consumed directly, constituting an important dietary staple. For the affluent industrial countries of North America and Europe, they have become the dominant source of high-quality protein for livestock and poultry feed. As growth in the world fish catch slows, the pressure on soybean supplies intensifies further.

Perhaps the best single barometer of the increasing world demand for protein is U.S. soybean exports. The growth in exports has been phenomenal, climbing from a few hundred million dollars in the early 1960's to more than $2 billion in 1972. The value of U.S. soybean exports now exceeds that of any other product, including high-technology items such as computers and jet aircraft.

Future demand prospects for soybeans are very bright. Both growing populations and rising affluence are generating additional demand. The supply problem is somewhat less promising. The world protein market is being converted from a buyer's to a seller's market. Soybean prices in 1973 have been more than double the average price during the 1960's.

Agricultural scientists have not been able to achieve a breakthrough in soybean yield per acre of the sort achieved for most other important crops. Since 1950, yields of soybeans in the United States, where two-thirds of the world's soybean crop is produced, have increased just over 1 percent per year. This contrasts with nearly 4 percent per year for corn. As a result, most of the fourfold increase in U.S. soybean production since 1950 has come from expanding the acreage of soybeans. We get more soybeans by planting more soybeans. As of 1973, nearly 1 in every 6 acres of cropland in the United States is planted to soybeans.

Together the United States and mainland China produce 90 percent of the world soybean crop. With the cropland idled under government programs in the United States rapidly disappearing, and with the world dependent on the United States for 85 percent of exportable soybean supplies, this inability to achieve a yield breakthrough suddenly begins to loom as a rather formidable cloud hanging over the world food economy. The Department of Agriculture now projects a decline in the U.S. soybean crop in 1974 as other crops, especially cotton, compete for available cropland. Such a decline combined with continuing growth in the world demand for soybeans can bring only higher prices for soybeans and for livestock products produced with soybeans.

Within China, the remarkable achievements on the nutritional front are based in large measure on the extensive direct consumption of soybeans. If the production of soybeans in China continues to decline, as soybeans are displaced by the higher-yielding cereals, the nutritional gains of the past decade may be reversed.

These difficulties in raising soybean yields in a land-scarce world suggest the need for a much greater research effort and in particular for the creation of a Sino-American Soybean Research Institute. Since the soybean originated in China, it probably has the most diverse available collection of germ plasm, a vital asset in an expanded soybean research effort. On the other hand, scientists in the United States have expended a great deal of effort to devise better cultural practices and to make the soybean plant more productive. The critical importance of the soybean to both economies, not to mention mankind as a whole, and the pressing need to achieve a breakthrough in yields of soybeans, argues for a pooling of germ plasm, the coordination of research efforts, and the sharing of research results.—LESTER R. BROWN, *Overseas Development Council, 1717 Massachusetts Avenue, NW, Washington, D.C. 20036*

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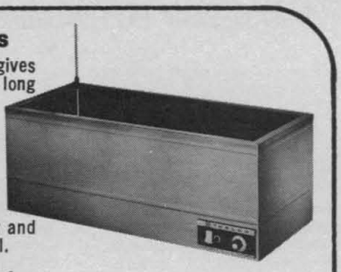

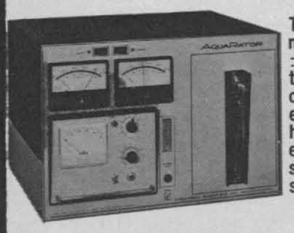

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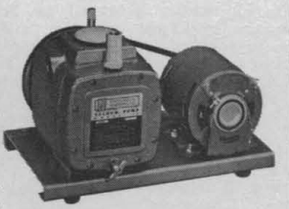

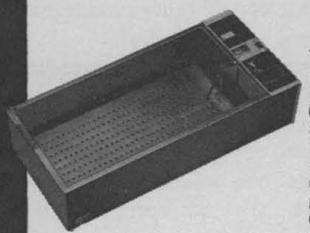

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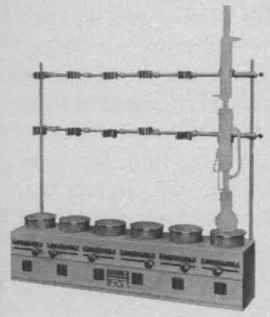

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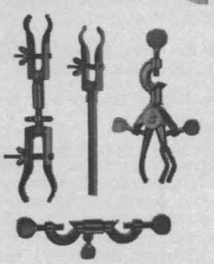

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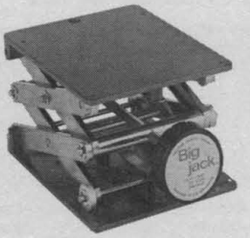

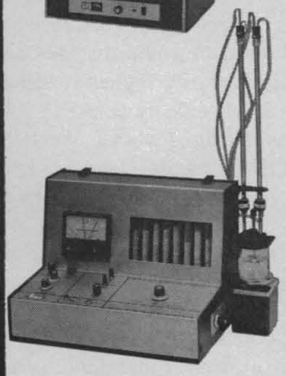

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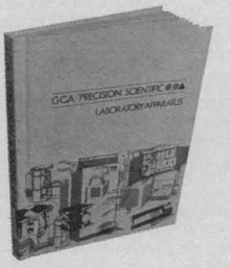

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in the region covered by the radar. Dual Doppler radar systems are also being used and developed by the National Oceanic and Atmospheric Administration, the National Severe Storms Laboratory, and also by the National Center for Atmospheric Research in conjunction with the National Hail Research Experiment sponsored by the National Science Foundation.

The method offers a unique opportunity to observe the wind field in precipitating convective storms at all stages of their development. The probing of convergence/updraft structures inside the precipitation regions in a manner discussed above will allow better description and study of a storm's inflow and outflow. The presence of vorticity and its vertical transport can also be assessed. Suspected interactions between the circulation of adjacent convective storms can be monitored and studied. Mixing processes can be identified from Doppler spectrum width and related to the structure of the organized wind field.

In addition, it should be possible to extend the dual Doppler method to the storm environment by release of man-made targets. This will bring a wealth of new information about convective storms and, therefore, should provide a significant contribution to the study of intense small-scale convective processes.

Note

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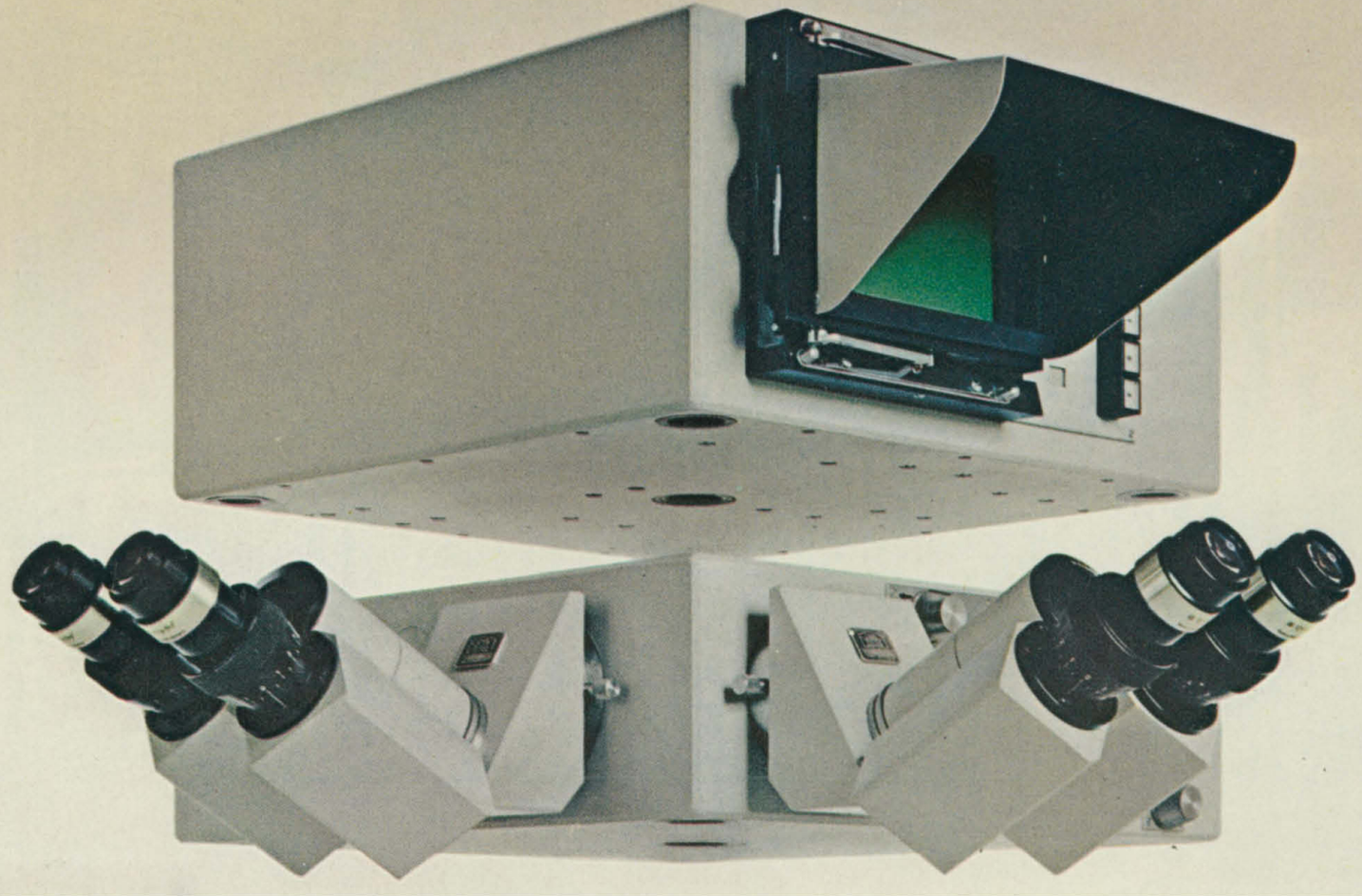

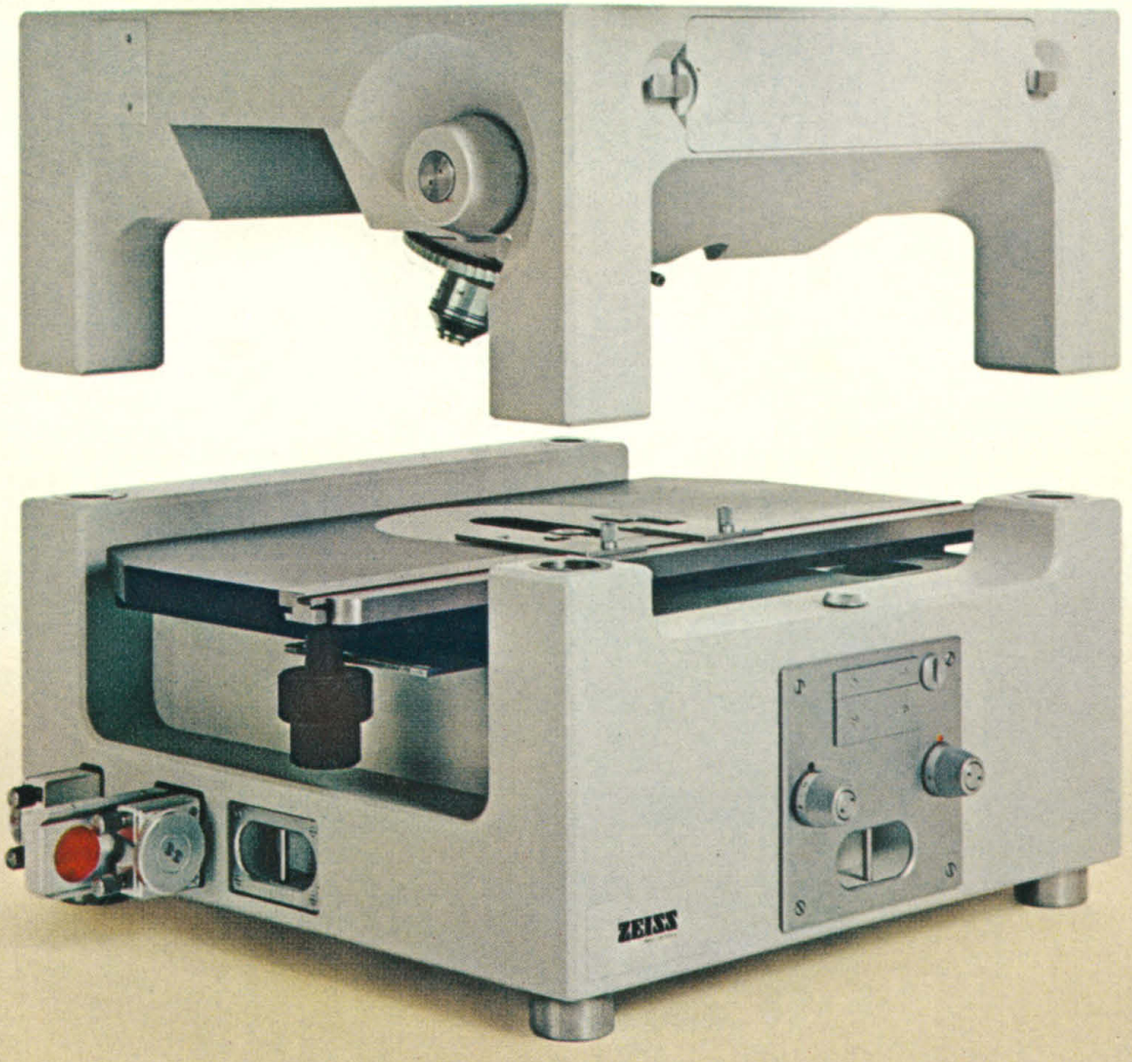

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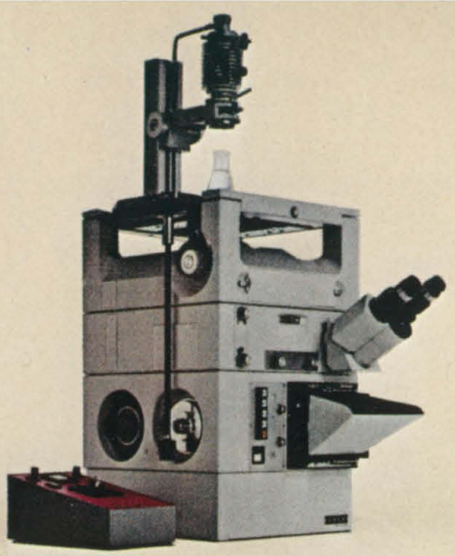

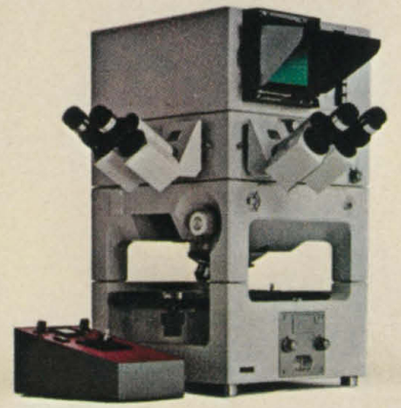

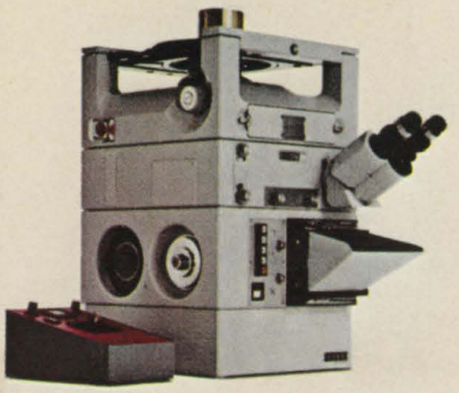

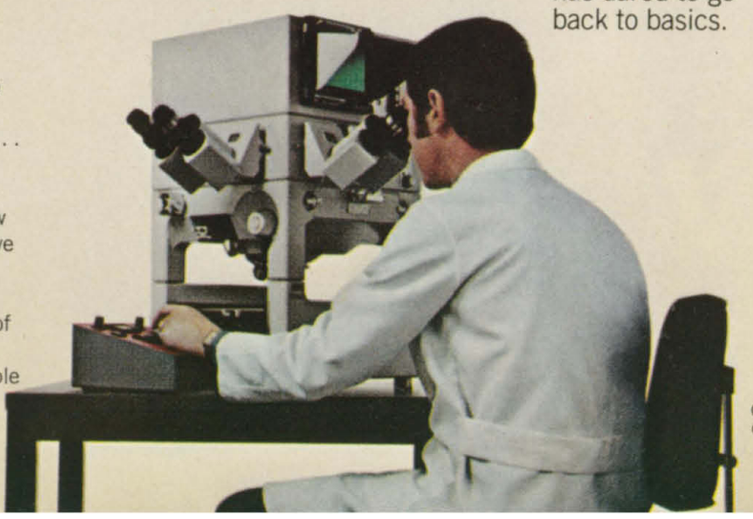

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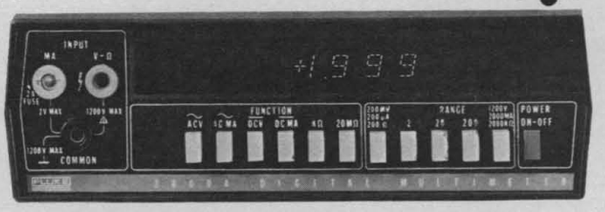

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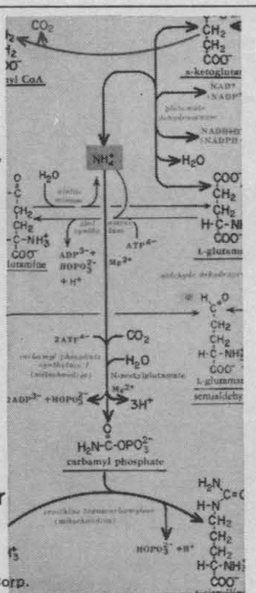

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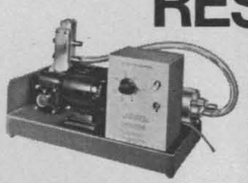

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NEWS AND COMMENT

(*Continued from page 269*)

What could be more helpful would be to have projects planned according to all relevant values and goals, but with their final evaluation to be made by a high-level board of review free to render its judgments independently of the construction agencies and the OMB. Recommendations to that effect were made in 1949 and 1955 by the first and second Hoover commissions on executive reorganization and, again this year, by the NWC.

The reasons why such a review board is needed, the NWC has indicated, are (i) that the project evaluations of the construction agencies tend to be colored by bureaucratic self-interest; (ii) that neither the OMB nor the Congress has the staff necessary to review the agency evaluations with the thoroughness required; and (iii) that the OMB is not in any case unbiased in its reviews, because of its overriding commitment to carrying out the President's budgetary policies.

In the judgment of the NWC, the review board should be structured as an independent agency, "nominally within the executive branch but insulated from presidential politics by appointments which extend beyond the term of the President." The chairman of the board, the NWC has suggested, should also be chairman of the Water Resources Council, the latter no longer to be headed by the Secretary of the Interior, as at present. The WRC has, to date, been notably weak in its review of the policies and programs of the construction agencies.

If the Nixon Administration should succeed in the difficult task of persuading Congress to establish its proposed Department of Energy and Natural Resources (DENR), the WRC will be abolished and the project construction agencies will all be placed in the new department (in the case of the Corps of Engineers, only part of its planning staff would be transferred to DENR). Under these circumstances, however, the establishment of an independent review board could be more important than ever, for a counterweight to this big new bureaucratic conglomerate could be vitally needed.

As an adviser to the President and the Congress, the review board could function in two ways. One would be to point up broad policy issues, such as how water resource policy may affect the production of food and energy or how it would relate to a strategy for redirecting patterns of national growth. The other would be to scrutinize water resource development in individual regions, watersheds, and projects, assaying the need for a particular project in the light of all available alternatives, the degree of citizen participation in plan formulation, the protection of environmental values, and the honesty of cost and benefit projections.

To keep its staff from ballooning to excessive size, the review board could (as the NWC suggests) rely on the construction agencies to provide most of the data needed for its review. Such information would not in every case be sufficient, but, as RFF's John Krutilla observes, "If you really made some internal checks for consistency, for plausibility, for reasonableness, project benefits would often be significantly deflated." In addition, the review board would be able to obtain much information from the comments made by entities such as the Environment Protection Agency (EPA), the U.S. Fish and Wildlife Service, and the private environmental groups on the environmental impact statements prepared by the project construction agencies, as required by the National Environmental Policy Act (NEPA).

NEPA itself has contributed remarkably to opening up the process of water project evaluation—this being most strikingly demonstrated in an opinion early this year by Judge Carl O. Bue, Jr., of the U.S. District Court in Houston. Judge Bue pronounced the benefit-cost analysis made by the Corps of Engineers for the Wallisville Dam–Trinity River navigation project to be grossly defective, particularly in that environmental benefits were claimed but environmental "costs" were not. A review board of the kind proposed by the NWC could, to the extent that the White House was willing to act on its advice, actually serve as an arbiter in water project controversies. The arbiter's role is not one that the courts have been able to assume because NEPA does not go much beyond demanding full disclosure.

In sum, a competent review board, assisted by NEPA and the natural adversary relationship that exists between agencies such as the Corp of Engineers and the EPA, may be able to do far more than even the best thought-out Principles and Standards in erasing water resource development's pork barrel image.—LUTHER J. CARTER