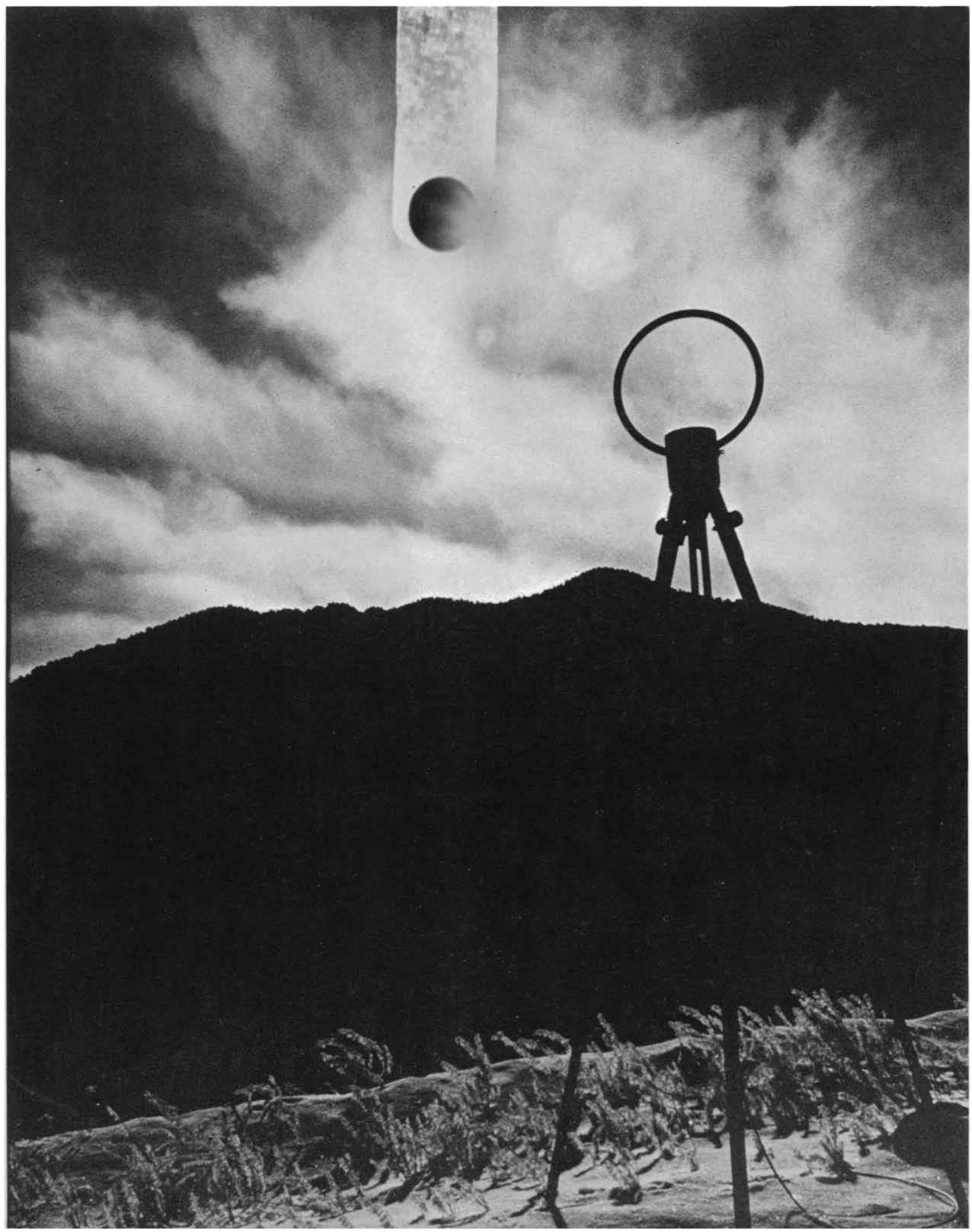
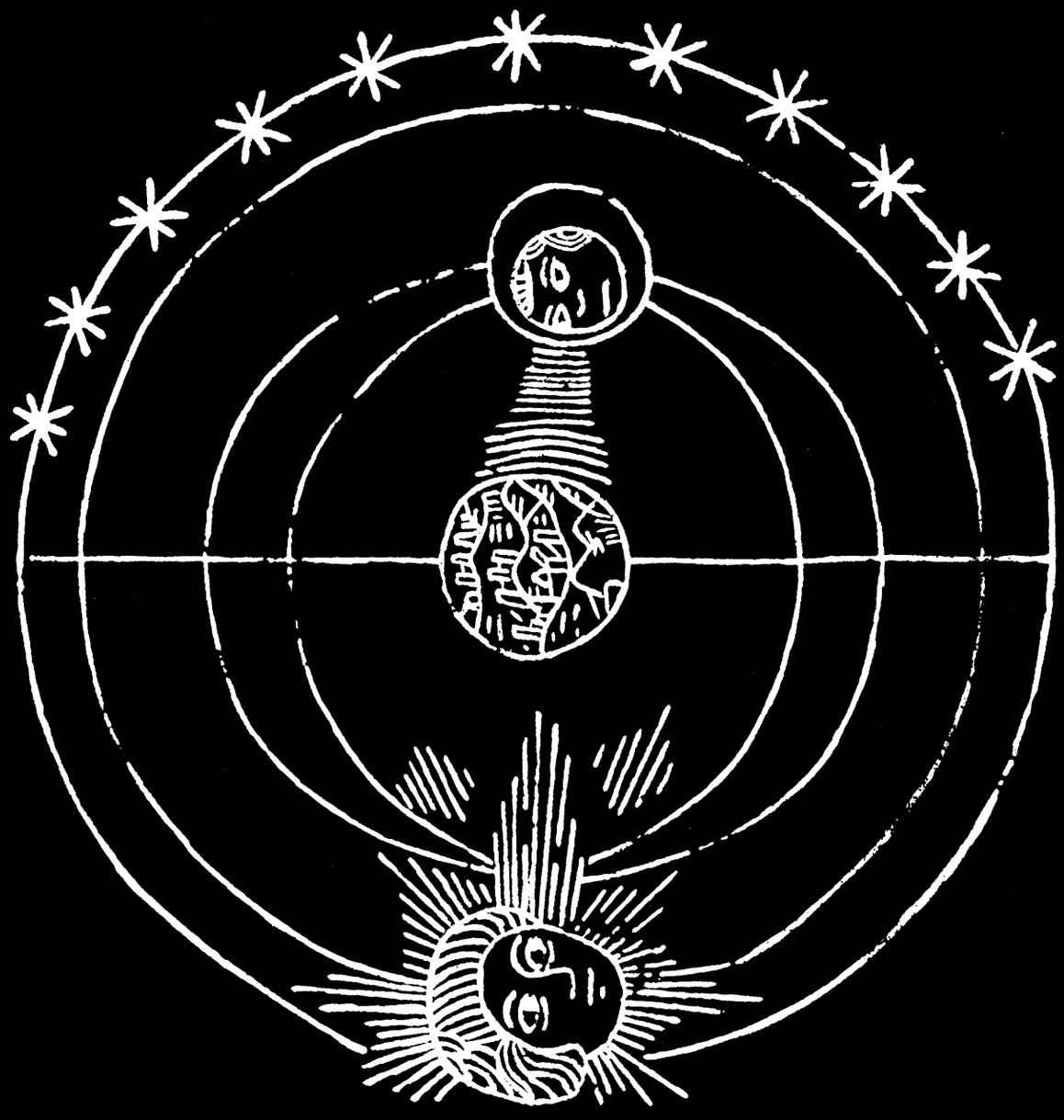
SCIENCE

29 August 1969
Vol. 165, No. 3896

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE





AAAS-WESTINGHOUSE SCIENCE WRITING AWARDS 1969

To encourage and recognize outstanding writing on the natural sciences and their engineering and technological applications (excluding medicine) in newspapers and general circulation magazines.

Three awards of $1000 each for science writing: in newspapers with daily circulation of over 100,000; in newspapers with daily circulation of less than 100,000; in general circulation magazines.

Contest year. Material must have been published within the United States, October 1, 1968, through September 30, 1969. Deadline date for submitting entries is October 10, 1969.

For entry blanks and detailed rules, contact Grayce A. Finger, Dept. W, American Association for the Advancement of Science, 1515 Massachusetts Avenue, N.W., Washington, D.C. 20005.

Kodak

A product worth feeding to the pigs

The pig is a land animal. The arteries that bring human food calories from the country to the city would fail were it not for the work of the pig in transforming the seeds of the large grass, corn, into tasty protein. The most important muscle involved in this work encloses the sow's uterus. It must be protected from atony.

The general conception of the pig is depicted at left. The picture is not wholly lacking in truth. Pigs survive under inelegant conditions. They can be used for garbage disposal—in fact, were so used by bygone generations of men. It is now hard to make money that way. (Money has a vital but very complex part in the global ecosystem.)

To make money on pigs today, the animal is not permitted to waste time wallowing. It is encouraged by every means to concentrate on ingesting a most carefully designed diet. Corn, its major component, is rich in polyunsaturated fats. Polyunsaturated fats are fine for man and beast, but they raise the need for the natural antioxidant, vitamin E. If that need is unmet, the sow's uterus will have lost its tone and will falter after having ejected but a few dozen piglets in her lifetime.

One of our functions in the economy is to manufacture vitamin E from certain natural oils. We are pleased to report that the more efficient brands of pig feed now contain our product.

Anybody want B.O.D. data?

Science's serving maid, photography, must mind her manners.

A laboratory complex that takes full advantage of her many manifestations generates an effluent that may impose its share of Biochemical Oxygen Demand in neighboring waters above ground or out of sight. The time to ignore such matters is running out. Those in a position to understand about Biochemical Oxygen Demand will be among the first to agree.

They may also be called upon for counsel on adequate capacity for the secondary waste treatment by which BOD is microbiologically worked off before discharge to environment. The calculation of load would be easier if data were readily available for specific ingredients. It therefore seems a good idea to publish such data for widely used chemical products of our own manufacture. This we have now done in a practical primer entitled "Disposal of Photographic-Processing Wastes." It contains data also on what ions and compounds may be present in our proprietary processing preparations.

Order as Kodak Publication No. J-28 ($1) from Department 454, Eastman Kodak Company, Rochester, N. Y. 14650.

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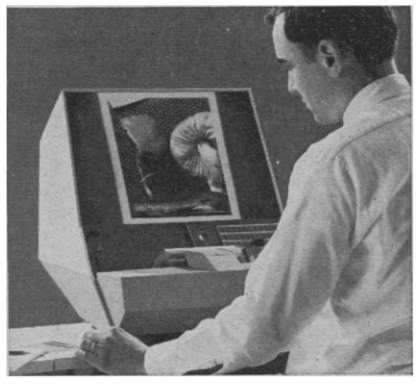
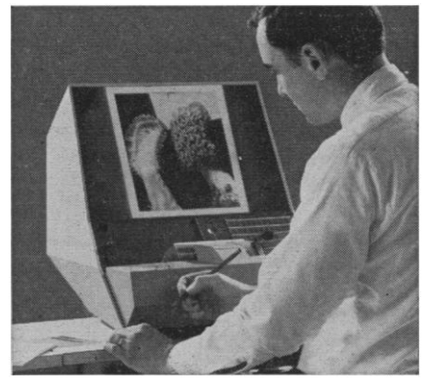
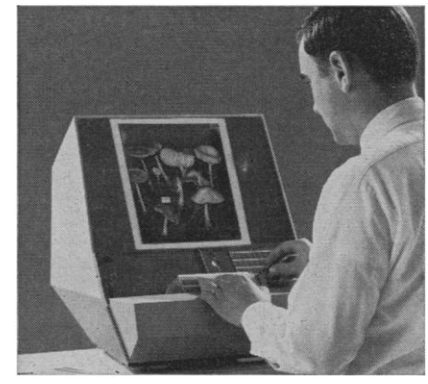
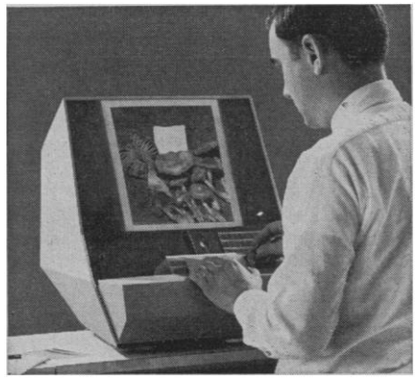
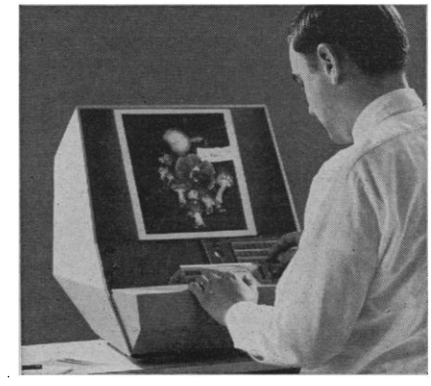








Attention, systematists: Systematics is your game. Business systems is ours. A relationship may develop. **Color microfilm has arrived.** If color is an important taxonomic character for you, microfilm organized in jackets may now be ready to maintain order among a great wealth of taxa. Talk to the people in your own institution who know microfilm equipment. Then inquire about color microfilm from Business Systems Division, Dept. WL, Eastman Kodak Company, Rochester, N. Y. 14650.



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SCIENCE

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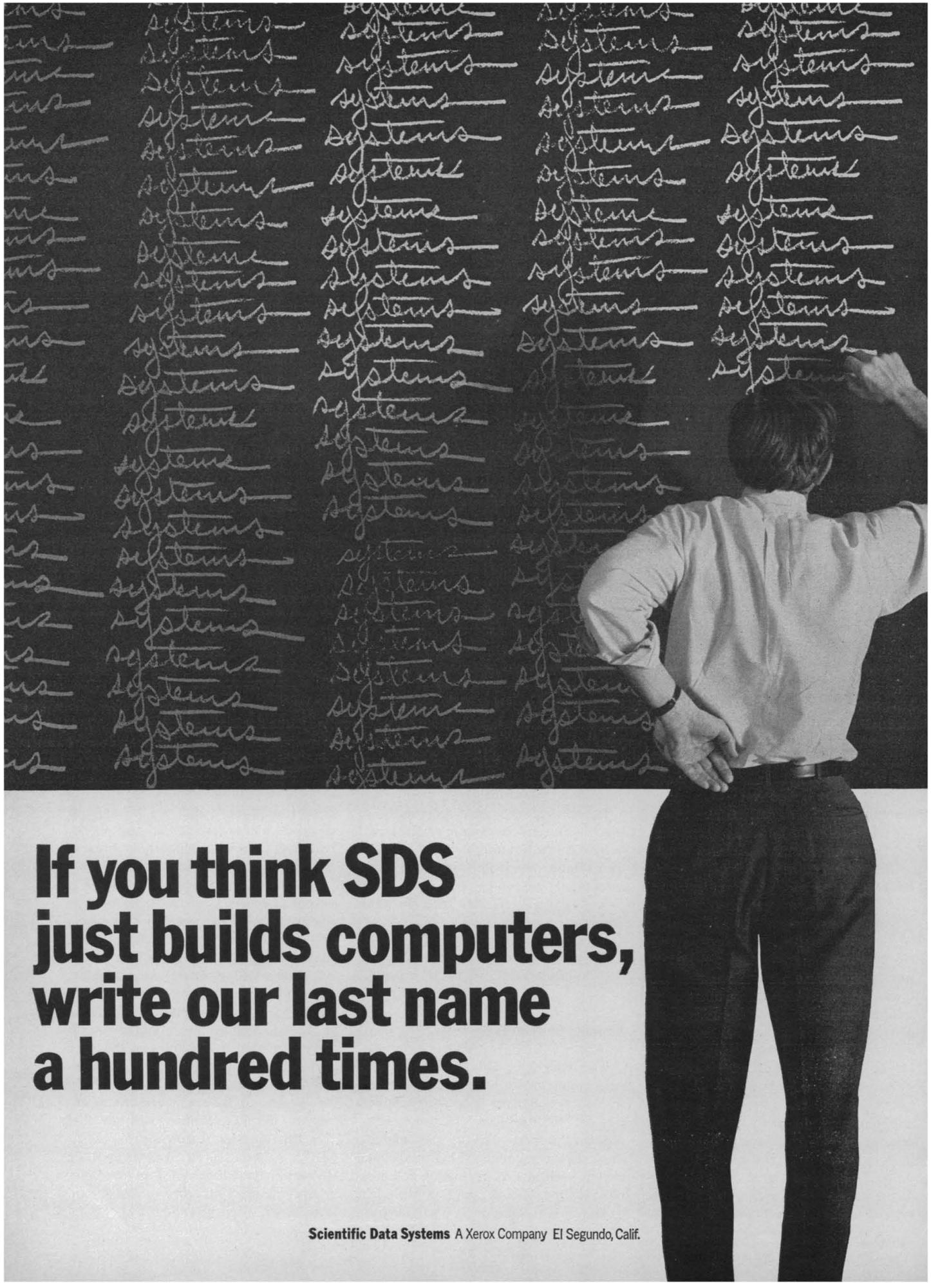
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

COVER

Apparatus used for precise antenna-pattern measurements at National Bureau of Standards, Boulder, Colo. The "golden apple" (top), a small metal ball containing transistors and batteries, is supported only by a Mylar thread, obviating the use of conventional equipment which distort the field. As the loop-shaped transmitting antenna (right) moves, a tiny light glows on the ball when the radio field reaches a certain intensity. See page 867. [Schaeffer and Seawell, Black Star]



If you think SDS just builds computers, write our last name a hundred times.

Scientific Data Systems A Xerox Company El Segundo, Calif.

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SCIENCE

Microcosms in a World Apart

Our cities are sick, and their condition grows worse. Morale has deteriorated under the impact of lawlessness, pollution, and the ugliness of the environment. Obsolete, the cities are fashioned in accord with the realities of a century ago. The long-range solution is to build cities of radically new design. However, that is a task of a generation or more, and the crisis is now. We must look for measures that can be implemented quickly. In this search we can learn from the examples of other peoples who have also faced overcrowding.

The visitor to European cities sees much that could with advantage be adapted here. Consider, for example, the Tivoli in downtown Copenhagen. In a parklike area of moderate size are ponds and waterfowl, together with music, theater, dining, dancing, and amusement concessions. The Tivoli is fenced in, and there is a nominal admission charge. With security, the solid citizens of Copenhagen can relax and enjoy their holiday outings.

Another such area, perhaps even more desirable, is the Palmengarten in Frankfurt. Located near the middle of the city, it features botanical displays of extraordinary variety and beauty. The park is small by American standards. Yet skilled landscaping makes it seem larger than it is. Inside its boundaries one has the impression of being in a world apart. There are ponds, wooded paths, grassy glades, and flower gardens—a delightful spot for a stroll or relaxation in the sunshine. Moreover, there are microcosms within the world apart. In one small greenhouse is a marvelous collection of orchids. Near it is another building housing a great variety of cactuses. Yet another greenhouse contains huge tropical pond lilies. In a larger glassed-in space are luxuriant palm trees; at one end of the big room there is a waterfall with a fish pond beneath it. The enveloping greenery and the sounds of falling water combine most agreeably to lift the spirit.

In Europe, beauty is not confined to a few parks. At the typical crossroads, instead of billboards there are carefully tended flower gardens. Indeed, there are flowers almost everywhere, even at the airports.

The traveler returning from Europe is greeted with brutal ugliness. What a miserable welcome! Yet it is a fair sample of what he is likely to see in most cities. Pitifully little thought and energy have been devoted to bringing beauty to urban centers. Yet the opportunity is often available. Consider the Mall associated with Independence Hall in Philadelphia. Its area is comparable to that of two European parks, and it occupies some very expensive real estate. The Mall has a static vista, fountains, and some benches frequented principally by derelicts. For refreshment one may buy pretzels from street vendors. In contrast, one of the most attractive features of the Society Hill section of Philadelphia is a tiny 18th-century garden located a few hundred meters from Independence Hall. This plot, tended by the Pennsylvania Horticultural Society, is frequently replanted, so that every few weeks it provides a different display. Though small, the garden is excellent in the quality and variety of its planting, and it pleases many passersby.

This country has park facilities whose value as real estate totals multibillions of dollars. We are not getting our money's worth, and it is time that constructive thought and effort were devoted to making it possible for the majority of our citizens to enjoy what could be achieved in the way of spirit-building recreational facilities.—PHILIP H. ABELSON

AUDIOTAPES OF AAAS ANNUAL MEETING SYMPOSIA AND PANEL DISCUSSIONS

Dallas, Texas, 26–31 December 1968

Through a cooperative arrangement between AAAS and Science Service, tape recordings of 15 symposia and panel discussions, presented at the Annual Meeting of the AAAS, are now being released at cost for general distribution. The objective of this undertaking is to make the proceedings of these meetings rapidly available to a wide public.

In a number of sessions, some information was presented on slides. Authors should be contacted directly for copies. Because of a serious epidemic of influenza at the time of the Dallas meeting, a few of the contributions were not given by the originally announced authors.

Tapes are sold as self-contained, half-day sessions. They can be purchased as conventional open reels (3¾ inches per second speed) that can be played back on any conventional audiotape player, or as cassettes for playback on a cartridge player. Each half-day session is identified, for ordering purposes, by a number ("1/68," "2/68," and so on). An order form is at the bottom of this page.

Acknowledgment is made to Ampex Corp. for assistance in recording and distribution and to WAMU, American University, for aid in editing.

The Scientific Research Society of America (RESA) Annual Address and Discussion
- 1/68, 3 hours, $7.00

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- 3/68, 3 hours, $7.00 (Part I)
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- 27/68, 3 hours, $7.00 (Part I, Progress of Research and Technology on Food Supply and Population Control)
- 28/68, 3 hours, $7.00 (Part II)

More complete information about the tapes appears in *Science*, 11 April 1969, pages 113–117.

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AAAS ANNUAL MEETING AUDIOTAPES

firmed repeatedly; (ii) most of the data was considered compatible with transfer factor being an immunogen; and (iii) developments in vitro, particularly the activation of animal lymphocytes by dialyzable transfer factor of human origin, augur well for a rapid solution of the problem.

Bloom and Granger were the initiators for two separate discussion sessions devoted to the now recognized MIF and lymphotoxin as effector molecules of cellular immunity. Activated lymphocytes have now been shown to liberate factors with the following activities: MIF, LT, skin-reactivity, chemotaxis, mitogenicity, and interferon. Although the interaction of immune lymphocytes with specific antigen is required for the production of these effector molecules, the subsequent action of these effectors is nonspecific with respect to the target cells affected and, moreover, does not require the presence of antigen. With the exception of interferon, all of these agents have molecular weights around 80,000, and work is already under way to determine whether they are separate and discrete entities or reflect a single component.

The physiological role of these factors is not yet fully established. Chemotactic factor and MIF acting in concert could well account for the manifestations in vivo of delayed hypersensitivity, and the observed consequences of MIF injection can be interpreted in this light. Lymphotoxin, the cytotoxic factor, is suspected of playing a role in the homograft reaction, a concept which is supported by known instances of nonspecific spread of the reaction (for example, in the kidney) but contradicted by other instances of a highly selective reaction (such as in tumors and in the skin). Experiments with antiserums to the factors should rapidly resolve the problem.

In the final discussion, Uhr developed the evidence in support of immunoglobulin as the recognition unit in cellular immunity, and the thesis that the difference from humoral immunity probably hinged on a seemingly minor but essential aspect of immunoglobulin retention by thymic cells as compared to its secretion by plasma cells. The consensus was that our understanding of the effector side of the cellular immune response is now progressing rather rapidly, whereas there was less optimism concerning clarification of the induction side.

Publication (Academic Press) of the proceedings of the meeting is scheduled for October. The first volume of the new series was *Immunological Tolerance*, proceedings of a similar meeting in 1968.

N. A. MITCHISON
National Institute for Medical Research, Mill Hill, London, England

Sleep and Biorhythmicity

The relation of sleep research and biological rhythm research was examined in a symposium during the ninth annual meeting of the Association for the Psychophysiological Study of Sleep in Boston, 20–23 March 1969. The estrangement of these two related areas of work was ascribed to the preoccupation of sleep researchers with the psychophysiology of rapid eye movement (REM) sleep since its discovery 15 years ago. Since then a profusion of data, almost all of it involving measurements over time, has appeared.

Variable sleep dimensions in the time domain include latency to onset, total duration, duration of component phases (REM and non-REM), and period length of the cyclic alternation of component phases. Yet, in the post-REM era there has, until very recently, been no critical examination of the rhythmic aspects of sleep despite the fact that a highly sophisticated set of methods exists by which they may be studied. The student of sleep who was familiar with rhythm research could, at the least, define, measure, and control for periodic phenomena in his data.

Halberg showed how rhythms, especially circadian and ultradian ones, could be detected by the use of specialized computer programs whether or not they were apparent in sleep data plotted as a function of time. The parameters of such rhythms, namely, period (τ), amplitude (C), phase (ϕ), and phase difference (Φ), can likewise be estimated. For time series or sections thereof with constant phase angle, a least-squares spectrum and a cosinor display the amplitude and amplitude-weighted phase, respectively.

These measures have been determined for sleep data from diverse sources. Pöppel reviewed the evidence of the Aschoff school for the circadian character of the human sleep-waking cycle. The period (τ) of this rhythm in subjects isolated from time-givers was about 25 hours and such "free-running" individuals showed a change in phase difference (Φ) between the