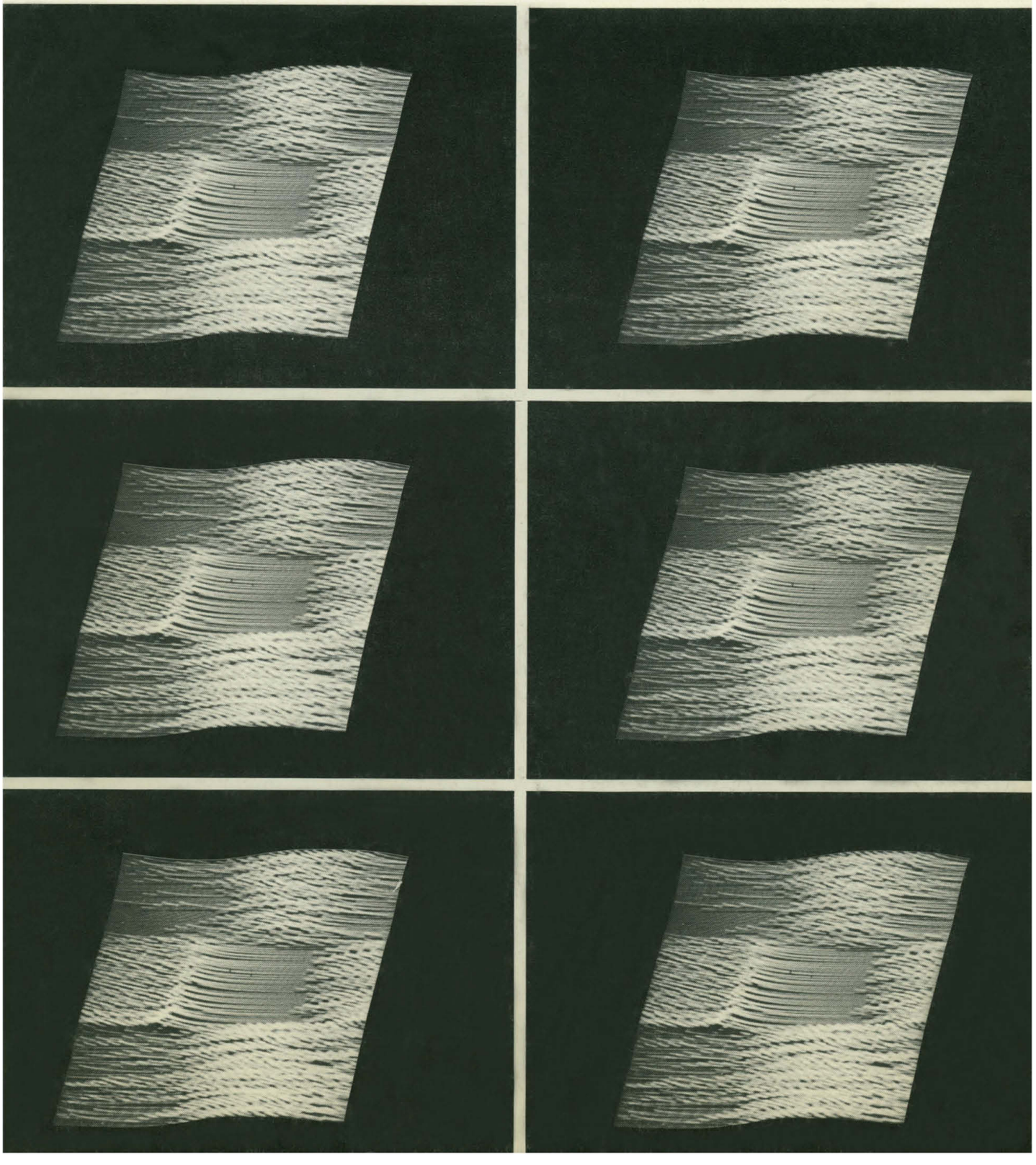
SCIENCE

7 January 1972

Vol. 175, No. 4017

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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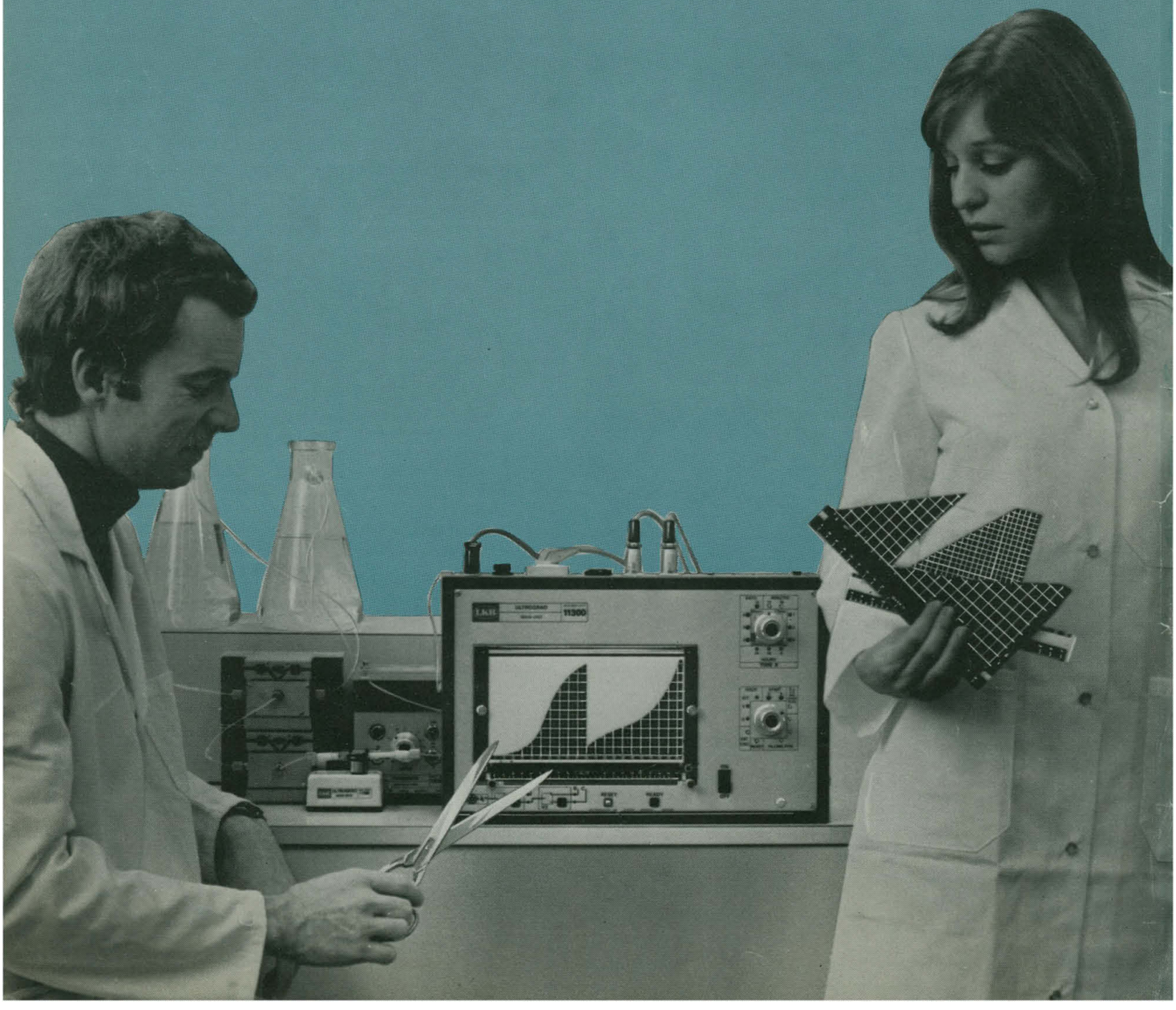

"Blue Skies . . ."

But not any more. Clear blue skies, like clear blue streams, seem to be going the way of the ten-cent cup of coffee.

Amos Turk, Jonathan Turk, and Janet Wittes don't have all the answers, but they do have the questions and some possible approaches to solutions in their new book, **ECOLOGY, POLLUTION, ENVIRONMENT.**

It's a new, provocatively written supplement for any science course, one that takes a good look at all the crucial aspects of ecology—from pollution to the ecologic balance of environment.

The authors have covered ecology briefly but broadly. They present relevant background material in the physical sciences first, so that the student who may lack previous formal science training can use the book profitably. Then, the authors explain and discuss the decisions that must be made about environmental problems. These are treated as social problems rather than as "science."

There are helpful illustrative exercises, bibliographies and review questions to help the student use this stimulating, modern book in an area of real, immediate concern.

By Amos Turk, City College of CUNY; Jonathan Turk; and Janet T. Wittes, University of Pittsburgh. About 240 pp. illustd. Ready March 1972. About $3.95

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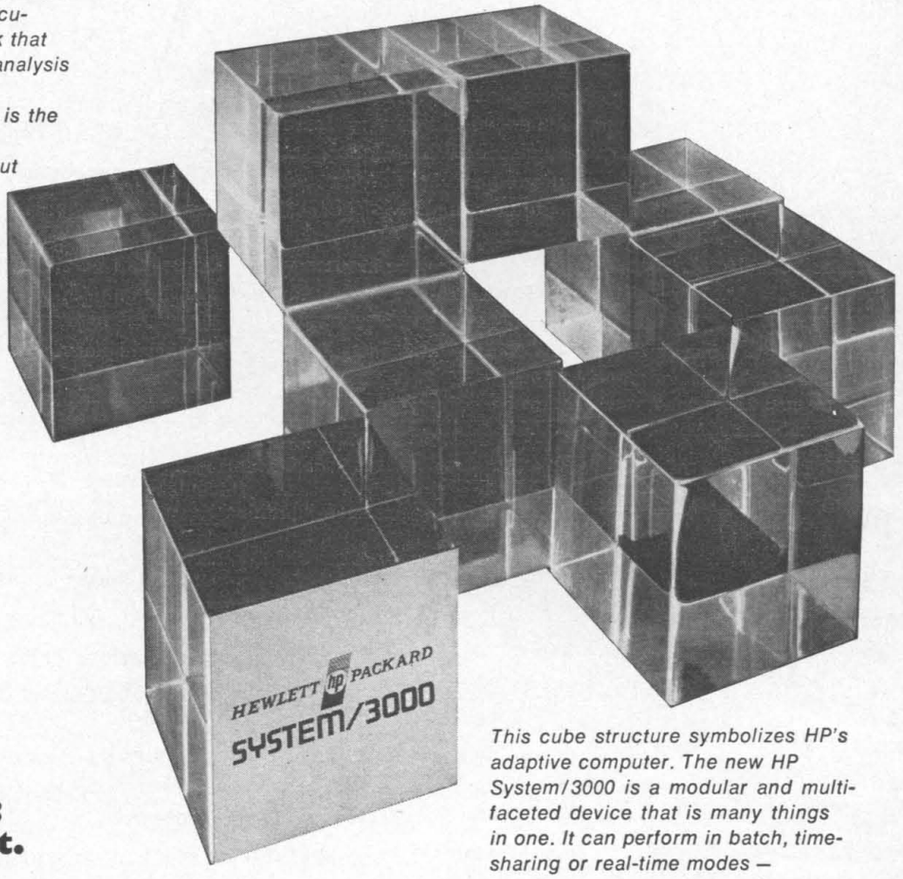
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

COVER

Three-dimensional response surface which analyzes the firing pattern of a single neuron in the olfactory bulb of *Peromyscus maniculatus bairdii*. See page 84. [Foteos Macrides, Massachusetts Institute of Technology, Cambridge]

Some things are changing for the better.

Many people know us as an instrument manufacturer: we make more than 2,000 products for measurement, test and analysis. Others know us as a computer company: more than 10,000 own our programmable calculators and computers. We prefer to think that our business is to serve measurement, analysis and computation needs . . . in science, industry, medicine and education. This is the rationale behind every new instrument, computer or system that we tell you about in these ads. This month:



This cube structure symbolizes HP's adaptive computer. The new HP System/3000 is a modular and multi-faceted device that is many things in one. It can perform in batch, time-sharing or real-time modes — simultaneously — and use three different computer languages at the same time.

Computer proliferation: a better way to control it.

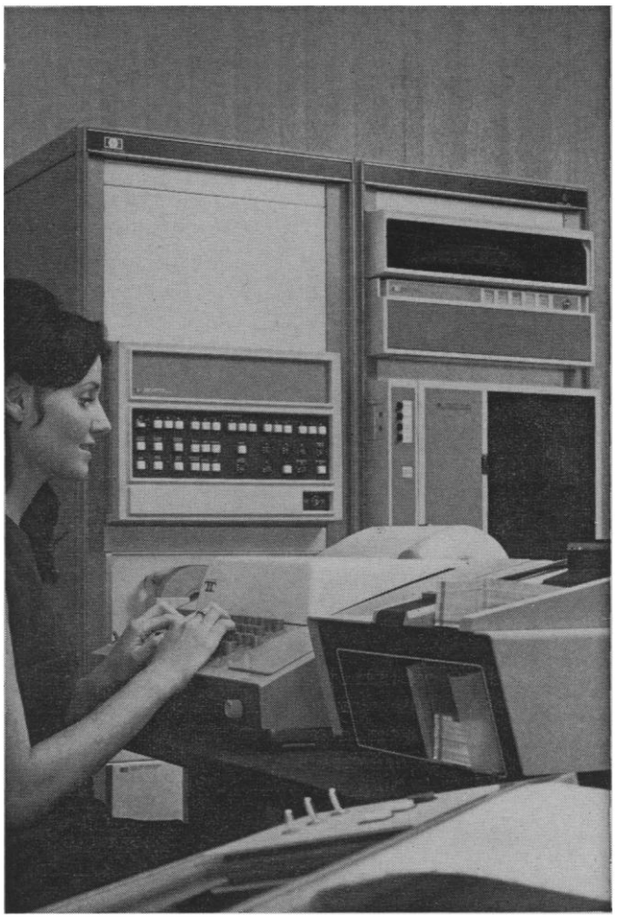
Until now many computer users in high-technology areas faced a puzzling fork in the road. With several computers already in use, they had to decide either to continue the proliferation of dedicated systems or turn to a large-scale system costing at least a half-million dollars.

Now there is a third and happier choice: HP's new adaptive computer System/3000. It is the first small-scale computer that handles batch, real-time and time-sharing all at once, each in more than one computer language — at half the price of a good alternative.

For time-shared tasks, it handles up to 64 users. For real-time processing, it allows several programs to be active simultaneously, completely protected one from the other. In batch processing, it permits execution of a variety of programs at extremely high speed.

And System/3000 is multi-lingual in all modes, including FORTRAN, BASIC and the new SPL/3000, a high-level systems programming language that combines the power of a Compiler with the efficiency of an Assembler.

How System/3000 accomplishes all this is a long story. Part of it involves advanced computer architecture, virtual memory that assures available core for every program in any mode, a huge micro-programmed instruction set, and a multiprogramming executive that insures dynamic allocation of system resources. For the rest of the story on the adaptive computer write for our brochure on System/3000.



Computer proliferation: a better way to do it.

For users who need to access a large data bank and also require ease of I/O interface, computer proliferation isn't always a problem. It often can be the solution.

To perform these tasks at a new low price, HP now offers a family of small disc-based computer systems dedicated to time-sharing, real-time or batch processing. Each system uses HP's versatile 2100 digital computer, and each is available with an impressive amount of storage. A choice of mass storage devices provides 5 to 47 million bytes of disc storage.

An HP disc-based system can be tailored to your specific needs, with more than a dozen peripherals and general-purpose interfaces for a variety of instruments. The new systems also use all of HP's existing software of over 500 library programs and applications packages.

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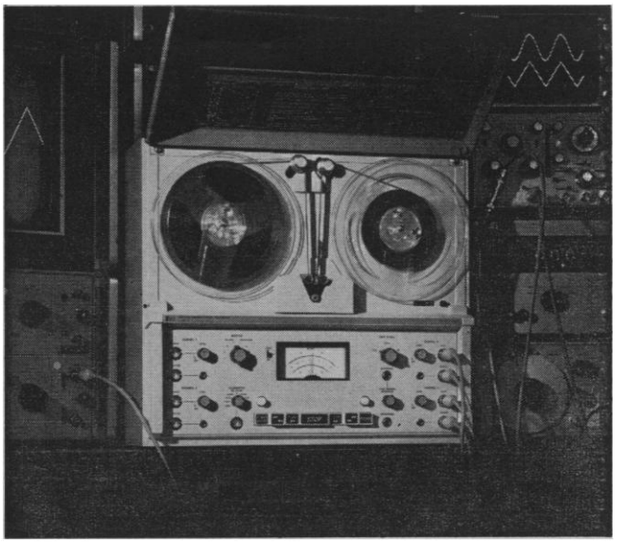

Instrumentation quality tape recording at a bargain price.

Most scientists would use portable instrumentation tape recorders for analog recording if only they performed as well as the big expensive laboratory machines. Unfortunately, their small size usually meant reduced performance.

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If this sounds too good to be true, listen to some of the 3960's capabilities. At 15/16 ips, its FM signal-to-noise ratio of better than 200:1 lets you play back signals that would be buried in noise (ECG's for example) on many lab machines as well as on any other portable.

The 3960 lets you mix and interchange four FM direct record/reproduce channels at will. You have a choice of three electrically-switched speeds, for a time-base expansion of 16:1 or 10:1 . . . without signal degradation. Tape drive is bidirectional so that you don't have to rewind either to continue recording or to play back.

Built-in facilities let you calibrate the 3960's FM electronics without external equipment. And an integral peak-reading meter lets you optimize record level without using a scope. Options include a 5 to 30 foot loop adaptor, an interrupting voice channel, and an inverter for 12 or 28 VDC . . . all integrally mounted.

Write for Application Note 89, a tape recording handbook useful to scientists interested in tape recording techniques for vibration and test analysis, research and clinical medicine, acoustics, oceanography and other environmentally difficult research projects.

For more complete information, write Hewlett-Packard, 1507 Page Mill Road, Palo Alto, California 94304. In Europe: 1217 Meyrin-Geneva, Switzerland.

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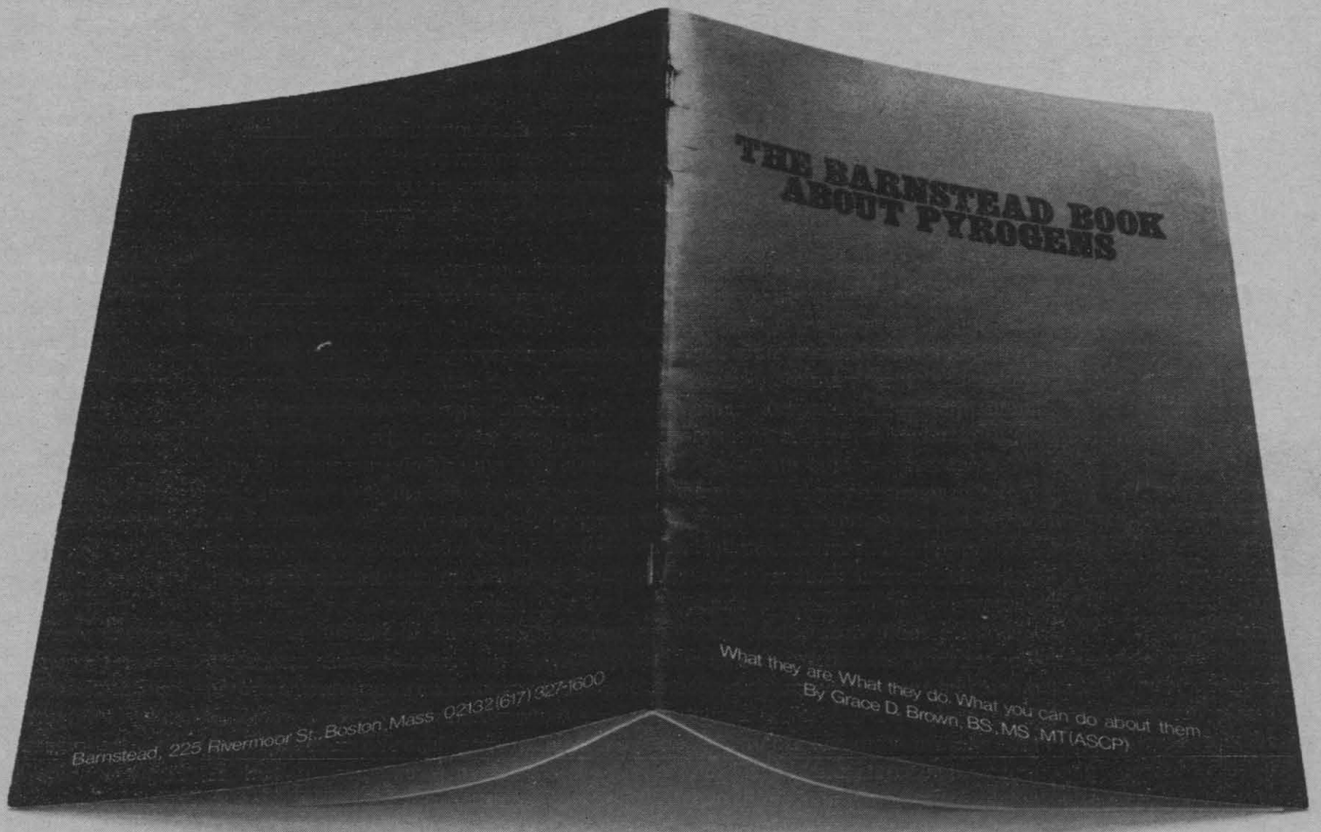

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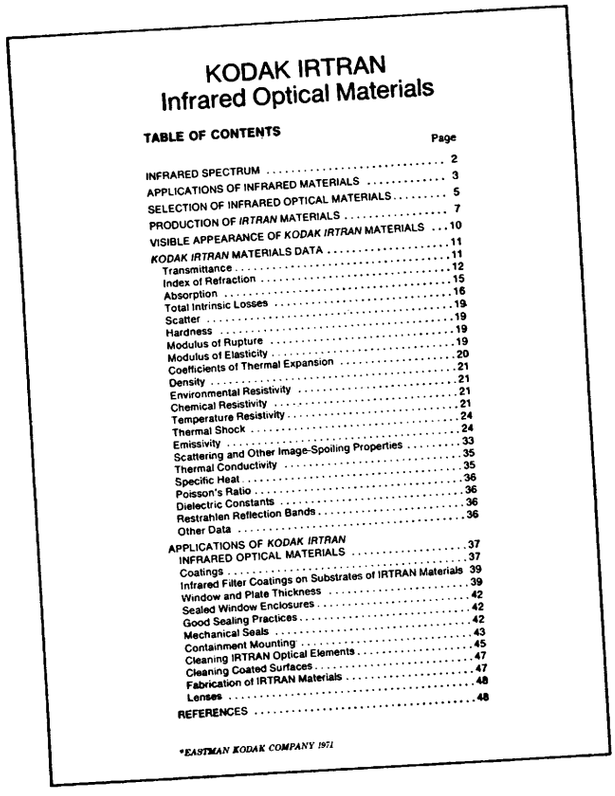

KODAK IRTRAN
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TABLE OF CONTENTS

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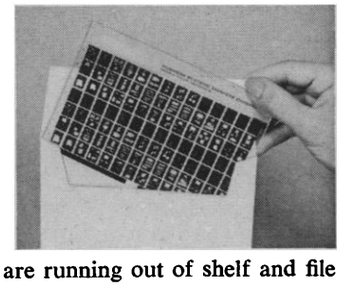

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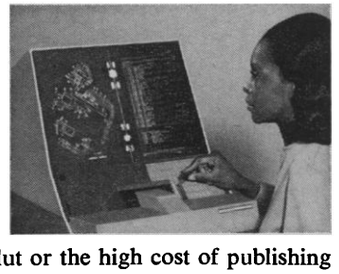


Do you have such a device at home? In your office? No? Too bad.

Hunting one up and going there could be a bit much to ask. Which is why the above-cited book comes printed on 8½″ x 11″ paper pages and contributes nothing to overcoming either your paper glut or the high cost of publishing detailed technical information.

Let's break this circle. Users of scientific and technical information can come to consider a microfiche reader an essential item of home and office furniture.

Technical publishing outfits eager to speed the day should keep in touch with Dave Kithil, Kodak, Rochester, N.Y. 14650.

but the printing industry will still be with us.

Microfiche has its place, but printer's ink will flow on and on.

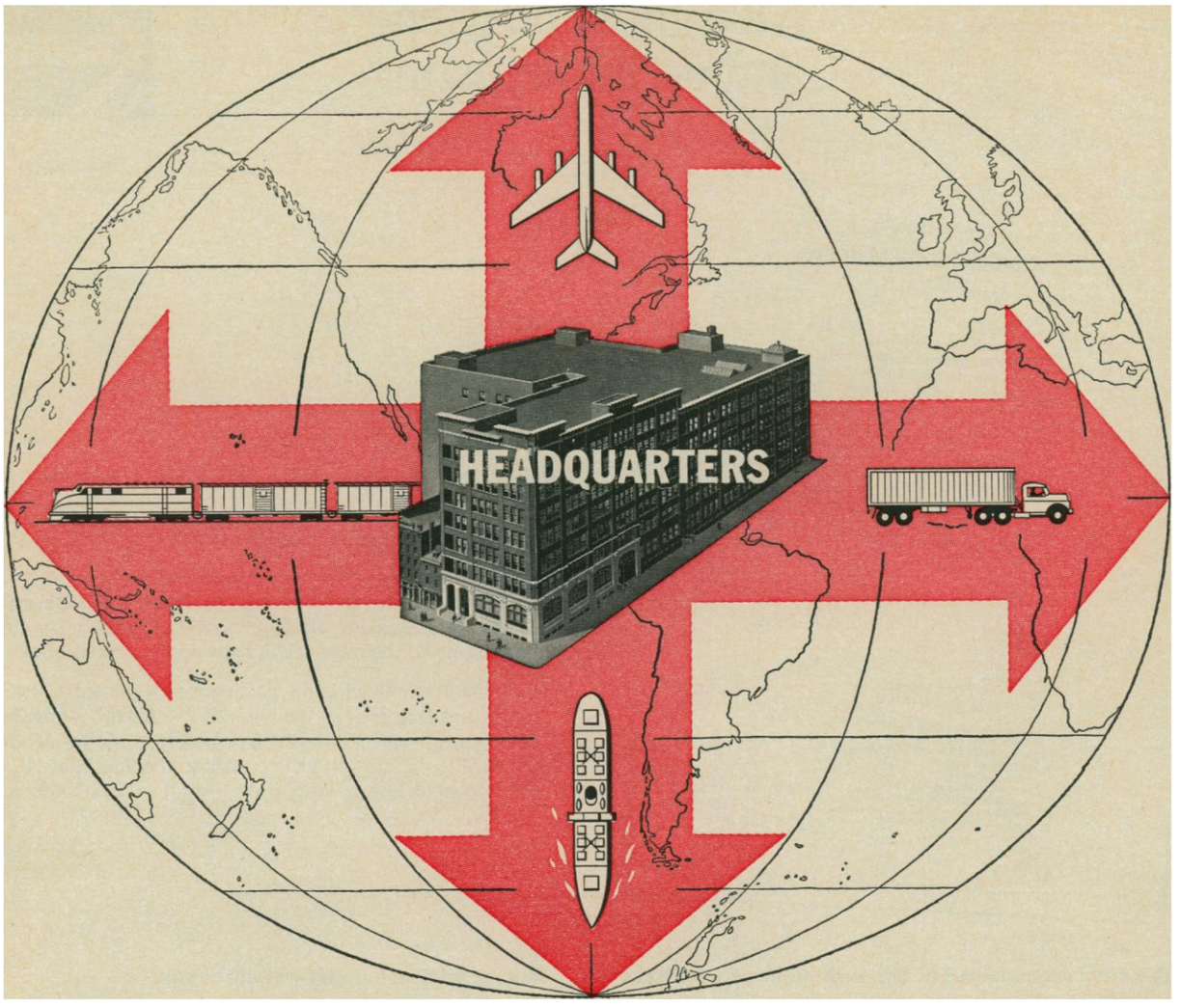
The more people who depend on the printing industry for a living and the more they know, the better for Kodak. The intricate complex of businesses and crafts centered on the art of printing and packaging is more than a principal market for specialized Kodak products. One way or another, it provides a life role for a not inconsiderable segment of mankind. Finding a role in life does seem to be a common problem.

Perhaps we should try to attract more kids to printing. (The more people who look to our customer industries for prosperity, the better for us.)

Perhaps we shouldn't. Recruiting should run on something more dependable than enthusiasm. Distress now afflicts the "overeducated." Strongly held still—perhaps rightly so—is a concept of education that comes down from a time when college prepared men for the ministry, medicine, law, or teaching. We are painfully aware that a lot of the teaching in preparation for less classical professions is out of date.

Even if we wanted to, we couldn't mount a campaign powerful enough to lure large numbers of kids into printing and the graphic arts, but we have collaborated with new-style academics, the printing and allied industries, and their unions in a measurement just completed of 1) actual manpower needs in these fields, 2) how changes in technology promise to affect the needs.

Interest in the findings should be made known to W. F. Flack, Kodak, Rochester, N.Y. 14650.



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SCIENCE

The Relation of Science and Technology

Since World War II, the federal government has selectively supported science and technology on the input side; that is, it has invested money and effort in education and research, which, it believed, would produce the resources for achieving national goals. Although many of these goals were ill defined, there was public confidence that highly educated people and a research beehive would produce what the nation needed. The activities thus supported were connected only loosely with the output side; in fact, relatively few output goals were stated explicitly on the national level. Traditionally, science and technology have been connected only by a thread to the products that had an impact on society. Today, this connection is becoming stronger. What we face now is a society that is beginning to demand that we as engineers and scientists no longer do what we like or what we choose from a long list of societal chores, but that we do the things that the society as a whole demands.

The setting of goals by a society such as ours is not a bad thing in itself. There have been some astounding successes in goal-oriented efforts; however, there have also been some notable failures when major goals were undertaken prematurely and without the fiscal, managerial, and intellectual resources that major goals demand.

The widespread misconception that, simply because we can put a man on the moon, we ought to be able to solve all of mankind's problems on Earth has an element of truth—but just that. It completely ignores the problem of timing and the limits of both the technological state of the art involved and the fundamental knowledge available. Sometimes it even ignores the laws of nature. Such neglect invalidates the argument that a society as technologically well developed as ours ought to be able to tackle anything with a high probability of success. In setting goals for society, we must be judicious in the timing of our commitment. To commit too soon is to risk failure. To hesitate too long deprives society of needed resources.

There is no simple answer to the question of how one matches the state of the art and science with national needs, but one essential element is a sense of unity among science, engineering, national purposes, and day-to-day reality. It is essential that the impact of science on society be viewed not as a linear progression from the discovery of knowledge to technology, leading to innovation and new products and services, but as a complex set of mutually dependent matters. The linear progression is a simplistic one.

It should be axiomatic that technology feeds on science, but it has never been made fully clear that science, in turn, feeds on technology and is often invigorated by goal-oriented enterprises. In fact, the coupling between these two once-disparate elements is far closer than many of us ever realized in the past. This close coupling of science and technology, and the feedback system it implies, carries with it a self-correcting mechanism. Failures in technology often encourage fundamental science.

Let me suggest that the overall national research program of the future be predicated on a balanced coupling of science and purposeful technology. We must forge science and technology as a sum and not as a difference. This overall strategy implies that scientists and engineers must be active in decision-making where goals are set.

—EDWARD E. DAVID, JR., *Science Adviser to the President*

AUDIO TAPES

AAAS Audiotapes-1971

AUDIO TAPES

AAAS taped symposia during its Annual Meeting in Philadelphia, 26–30 December 1971. Since the beginning of the AAAS audiotape program 3 years ago, we have tried to document selective sessions and to improve the quality of the recordings. We feel our 1971 recordings reflect such efforts.

The tapes listed below are offered for sale to persons who were unable to attend the sessions or who want a documentation of the symposia. The tapes have proven to be a valuable educational tool.

All recordings are available as 5-inch open reels (playing at 3¾ inches per second on any standard playback machine) or as cassettes. The cost of the tapes: single session symposium, $15 per session; multi-session, $15 for the first session and $12 for each additional session ordered of the same symposium. Each session lasts about 3 hours.

Each symposium is identified by a number (87/71, 88/71, and so on), while the sessions of each symposium are designated by Roman numerals.

More complete details on the symposia may be obtained from Grayce A. Finger, AAAS Audiotape Program, 1515 Massachusetts Avenue, NW, Washington, D.C. 20005.

87/71—Role of Aggression in Human Adaptation (One Session).

88/71—Constantinos A. Doxiadis, "The Two Headed Eagle" (One Session).

89/71—Workers and the Environment (One Session).

90/71—Astronomy from a Space Platform (Sessions I-II).

91/71—Indicators of Environmental Quality (Sessions I-IV).

92/71—Experimental Manipulation of Natural Systems (Sessions I-II).

93/71—Technology and the Humanization of Work (Sessions I-II).

94/71—Value and Knowledge Requirements for Peace: Science and the International System (Session II); Peace through Change, The Risk and the Promise for Man's Future (Session III); Biological Basis of Destructive Behavior (Session IV); Environmental Sources of Human Destructiveness (Session V).

96/71—Population Control in Social and Economic Perspectives (One Session).

97/71—Confronting the Violence of Normal Man (One Session).

98/71—Physics Looks at Biological Structure (Sessions I-II).

99/71—Early History of the Earth and Moon (Sessions I-II).

100/71—Oceanography (Sessions I-IV).

101/71—Energy Crisis: Some Implications and Alernatives (Sessions I-IV).

102/71—Biological and Cultural Bases of Sex Role Differentiation (Sessions I-II).

103/71—Smoking and Health (One Session).

104/71—Environmental Noise (Sessions I-II).

105/71—How Valuable Is Human Health? (Sessions I-II).

106/71—Man-Made Interactions (Session I-II).

107/71—Interactions Between Natural and Urban Communities (Sessions I-II).

108/71—Role of Mathematics in the Development of Science (One Session).

109/71—Encounter Groups (Sessions I-II).

110/71—Environmental Sciences and International Development (Sessions VII and VIII).

111/71—Heavy Metals as an Environmental Hazard to Fish, Birds, and Man (Sessions I-II).

112/71—A Search for the Recognizable Goals and Constraints of the Steady State Earth (Sessions I-II).

113/71—Technology and Growth in a Resource Limited World (Sessions I-II).

114/71—Future of the Cities (One Session).

115/71—Women in Academia (Sessions I-II).

116/71—Daniel P. Moynihan, "Waste Disposal in an Age of Rubbish: Social Science Interpretations of American Society in the 1960's" (One Session).

117/71—Can We Develop an Index for the Quality of Life? (Sessions I-II).

118/71—Scientific Aspects of Contraception (One Session).

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