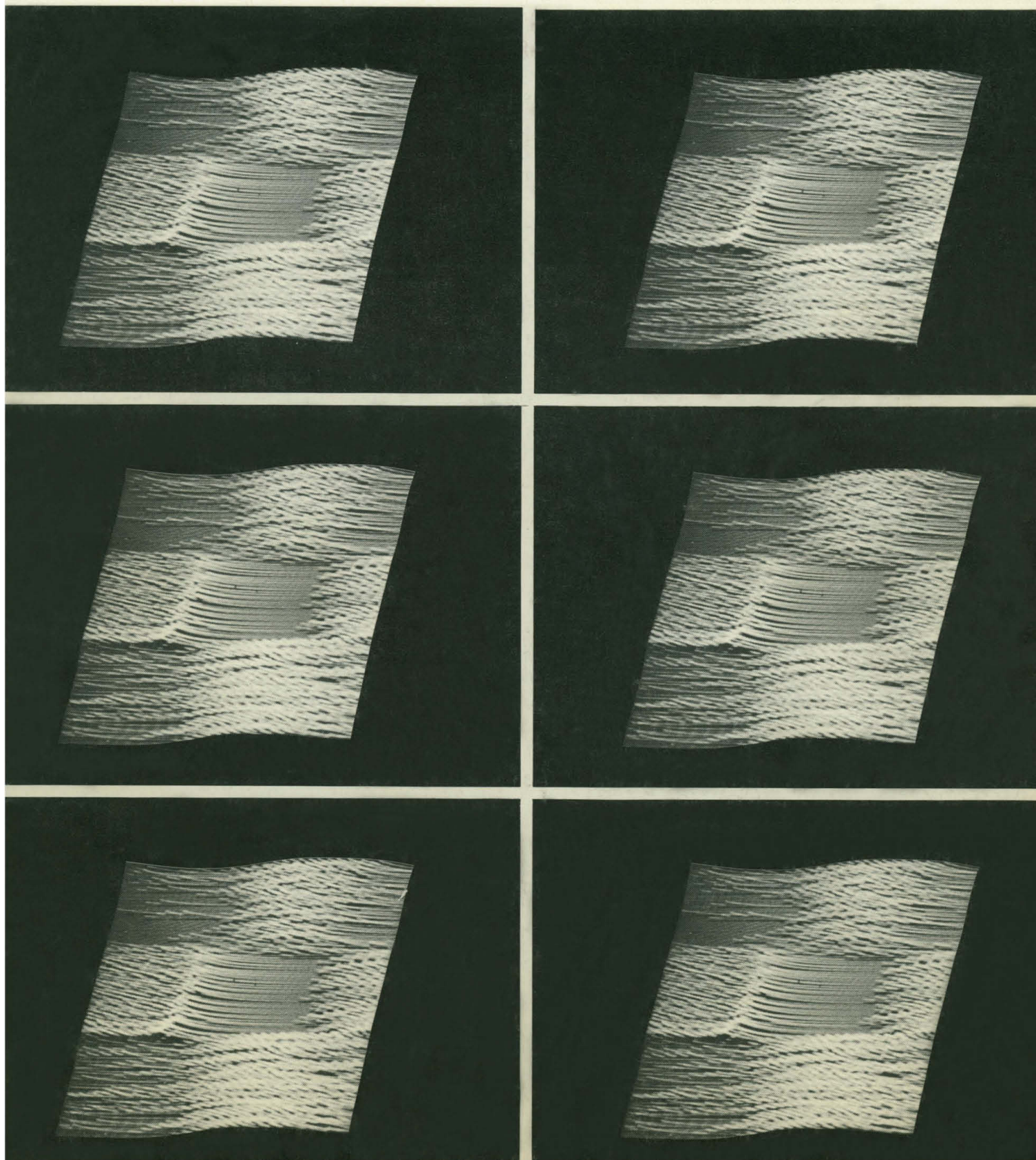


SCIENCE

7 January 1972

Vol. 175, No. 4017

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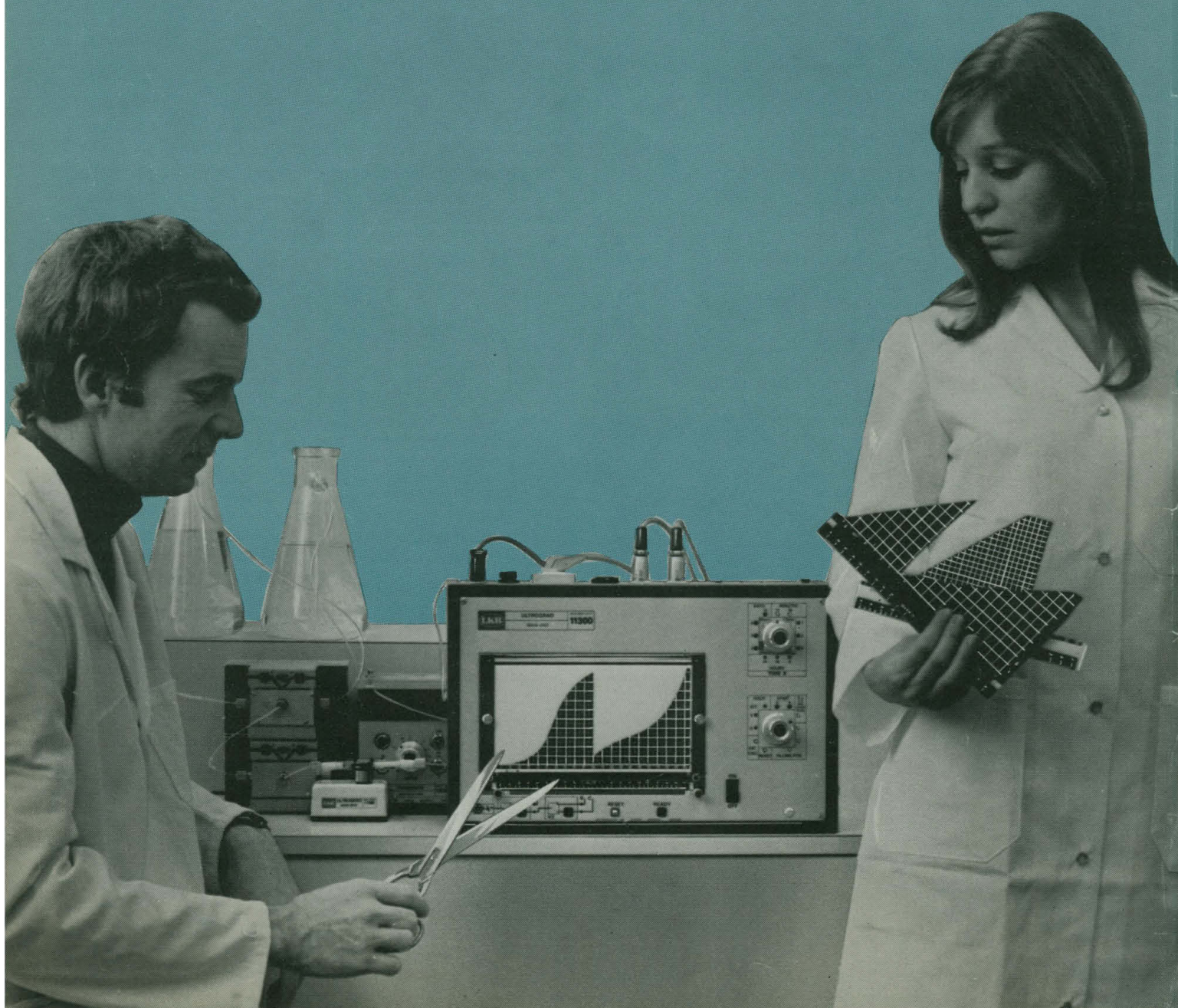
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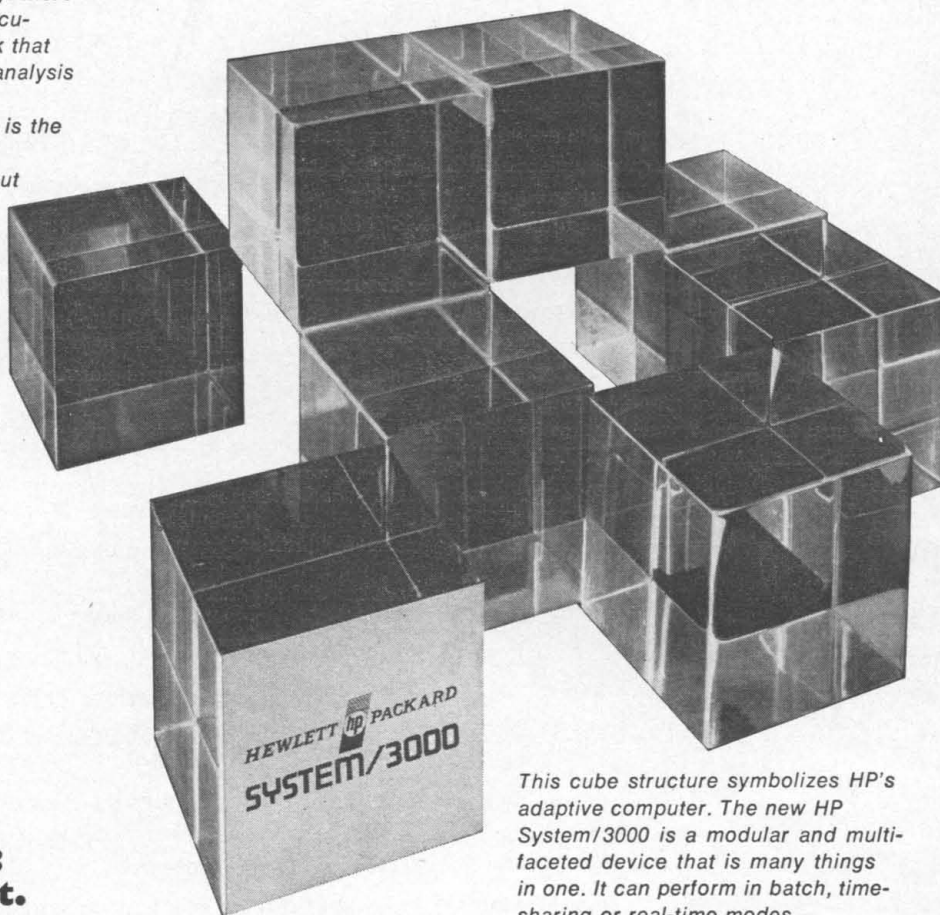
COVER

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]

The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objects are to further the work of scientists, to facilitate cooperation among them, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

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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.

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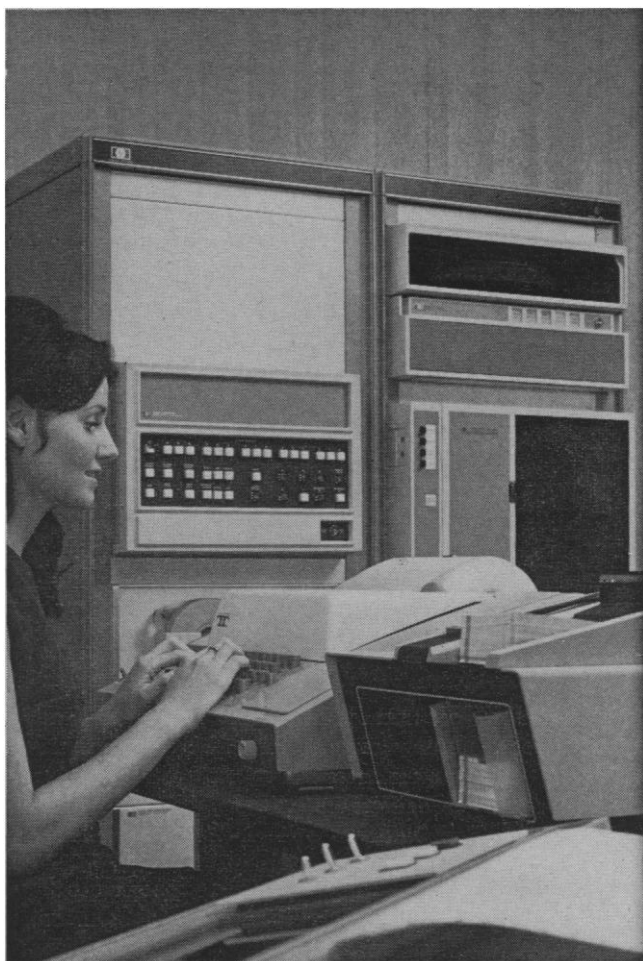
For time-shared tasks, it handles up to 64 users. For real-time processing, it allows several programs to be active simultaneously, completely protected one from the other. In batch processing, it permits execution of a variety of programs at extremely high speed.

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.

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 do it.

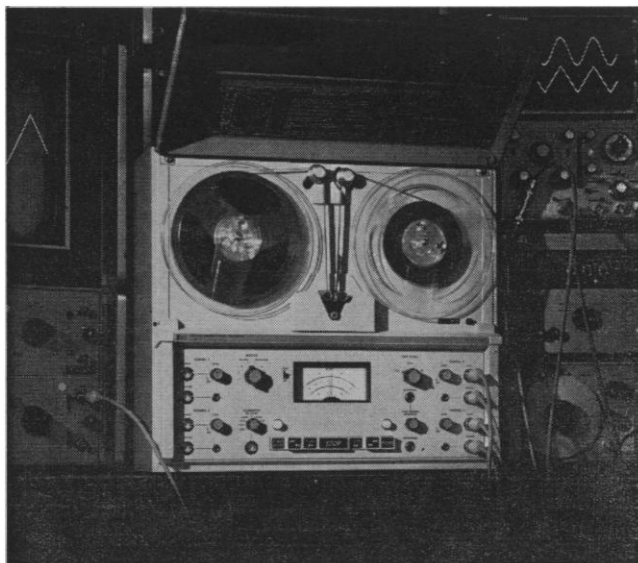
For users who need to access a large data bank and also require ease of I/O interface, computer proliferation isn't always a problem. It often can be the solution.

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.

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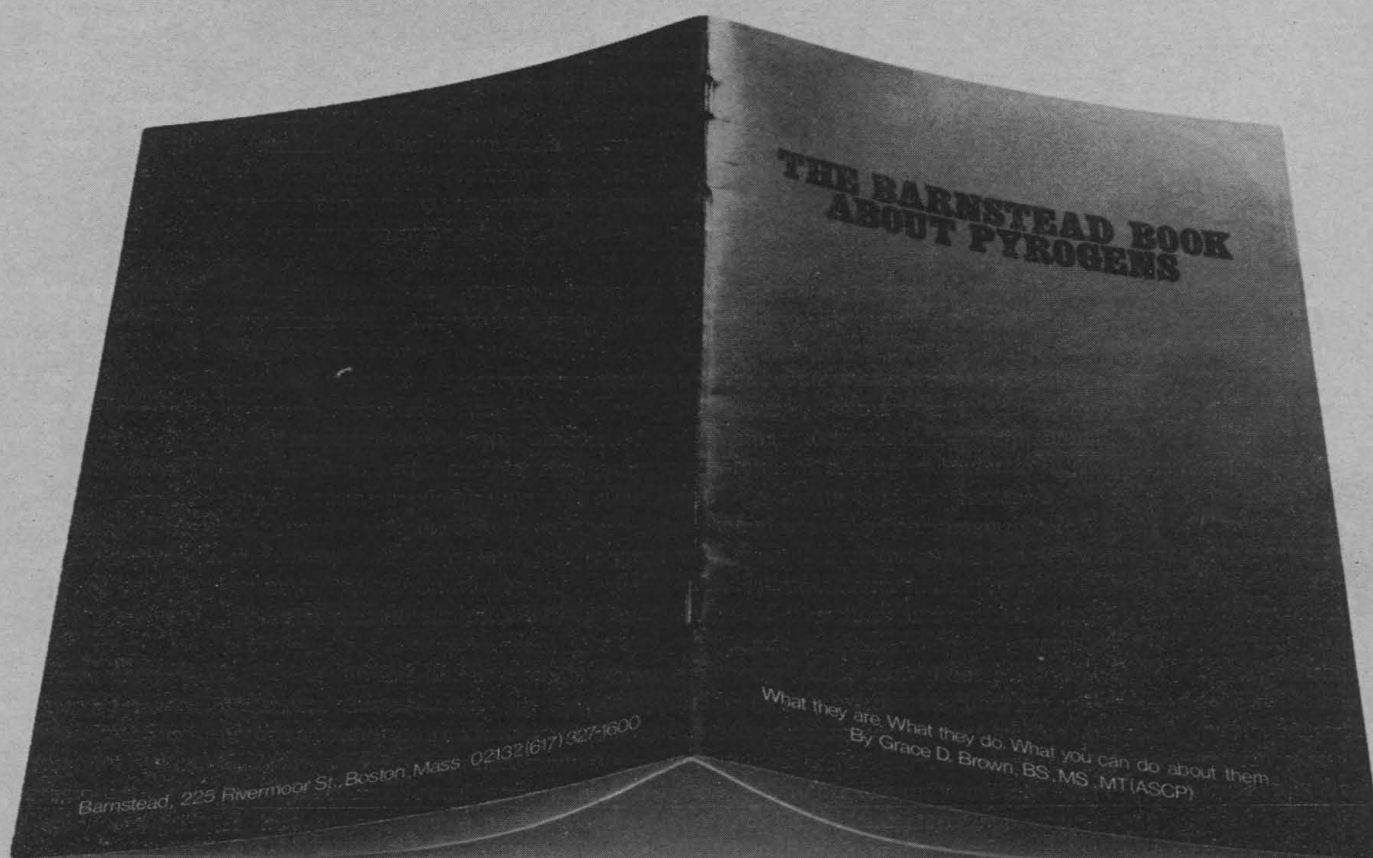
Write for Application Note 89, a tape recording handbook useful to scientists interested in tape recording techniques for vibration and test analysis, research and clinical medicine, acoustics, oceanography and other environmentally difficult research projects.

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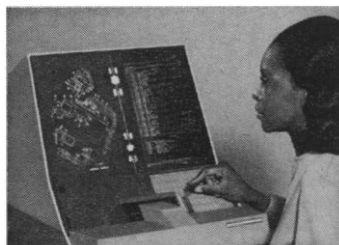
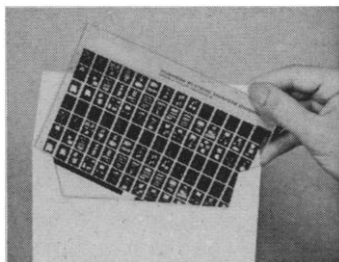
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but the printing industry will still be with us.

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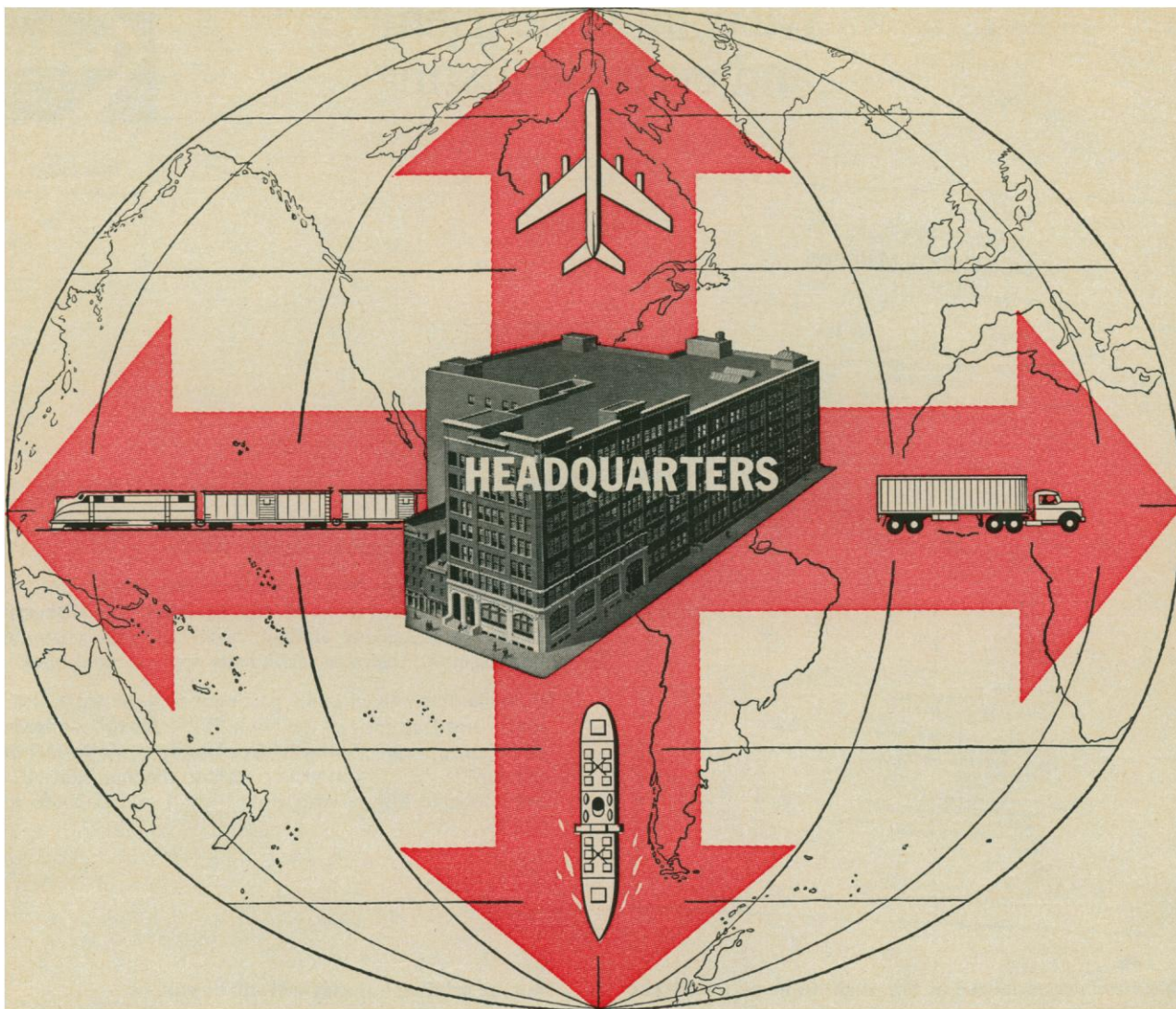
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Perhaps we shouldn't. Recruiting should run on something more dependable than enthusiasm. Distress now afflicts the "overeducated." Strongly held still—perhaps rightly so—is a concept of education that comes down from a time when college prepared men 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.

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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*

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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).

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