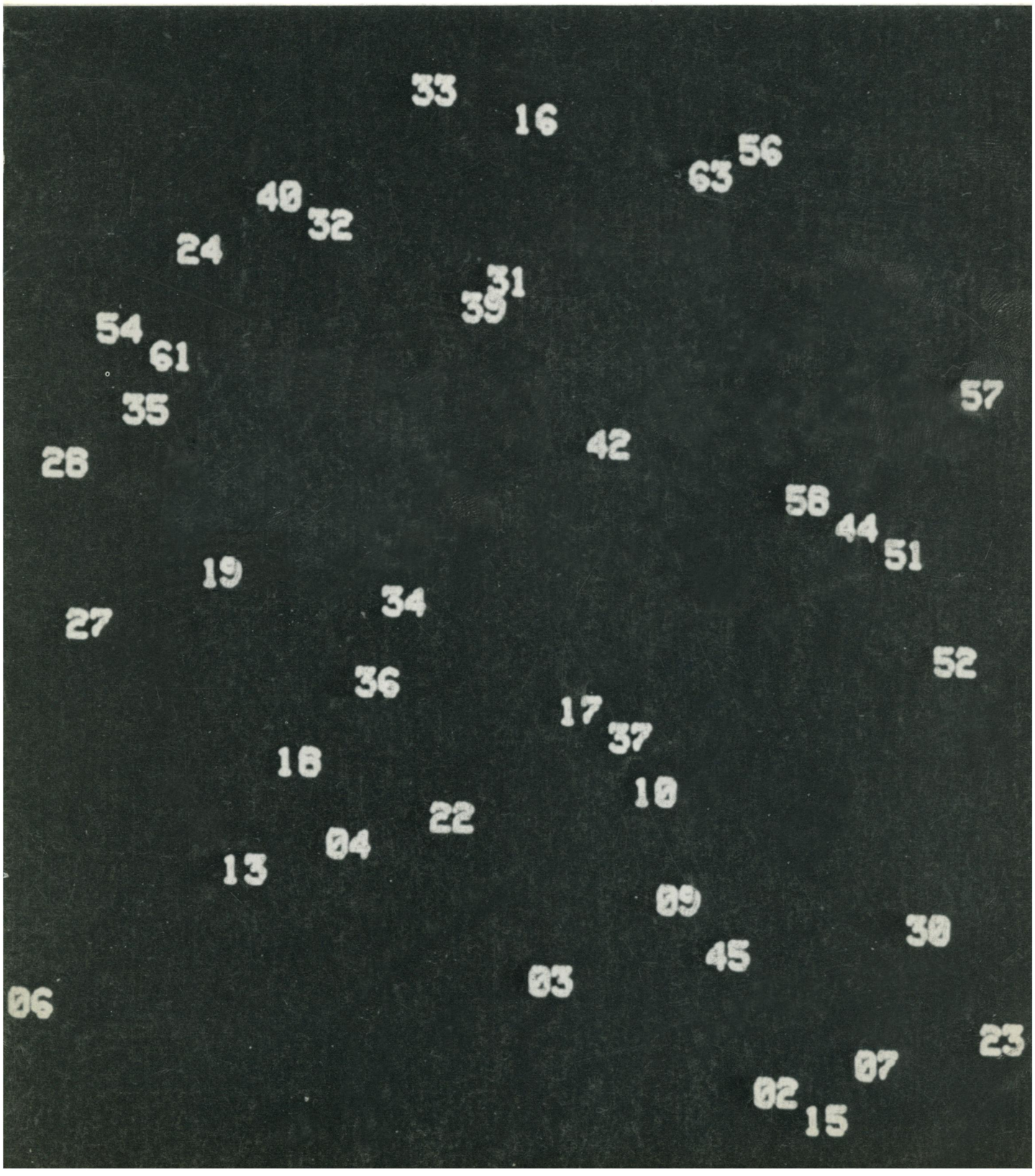
SCIENCE

1 February 1974

Vol. 183, No. 4123

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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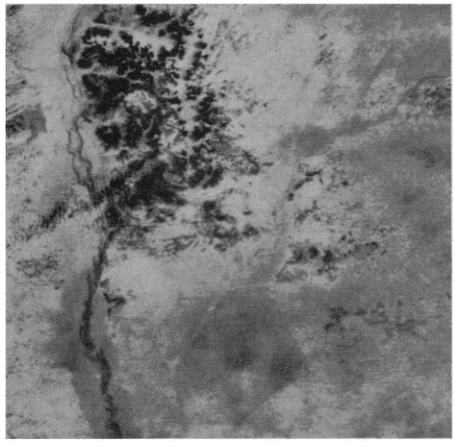
Know the land and the people*

Land

Imagery from satellites and aircraft utilizes our products. Let the benefits fall where they may.

The Sahara is expanding. Millions are suffering in West Africa. Where the sand blows, the land was once green, just as all the Sahara was in prehistory, before man turned from hunting to herding.



On April 20, 1973, NASA's ERTS caught this image from 567 miles high over the Mali-Niger border. Both are large countries drying up. Note the faint hexagon at bottom center. Its great significance was not understood. Turned out to have been drawn in five years with barbed wire that kept ruminants out long enough for grass seed dropped by the wind to do its work. Now the Niger government may convince its herdsmen citizens that barbed wire and range management threaten their way of life far less than would acceptance of employment as haulers of concrete for damming rivers.

In the U.S.A., where beautifully marbled beef is much prized, the feedlots where that beef is finished for market carry up to 200 animals per acre. Herding reaches its pinnacle. The herdsman must now worry about what comes out of the beasts as well as what to put into them. A stationary 100,000 cattle on 500 arid acres limits ground cover to salt-tolerant vegetation. In non-arid country runoff may pollute water supplies far away. Vegetation patterns, drawn by nutrients and salt and photographed from the air, can guide the feedlot operator on expanding or moving the operation.

Or so it would appear from a paper entitled "Remote Sensing for Detecting Feedlot Runoff." The American Society of Photogrammetry chose it for an award as the best photogrammetry paper by a college undergraduate. For a reprint write Kodak, Dept. 55W, Rochester, N.Y. 14650.

People

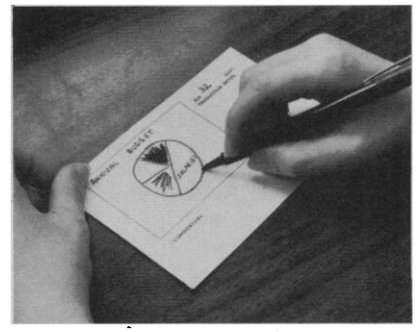
How to give them a better-than-offhand talk:

1. Think about:

What do they have in common?
Why are they coming?
How much do they know already?
How much more do they want to know?
What attitudes will they bring with them?
What do I want to change or accomplish with my message?

2. Get a pack of 4″ x 6″ index cards.

3. Draw a large box in the upper left-hand corner of a card. In that box draw a crude sketch of what comes into your mind when you concentrate on one of the principal points you want to make. It may be a chart, clipping, symbol, diagram, or a photo of a person, place, or thing. Underneath state the point in as few words as needed to cue yourself to the thought.



4. Do a similar card about the thought that leads into the thought you have just expressed. Now do one about the thought that follows the first one. Keep going like that.

5. When you run out of ideas to tack on ahead or behind, think of the important points that haven't fallen into sequence yet. Make cards for them. **Always work up the sketch before the words.** (If lively words flow out of you too easily to work that way, probably anything you'd say on any subject would fascinate any audience. In that case you hardly need any of this advice.)

6. Arrange the cards on a table in an order that makes sense.

7. Now get critical. Is the development of the ideas too plodding? Would some other scheme of arranging the cards liven up the beginning and the end? Which cards should be tossed out? Where are you skipping too fast? Where are you trying to pack too much into a single card? Make out the additional cards you need.

8. Now get critical about your stack of cards from the standpoint of practicality. Some of your sketches would take too much time and art talent to turn into presentable slides. Substitute images easier to obtain from internal sources or the public domain. If you are on your own for this, a KODAK EKTAGRAPHIC Visualmaker kit can much simplify your slide-making problems, both in copying extant material and in snapping originals.

9. Run through the talk. Make believe your sketches are already slides on the screen. Speak from the cues you've written under the sketches. (When you give the actual talk, the slides themselves may suffice as cues. Then you wouldn't be reading at all. Why assemble an audience just to hear you read?)

10. Decide whether you have too much or too little material. Discard or add cards accordingly.

11. Now you are ready to prepare your slides. Worst of the pitfalls is type or other detail that the important but shy people in the back row can't quite make out on the screen. To avoid this and other mistakes, send for the free Kodak publication "Slides with a Purpose." Address request to Dept. 55Z, Kodak, Rochester, N.Y. 14650. We'll throw in literature about the KODAK Visualmaker and other handy products.

12. You're on!

13. You're great!

Kodak

*A service mark of Eastman Kodak Company. It will be our theme for the nation's bicentennial. It summarizes much of our reason for existence.

1 February 1974

Volume 183, No. 4123

SCIENCE

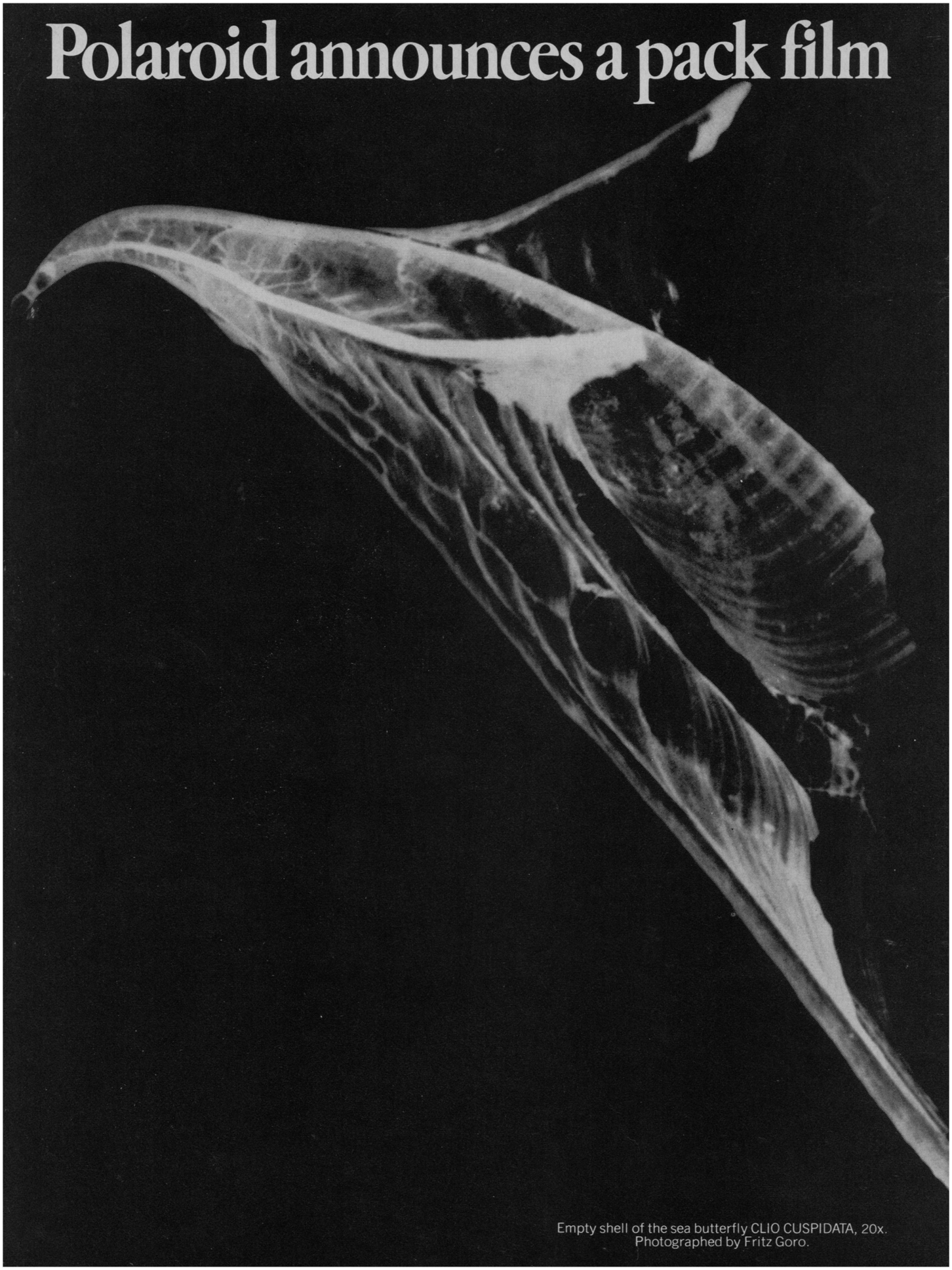
SCIENCE is published weekly, except the last week in December, but with an extra issue on the fourth Tuesday in November, by the American Association for the Advancement of Science, 1515 Massachusetts Ave., NW, Washington, D.C. 20005. Now combined with **The Scientific Monthly®**. Second-class postage 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 subscriptions: 9 months $22.50; 10 months $25. 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

Cathode-ray tube display, showing the map of punctate visual sensations ("phosphenes") elicited in the visual field of a totally blind patient. The numbers indicate the position in the implanted array of the stimulating electrode associated with each phosphene. See page 440. [Institute for Biomedical Engineering, University of Utah, Salt Lake City]

Polaroid announces a pack film



Empty shell of the sea butterfly CLIO CUSPIDATA, 20x.
Photographed by Fritz Goro.

for instant prints and negatives.

A new film for cameras and instruments now using Polaroid 3¼"x4¼" film.

Introducing Type 105.

A brand new Polaroid Land film for industrial, scientific and laboratory photographers that delivers exceptionally high-quality prints and negatives. And delivers them economically and conveniently.

Just 30 seconds after you shoot with Type 105 you get a black and white print of exceptional tonal range, sharpness and luminosity.

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What's more, this new positive/negative film comes in our convenient 3¼" x 4¼" eight-shot pack format. So it fits any instrument, camera, and Polaroid Land camera that already uses our Type 107 or Type 108 pack film.

(For 4 x 5 cameras and instruments we're introducing a new adapter for all our 3¼" x 4¼" pack film called the Model 405 Land Pack Film Holder.)

Ask at your photo store for our new Type 105 Land film.

A superb black and white film for instant prints and reprints.

Polaroid's instant positive/negative pack film.

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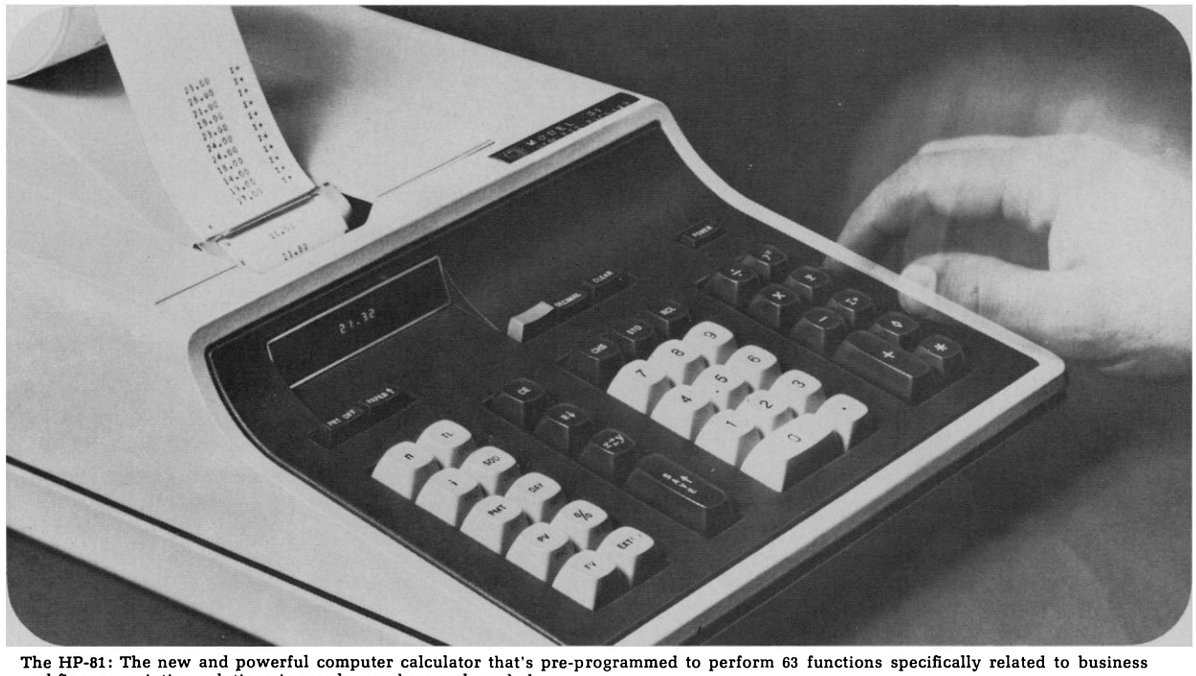
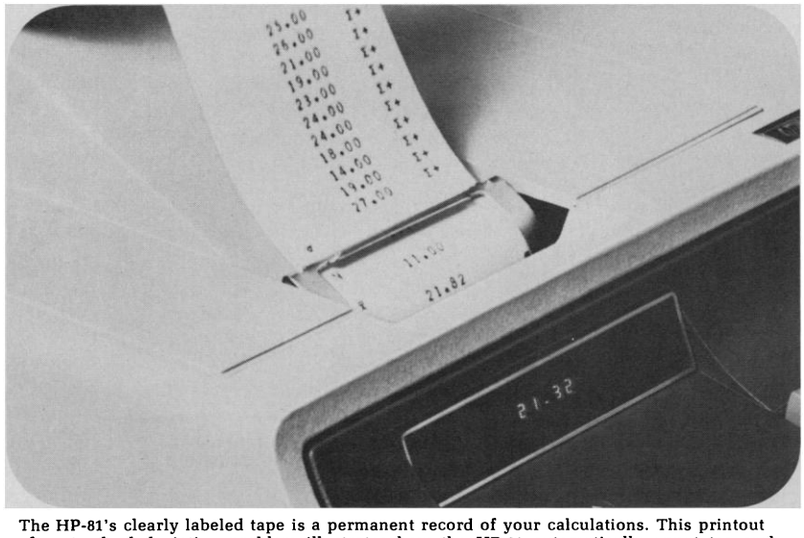
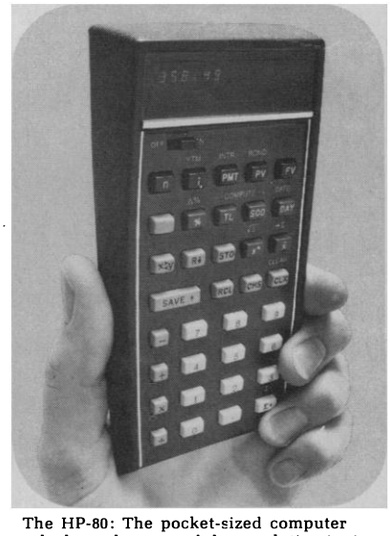


The HP-81: The new and powerful computer calculator that's pre-programmed to perform 63 functions specifically related to business and finance, printing solutions in words, numbers and symbols.



The HP-81's clearly labeled tape is a permanent record of your calculations. This printout of a standard deviation problem illustrates how the HP-81 automatically annotates each entry with easy-to-read symbols identifying each operation.



The HP-80: The pocket-sized computer calculator that started the revolution in time and money calculations. For professionals in business and finance. $395*

The HP-81 helps you make business a little more of a science.

The plethora of calculators now on the market can baffle potential buyers with a confusing array of choices. Fortunately, HP continues to provide clear choices when it comes to calculators for science and engineering, and for the world of business and finance.

For the latter, the HP-80 is still the only pocket-sized computer calculator with 40 pre-programmed business functions. And now there's the new HP-81, which applies even more computation power to the business of evaluating the complex relationships between time and money.

The HP-81 is considerably more than a desk-top HP-80 with a printer. Its added capabilities include 63 pre-programmed functions for performing – in a few seconds, and in a few keystrokes – complex business problems that used to take up to 20 minutes to calculate

manually. For example, with the HP-81 you can compute and print a 30-year mortgage table in 83 seconds, get a coupon equivalent yield in 21 seconds, or figure a discounted cash flow in 14 seconds. All without tables, calendars or formulas. They're all built in.

The HP-81 contains two 200-year internal calendars (360 and 365 days), 20 storage registers for saving dates or numbers for repetitive calculations (and for automatic multiplication or division by any constant you choose), and 10 special modes for bond and note calculations. Best of all, the HP-81's flexibility helps you explore alternate approaches to a problem. You can check variables using a different date or number, without re-entering the entire problem, and get fast assurance that you have come up with the best decision.

The time and money saved by one or two profitable decisions could easily repay the $925* purchase price. An LED display and high-speed buffered keyboard are optional. For more details on HP's newest time and money machine, send in the coupon.

Finally, a professional quality scope at a practical price.

In oscilloscopes laboratory quality means high performance. Almost every designer has one on his bench. But service and production troubleshooters don't have it as good. They too could often use a high performance scope, but can't risk this expensive and delicate instrument in their more demanding environment.

Now comes the HP 1220A to plug this price/performance gap. This entirely new oscilloscope combines industrial-quality ruggedness with professional performance at a practical price.

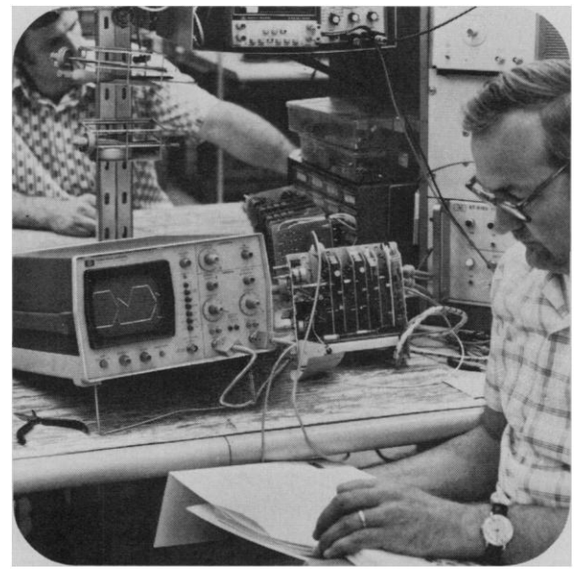
The new scope's large (8 x 10 cm) parallax-free display makes all troubleshooting easier. Because the display is calibrated horizontally as well as vertically, it's easy to locate timing circuit problems and accurately measure ac and dc voltages of waveforms.

TV servicemen don't have to fuss with frame or line triggering because the scope does it automatically. And when they want to pull out vertical interval test signals, they just turn the times-ten magnifier control.

Tough enough for the production line or service truck, the scope's rugged one-piece frame protects it against shock, and its unvented cover shuts out dust and moisture. So stable that it has only one external screwdriver adjustment, it rarely requires recalibration.

And in the classroom, the scope's fast set-up gives the instructor more time to teach. The automatic trigger always displays a baseline and immediately locks on any signal of the correct polarity and amplitude. When the student loses the signal, he can bring it back on screen just by pushing the beam finder button.

The dual-channel Model 1220A has a 15 MHz bandwidth and 2 mV/cm sensitivity, more than enough for audio, video, logic and control circuit measurements even at low levels. The 1220A costs $625*.



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SCIENCE

AAAS Meetings

The capacity of Americans to form organizations and to conduct huge annual powwows is prodigious. So vast is this activity that it constitutes a major source of revenue for the hotel business. However, the immediate, and especially the long-term, residue of all these gatherings is usually not very much. A notable exception is the AAAS annual meetings. The impacts and enduring effects of these have been great. Ideas foreshadowing major social change have had their first public visibility there.

The typical organization, and indeed most scientific societies, conduct meetings that are designed to cater to a narrow area of common interest. In contrast, AAAS has adhered to policies adopted at an Arden House conference in 1951, which provided, in part, that AAAS should "devote more of its energies to broad problems that involve the whole of science, the relations of science to government, and indeed the relations of science to our society as a whole." This has proved to be a wise policy and one that will continue to be so in the future. We are moving from a familiar era of unbridled growth toward an uncharted pattern of no-growth, from abundance to global shortages. The people's comfort—indeed, their very existence—will be determined by how well science and technology function. To most people, many of the current problems that plague the world have come as a shock. To members of AAAS these matters are old hat. They have been discussed repeatedly in annual meetings and in the pages of *Science*.

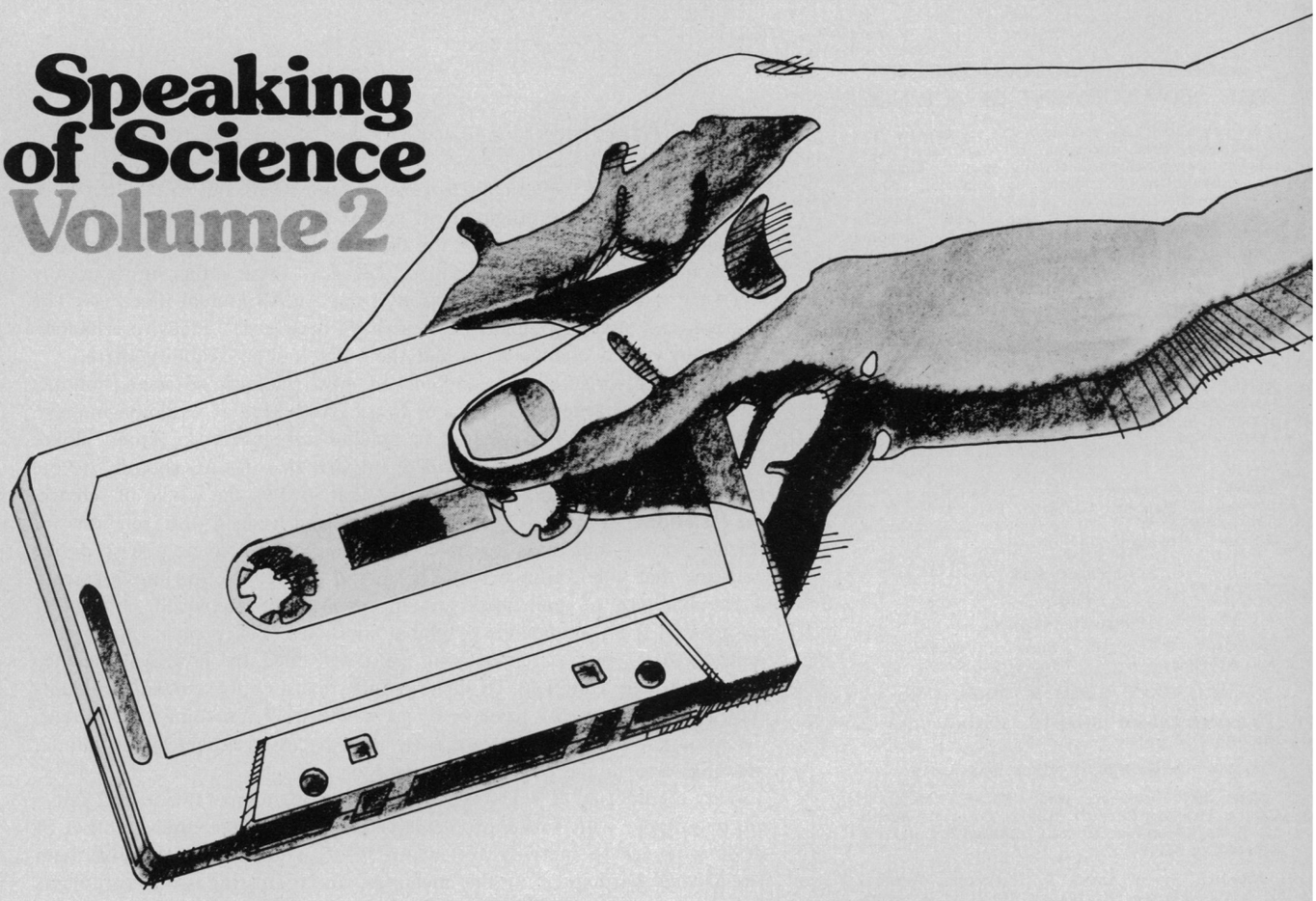
Only a minority of scientists are qualified by temperament and interest to grapple with social problems. However, a substantial fraction of those who are so inclined are members of AAAS, and many of them attend and participate in the meetings. In addressing social problems that have a substantial scientific or technological component, scientists and engineers bring a number of talents and attitudes to the task, in addition to their detailed knowledge. They tend to be future-oriented. They strive to elect significant goals. They are trained to identify the crucial variables. They are problem-solvers.

The coming meeting in San Francisco (24 February through 1 March) largely follows the precedents of the earlier ones. In more than 100 symposia, ranging in length from a half-day to several days, a broad spectrum of topics will be dealt with. Some are nearly completely scientific in character. Most have a social component.

One of the 2-day symposia represents something of a departure from past practice. It has been arranged by the cochairmen of the meeting, William R. Hewlett and Glenn T. Seaborg. They have selected and recruited as participants a very distinguished group, largely of nonscientists. The topic is "The San Francisco Bay Area: Looking toward the 1990's." Such matters as population trends, energy use, housing needs, quality of the urban environment, transportation, health, education, and Bay Area economics will be discussed. Participants will include Ed Reinecke, lieutenant governor of California; Charles Hitch, president of the University of California; and Edgar Kaiser, Sr., chairman of the board of Kaiser Industries.

The Bay Area has an excellent record of leadership and innovation. Its educational institutions are unsurpassed. It has a habit of translating serious talk into serious action. The very atmosphere of the place stirs the blood and leads to achievement. The symposium on the Bay Area in the 1990's could mark a crucial moment in the development of this vital region. It could also foreshadow like developments in other parts of this country.—PHILIP H. ABELSON

Speaking of Science Volume 2



The second volume of this informative series of half-hour conversations between scientists and science journalists is now available. Scientists talk about their work with particular insight into a variety of topics of interest and concern. These twelve dialogues have been compiled by the AAAS and edited on to six audiotape cassettes and packaged in an attractive album.

1. The Dilemma of Prisons, Dr. John P. Conrad, Dr. Edith E. Flynn, Mr. J.D. "Sonny" Wells with William Hines
2. Science and Sociology of Weather Modification, Dr. J. Eugene Haas, Dr. Thomas F. Malone with Peter Calamai
3. New Dimensions in Human Genetics, Dr. Leon E. Rosenberg, Dr. Michael M. Kaback, with Barbara J. Culliton
4. Children and Environment: A New View, Dr. Jerome Kagan with Judy Randal and Edward Edelson
5. Energy Rationing, Dr. Earl Cook, Dr. Samuel Z. Klausner with William Hines
6. Forest Ecology and Management, Dr. Gene Likens, Dr. Arnold W. Bolle with Edward Edelson
7. Environment and Cancer, Dr. C.S. Muir, Dr. Marvin Schneiderman with Edward Edelson
8. Patterns of Discovery, Dr. Benjamin Bederson, Dr. John K. Hulm with Edward Edelson
9. The Limits of Growth: A Debate, Dr. Dennis Meadows, Dr. S. Fred Singer with David Perlman
10. Tragedy of the Commons Revisited Dr. Garrett Hardin with Richard D. Lyons and Edward Edelson
11. Understanding Perception, Dr. Richard L. Gregory with Edward Edelson and Barbara J. Culliton
12. Exploring the Universe, Dr. Halton Arp, Dr. Herbert Friedman with Allen L. Hammond

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(Continued from page 401)

tion to their application to wildlife conservation, assembly rules may be applied to a major unsolved problem in theoretical ecology—the problem of coping with complexity.

Theoretical ecology has dealt mainly with one-dimensional systems. Competition studies model one species competing against another although, as evidenced by Diamond's work on community structures, this model is not always appropriate. Many species act together to compete against other groups of species. Niches may also depend upon several variables rather than upon a single variable (such as food size) analyzed by MacArthur and May. The development and analysis of multidimensional models presents a challenging problem for theoretical ecologists.

Theories of community structure and island biogeography are now being extended to other fields of research such as anthropology and epidemiology. John Terrell of the Field Museum of Natural History in Chicago is applying results from theoretical ecology to studies of the evolution of human populations. Joel Cohen of Harvard University has developed a probabilistic model of malaria epidemics based on the concept that species already on an island (in this case, the host for the malaria protozoa) affect the subsequent establishment of other species on that island. Such applications of theoretical ecology promise to enrich both other fields of research and theoretical ecology. For example, Montgomery Slatkin of the University of Chicago and his colleagues have extended Cohen's model to describe colonization by species with high extinction rates (such as insects) in situations where the colonists come from other habitats within the system.

The unsolved problems in theoretical ecology are many, but Diamond, for one, is optimistic about the future. He compares the state of theoretical ecology today to molecular biology 15 years ago—new concepts and techniques for research have recently been developed, and, he believes, the next two decades will see the completion of a revolution in the study of ecosystems.

—GINA BARI KOLATA

Additional Reading

1. R. H. MacArthur, *Geographical Ecology* (Harper & Row, New York, 1972).
2. R. M. May, *Stability and Complexity in Model Ecosystems* (Princeton Univ. Press, Princeton, N.J., 1973).
3. J. M. Diamond, *Science* **179**, 759 (1973).
4. J. Terborgh, *Ecology* **52**, 23 (1971).