SCIENCE

5 November 1971

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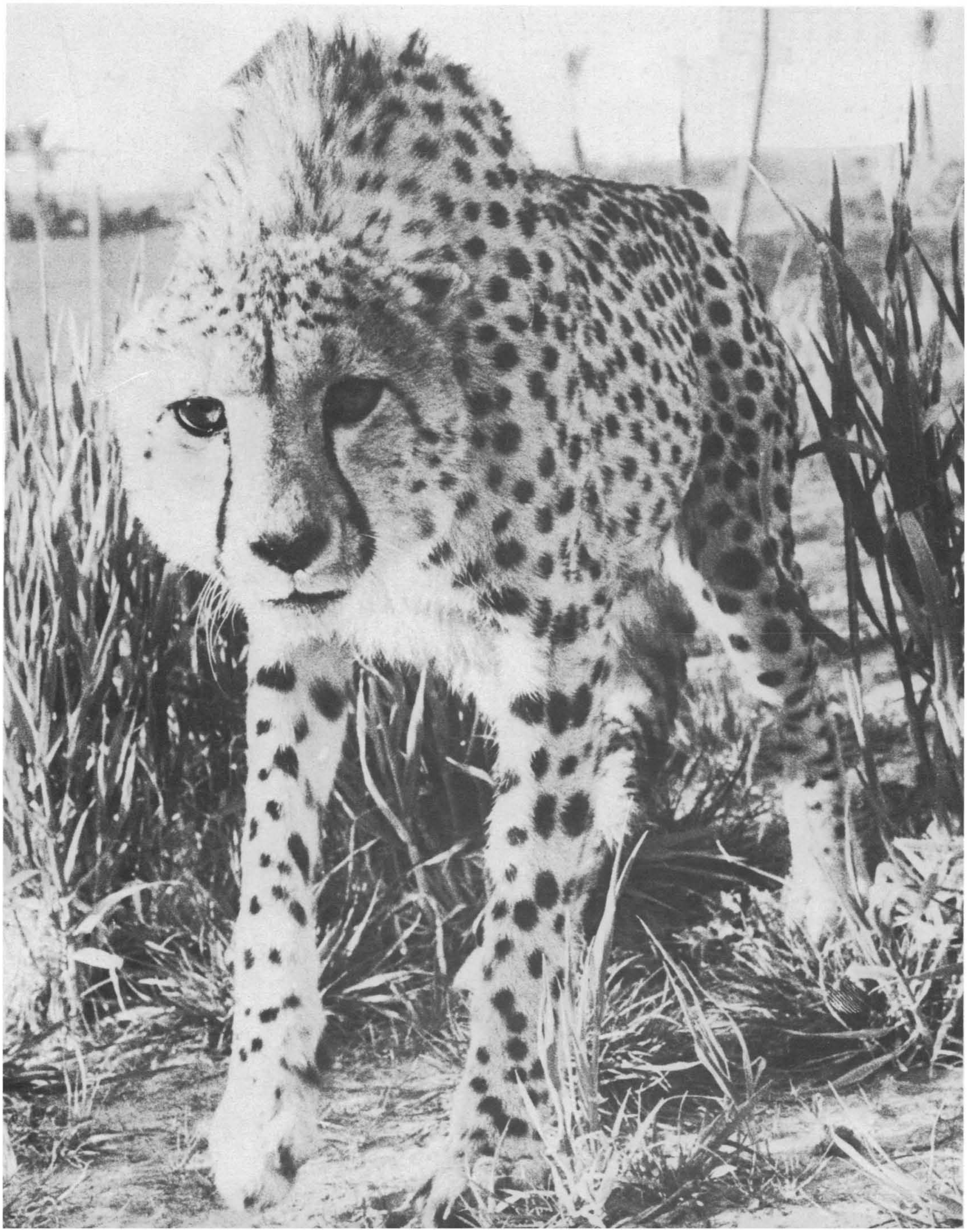
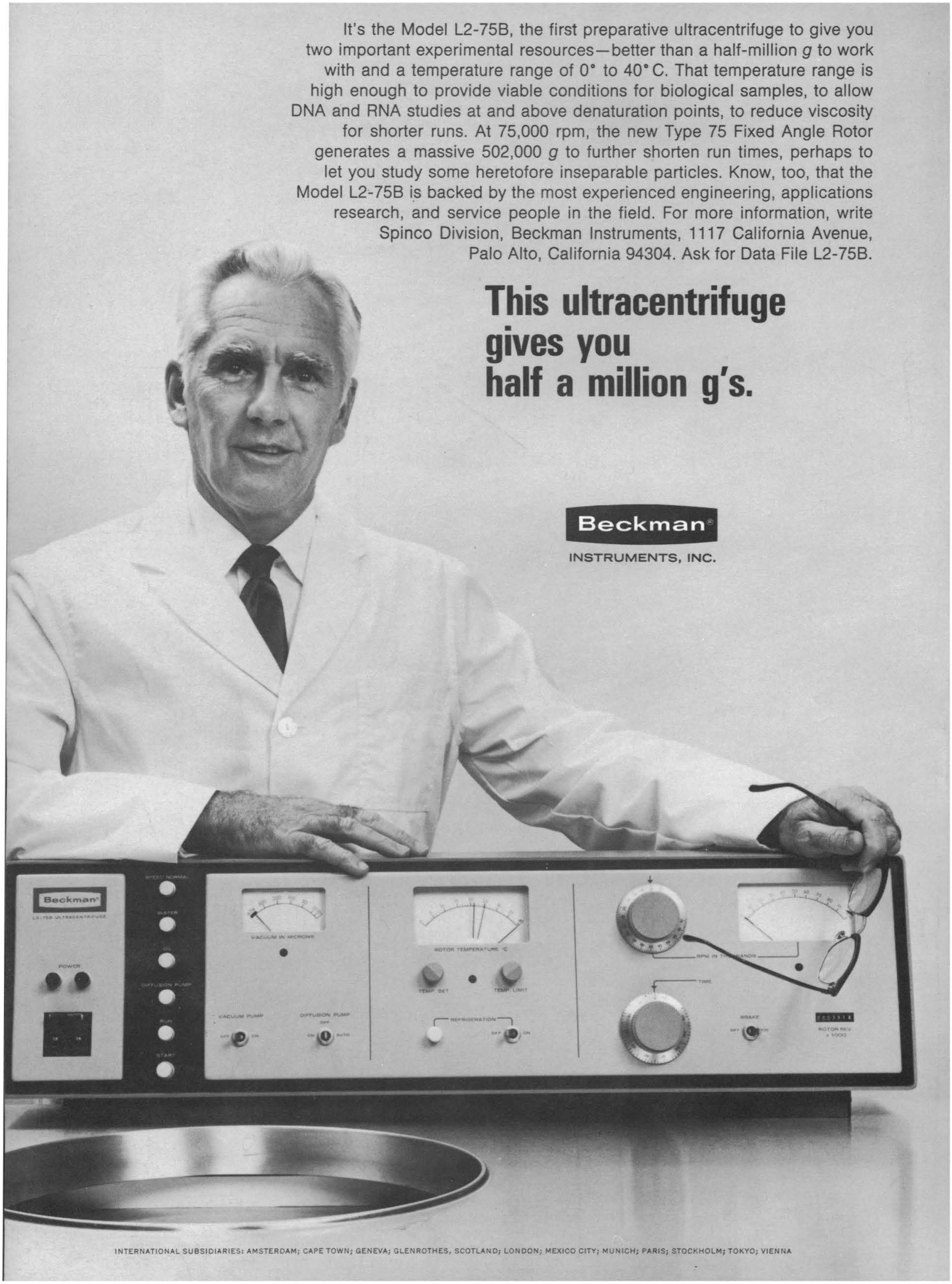
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

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SCIENCE

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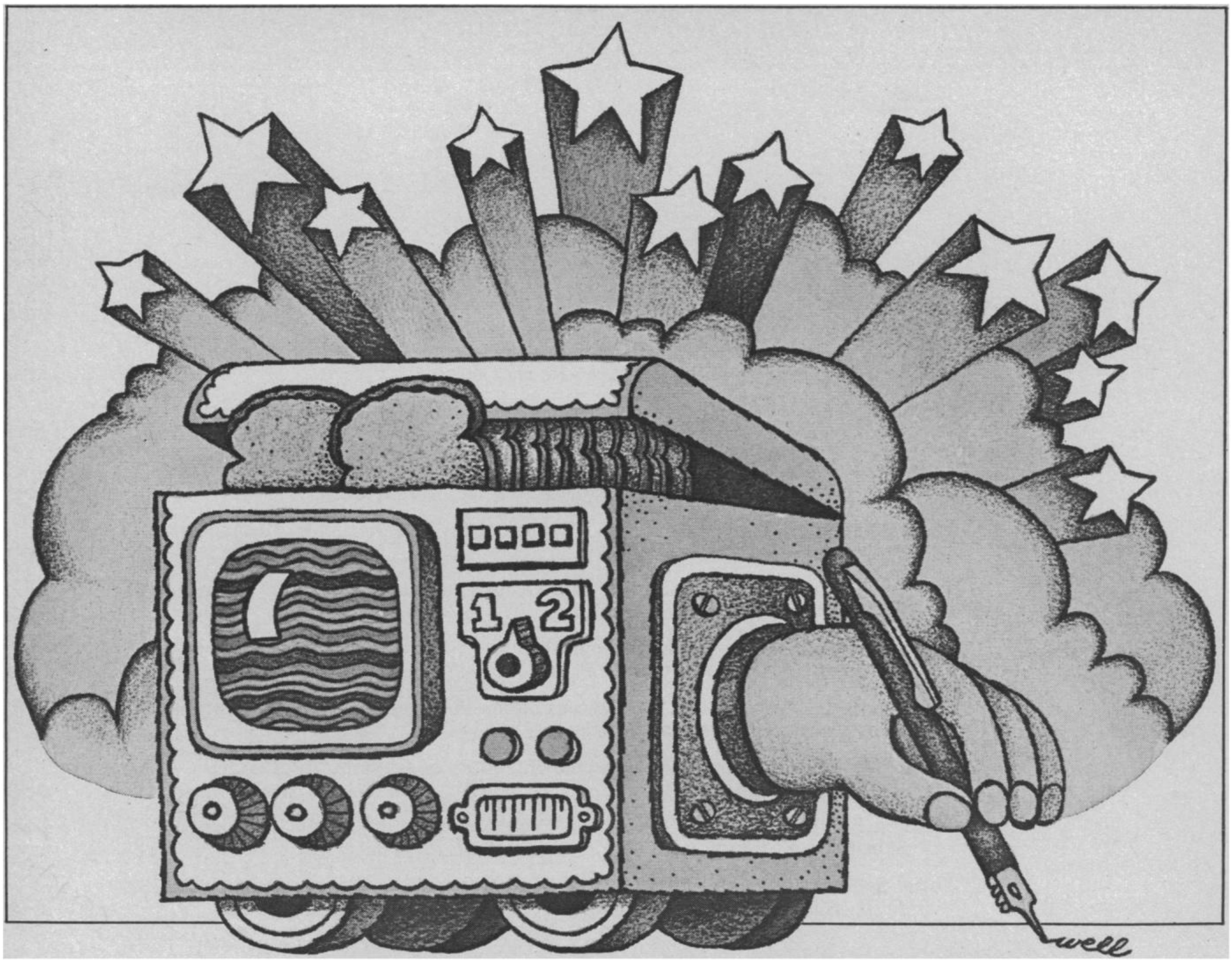
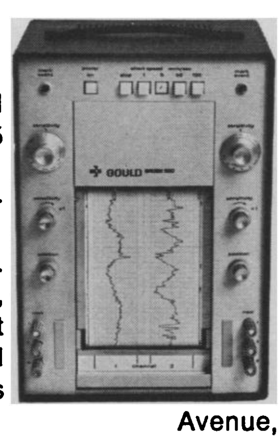
The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objects are to further the work of scientists, to facilitate cooperation among them, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding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

COVER

Interspecific, threatening posture in cheetah (*Acinonyx jubatus*). See page 615. [Randy Eaton, University of Georgia, Athens]



What's smaller than a breadbox, has two channels and built-in preamps, and writes well under pressure? Answer: the Brush 220.



The Brush 220. A rugged, two-channel recorder that's little to the tune of 25 pounds, accurate to 99½% linearity.

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It starts with our pressurized ink system. A system that forces ink into the paper, instead of just laying it on. So you get traces that are clear, clean, and crisp. And a disposable ink cartridge holds a year's supply of ink.

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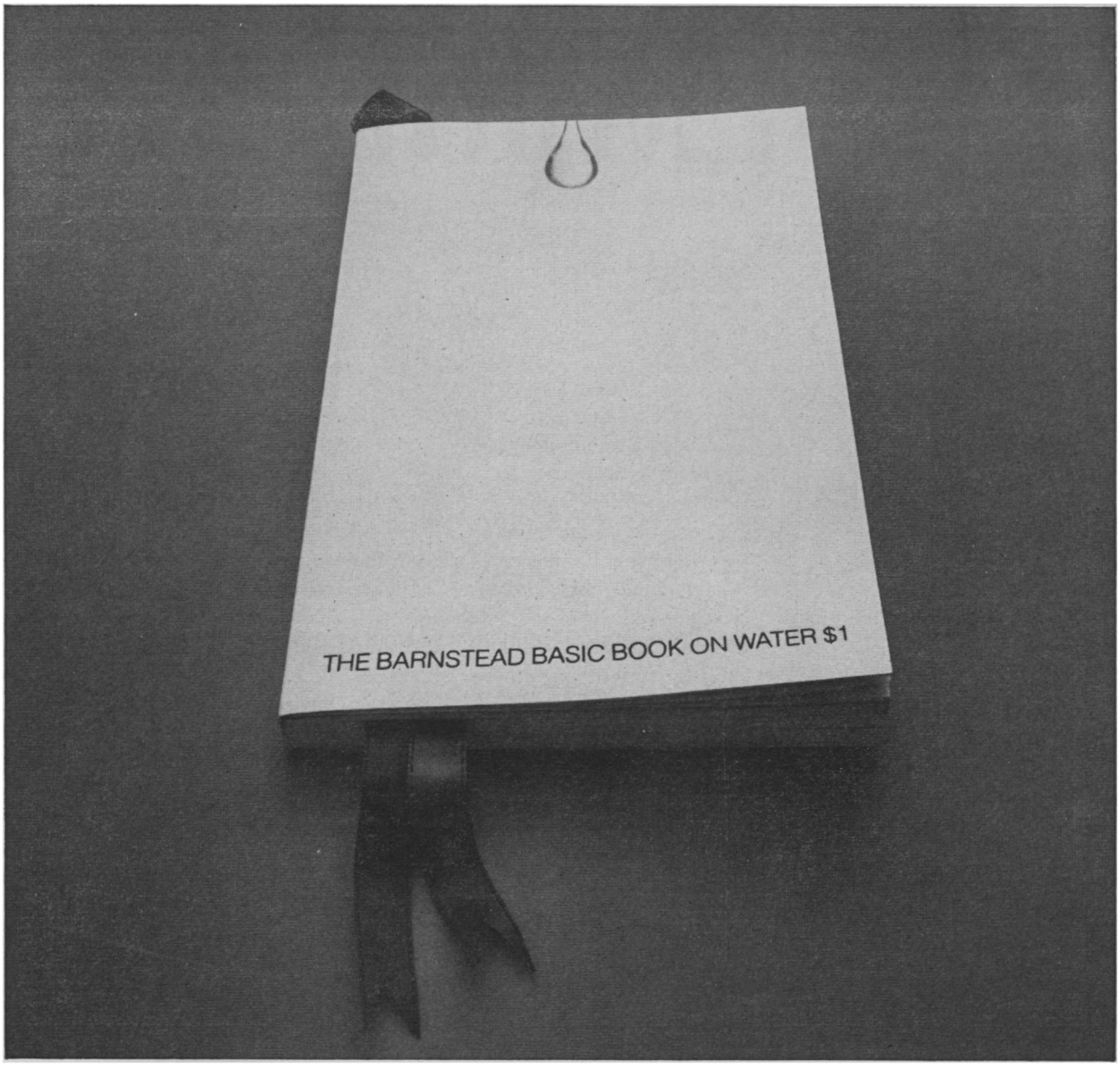
BRUSH INSTRUMENTS

GOULD



It's not just another book. It's a whole new bible on water.

And it's about time.
There's been a lot of loose talk about the what's, why's, when's and how's of water and what you can and can't and should and shouldn't do with it.
But nobody's taken the time to cut the fact away from the fiction and put it all down on paper.
So we did it ourselves.
All one hundred and twenty eight pages of it.
And there's no sell in it.
Not one word about why most of the people in your business think we're the first people to talk to in ours whenever they want to talk about water and how and when to process it.
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We don't mention our process water systems.

We wrote it to clear the air about water and we don't even want us to get in the way.
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The people in your lab.
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Your architects.
Your purchasing people.
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Each copy you order will cost you one dollar.
Even at that price we're still taking a beating on it.
But we think once you read it you'll know that we wrote the book on water.
And maybe you'll beat a path to our door to find out how much better we can help you do whatever you do with it.

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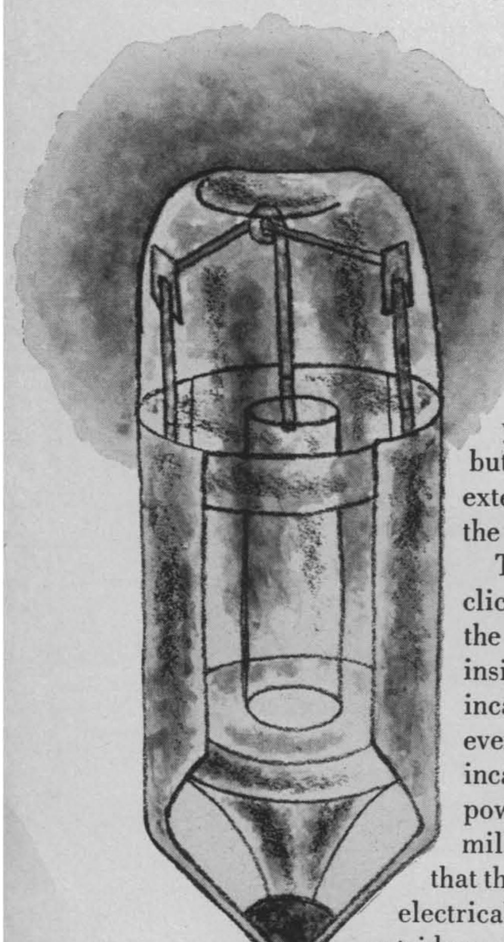
The Evolution of

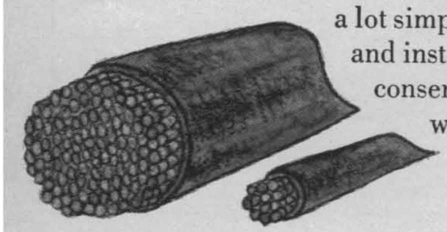


If you've ever used a telephone with buttons that let you switch from one line to another, you probably noticed a decided "click" when you pressed one of the buttons—and a thick cable extending from the back of the phone's base.

The reason for both the click and the thickness of the cable is that the lamps inside the buttons are incandescent bulbs, and even the smallest incandescent bulb requires power in the order of 400 milliwatts. This means that the lamps have to get electrical power from an outside source; that all the switching has to be done *inside* the phone (hence the clicks); so we need 50 wires coming out of it.

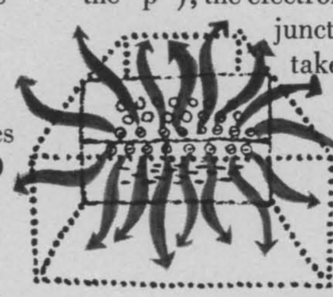
What would happen, however, if that light source required no more power than normally required to operate the phone itself, and if this light source were *also* compatible with integrated circuitry?

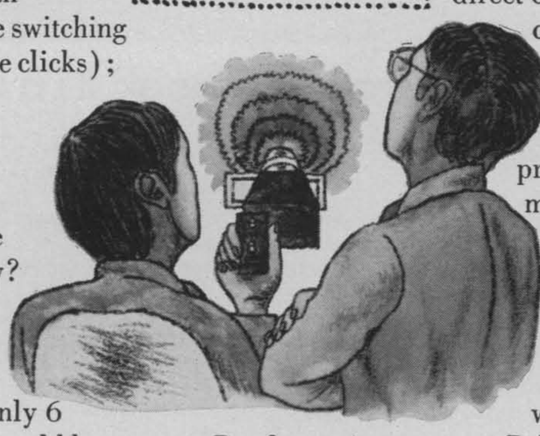
It would mean, first, that the switching could be done electronically; a light touch of the button would activate it; and the phone would need only 6 pairs of wires. Furthermore, the phone would be a lot simpler, hence less costly to make and install; much copper could be conserved; and power consumption would be reduced.



Well, such a light source is in late stages of development at Bell Laboratories and Western Electric. It's the gallium phosphide, light-emitting diode, and its ultimate significance goes far beyond even what we've already described.

Like all solid-state diodes, the light-emitting variety is made up of an "n"-type layer doped with an impurity which produces an excess of electrons in the conduction band, and a "p"-type layer doped with an impurity which produces an excess of holes in the valence band. When voltage is applied (negative to the "n" layer, positive to the "p"), the electrons and holes drift toward the junction, where recombinations take place. Under certain favorable conditions, the energy emitted in such a recombination can take the form of a photon of visible light, a virtually direct conversion of electric current to light.



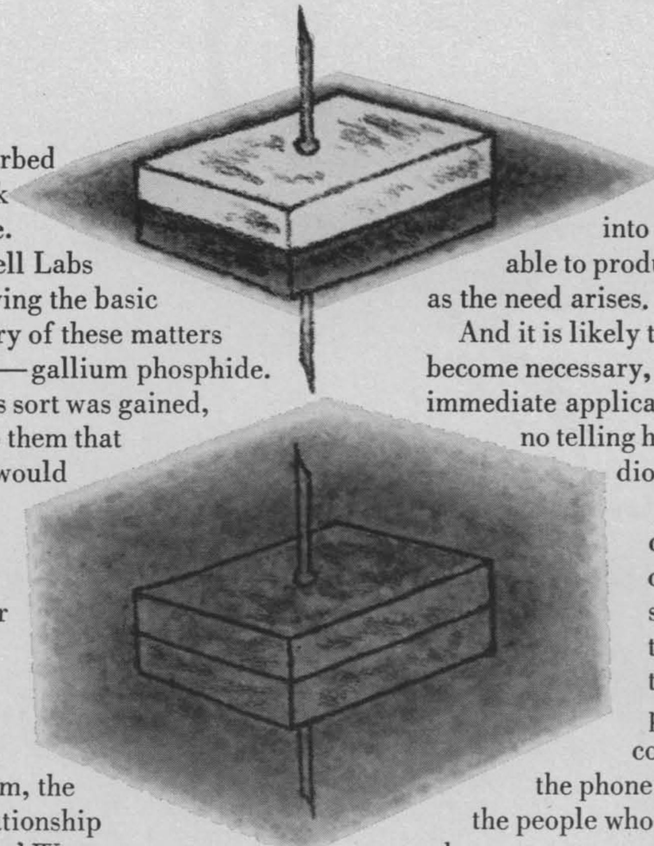


This phenomenon has been long recognized; the problem was finding a material to make an efficient light source.

In the early 1960's it was discovered that gallium arsenide phosphide was such a material.

But for various reasons Bell Labs scientists were not quite satisfied with GaAsP. Among other things it was not efficient enough at visible wave-lengths. Furthermore, it was not sufficiently transparent: many of the photons that *are*

a Solid New Light



produced get reabsorbed before they can break loose from the diode.

Meanwhile the Bell Labs scientists were studying the basic physics and chemistry of these matters in another material—gallium phosphide. As knowledge of this sort was gained, it began to appear to them that gallium phosphide would make a better light source.

It would take development time for gallium phosphide lamps to surpass those of gallium arsenide phosphide. But in the Bell System, the unique working relationship between Bell Labs and Western Electric makes it possible to telescope the later stages of development with the early stages of production technology.

Thus, once the research had reached a point where it seemed possible to produce efficient diodes on a larger scale, part of the development effort was moved to Western Electric's plant in Reading, Pa. Here, Western Electric and Bell Labs engineers worked together, setting up pilot production facilities, and producing the diodes to be used in a field trial of experimental key telephones.

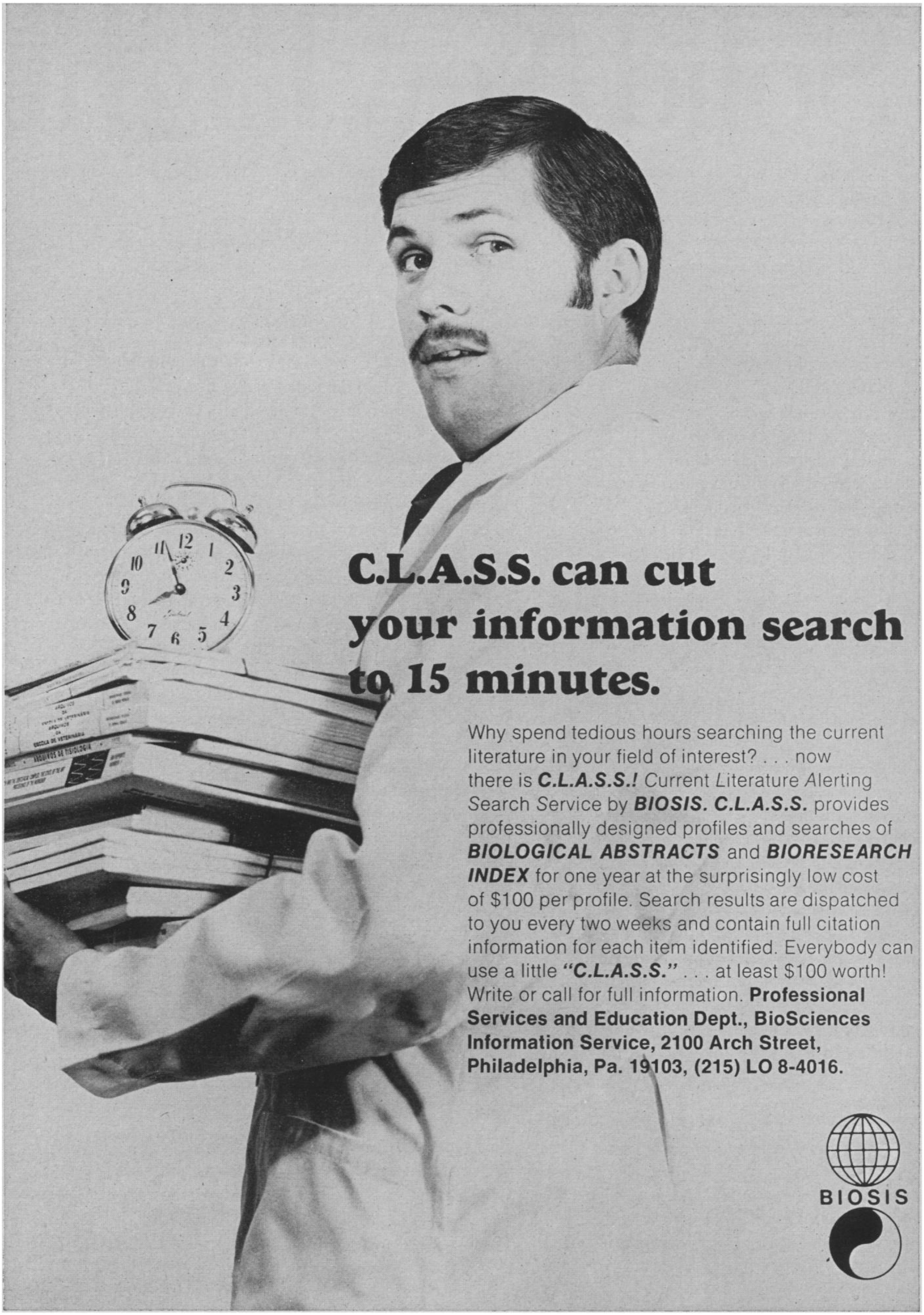
But even while all this was going on, Western Electric engineers were developing ways of turning Bell Labs experiments into mass production methods. Producing GaP crystals, doping them, mounting them, laser-testing them and getting them on line involved virtually a brand new technology. Because Western Electric engineers got into the job so early, they will be able to produce GaP diodes in vast quantity as the need arises.

And it is likely that mass production will become necessary, because looking beyond immediate application in key telephones, there's no telling how many uses for light-emitting diodes the Bell System will discover.

Their use would simplify the design and reduce the power consumption of telephone switchboards. And it's possible that some day your home telephone may have a readout panel that will allow you to dial a code when you come home, and see the phone numbers of the people who called when you were out; dial your bank and see your balance or dial a computer, put in a problem and see the answer immediately.

New, improved light-emitting diodes and all the advances they can mean are the kinds of things that happen because Bell Laboratories and Western Electric work together.

Bell Labs
Western Electric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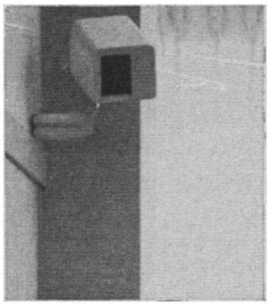
BIOSIS



We want to be useful ...and even interesting

Kodak

Time compressor

That camera up there can be set to expose silently one frame every 1¼ seconds, or one frame every 90 seconds, or anything in between. At normal projection speed the 7200 frames in the super 8 cartridge will run 6⅔ minutes, into which is compressed a time span from 2½ hours to 7½ days. For glaciology that's probably not enough compression, but for many other scientific endeavors and for engineering studies it's just fine.

Now as it happens that camera up there is neither designed nor priced as a scientific instrument. It is intended to keep an eye on thieves and robbers. Considered in need of watching are a vast acreage of floor space devoted to banking, retailing, warehousing – and many gates. If there is no reason to process the film, so much the better. But there *is* demand for a great many more such cameras than if the market consisted of a scientist or engineer here and there who would like to try some time-lapse movies on some problem or phenomenon but hesitates to promise his business manager that time-lapse photography will usher in a new era of progress for the enterprise.

Sad as is the need for so many such cameras, let us hope that the ill wind will blow science and engineering a bit of good.

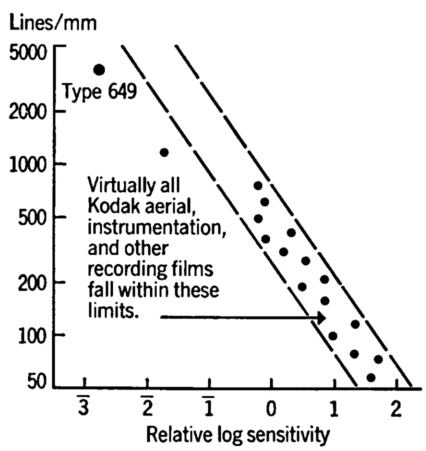
At less than $240, the KODAK ANALYST *Super 8 Camera may not be priced like a scientific instrument, but a request to Instrumentation Products, Eastman Kodak Company, Rochester, N.Y. 14650 can bring a visitor bearing the camera, counsel on its possible application to your problem, cartridges of* KODAK *MFX Film (less than $4.50 each), and instructions for getting it processed as quickly as though there had been a bank robbery. That MFX film was specifically created for time-lapse photography at an effective exposure index of 160. For color (balanced for 3400 K) you use the fast new* KODAK EKTACHROME *160 Movie Film (Type A).*

Prices subject to change without notice.

Is holography ready to leave the laboratory?

Kodak's role in holography – which means registering light waves instead of images–is shaping up in the production of photographic materials to make it work better for the companies staking their lives on it.

The well-known KODAK "Spectroscopic" Plates and Film, Type 649-F, nourished holography through infancy and early childhood. Nothing else available on a practical basis provided as much resolution. The price paid in loss of speed was worthwhile. Here's what we mean:



The price need no longer be paid. **Advances in emulsion-making can now keep the dots from leaking out to the left at the top of the normal range on the chart.**

We are now happy to inform holographers that we can furthermore provide plates and film of enhanced diffraction efficiency along with the more favorable speed-grain relationship. We can also reduce the several micrometers of sag in the emulsion as it dries after processing.

That's what our technology can do. Now we are about to learn how much economic support exists for the technology. The entertainment field? Recording, storage, processing, and retrieval of information? You and we know that it costs less to manufacture by the mile than by the foot.

Conversation and correspondence on this matter are welcomed by Department 916, Eastman Kodak Company, Rochester, N.Y. 14650.

Dust, the study of

"70003" seems to be airborne dust from stainless steel.

"02170" arises primarily from the abrading of concrete floors and bearing metal.

0 2 1 7 0 represents relative distribution among the following elements:

- <5% Ni and Cr
- 65-75% Ca, Mg, and Si
- 5-15% Pb, Sn, and Zn
- 15-25% Cu
- <5% Fe

If one day 70003 suddenly shows up in the air of a production area and persists thereafter, it bears looking into. Iron in the air may harm the product. Or 70003 in the air may be important as an early warning of trouble in a machine. We have learned how to interpret some of these 5-digit profile numbers that appear on the computer printout from a system whose input is an air sample. Other organizations may need more digits than 5 or fewer in their adaptations of our system.

At any rate, whoever wishes to adopt or adapt it for the logging of dust can look up *Applied Spectroscopy 25*:270-5 (1971). No Kodak products are used in the system, but the system is used in making Kodak products. If our methods of elaborate vigilance against inorganic contamination can help in ways apart from the reliability of the Kodak sensitized goods produced, so much the better.

The spectrograph used is a commercially available direct-reading instrument. The dirt is collected on filter paper in a fully described filter holder connected to a vacuum pump or inserted in a high-velocity air duct. The paper is burned in a hollow electrode with the gap maintained at 2mm for 30 sec by a cardioid cam. It's the method of reporting results that may be the most interesting.

Recent Advances in the Preparation of L.S.C. Samples

Radioactive Proteins

A paper on the *"Rapid and Simplified Method for Liquid Scintillation Counting of Radioactive Proteins"*[1] clearly indicates the advantages of Aquasol for determining radioactivity of proteins. Observed counts from replicate samples prepared in Aquasol are highly reproducible; in addition, the observed radioactivity with Aquasol is higher than with a toluene/Triton X-100 (2:1) scintillation solution. Liver samples prepared in Aquasol accurately indicate actual protein activity, as shown by a linear response to protein concentration, and by a decrease in radioactivity of protein following cycloheximide and dimethylnitrosamine. Aquasol has the unique property of forming gels when mixed with water. This gel will hold the protein in suspension. On the other hand, samples prepared in toluene/Triton X-100 (2:1) scintillation solution settle on the bottom of the vial where self-absorption becomes an important factor. A procedure using Aquasol with acid-precipitated proteins follows:

1. Apply hot acid-precipitated proteins to Millipore filter under vacuum
2. Wash filter cake
3. Place filter cake and filter into liquid scintillation vial with 3.5 ml water
4. Add 11.5 ml Aquasol, shake well and count

Lipid Extraction From TLC

Data from the article, *"Recovery of Lipids from Thin-Layer Chromatography for Radioassay"*[2] demonstrates that the combination of a multipurpose scintillator, Aquasol, and a suitable elution system can give complete recovery of all classes of lipids from TLC plates. Both neutral and phospho-lipids give quantitative recoveries in the indicated systems. It was ascertained that up to 300mg of silica gel could be added to Aquasol without impairment of ^{14}C counting efficiency. Specific applications follow:

Neutral Lipids

1. Develop plate in hexane:ether:acetic acid (90:10:1)
   Unsaturated Lipids — expose to iodine vapor and allow for sublimitation of iodine.
   Saturated Lipids — develop in duplicate and spray one spot with sulfuric acid.
2. Suspend silica gel in 15 ml Aquasol
3. Shake well and count

Phospholipids (except phosphatidylcholine)

1. Develop plate in chloroform:methanol:7M ammonia (230:90:15)
2. Visualize spots by exposure to iodine vapor or H_2SO_4 spray
3. Suspend silica gel in 15 ml Aquasol
4. Shake well and count

Labeled Inulin

Inulin labeled with tritium or carbon-14 is widely used for assessment of glomerular filtration rate and determination of extracellular spaces. Signficant decreases in observed radioactivity with time have, in many instances, precluded the use of liquid scintillation counting as an analytical technique. The *"Evaluation of Liquid Scintillation Systems for the Assay of Tritiated Inulin"*[3] conclude that an Aquasol/water system affords ease of sample preparation, high counting efficiency and long-term sample stability. Samples prepared by this technique remained stable over the ninety-day experimental period, maintaining a satisfactory counting efficiency of approximately 27 percent. A brief description of the sample preparation technique is as follows:

1. Place tritiated inulin aliquod in liquid scintillation counting vial
2. Adjust sample volume to 3.5 ml with water
3. Add 11.5 ml Aquasol, shake well to form stiff gel, count

Acrylamide Gels

Data from *"Acrylamide Gel Electrophoresis of Radioactive Compounds With Accompanying Low Background"*[4] describes a method for the detection of radioactive components in polyacrylamide gel disc electropherograms by automated mechanical fractionation with the use of Aquasol. Aquasol also can be successfully utilized in the conventional, non-automated acrylamide gel counting procedures with minimal background interference. Unpublished data provided by Harris-McEvoy follows:

N, N'-methylenebisacrylamide cross-linked

1. Place 20 mg wet sample into glass liquid scintillation vial
2. Cover gel with 0.1 ml 30% H_2O_2 and cap tightly
3. Incubate at 50° until digested
4. Allow to cool
5. Add 10 ml Aquasol, shake well and count

Ethylene diacrylate cross-linked

1. Place 20 mg gel samples into liquid scintillation vials
2. Add 1.5 ml 10% NH_4OH and cap tightly
3. Incubate at 50° until digested
4. Allow to cool
5. Add 10 ml Aquasol, shake well and count

Reduction of Adsorption by Phosphates and Sulfates in Glass L.S.C. Vials

Data on the *"Incorporation of High Concentrations of Phosphates and Sulfates in Samples for Liquid Scintillation Counting"*[5] reports of problems associated with solubility and adsorption on the walls of glass vials by solutions of phosphates and sulfates. For instance, the loss of counts and reduction of apparent radioactivity over a period of time can be minimized by using Aquasol as follows:

1. Add up to 2 ml sample to 15 ml Aquasol
2. If precipitation or turbidity occurs, add water in increments of 0.2 ml, with shaking, until sample clears
3. Count

30% (W/V) Sucrose Density Gradients

Thirty percent (w/v) Sucrose gradient cuts were measured by liquid scintillation counting utilizing Aquasol. The results for tritium labeled samples follow:[6]

Sample Volume	Aquasol Volume	% of Sample	^3H Efficiency	Figure of Merit†
0.5 ml	14.5 ml	3.3	29.9 ± 0.1%*	14.9
1.5 ml	13.5 ml	10.0	29.3 ± 0.4%	44.0
2.5 ml	12.5 ml	16.7	27.0 ± 0.6%	67.5
3.5 ml	11.5 ml	23.3	26.7 ± 0.1%	93.3

†Figure of Merit = (volume added sample) (efficiency)

- Counting performed on Packard TriCarb Model 3320
- Absolute efficiency of TriCarb is 60% with sealed ^3H standard in toluene
- Settings: Gain — 50%, Discriminators 50-1000
- 3 samples at each point. Internal standard = 125190 DPM
- All samples clear at room temp.

*S.D. of the mean

References and Notes

1. Marvin A. Friedman, Gail Miller, Arthur McEvoy and Samuel S. Epstein, *Anal. Chem.*, Vol. 43, No. 6 (1971).
2. David Kritchevsky and Saroj Malhotra, *J. Chromatog.*, 52, 498-499 (1970).
3. Arthur McEvoy and Wayne G. Harris, *Anal. Biochem.* (in press) (1971).
4. Bohdan Bakay, *Anal. Biochem.*, 40, 429-439 (1971).
5. Unpublished data, Assay Laboratory, NEN Corp.
6. Unpublished data, Assay Laboratory, NEN Corp.

ernment to reverse its position, but to waste public health funds to protect the public from imaginary hazards is an unwanted consequence that Wade overlooks.

Wade describes the advisory committee report as a "whitewash" job and asks the question, "Why did the EPA advisory committee on 2,4,5-T fail so badly to reach a verdict that would be generally acceptable to the scientific community?" Let us assure you that the "verdict" of the committee does indeed represent the majority view of toxicologists.

The tragedy of the whole controversy is that the EPA, by Wade's own admission, set aside the recommendations of the scientific advisory committee "in response to external pressure" and continued the ban on 2,4,5-T. In so doing, the administrator of EPA has done a disservice to his own scientific staff and has shaken the confidence of toxicologists in the scientific integrity of his agency. Must the majority membership of a scientific profession resort to "external pressure" to obtain sound judgment in government, rather than being permitted to devote full time to the investigation of real health hazards?

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Nicholas Wade makes a mistake shared by most scientists, publicists, and politicians who engage in the tricky problem of assessing the biological hazards of low-level physical insults. As one who has been involved in the almost isomorphic controversy regarding low levels of radiation, I can sympathize with both the "classical toxicologists, food technologists and agri-chemical engineers, who are trained to look for the short-term effects . . . [and the] microbiologists and geneticists . . . who are professionally concerned with the long-term effects of chemical contaminants on human health."

The point missed by Wade, as well as by most of the other protagonists, is that the seemingly simple question "What is the effect on human health of very low levels of physical insult?" can be stated in scientific terms; it can, so to speak, be asked of science, yet it cannot be answered by science. I have, in a paper presented to the Ciba Foundation last June, proposed the name *trans-scientific* for such questions that seemingly are part of science yet in fact transcend science—that is, are incapable of resolution by science.

Let me use as an example of a trans-scientific question the problem of low-level radiation dose. Here far more is known of a quantitative sort than in the case of chemical pesticides. The dose of x-rays, given all at once, that is necessary to double the spontaneous mutation rate in mice is often taken to be 30 rems. One may well ask, assuming the dose-response curve to be linear down to zero dose, how large an experiment would be required to *demonstrate* empirically that 170 millirems (which until recently was about the yearly dose allowed to be imposed by nuclear industry) would increase the mutation rate by the 0.5 percent predicted by the linear dose-response theory? The answer is that around 8×10^9 mice would be required to demonstrate a 0.5 percent effect at the 95 percent confidence level. So large an experiment is beyond practical comprehension. The original question as stated is therefore, in my terminology, trans-scientific.

One must note, further, that large experiments of this sort, when practical, are conducted on mice, not men; there is always a trans-scientific residue in any such experiments because of the inherent uncertainties in extrapolating quantitative dose effects from animal to man.

In a certain sense, Fitzhugh's attitude toward toxicology, which Wade somewhat sarcastically refers to as "refreshingly simple," is entirely correct: ". . . anything is safe if you go low enough, and anything is toxic if you go high enough." The point which has been lost is that any null experiment—that is, an experiment that shows no biological effect at low levels of insult—does not *prove* the insult is harmless, since a larger experiment might show effects. In the case of radiation, where massive quantitative data are available, the experimental population required to verify the linear hypothesis down to 170 millirems in mice is impossibly high.

As scientists, therefore, we must admit that some questions, including the most important ones raised by concern for the environment, are really trans-scientific, not scientific. When ". . . Ruckelshaus and Miller . . . were surprised to find that scientists could disagree among themselves as much as lawyers do . . ." the disagreements in the main were over trans-scientific, not scientific, questions.

This does not mean that all questions underlying establishment of emission standards are trans-scientific; as Wade points out, the concentration of 2,4,5-T in food chains is a bona fide scientific question that science is proficient in answering. But I must stress that where low-level effects are concerned, there will always be a trans-scientific residue. To decide on standards when science can say neither yea nor nay requires some procedure other than the one usually used by scientists in resolving bona fide scientific questions. Some version of an adversary procedure, whether formal, as in the licensing of a nuclear reactor, or informal, as described in Wade's report, probably is the best we now have for resolving the trans-scientific questions that underlie so many of the conflicts between science and technology, and society.

ALVIN M. WEINBERG
Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830

We have just returned from another inspection of the impact of war on the environment of Indochina, where the following situation came to light. Its gravity is reinforced by EPA Administractor Ruckelshaus's recent decision that public health considerations demand the maintenance of severe restrictions on the use of 2,4,5-T.

After the laudable suspension of the use of the military antiplant agent Orange (a mixture of 2,4-D and 2,4,5-T) last year (News and Comment, 24 Apr. 1970, p. 453), there remained unused in South Vietnam some 5.2×10^6 liters of Orange containing about 3×10^6 kilograms of 2,4,5-T, enough to treat over 200,000 hectares at standard military dose rates. We received conflicting reports as to whether the United States or South Vietnam currently has legal jurisdiction over this material.

Although the application of all antiplant agents in South Vietnam by U.S. armed forces was officially suspended in early May of this year, the South Vietnamese armed forces continue to apply them. The South Vietnamese currently employ agents White (a mixture of 2,4,-D and picloram) and Blue (dimethyl arsinic acid), but it is our fear that the stores of Orange will also be used by them in the future. Our attempts to obtain clarification of this potentially serious situation met with frustration. An official spokesman for the South Vietnamese armed forces refused to comment. An official spokesman for the U.S. Embassy limited himself for the record to the statement that these unused stores of Orange "had not been forgotten." Unofficially, he commented that he wished he knew of a ready means of disposal for them. Finally, an official spokesman for the U.S. Military Assistance Command informed us in no uncertain terms that the Orange was the property of the Vietnamese government, that it was their country, and that they could employ it if, when, and as they wished.

It would be the height of bureaucratic nearsightedness for our government not to cut through any necessary red tape in order to have the remaining Orange destroyed before it is too late. The 21.9×10^6 kilograms of 2,4,5-T contained in the Orange, with which we inundated South Vietnam between 1962 and 1970, were applied prior to a knowledge of the medical (toxic and teratogenic) dangers; they are now known.

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Lindsay's Record

In Bazell's report on health research in New York City (News and Comment, 17 Sept., p. 1108) I was quoted as saying: "[Mayor] Lindsay is a typical liberal arts major who flunked science in prep school, so now he doesn't like scientists."

That statement looks harsher in print than it sounded or was intended when spoken—in hyperbole and in illustration of another point.

For all I know, John V. Lindsay may have had high marks in science at prep school; in political science, he undoubtedly led his class. As for his relations with scientists, his friends in New York count upon him to lead the way to change in the national political arena away from the anti-intellectualism that blights the support of science from Washington today.

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SCIENCE

AAAS Meeting in Mexico City

In 1973 the AAAS will celebrate its 125th anniversary as a scientific organization which, since its inception, has been concerned with the implications of science for human welfare. In recent years, sharper emphasis has been given to this aspect of Association activity, and in 1973 a new international dimension will be added. The board of directors has approved plans for holding the annual meeting in Mexico City. The meeting will be the first of its kind in the history of the AAAS, extending its concerns substantially beyond the United States and Canada. It will be jointly planned and financed with the Consejo Nacional de Ciencia y Technologia of Mexico. It will be the first general inter-American meeting on science and technology.

The joint meeting will concern itself with an inquiry into "Science and Man in the Americas." Its objectives, as stated in a preliminary proposal, will be to present to a professional and a lay audience aspects of science that profoundly influence the development and well-being of all people in the Americas.

The dates of the meeting will be 18 to 22 June, but two other major related activities will span a broader period of time. First, all AAAS-affiliated societies are encouraged to develop with their Mexican colleagues specialized meetings either preceding or following the main meeting. Second, a major exhibition of science and technology, which will take place over a period of approximately 3 weeks, has been proposed.

To plan the details of the meeting, a U.S. executive committee,* which will work closely with the Mexican Consejo, has been appointed

The Consejo is an official body of the Mexican government, with broad responsibilities in scientific and technological affairs. The Consejo was created in December 1970 upon the initiative of President Luis Echeverria of Mexico. Its objective is to collaborate as adviser to the Mexican government in all activities related to science and technology.

The director-general of the Consejo is Eugenio Mendez, who is secretary of transportation and communications in President Echeverria's cabinet. Its board of directors includes several other cabinet officers, as well as other top scientific officials of Mexico.

The program will comprise areas of particular importance to the Americas. Among these are the sea and its resources; ecological changes produced by progress; energy and the ftuture; technology for the use of deserts and arid zones; new foods, food technology, and nutrition; seismology and earthquake engineering; new techniques in automation and information processing; astronomy in the Southern Hemisphere; and others, including anthropology, pharmacology, population, and public health.

The major activities will take place in the well-equipped auditoriums of the Medical Center of Mexico City. All sessions will be in both Spanish and English.

The board of directors of the AAAS feels strongly that the Mexican meeting, emphasizing those activities which further the public understanding of science throughout the hemisphere, is consonant with the fundamental aims of the Association. It is to be hoped that the knowledge exchanged, when applied to human affairs, can play an important part in the future of the whole American continent.
—ATHELSTAN SPILHAUS, *Chairman of the Board of Directors, AAAS, Smithsonian Institution Building, Washington, D.C. 20560.*

* Harrison Brown, foreign secretary, National Academy of Sciences; William T. Golden, treasurer, AAAS; Caryl Haskins, former president, Carnegie Institution; Howard O. McMahon, president, Arthur D. Little, Inc.; Glenn T. Seaborg, former chairman, AEC, and president-elect, AAAS; Henry Dreyfuss, designer; Walter Berl, meeting editor, AAAS; William Bevan, executive director, AAAS; and Athelstan Spilhaus.

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