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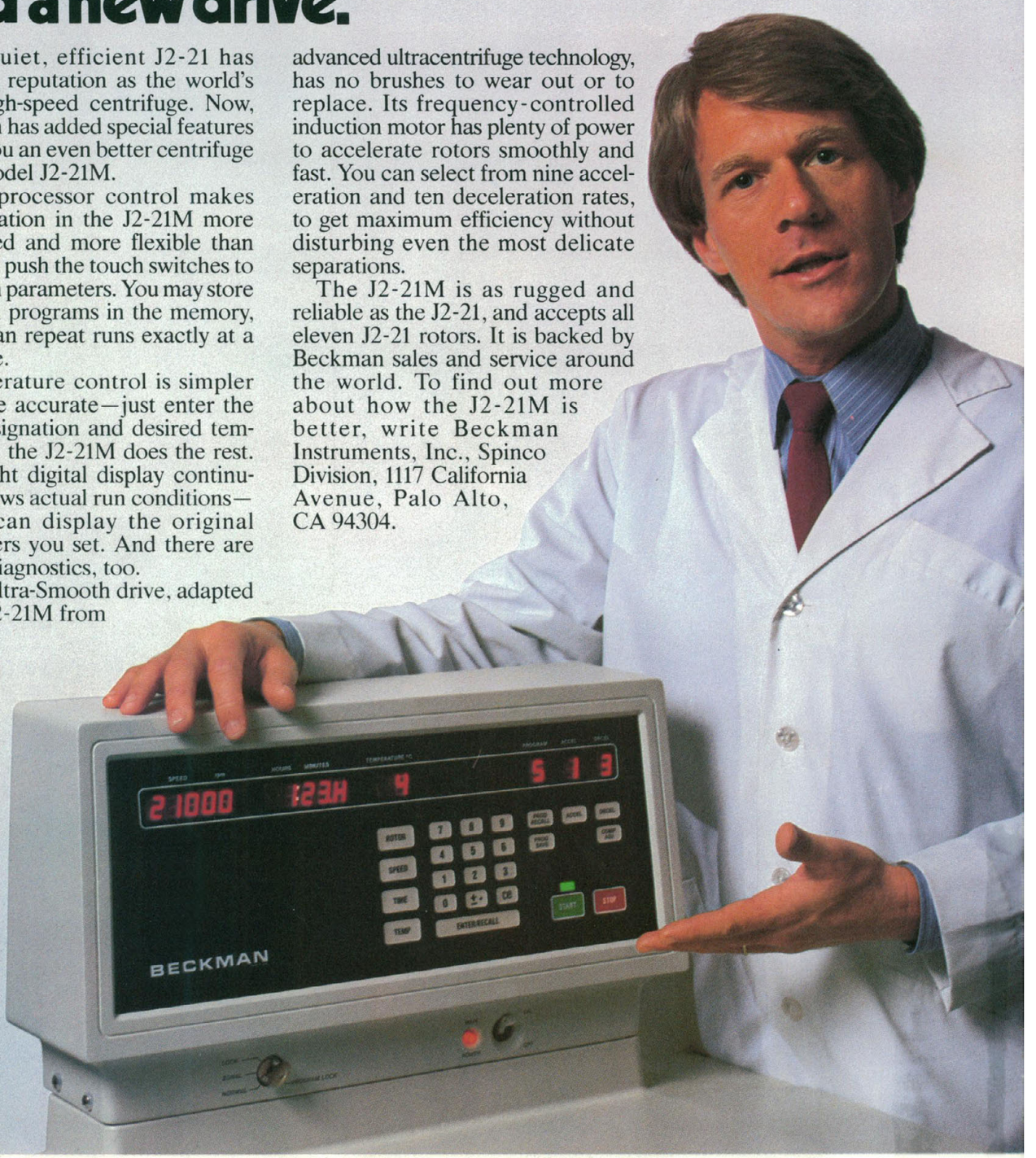

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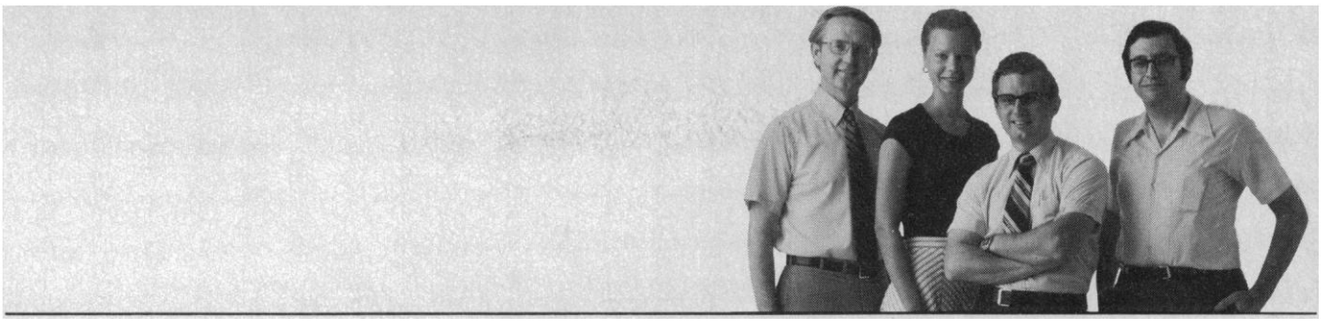
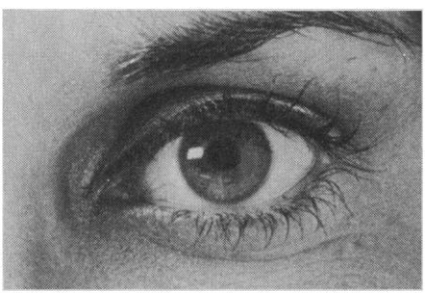


The eyes have it.

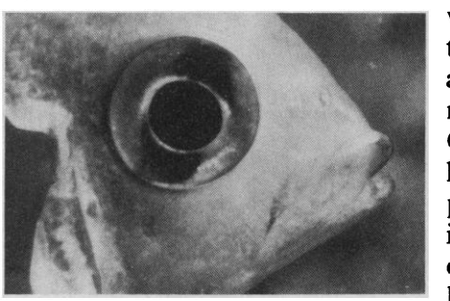
In sophistication, they beat anything we expect to offer soon. Therefore we would be foolish to begrudge the salaries and benefits paid for the full-time research of David F. O'Brien, Patricia N. Tyminski, and Richard T. Klingbiel, and the nuclear magnetic resonance (NMR) collaboration of Nicholas Zumbulyadis. At best, the value added to Kodak products by that work can show up only in the distant future and probably in quite unplanned ways. Back in 1912



Kodak realized that research embodied a good measure of risk taking. Actually, it has paid off.

For certain scientific applications, as in astronomy and autoradiography, photography has it over vision by its ability to accumulate energy for hours and days at a time. Furthermore, the resulting physical image can be restudied a century later. However, in everyday photography, the need to adjust, by technology or skill, the intensity and duration of the exposure instead of the sensitivity of the receptor, as the eye does, is a drag. During working hours, we also envy the multimillionfold range of that sensitivity, which gets us home safely from work in daylight or dark.

Thus motivated, Kodak Research Laboratories have been able to report to all interested the following modest progress:



Initially we demonstrated that some synthetic membranes of rhodopsin, the light-sensitive protein, and the phospholipids, the building blocks of cell membranes, exhibited natural or functional photochemical behavior.*

These observations led to studies of the structure of natural and synthetic rhodopsin membranes by the use of NMR and chemical probes.†

Parallel to the structural studies, we have examined the light-amplification mechanisms. Observations of light-induced ion permeability increases of rhodopsin membranes have shown 10^2 to 10^3 of amplification.‡

Current studies with light-activated enzymes, a phosphodiesterase and a GTPase have produced amplifications of 5×10^5. These enzymes reside on the surface of rhodopsin membranes and are activated by bleached rhodopsin.§

Rhodopsin-activated camera film is most unlikely. But what about lipid bilayers as orienting devices for polymerizations? Maybe they could hold enzymes in place for work they cannot accomplish by random encounters in solution. Nature's way is the best way, it is said.

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†*Biochemistry* 17 (1978), 4186-4192
Biochemistry 18 (1979), 5427-5432
Biophysical Journal 25 (1979), 131a
Biochimica et Biophysica Acta 603 (1980), 313-321
‡*Proc. Natl. Acad. Sci. USA 74* (1977), 5222-5226
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§*Biophysical Journal 33* (1981), 203a

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COVER

Young Turkish hamster (*Mesocricetus brandti*). Members of this species are quite similar to the common laboratory Syrian hamster (*M. auratus*), yet both of these species show strong sexual preferences for their own kind. Along with most forms of species-typical behavior, species discrimination and species preference are retained in hamsters deprived of neocortex since birth. See page 459. [Michael R. Murphy, National Institute of Mental Health, Bethesda, Maryland]

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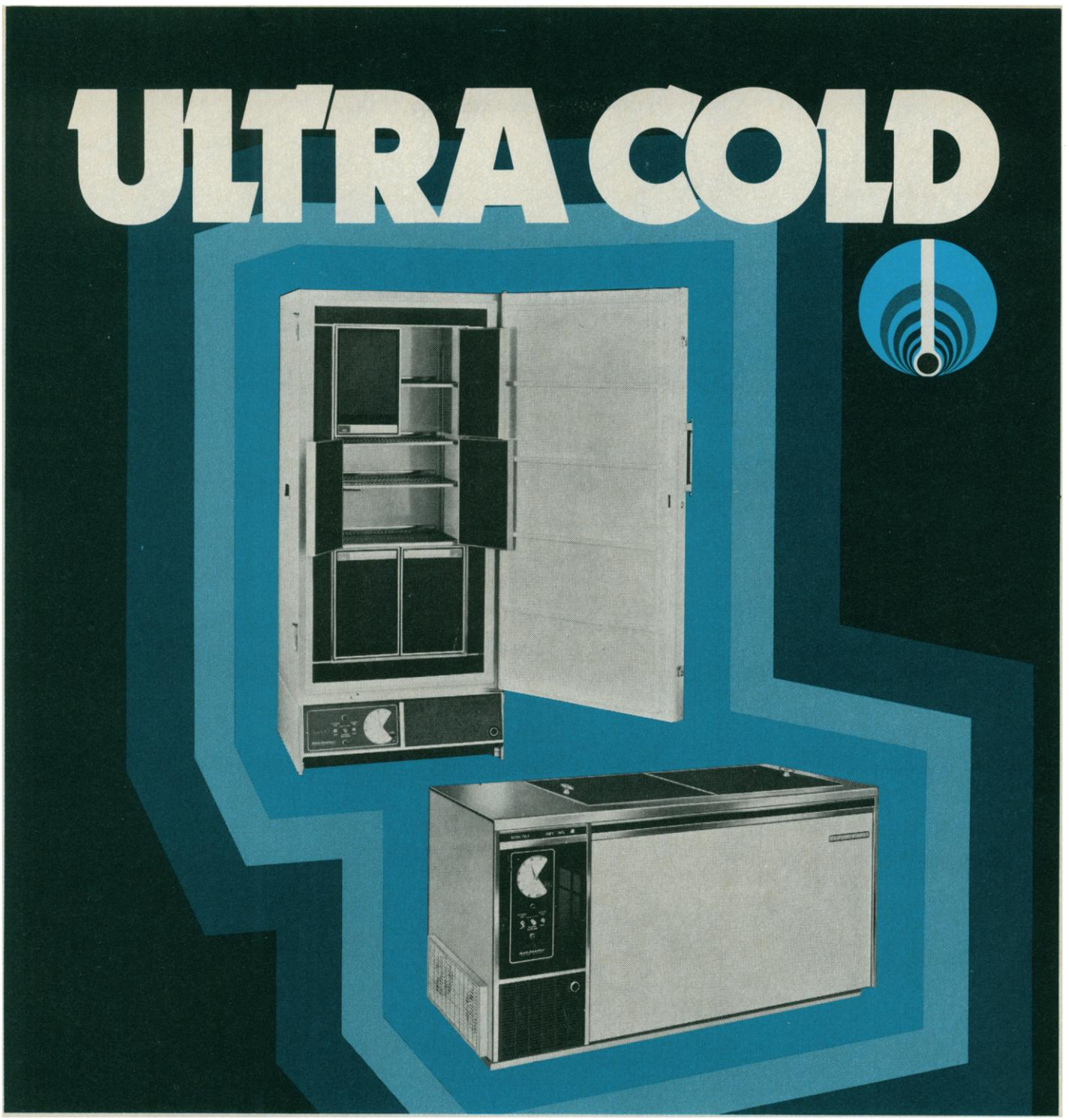

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therefore, I cannot comment on the possible effects of the dose revision.

In summary, the new dose estimates—if correct—do *not* strengthen the argument that there is "no" safe "level of exposure to radiation."

PETER G. GROER
Institute for Energy Analysis,
Oak Ridge Associated Universities,
Post Office Box 117,
Oak Ridge, Tennessee 37830

References and Notes

1. The estimated mortality rates for leukemia and AMN in the 0 rad dose group are $4.4 \times 10^{-5} \pm 0.8 \times 10^{-5}$ and $2.3 \times 10^{-3} \pm 0.06 \times 10^{-3}$ per person-year respectively. The same rates for the 1- to 9-rad dose group are $4.8 \times 10^{-5} \pm 1.3 \times 10^{-5}$ and $2.17 \times 10^{-3} \pm 0.09 \times 10^{-3}$ per person-year. This calculation assumes a rate constant in time. The estimated crude probabilities for these end points at a dose of 0 rad are 28/29,943 = $9.0 \times 10^{-4} \pm 2.0 \times 10^{-4}$ and 1,460/29,943 = $4.9 \times 10^{-2} \pm 0.1 \times 10^{-2}$. The same probabilities for the 1- to 9-rad dose group are 14/13,796 = $1.0 \times 10^{-3} \pm 0.3 \times 10^{-3}$ and 634/13,796 = $4.6 \times 10^{-2} \pm 0.2 \times 10^{-2}$. The corresponding net probability estimates for leukemia were presented by P. G. Groer, T. Ishimaru, M. Ichimaru, Y. Yasunaga, and J. Brodsky at the Radiation Research Society Meeting, Minneapolis, Minn., in June 1981. Net probability estimates for AMN can be obtained by a life-table analysis. The data are from G. W. Beebe, H. Kato, C. E. Land, *Life Span Study Report 8* (TRI-77, Radiation Effects Research Foundation, Hiroshima, Japan, 1977). Errors are expressed as ± 1 standard deviation.
2. W. E. Loewe and E. Mendelsohn, *Health Phys.*, in press.
3. The estimated mortality rates for leukemia in the 0.1- to 9-, and 10- to 49-rad T65 dose groups are $7.1 \times 10^{-5} \pm 2.7 \times 10^{-5}$, $7.4 \times 10^{-5} \pm 2.0 \times 10^{-5}$, and $5.1 \times 10^{-5} \pm 2.0 \times 10^{-5}$, respectively. The estimated crude probabilities of dying from leukemia for the same groups are 7/4004 = $1.7 \times 10^{-3} \pm 0.6 \times 10^{-3}$, 13/7140 = $1.8 \times 10^{-3} \pm 0.5 \times 10^{-3}$, and $1.2 \times 10^{-3} \pm 0.5 \times 10^{-3}$. The results for the corresponding net probability estimates were presented in the paper cited in (*1*). All estimates for leukemia in Nagasaki use data which incorporate the changes in group sizes due to the relocation of the hypocenter in this city.

Boojums

For the first appearance of the term "boojum" (Research News, 19 June, p. 1378), and for that matter, "snark," in scientific literature (well, social science), please refer to the presidential address given by Frank Beach to the Division of Experimental Psychology, American Psychological Association, in 1949. The title of that speech was "The snark was a boojum." The speech was reprinted in, among other publications, *Readings in Animal Behavior* (T. McGill, Ed., Holt, Rinehart and Winston, New York, 1965).

PETER LAU
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Mermin need not worry about Anderson's getting credit for introducing the term "boojum" into the scientific literature. Priority goes to noted psychologist Frank Beach, whose article "The snark was a boojum" appeared in the *American Psychologist* in 1950 (vol. 5, p. 115). Beach cautioned American comparative psychologists against excessive reliance on white rats as their subject of study, lest in virtually exclusively hunting that snark, their own research specialty would "softly and suddenly vanish away." Beach may well have been right. According to the June 1981 issue of the *American Psychologist*, there is a serious move afoot to change the title of the major American outlet for the kind of work to which Beach himself so eminently contributed—the *Journal of Comparative and Physiological Psychology*. The proposed new title eliminates "comparative" entirely and substitutes modern synonyms for "physiological." Although in Beach's use, boojum was not a scientific construct, as it seems to be in Mermin's, Beach should be acknowledged for finding in Lewis Carroll's boojum an apt metaphor for the state of an entire scientific discipline.

WILLIAM N. DEMBER
Department of Psychology, University of Cincinnati, Cincinnati, Ohio 45221

With reference to the article "Let us now praise famous boojums," I would like to point out that boojum has been the common name for *Idria columnaris* Kellogg since 1922 (*1*). The boojum has been described as a bizarre plant found primarily in Baja California, and the term boojum has been given as the common name for *Idria columnaris* Kellogg in at least two publications in scientific journals (*2*). It would appear that physicists are not the only scientists who read Lewis Carroll.

JOCELYN C. TURNER
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References

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Effectiveness of Psychotherapy

I fear that Dawes' perfectly reasonable point (Letters, 29 May, p. 986) regarding the skill of the therapist as a factor in the experimental interaction between psychotherapeutic treatment and patient will obscure the point Strupp was making in the passage quoted by Kolata (Research News, 24 April, p. 432). In the passage quoted, Strupp was warning against too great a reliance on the experimental design applicable to the evalua-

tion of drug treatments, where clear knowledge of the ingredients of the treatment are usually available beforehand.

One of the important features of the National Institute of Mental Health program is that it starts with two psychological treatments of depression that are more explicitly specified than most. Yet embedded in these specifications are approximately 20 hours of interaction between two persons in which there is great room for variations according to specific characteristics of patient and therapist and the surrounding circumstances. Not only that, but the treatments constitute a roughly sequenced package of therapist interventions, such as tasks, explanations, and inferences. Prior research has encouraged the belief that these interventions provide positive treatment effects and justify the ambitious follow-up program. It is important to emphasize that this program includes plans to search for evidence that all the explicit components of the treatment are important to the changes sought and that inadvertent accompaniments are not major factors.

From all the controversy over the effectiveness of psychotherapy, it should be clear that, even given that the evidence is positive, the effects are not great or certain. This tells us that whatever knowledge we have is very crude and inexact. Our treatment packages may contain actions that prove to be useless rituals or, even worse, rituals that block or undo the very effects we seek. Research designs should be directed beyond the goal of evaluation of any treatment package toward the kind of understanding that can provide a basis for increasing the power, certainty, and safety of psychotherapeutic treatments. The dangers in the analogy to chemotherapies are that it fosters unrealistic public expectations and inappropriate research questions and designs.

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Correction

In an article titled "How safe is Bendectin?" (31 Oct. 1980, p. 518), it was incorrectly reported that William McBride of Sydney, Australia, was paid $5000 a day to testify as an expert witness in a court case involving allegations that Bendectin caused birth defects in a Florida child named David Mekdeci. McBride was not paid for certain testimony. Rather, he was compensated for time away from his Australian practice at a rate of approximately $1116 a day so that he could appear as an expert witness on behalf of the Mekdeci family. He was also reimbursed for his travel expenses to and from Australia. *Science* regrets the error.

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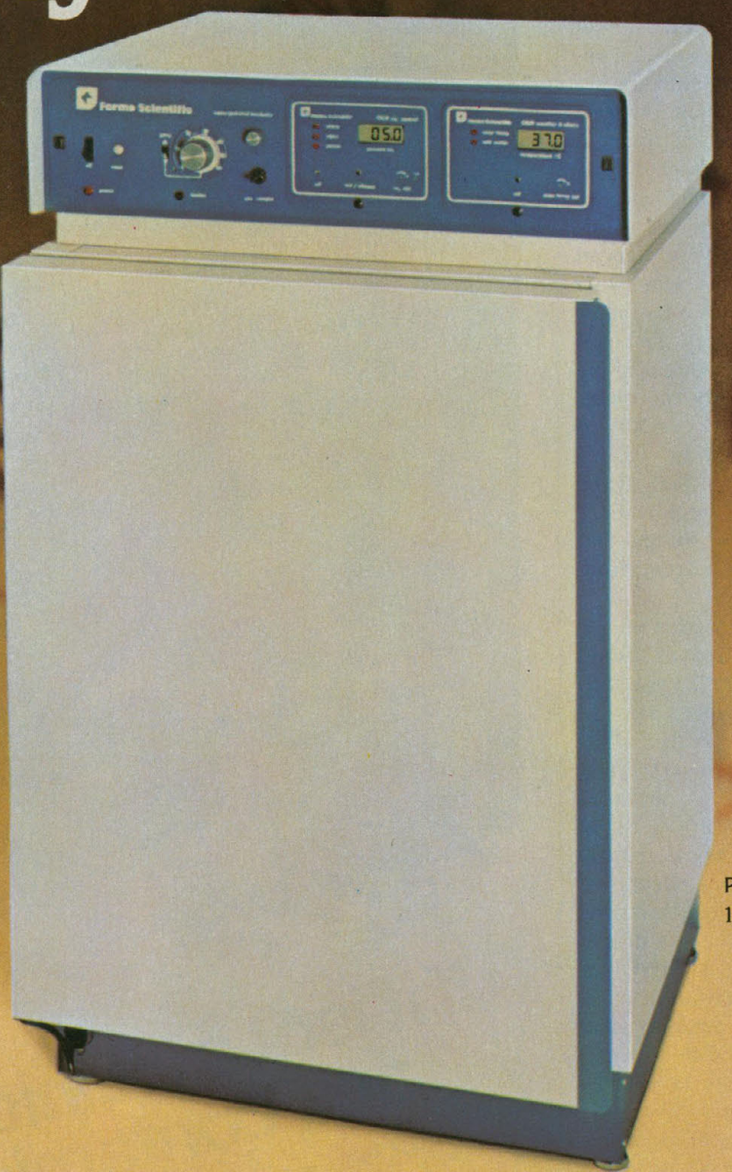

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24 July 1981, Volume 213, Number 4506 **SCIENCE**

Federal Policy for Basic Research

The Sixth Annual AAAS Colloquium on R & D and Public Policy, held on 25 and 26 June, was an important event at a crucial time. It brought together from across this country several hundred scientists and engineers from academia, industry, and government to interact with policy makers in the Administration and Congress. The House of Representatives on those dates was in the midst of considering a major budget-cutting measure. The discussions at the colloquium did not directly affect the voting on the Hill but are likely to influence later decisions, for example, on funding of science education by the National Science Foundation.

As has been customary, AAAS staff prepared good introductory material for the colloquium in the form of a 162-page volume analyzing the 1982 budget for R & D.* The analysis compares the Carter and Reagan budgets for 1982 and data for earlier years. Detailed budgets for the various agencies conducting R & D are presented. A less comprehensive but useful estimate of R & D expenditures by industry is included.

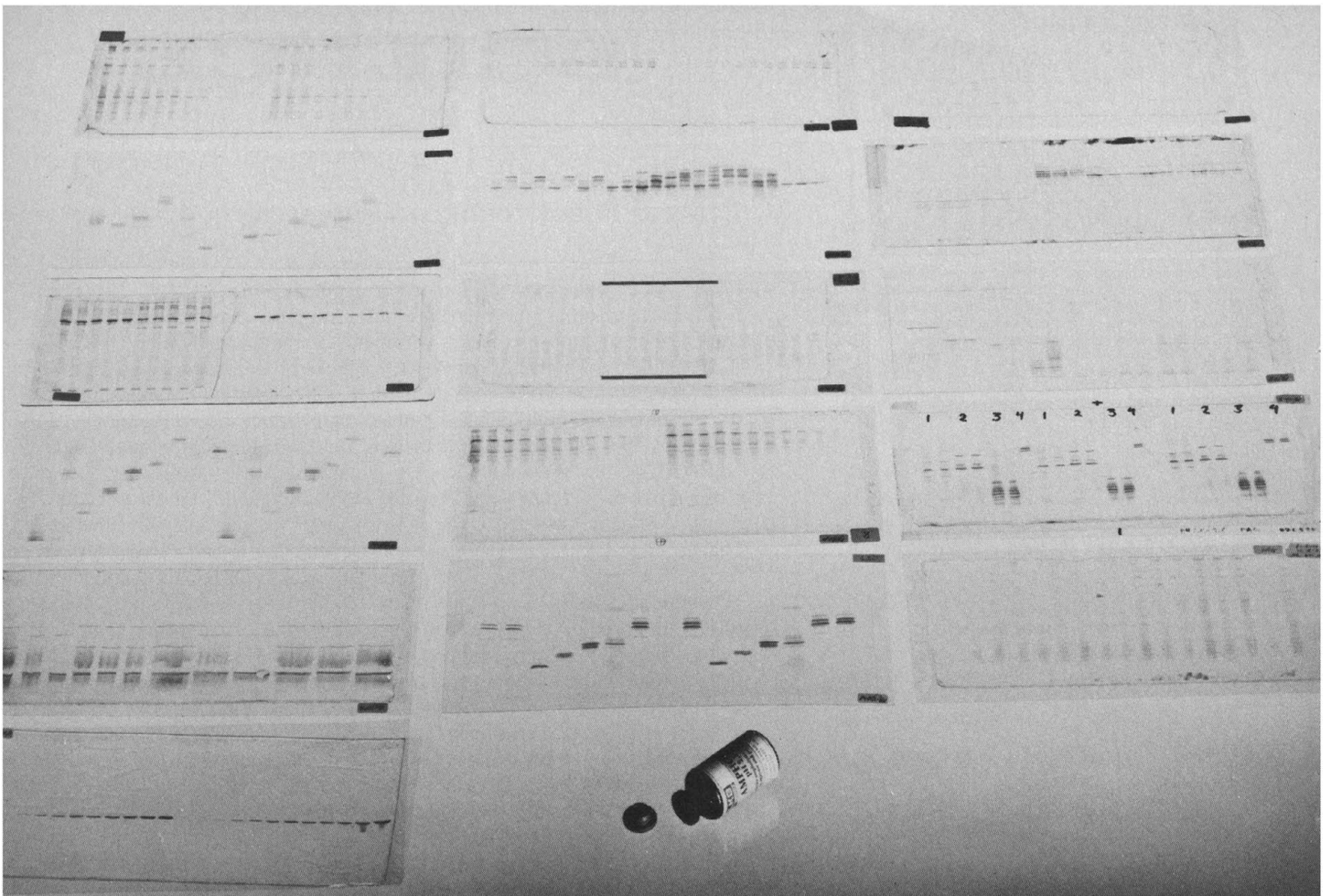
Key members of the Administration and Congress who addressed the colloquium included George Keyworth, II, director-designate of the Office of Science and Technology Policy; Glenn R. Schleede, executive associate director of the Office of Management and Budget; and Murray L. Weidenbaum, chairman of the Council of Economic Advisers. In the discussion period following each talk there were lively comments that gave the audience and the speakers abundant exposure to the many concerns of the scientific and engineering communities.

Some of the speakers at the colloquium delivered their talks from notes, but the three Administration participants named above brought texts of their remarks. These are to be regarded as statements of Administration policy. In all three texts there were assertions that the Reagan Administration is aware of the importance of basic research. The Administration argues that, if given favorable tax treatment, industry will increase its share of basic research activities. However, there is a realization that government funding is required. Weidenbaum said that "economists are well aware that . . . most areas of basic research still require public support. . . . This is because basic research is so risky, and because the discoveries it may make are not easily converted to rewards for individual entrepreneurs. Any sensible policy towards science must recognize the essential role of basic research as the foundation of our economic program, and the concomitant need to give it public as well as private financial support."

Schleede stated that "the Administration is continuing to support basic research particularly in the natural sciences and engineering because such research results in the advancement of science that underlies long-term economic growth." Keyworth made similar remarks: "The Administration views basic research as a vital investment with a good return. That investment is a Federal responsibility, but one that must be shared by the private sector."

Keyworth made a good impression on his audience, both in his presentation and in the discussion period. He will be in no position to be "science's man" in the White House, and he bluntly said, "It is to the decided advantage of the science and engineering communities to have a Presidential adviser that is looked upon by the White House, not as a political pleader for those communities . . . but as an objective adviser who can act as an effective link to them." Keyworth has set for himself the role of a team member. "The contributions of the science adviser to specific policies or programs may not be identifiable or visible; nevertheless, they will be there. Working in this way the science adviser and his office will best serve the President, the broader goals of science and technology, and, most important, the needs of the country."—PHILIP H. ABELSON

*W. H. Shapley, A. H. Teich, G. J. Breslow, *Research & Development: AAAS Report VI*, AAAS, Washington, D.C., 1981. xv + 162 pp., $7.50.



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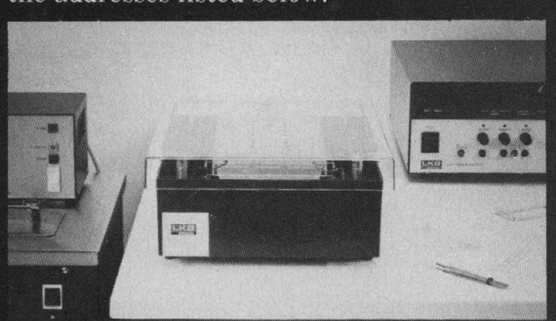

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