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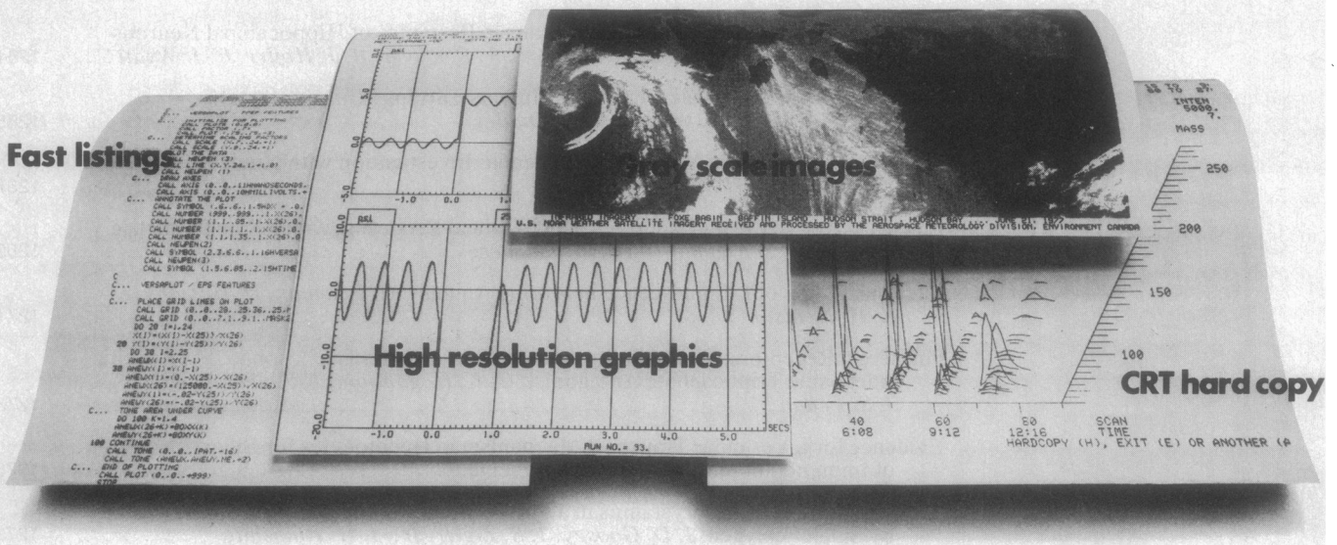

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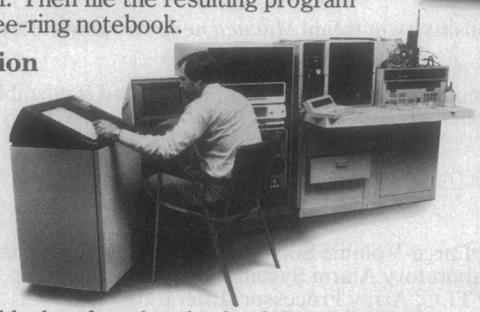

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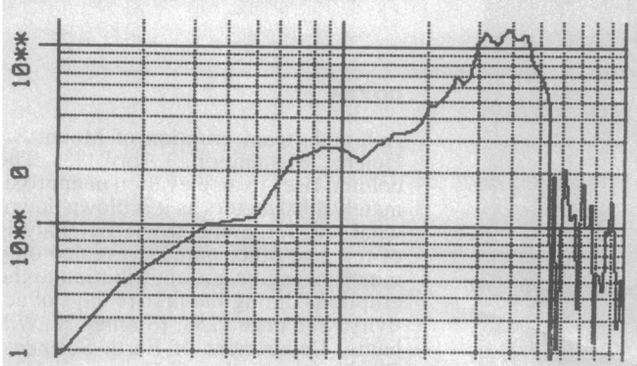

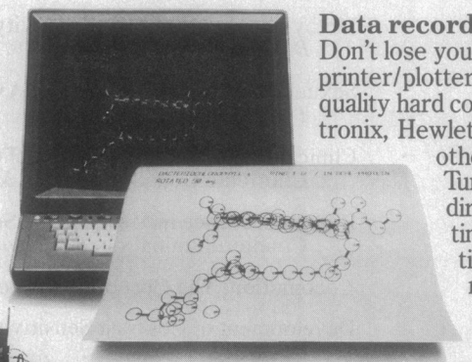

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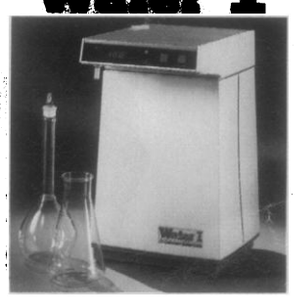

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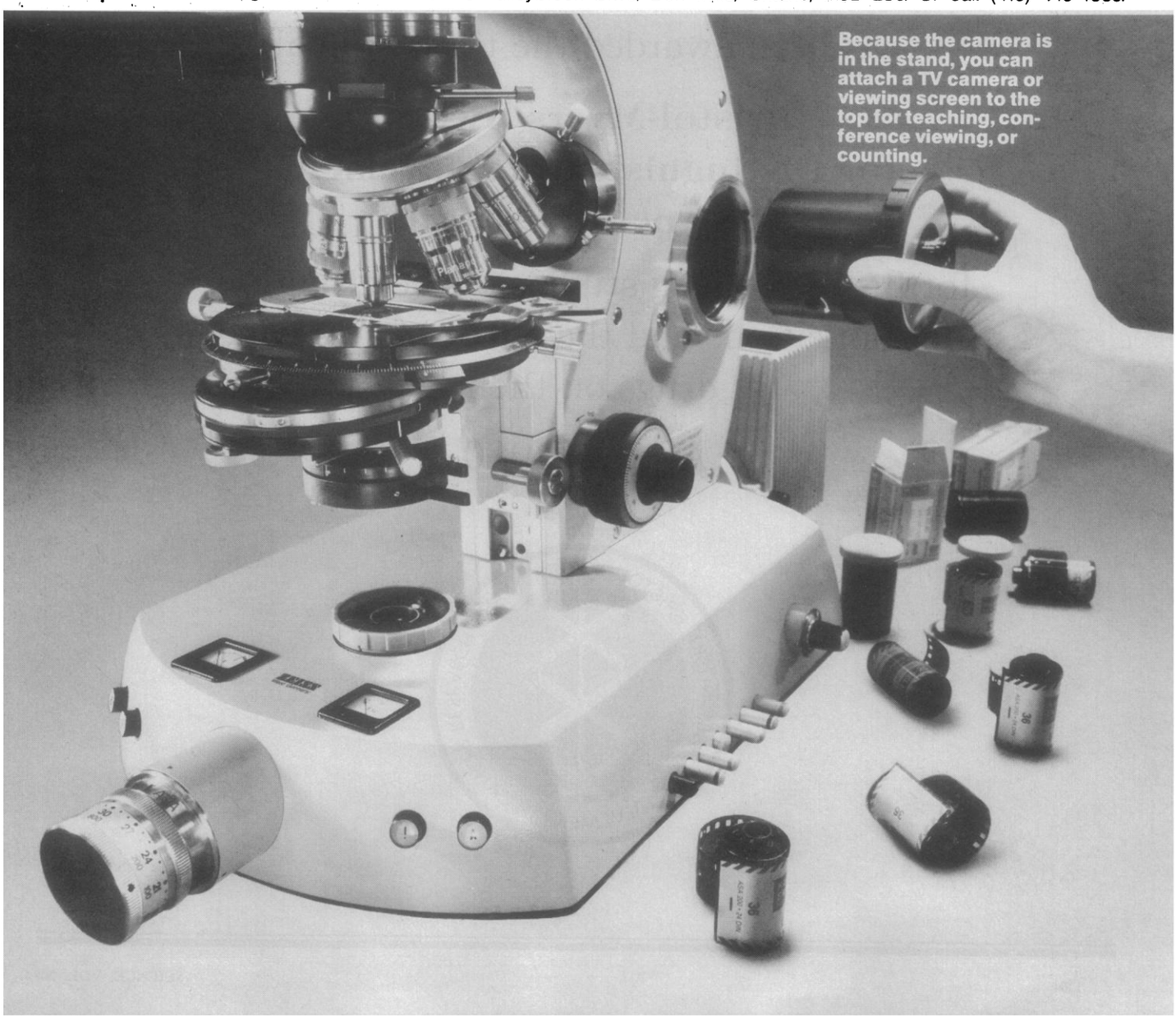

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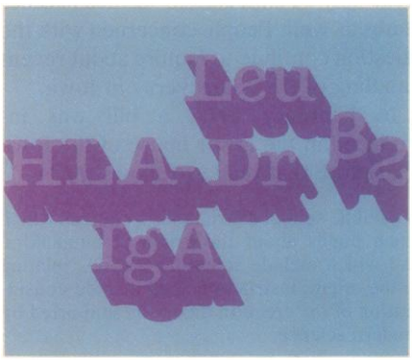

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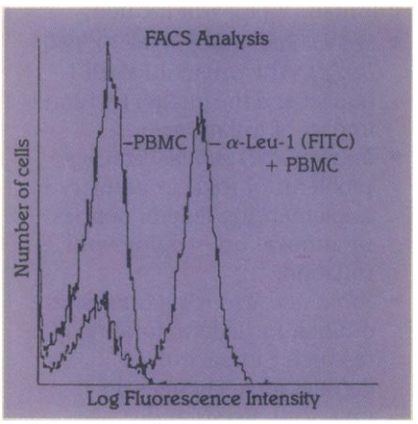

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1. Evans, R.L., et al. (1978). Two functionally distinct subpopulations of human T cells that collaborate in the generation of cytotoxic cells responsible for cell-mediated lympholysis. J. Immunol. 120, 1423.
2. Engleman, E.G. and Levy, R. (1980). Immunologic studies of a human T lymphocyte antigen recognized by a monoclonal antibody. Clinical Research 28, 511A.
3. Reported in Plenary Session at FASEB (L.A. Herzenberg) (April, 1980). Monoclonal antibodies and the FACS-complementary tools for phenotypic and functional dissection of the immune system. Text to appear in Federation Proceedings (Ledbetter, J.A., Evans, R.L., and Herzenberg, L.A.).
4. Lampson, L.A. and Levy, R. (In Press). Two forms of Ia-like molecules on human B cell lines. J. Immunol.
5. Conley, M.E. and Kearney, J.F. (1980). Hybridoma antibodies specific for human IgA subclasses. Federation Proceedings 39 (3), 927.

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LETTERS

Creationism in Iowa

Efforts to require equal time in the public schools for the teaching of "scientific creationism" and evolution are currently under way in Iowa, Minnesota, Ohio, New York, Virginia, Georgia, Tennessee, California, and Florida. The issue may be expected to surface in other states as well. People concerned with the question continue to inquire about recent handling of the controversy in Iowa.

In February 1977, a bill was introduced in the lower house of the Iowa legislature that read as follows (*1*):

> If a public school district offers courses which teach pupils about the origin of humankind and which include scientific theories relating to the origin, instruction shall include consideration of the creation theory as supported by modern science.

The bill was killed in committee.

In May 1977, a local school district asked the Iowa Department of Public Instruction (DPI) to consult with experts in the scientific community to determine if the evidence used to support the creationist theory was scientifically credible and should be made available to students to exemplify good scientific investigation. Also, a member of the Iowa legislature asked the DPI to study the status of the teaching of creationism in the public schools of other states.

In June 1977, DPI State Superintendent Robert D. Benton directed the DPI science consultant to thoroughly study the issue. A questionnaire was sent to the departments of education of all 50 states. Forty-five responded. It was found that few states have guidelines for dealing with the controversy. The methods used generally involve either neutrality, or selection or screening of instructional materials by a state committee. Six states require, either by legislation or by departmental regulation, some form of recognition of creationism.

After careful review of activity in other states, it was decided that a DPI position paper would be preferable to legislative mandates or state board rulings. This approach would encourage schools to exercise independent control of educational issues. DPI also sent inquiries to two dozen scientific, educational, civic, or creationist societies; church organizations; and most Iowa colleges. Several hundred scientists, teachers, school administrators, clergymen, philosophers, parents, textbook authors, and lay people were contacted. Relevant legal literature was researched. A position paper was finally prepared that supports evolution as a valid scientific theory but does not mandate the teaching of either evolution or creationism. The decision about what to teach is left in the hands of local school boards. The paper has been reprinted in several journals (*2*), and copies have been requested by approximately 500 persons or organizations in various states.

During 1978 and 1979, various meetings dealing with the controversy were held at universities, colleges, the Capitol Building, and elsewhere in the state. The Des Moines *Register*, which has a statewide circulation, carried a large and continuing volume of correspondence. The *Register* reported that it was receiving a disproportionate number of letters supporting creationism versus those supporting the teaching of evolution. But the newspaper printed approximately equal numbers of letters on both sides. The letters pretty well covered all aspects of the issue. Editorially the *Register* supported evolution and opposed equal time (*3*).

In February 1979, a new bill was introduced in the Iowa State Senate calling for the following (*4*):

> Whenever the origin of man or the origin of the earth is alluded to or taught in the educational program of public schools of this state, the concept of creation as supported by scientific evidence shall be taught as one theory.

The bill stimulated renewed discussion throughout Iowa, both among professionals and lay people.

In April 1979, Iowa Governor Robert D. Ray said he was against a state mandate that public schools in Iowa also teach the creation theory if the evolution theory is taught. In a news conference Ray stated that school officials already have the flexibility to address the subject of creation and should continue to have control (*5*).

Also in April, voting members of the board of directors of the Iowa Academy of Science adopted the following statement:

> As scientists we object to Senate bill #458 which proposes to equate "scientific creationism" and evolution as scientific theories. We object primarily because "creationism" is not science but "religious" metaphor clothed as "scientific" fact. There is an overwhelming acceptance by knowledgeable scientists of all disciplines that evolution is consistent with the weight of demonstrable evidence.
> We feel that Iowa students deserve an education consistent with views of legitimate scientists and that "creationist" views have no proper place in the science classroom. We fully respect the religious views of all persons but we object to attempts to require any religious teachings as science.

The academy statement was distributed to members of the state senate on the

day of a public hearing on the bill before the Senate Education Committee. It also appeared in the press and apparently had substantial effect. Attendance at the committee hearing by both senators and the public was good. Media coverage was extensive. Students in favor of creationism from Iowa State University held orderly demonstrations. After the hearing, the equal-time bill was referred to the finance committee, where it was held without being taken to the floor.

Several factors probably contributed to the bill's failure to progress. They include the required expense, the substantial discussions of the controversy in the newspapers and elsewhere, The *Register*'s editorial position, Governor Ray's stand, DPI's position paper, the intercession of the Iowa Academy of Science, and the management by State Senator Arthur A. Small, Jr., who led the opposition. Especially important was the involvement of a large number of evolutionary scientists, both in generating pro-evolution publicity and in speaking at the Senate hearing and at other meetings.

The Iowa Academy of Science is appointing members of a panel willing to assist teachers who encounter difficulties because of teaching evolution. The DPI will inform teachers throughout the state of the existence, membership, and charge of this panel. The Social Implications of Science Committee of the academy endorses this action and will respond to this and other controversies as the need arises.

During the summer of 1979, an interim study committee of the Iowa legislature was directed to review the controversy and make recommendations to the full legislature. The study committee decided not to recommend a creationist bill to the 1980 legislature.

Also during the summer one of the sponsors of the 1979 Senate bill queried the state attorney general's office concerning purported discrimination against creationism in the schools. The opinion of the assistant attorney general was that "nothing in Iowa law requires the teaching of the creationist model in public school science courses" (*6*).

In January 1980, a new creationist initiative resulted in the proposal of another version of the 1979 bill that says: "Whenever the origin of humankind or the origin of the earth is alluded to or taught in the educational program of the public school corporations of this state, the concept of creation as supported by scientific evidence may be included." The 1980 bill would seem to apply to *all* levels of state-controlled institutions of education.

Unified action by scientists, through such organizations as the academies of science, and clearly defined positions taken by education departments appear to be appropriate means for handling such controversies.

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References

1. H. Daggett, "Iowa House file 254" (bill filed with the Iowa General Assembly, Des Moines, February 1977).
2. J. Gerlovich, *Iowa Sci. Teach. J.* **15**, 2 (September 1978); *Capsule* **XII**, 1 (March 1978); *NABT: News and Views* **22**, 2 (April 1978); *Sci. Ed. News* (summer 1978).
3. Des Moines *Register*, 21 February 1979, p. 10A; *ibid.* 29 March 1979, p. 16A.
4. J. Jensen *et al.*, "Iowa Senate file 261" (bill filed with the Iowa General Assembly, Des Moines, 16 February 1979).
5. S. Walters, Des Moines *Register*, 5 April 1979, p. 1.
6. H. D. Hagen, "Response to Senator B. Van Gilst" (Office of Iowa Attorney General, Des Moines, 28 August 1979).

Administration of Research

Philip H. Abelson's editorial (25 Apr., p. 353) on the "Diversion of funds from research" prompts me to respond. In the editorial, Abelson suggests that university presidents who are close to the situation and who have responsibility to act have been relatively inert. As a recently retired university president, I have some suggestions.

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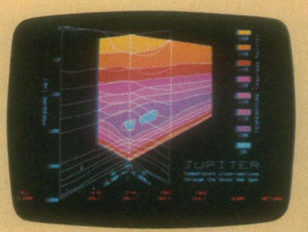

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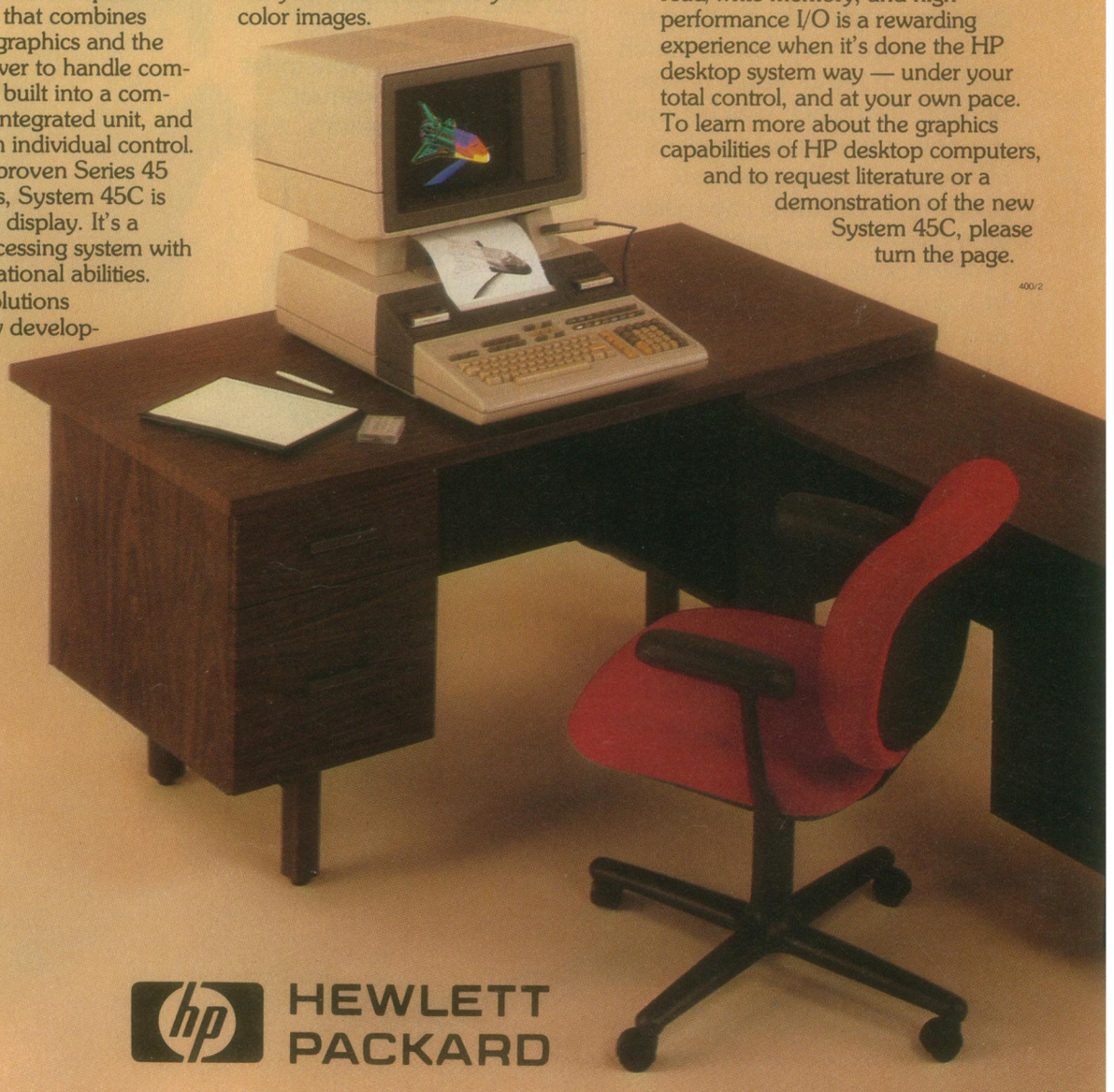

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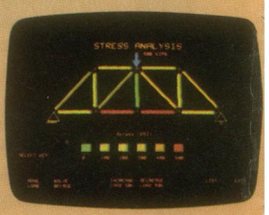

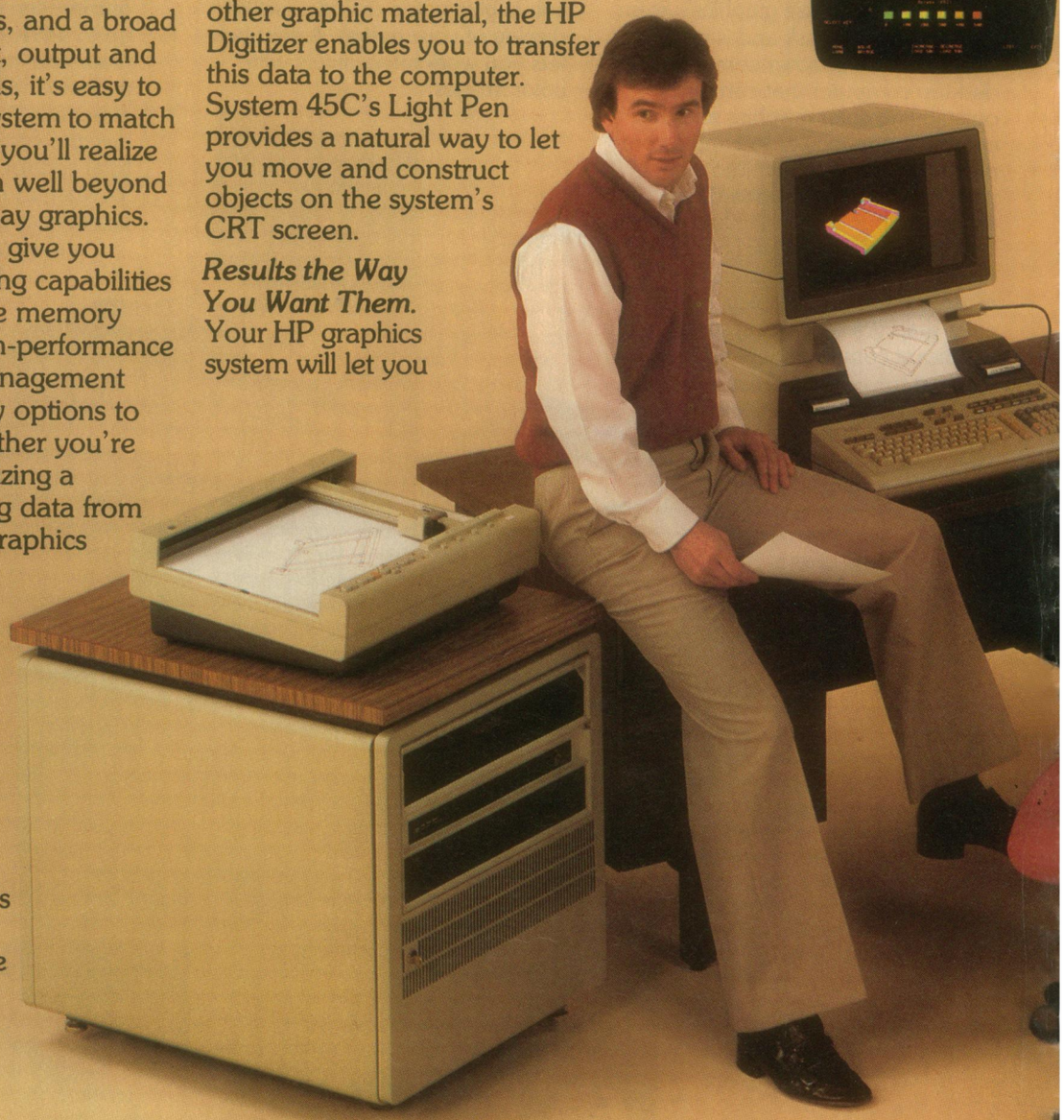

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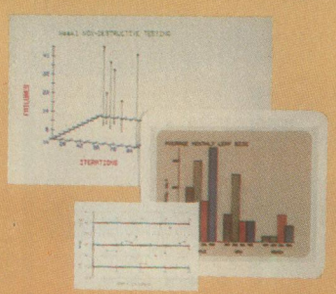

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References: 1. Er-el Z, Zaidenzaig Y, Shaltiel S: *Biochem Biophys Res Comm* 49:383, 1972. **2.** Shaltiel S: *Methods Enzymol* 34:126, 1974. **3.** Shaltiel S: *FEBS Proc* 40:117, 1975. **4.** Shaltiel S, Ames GF, Noel KD: *Arch Biochem Biophys* 159:174, 1973. **5.** Shaltiel S, et al: *Proc Nat Acad Sci* 72:3397, 1975.

Research/Response/Responsibility

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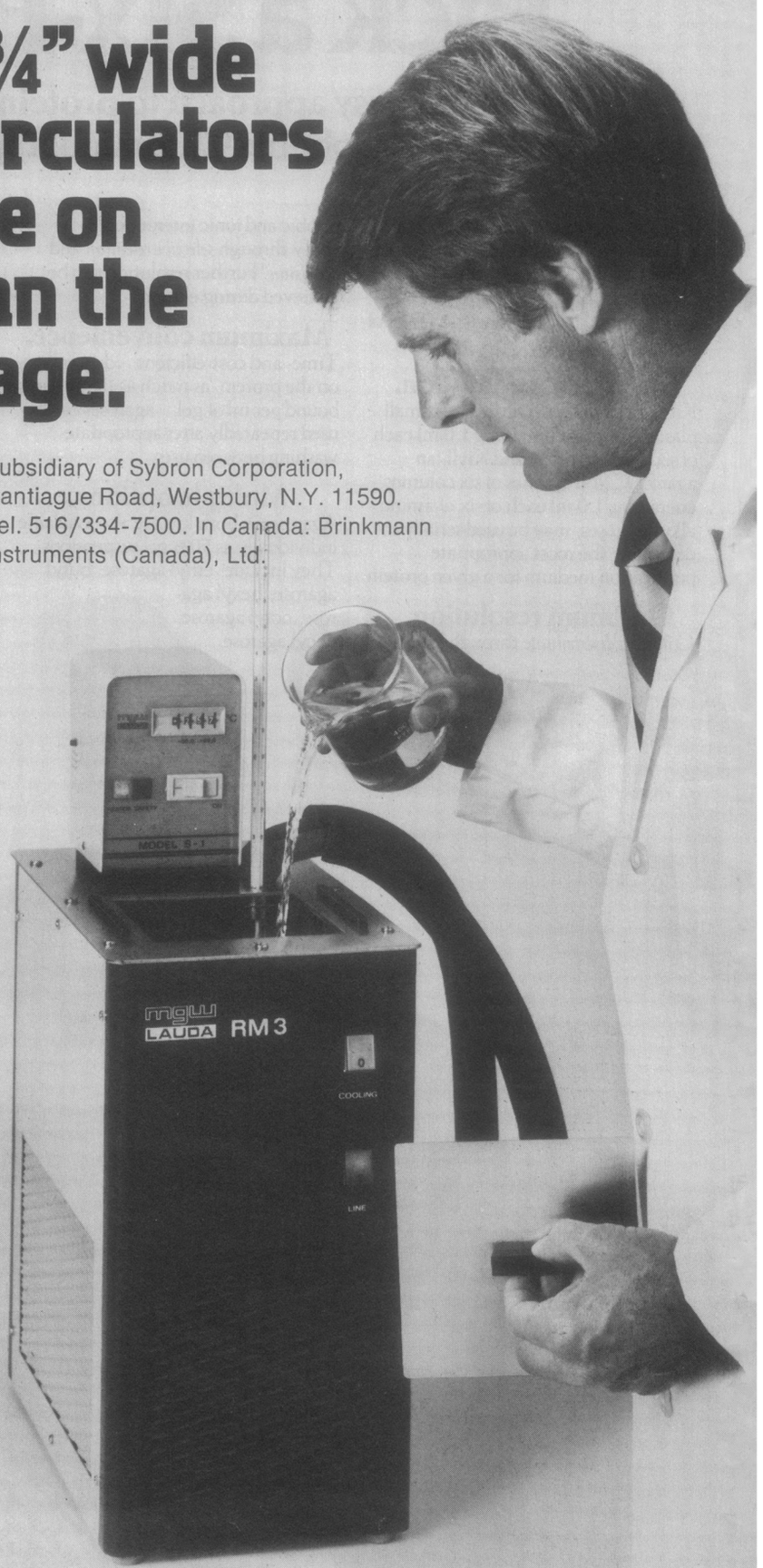

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13 June 1980, Volume 208, Number 4449 **SCIENCE**

Regulation of Social Research

At the dawn of federal regulation of use of human subjects in research, Preston Burnham* wrote that he might someday "mark 1966 as the year in which all medical progress ceased." Thus far he has proved a poor prognosticator. Gray and Cooke† recently reported that just over half of 2000 researchers questioned about their views on institutional review boards (IRB's) said that benefits of the review process outweighed difficulties, although nearly half also said that "their research had been impeded in a way that was not balanced by benefits." Burnham's forebodings may yet be prescient, but for research in social science.

The Department of Health, Education, and Welfare (HEW) has proposed regulations that would extend the requirement for prior approval by an IRB to research in any field, HEW-funded or not, that involves collection of information about identifiable persons, living or dead.‡ A political scientist collating *New York Times* stories about individual politicians, a sociologist studying sports, a statistician intent on identifying the authors of the Federalist papers could not proceed without an IRB's consent. A defender of the proposed regulations might say that they would not be applied in such instances, but if that is true then they should be stated so that such cases fall outside their bounds. The regulations clearly require "prior and continuing review and approval by an Institutional Review Board" in these examples.

Harms risked by human subjects of research range from the possibility of sudden death to that of faint embarrassment. No single mechanism can be optimal for all situations. Government intervention should be closely tied to the reality of the risk and to the protection needed. At present, we have little hard data establishing the incidence of harm, let alone its nature or the circumstances in which it occurs. A systematic study of incidence, to date, is appended to the 1978 Report of the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. Interviews revealed "harmful effects" in 79 of 2384 projects surveyed, and these were found to be generally "trivial or only temporarily disabling," although in some medical investigations deaths were reported. For the social sciences, only anecdotes suggest the need for special protection in some situations, but when and what kind of protection are far from clear.

The common ethical problems within social research differ from those in biomedical experiments even as those within biomedicine differ from field to field. In social psychology, there is often a question of use of deception; in documentary research, the question of privacy of records arises; in interview research, the major problem is protecting confidences. These require different solutions. Since hospitals and clinics are legally responsible to their patients, some form of institutional peer review of studies of patients seems reasonable. The same procedure may be inappropriate for interviews or for library research. Indeed, clearing procedures with a review board makes it harder, not easier, for a scholar to protect confidences.

The major professional and university associations, led by the American Council on Education, have urged HEW to abandon its dragnet approach. Instead of prior review of all research involving human subjects (minus a list of specific exceptions), the associations urge that review be limited to significant risks of harm—that is, to research that involves intrusion on a subject's person, deprives subjects of resources, or deceives them.

In research, as in other walks of life, risk exists in interactions that consist of nothing more than open exchange of information. The HEW proposal for protection—by imposing restrictions on who may speak to whom—threatens the freedom of scientist and layman alike. As the Federalist papers argued in regard to a similar proposal to solve a problem by restricting liberty, "it could never be more truly said than of the . . . remedy, that it is worse than the disease."—FREDERICK MOSTELLER, *President, AAAS*

*P. J. Burnham, *Science*, 22 April 1966, p. 448. †B. Gray and R. A. Cooke, *Hastings Center Report*, February 1980, p. 36. ‡*Federal Register*, 14 August 1979.

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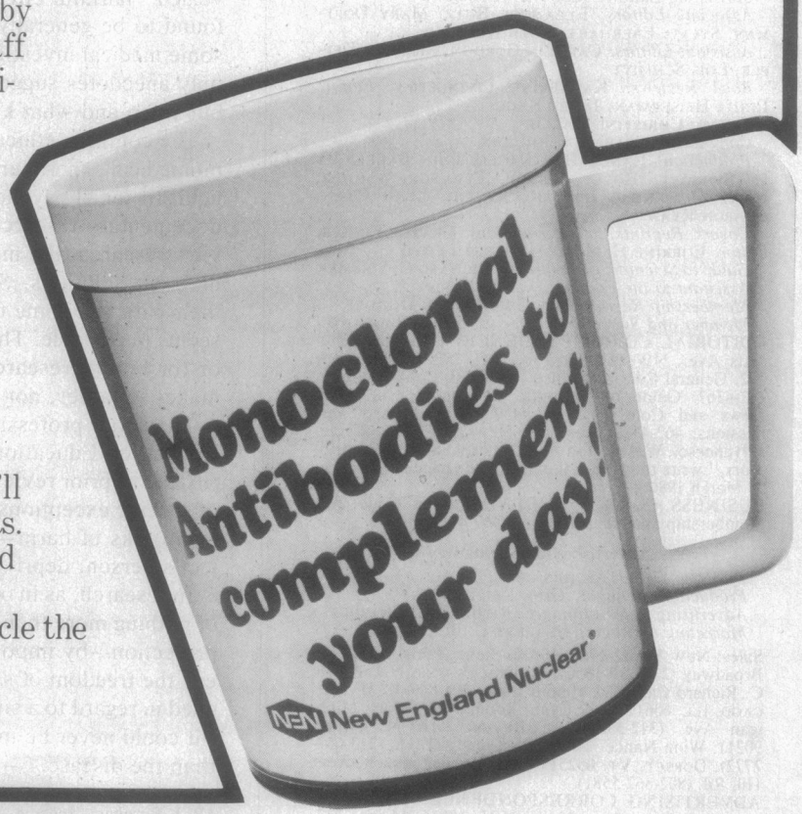

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Toronto
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Please note that all contributions must be submitted and signed by a AAAS member or fellow, although this person need not be one of the authors.

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