# SCIENCE

14 May 1971

Vol. 172, No. 3984

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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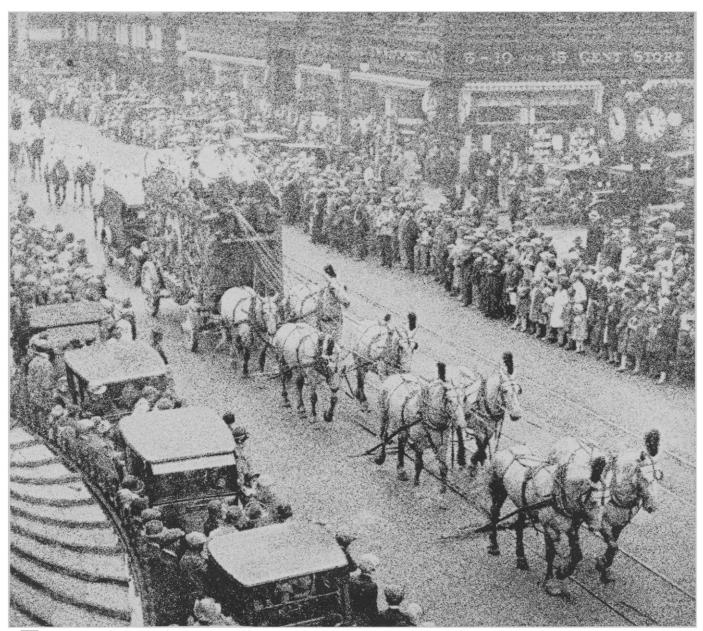
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# WHILE YOU CAN STILL SEE IT

When we published W. Clyde Allee's Principles of Animal Ecology in 1949 it was thought desirable to begin the introduction with a definition of the term "ecology." In 1953 we published Eugene P. Odum's leading textbook on the subject. By the beginning of 1971, when we published Charles E. Warren's Biology and Water Pollution Control, ecology had grown from a rarefied academic subject to a matter of life and breath.

Now everyone seems to be bringing out an ecology book.

We are glad to see this show on the road, and grateful for our early seat on the bandwagon. We hope our kids won't have to grow up where clean air, clear water, and a natural environment are memories, like the circus parade.

If you are currently (or potentially) teaching ecology (by that or any other name) you should write our Education Department for more information or examination copies of these books: Allee et al.: **Principles of Animal Ecology**—a classic work that laid the foundation for most modern research in animal ecology—1949, \$16.50.

Eugene P. Odum: Fundamentals of Ecology—the leading college text; man and his environmental relationships are detailed—3rd Edition just ready, about \$11.75.

William E. Hazen: Readings in Population and Community Ecology—23 classic papers that every student of ecology should read—2nd Edition March 1970, \$5.75.

Charles E. Warren: Biology and Water Pollution Control—how pollution affects aquatic biosystems and biological methods for water pollution control—Jan. 1971, \$11.

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#### 14 May 1971

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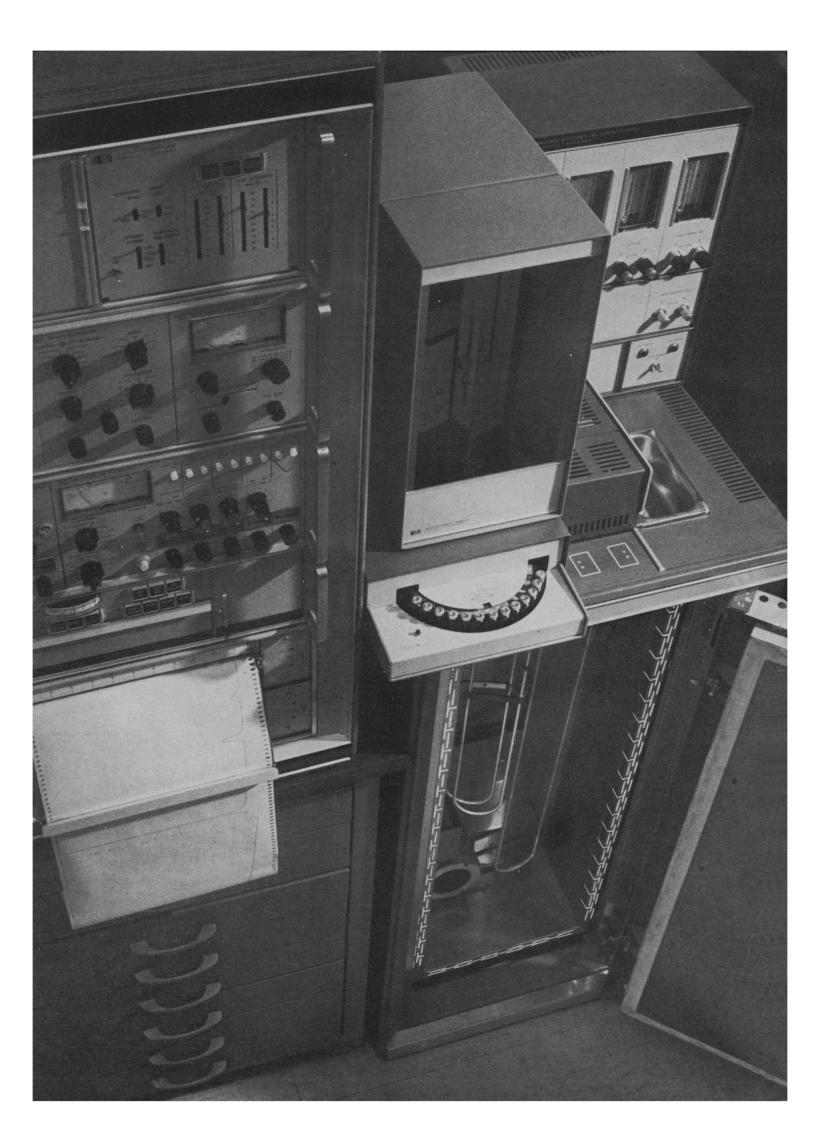
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#### COVER

The principle of linear perspective. "The perspective of projection is the section by a surface [the surface of the picture] of the pyramid of sight... issuing out of the eye." Here the viewer's left eye is closed; he is depicted as though holding to the viewing eye strings marking the pyramid of sight, the apex O being the center of rotation of the eye. Reproduced in M. H. Pirenne's Optics, Painting, and Photography (reviewed on p. 685) from Brook Taylor's New Principles of Linear Perspective, first published in 1715.



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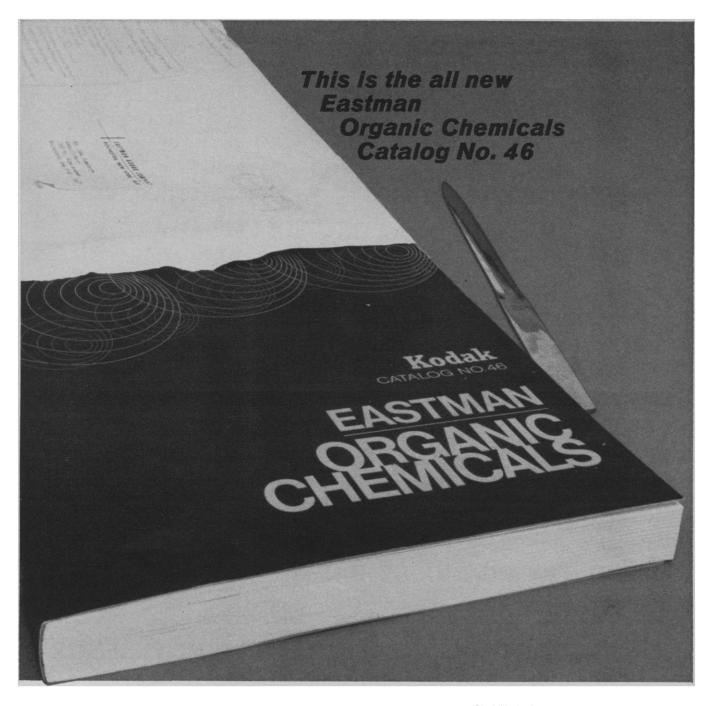
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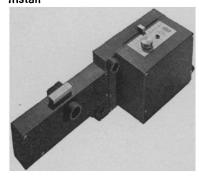




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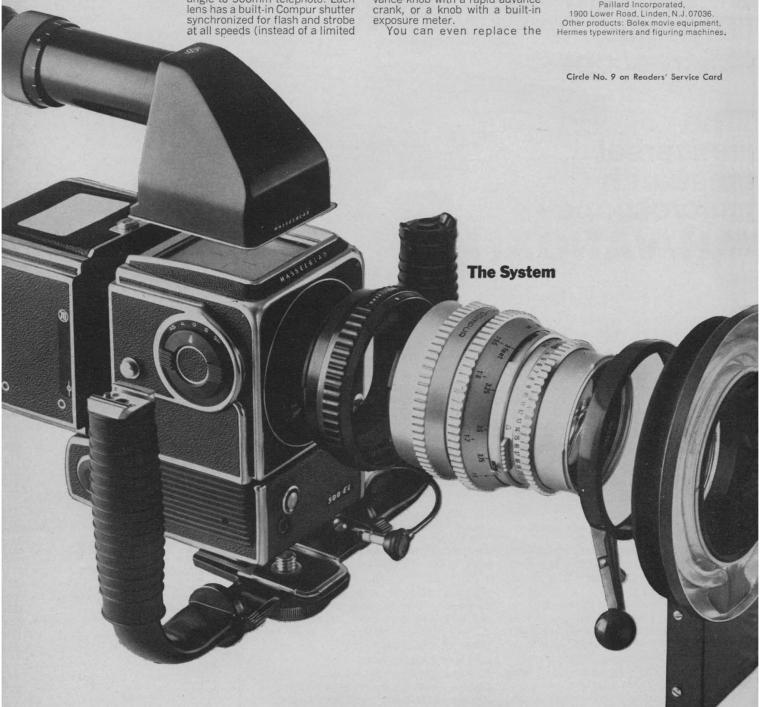
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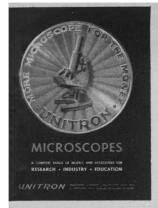


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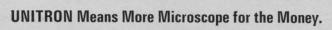






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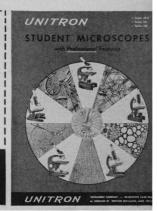


Fig. 1. Fungiform papillae from a rat's tongue. 2470x

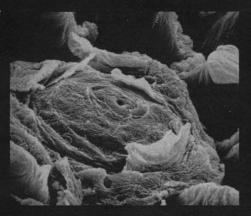
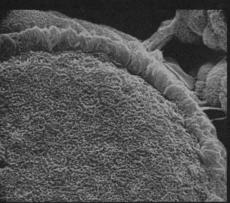


Fig. 2. Frog's tongue. Each flower-like structure is a taste organ. 450x

Fig. 3. Detail of frog's taste organ (Fig. 2) at higher magnification. 3000x.



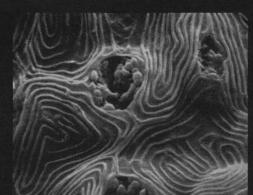


Fig. 4. Scales of a guppy fish. The two holes are openings of taste buds. 4000x.

Fig. 5. Details of the arms of a small octopus with suckers. 68x.

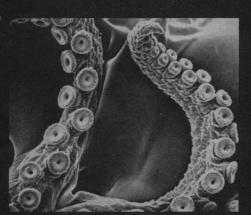




Fig. 6. Internal surface of sucker of octopus. 220x.

# We thank Dr. Pasquale Graziadei for the SEM's, and Dr. Graziadei thanks the Durst S-45EM for the enlargements.

Perhaps it seems unusual for a scientist who's using a scanning electron microscope that costs many thousands of dollars to give much of the credit for his excellent photomicrographs to an enlarger that costs a fraction of that. But, as Dr. Graziadei says, "Everybody insists on the 3Å resolution of the electron microscope, but unless we have the resolution in the enlarger, too, we can't print it."

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<u>Model DSRLG:</u> Another logical move. Two SRLG's in one dual-pen recorder. Think of what that means if you work with a spectrophotometer, photometer, or densi-

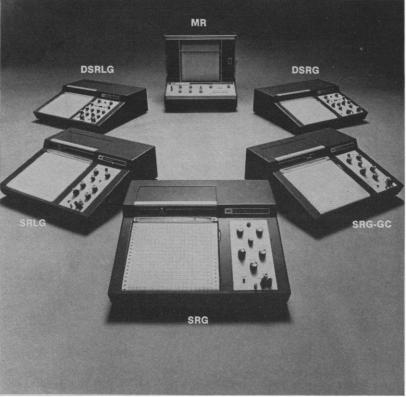
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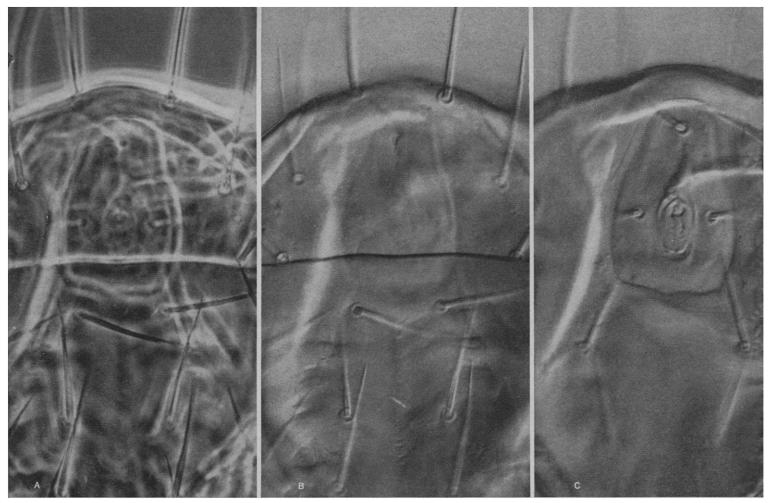
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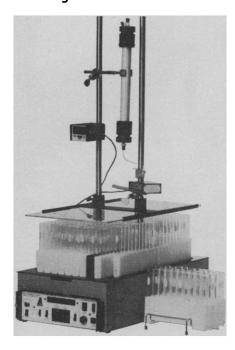


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man rank correlation coefficient, for the ranks of the average lottery numbers by month, was .021. These values offer strong positive evidence regarding the randomness of the procedures used to generate the 1971 lottery numbers and stand in marked contrast to the analyses reported in my article for the 1970 lottery.

STEPHEN E. FIENBERG

Department of Statistics, University of Chicago, 1118 East 58 Street, Chicago, Illinois 60637

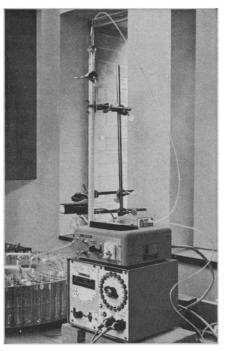
#### **Standards**

Boffey's article on "Radiation standards: Are the right people making decisions?" (26 Feb., p. 781) recounts the history of how this particular standard came about. Thirty years of dedicated work by the International Commission on Radiological Protection and the National Council on Radiation Protection and Measurements have produced formal AEC regulations. This historical effort can serve as an admirable example of how voluntary technical standards can be generated by consensus and technical competence on a national and even an international level.

Boffey also touches on the more basic aspects of the procedures by which technical standards are set-not only nuclear standards. There are many hazards affecting the quality of our life, of which the radiological hazard is probably one of the least significant ones at the present time. More important issues are the effect of additives and preservatives in the food industry, fertilizers and pesticides in agriculture, drugs, noise, solid wastes, and the whole area of safety factors in design-be it jet planes or suspension bridges. In all these issues some standards are used consciously or unconsciously, which affect the public at large. Basically, these decisions should be riskbenefit decisions, which are clearly not technical problems alone, but involve wider public issues.

In the past, the far-reaching effect of such technical standards was not generally appreciated. Only recently has a significant portion of the public begun to understand that radiation limits, or the 0.5 part per million limits for mercury, the use of drugs, or all safety factors on automobiles, for example, involve a value judgment. Bof-

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fey writes: "The literature of virtually all standards groups is laced with warnings that the standards involve value judgments and that the final decisions should be made by society, but thus far society has not really come to grips with the complex problem and the scientists have been left in charge by default. As far as can be determined by the public record, the scientists have not really tried to perform a quantitative risk-benefit analysis in developing the standards. The various standards groups have refused to get involved in 'the numbers game' of estimating how many deaths might result. . . ." This implied criticism of our scientists is not really warranted; on the contrary, they deserve encouragement to further develop the scientific basis on which standards rest.

I don't believe that any professional, or any competent individual, would be presumptive enough to decide on the "acceptability" of the risk to all members of society. Of course, we all realize that such risks do exist, that by merely getting up in the morning we take a risk of not seeing the end of the day. . . . The development of an "acceptable risk" to society is definitely a political process, particularly in a participatory democracy. But it will take much more sophistication in our social processes to arrive at an acceptable numerical solution, even in the few cases where the scientific basis for such numerical solutions is available. In the meantime, we could have a moratorium on all activities where numerical "risks" are not known or not acceptable. This possibility does not seem to be practical. On the other hand, and in a pragmatic way, we will continue to rely on our experts and on what, in their best judgment, is in the best interest of society, as was the case with the recently reaffirmed radiation protection standards. It is understood that as in any participatory decisionmaking, the standard-setting process will not result in, and does not call for, unanimous agreement of all parties involved.

Eventually, all such standards have to go through the "political process" to find public acceptance. It is true that experts have erred in the past, even groups of experts, and so has the public. Even the jury system is not infallible, but it's still the best that society has come up with.

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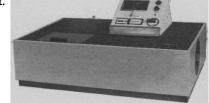
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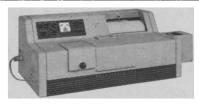


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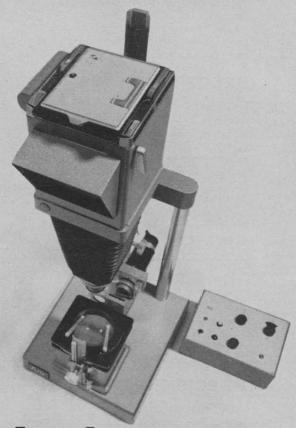
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#### Institute of Medicine

Medicine has never been an integral part of the National Academy of Sciences (NAS). To correct this lack, it was agreed in August 1970 to form an "Institute of Medicine of the National Academy of Sciences." The Institute will not have a separate charter. Its purposes will be to study vital issues related to health and medicine and to report the results to physicians, the public, or both. Studies may be initiated and conducted by the Institute, and proposals may originate in the National Research Council. Requests for study and advice from government or other organizations will be welcomed for consideration.

It is hoped that the membership will be of such quality as to inspire a high degree of confidence in its competence and impartiality. Further, it is hoped that the Institute will help consolidate medical opinion originating with practicing physicians, medical schools, the American Medical Association, specialty societies, and government. Of necessity, the 28 founding members were largely self-elected, and the some 70 more who have been elected will be announced soon. The future membership should climb to about 400.

The Institute is not intended only as an honor. Hence, members will be drawn chiefly from men and women approximately 50 years or younger for a 5-year term, once renewable but terminating at age 66. They will then automatically become "senior members." Before election those proposed must agree to give a substantial amount of working time to the Institute.

About 25 percent of the members will be drawn from those whose activities cover a wide range of disciplines, such as law and economics. The other 75 percent will be selected from those actively involved in some important aspect of health care including nursing, dentistry, medical practice, education, and research. No attempt will be made to secure society or specialty representation; instead, election will be based on demonstrated excellence in a broad range of medical and statesmanlike activity.

Any organization is only as good as its members. The Institute has been exceptionally fortunate in securing Dr. John Hogness, former dean of the University of Washington, Seattle, as its permanent president. He will assume office on 1 August 1971 and will soon recruit a staff. Head-quarters will be in the familiar NAS complex in Washington. Initial financial support will come from NAS, but this will be largely replaced by grants and payments for service.

The Institute faces a difficult period. It must maintain its integrity, exhibit courage in its decisions, and willingly undertake study of problems that others prefer to shun. Medicine is teeming with just such sensitive problems. It is hoped that by keeping the Institute relatively small, the heavy hand of bureaucracy and the hegemony of committees will not stifle commingling of individual thinking. It is most important that creativeness not be lost in formalities, puffery, and politics. Statesmanship will be required to keep the Institute from becoming parochial and dominated by cliques.

The Institute of Medicine has a supremely important function to fulfill. It has been structured to become an instrument of the young. It is up to them to make it succeed. If they fail, the Institute should be mercifully disbanded before it obstructs a better organization. If they succeed, the formation of the Institute will have been the greatest organizational step taken in medicine during our lives.—Irvine Page, Cleveland Clinic, Cleveland, Ohio

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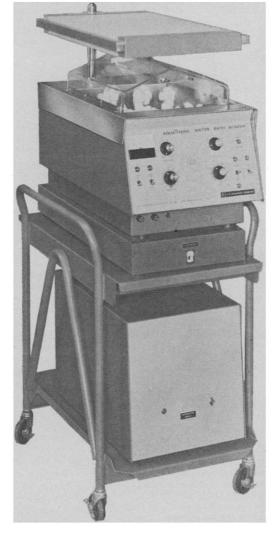
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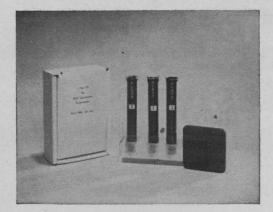
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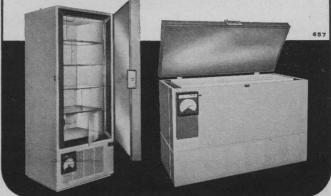
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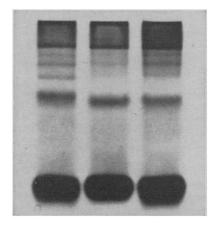
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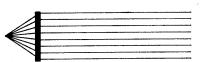
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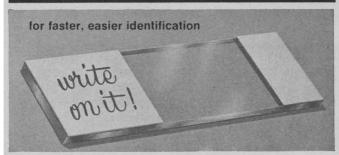
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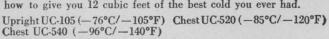
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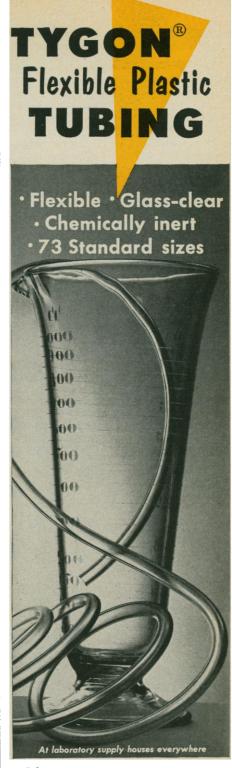
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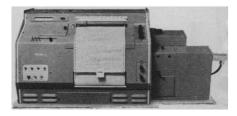
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