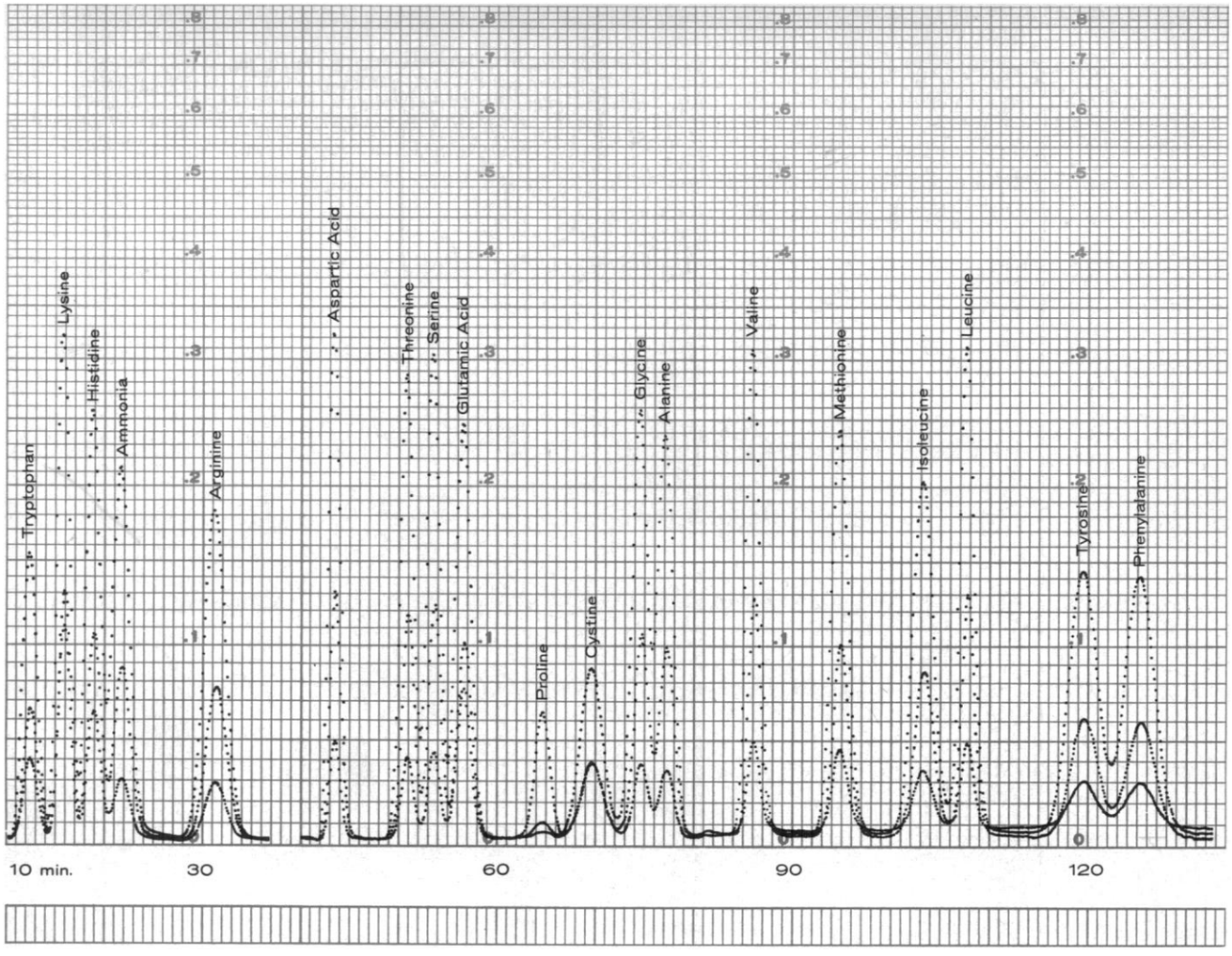
SCIENCE

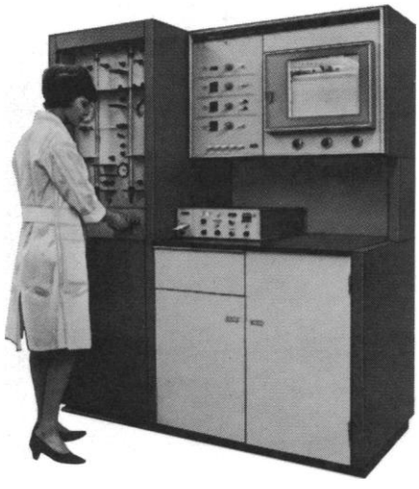
20 May 1966

Vol. 152, No. 3725

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

GROUND SQUIRREL





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20 May 1966
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SCIENCE

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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

COVER

The ground squirrel (*Citellus mexicanus*), a diurnal animal, has an all-cone retina, within which there are complex neural mechanisms for integrating information bearing on the discrimination of movement and color. See page 1092. [Charles H. Weber and Charles R. Michael, Johns Hopkins University, Baltimore, Maryland]

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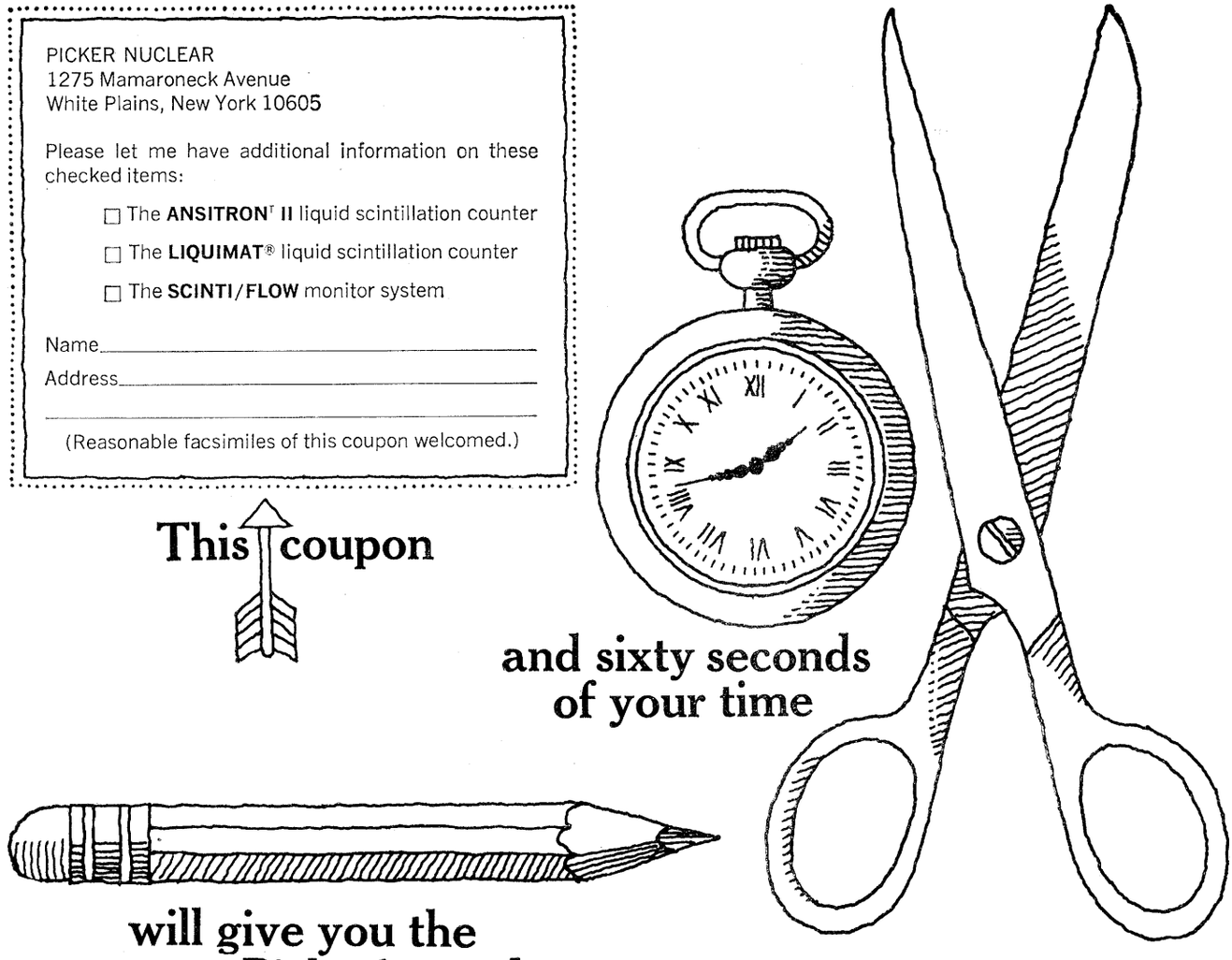

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Modern communications equipment continues to become more complex, but people don't. And since it takes people to make communications equipment, Western Electric continually works toward improvements at the interface. Recently, with specialists in the technology of biomechanics, we have been taking a look at various objects that can affect the comfort and efficiency of our people. The chairs they sit in. The position of their arms. The tools — even the simplest tools — they work with.

What we learned about pliers is an illuminating example.

A pair of pliers can be a most inefficient tool for mass production. To work with them you have to twist your wrist at an awkward angle, and insert a couple of fingers between the handles to open them. This is all right if you're just tightening a nut or two, but if you're wiring complex circuits hundreds and hundreds of times a day it can be pretty tiring and uncomfortable.

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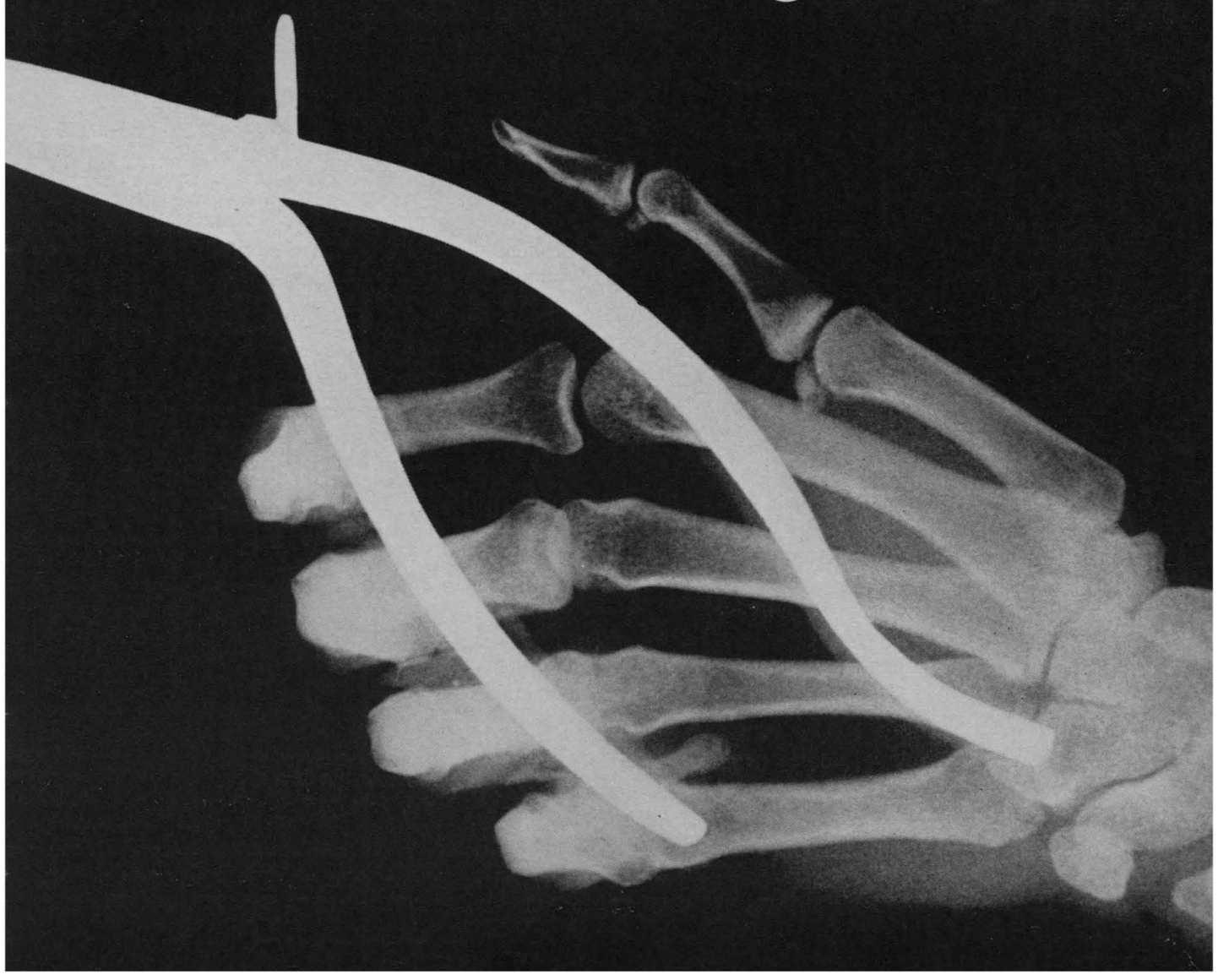

How to prove absolute flatness of stereo field

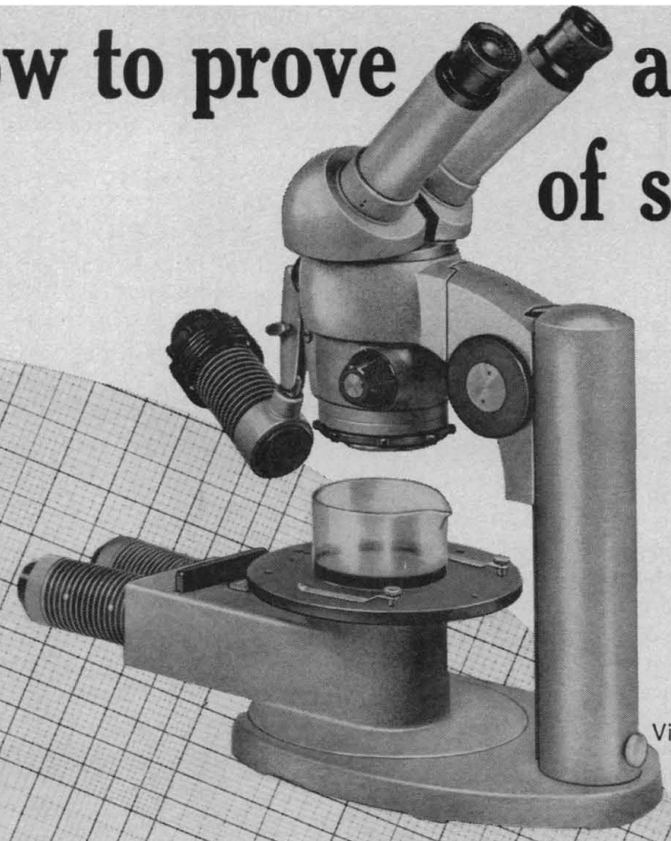

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exhibit itself is available for national showing during the next two years under the sponsorship of the Department of Circulating Exhibitions of the Smithsonian Institution. Persons and institutions interested in showing the exhibit should address Miss Frances Smyth of that department.

DAVID G. BARRY
State University of New York, Albany 12203

. . . Stevens seems to harbor the notion that is only through the "artist's vision" that the beauty of nature can be revealed. Cannot ideas of beauty be communicated directly from nature with science as the intermediary? The artist may be trying to communicate certain ideas with his work, but the observer's interpretation of the work is not necessarily the same as the artist's. Does art lose its value if it stimulates ideas in the viewer different from those which the artist intended? I should think not. Why then may not a microscopic or telescopic image convey a stimulus of equal esthetic value? Is the imagination not aroused in contemplation of the meaning and boundless natural beauty in a photograph of an exploding galaxy? Indeed, these "eye-catching configurations" and "accidents of nature" are probably all the more exciting because they show the natural beauty around us without having to wait for some artist to make the revelation.

In his comments on "esthetic honor" and "the artist's traditional preeminence in his own field," Stevens sounds like other critics of science and automation who are afraid that they or their specialty will be supplanted in this Age of Machines. "Art in science" is merely a by-product of research. The scientist is not concerned with turning out works of art per se. But if something worthy of being shared with others is kept hidden in order not to displease the hypersensitive artist, then who is the loser?

RICHARD A. DURAT
Department of Chemistry, Boston College, Chestnut Hill 67, Massachusetts

. . . Artists at present seem to have very little concern for beauty, no doubt because they are so busy "communicating ideas." Perhaps the enthusiasm of non-artists for beautiful, science-produced objects arises because artists are so wrapped up in producing the "meaningful symbols" of which Stevens speaks by welding pieces of junk together or copying comic strips. It is a rare work of art these days which produces that good gutty sensation one gets from looking at something beautiful.

Stevens evidently wishes us to take into consideration the intention of the artist, for he admits that some works of art suffer in comparisons with the unintended by-products of scientific endeavor. This is like saying the runner-up should get the gold medal because he tried harder. The artist whose products are feeble in comparison with the computer patterns should probably try painting something else, or maybe stop trying to be an artist. He might even try learning how to run a computer, in order to produce the patterns he desires with the artistic intent he considers so necessary. Meanwhile, he would do well to remember that his intention counts for nothing with his audience. His work must stand alone. If it elicits the response in the viewer that he intended, fine; but he cannot cry foul if the same response is elicited by a photomicrograph, nor can he even say that his work is art and the other is not. The labels on the pictures telling which is which do not count as part of the pictures. . . .

MARY A. POWERS
1138 Whitfield Road, Northbrook, Illinois 60062

That Biblical Spider Again

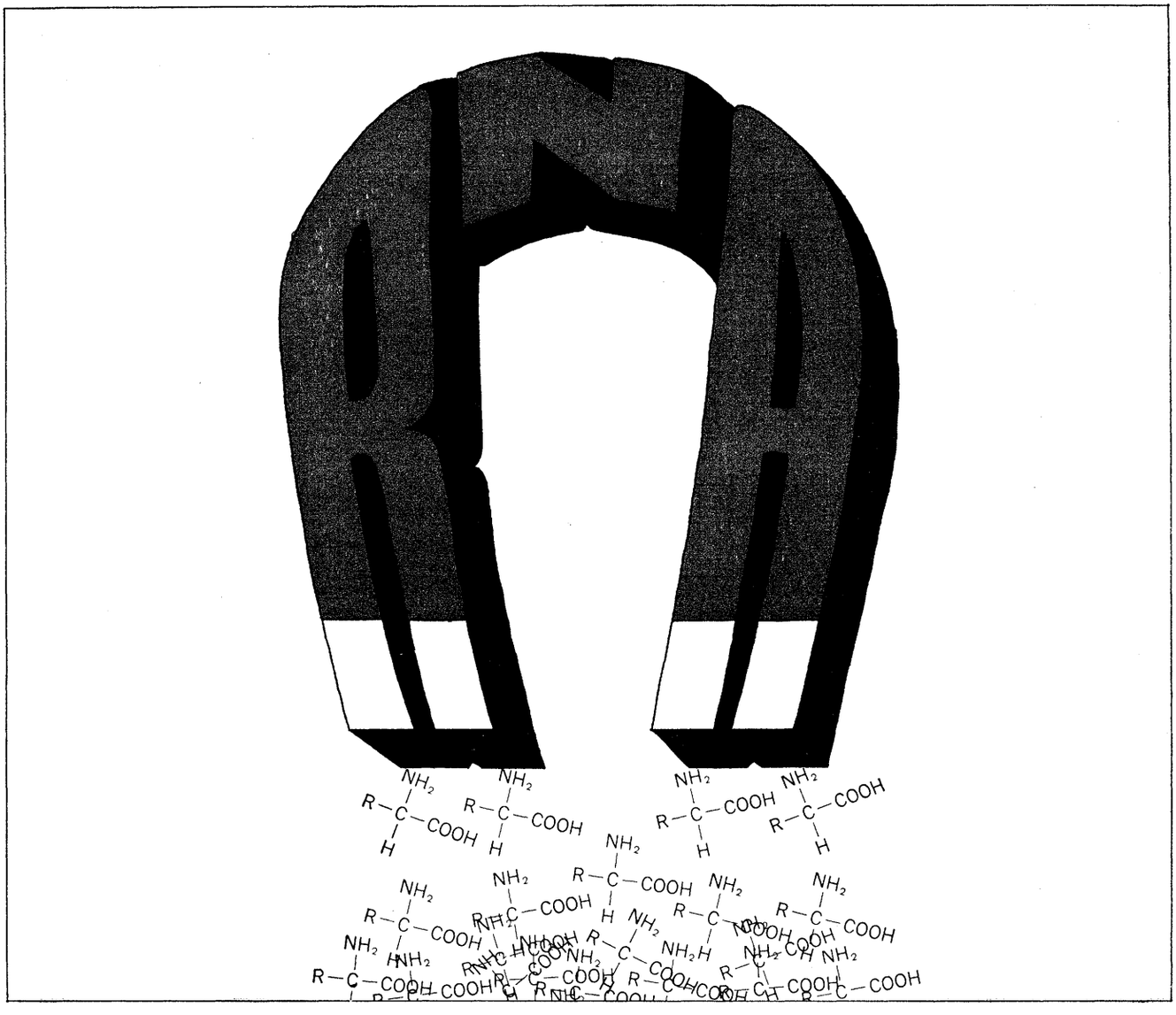
Disputing F. Allen's interpretation of a line in Psalm 90 (Letters, 29, Oct., p. 554), E. E. Pilchik (Letters, 28 Jan., p. 404) lists translations of the Bible and remarks, "Not one hints of a spider in Psalm 90."

In the Latin (Vulgate), which Pilchik lists, the end of verse 9 of Psalm 90 (Vulgate 89) reads: "Anni nostri sicut aranea meditabuntur." The English (Douay, 1609), which Pilchik does not list, translates this: "Our years shall be considered as a spider."

In the *Liber Psalmorum* (Rome, 1945), the end of verse 9 of this same Psalm appears as: "finivimus annos nostros ut suspirium," which *The Psalms* (Benziger, New York, 1946) translates: "we have ended our years, like a sigh."

I end with a sigh of relief. The spider is gone.

M. W. BURKE-GAFFNEY
Saint Mary's University, Halifax, Canada



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20 May 1966, Volume 152, Number 3725 **SCIENCE**

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Water Pollution

A few years ago the Wisconsin State Board of Health reported the existence on the Mississippi River of a "wall of foam 35 feet wide, 300 feet long and 15 feet high." This was only one of many photogenic news-making incidents. Consequently, the issue of water pollution was publicly dramatized and oversimplified. Synthetic detergents were spotlighted as sources of the nuisance. The principal chemicals involved were alkyl benzenesulfonates, the alkyl group usually being a C_{12} branched-chain hydrocarbon. Biological degradation of this structure is slow. Threatened with congressional action, the detergent manufacturers abandoned production of the branched compounds, using instead a linear alkyl benzenesulfonate that is degraded more readily. This changeover (made at a cost of $150 million) was completed by June 1965. In hearings last week before a committee headed by Senator Muskie, a year of field experience with the new products was described. The input and output of detergents from several major sewage treatment plants have been monitored. As a result, it was possible to follow closely the consequences of the changeover. Part of the chemicals now are degraded on the way to the treatment plant, and the rest are more easily removed once there. When 90 percent of the other sewage is consumed, a similar fraction of the new detergent disappears.

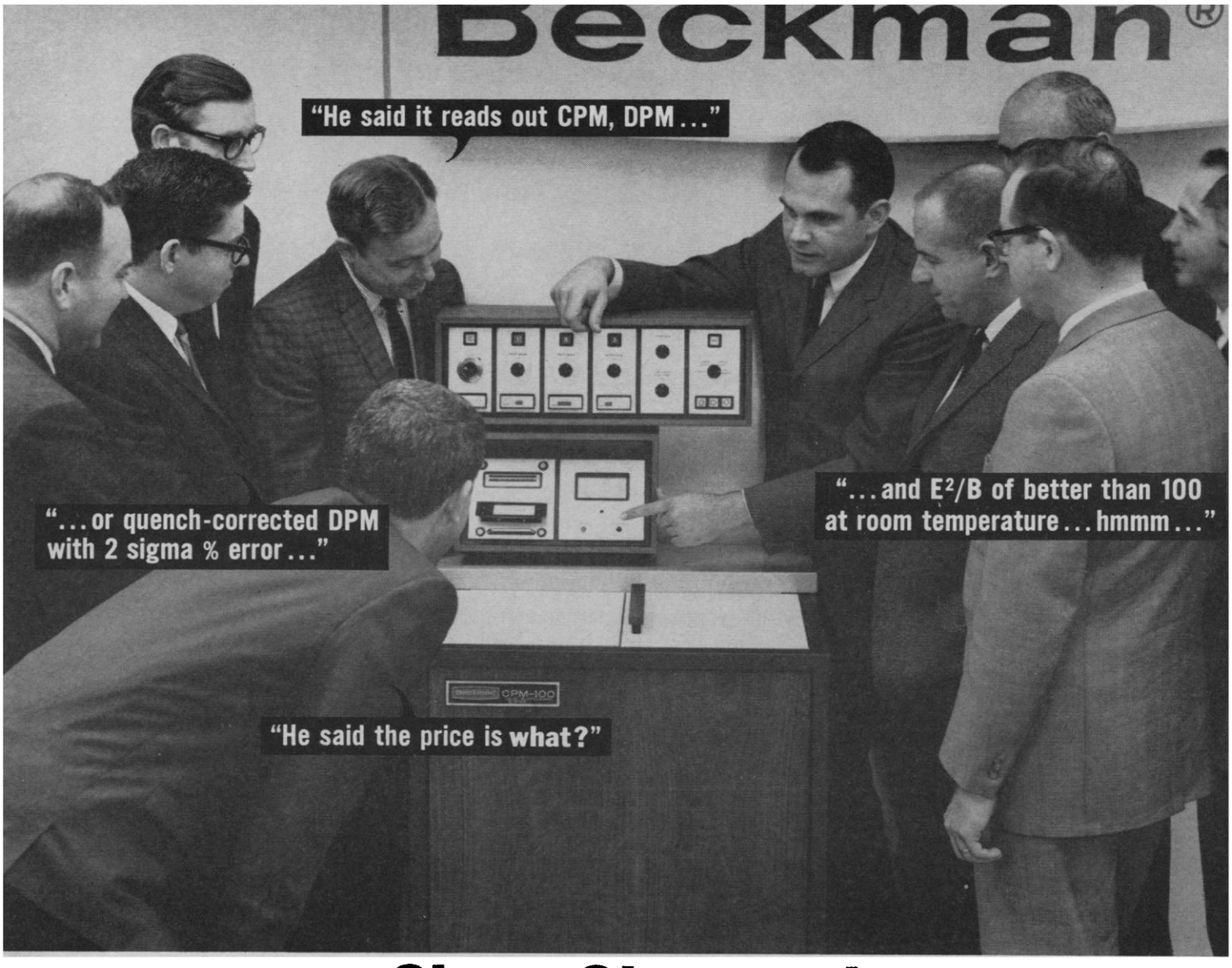
In spite of this excellent experience with modern treatment plants, the manufacturers may yet face further pressures. Much of the sewage in this country is disposed of in cesspools or septic tanks. In well-designed systems the effluent flows into surrounding soil, where it is acted on by aerobic bacteria, and the new detergents are removed. However, if free oxygen is absent, the detergents are not degraded. Householders using wells may still find their water foamy.

The dramatic aspects of the detergent problem, however, seem solved, and this is good. Now our people and the Congress can turn to the substantive problems of water pollution. Only a minor fraction of the sewage from towns and cities is fully treated. Upstream communities show little enthusiasm for spending money for the benefit of communities farther down. Even in those cities that have "full treatment," performance is often poor. In most instances the storm drains and the sewage systems are interconnected. When a storm occurs, the treatment plant is bypassed. This occurs at a time when the scouring action of high-velocity flow dislodges large quantities of solids that have accumulated during low flow. The problem will not be quickly disposed of. The cost of separating storm and sanitary sewers has been estimated at $20 to $40 billion.

Water pollution is not one problem but many. Each watershed requires a different approach, depending on technical, economic, and political factors. A particularly instructive case to follow will be events at Lake Tahoe. This beautiful lake is threatened with degradation. Once relatively poor in algal nutrients, the water has been fertilized by effluent from treated sewage. The communities surrounding the lake now plan to pump their effluent out of the Tahoe watershed. However, even this practice may not suffice. It may become necessary to ban use of fertilizers on garden plots around the lake.

The problems of water pollution are many and complex. The greatest present difficulty is that, while the public favors pollution abatement, only a few politicians are providing imaginative leadership.

—PHILIP H. ABELSON



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A 50-SECOND QUIZ ON A SUBJECT THAT SHOULD BE OF INTEREST TO SCIENTISTS

ISI Quiz Number One

1. What % of research is unintentionally duplicated because adequate literature searches were not done? a. 12% b. 22% c. 45% d. 68%	2. Of all the scientists who ever published, what % are still publishing? a. 25% b. 50% c. 75% d. 90%	3. What % of scientists never search the literature? a. 25% b. 32% c. 57% d. 72%
4. What organization has the world's largest bank of computer tape files of published scientific information? a. NLM (National Library of Medicine) b. VINITI (Vsesoyuznyi Institut Nauchnoi i Tekhnicheskoi Informatsii) c. ISI (Institute for Scientific Information) d. NASA (National Aeronautics and Space Administration) e. CFSTI (Clearinghouse for Federal Scientific and Technical Information)	5. The number of scientific papers is doubling every a. 3 years b. 10 years c. 25 years d. 35 years	6. The average paper is cited a. 1.5 times a year b. 3 times a year c. 5 times a year d. 11.5 times a year
7. The average paper by a Nobel Prize winner is cited a. 3 times a year b. 10 times a year c. 22 times a year d. 160 times a year	8. What is the largest single multidisciplinary scientific index published today? a. Index Medicus b. Chemical Abstracts c. Referativnye Zhurnaly d. Science Citation Index e. Biological Abstracts f. Engineering Abstracts g. U.S. Government R&D Reports	9. What is the average number of references cited in a scientific paper? a. 3 b. 9 c. 17 d. 28

ANSWERS: 1. b 2. d 3. a 4. c 5. b 6. a 7. a 8. d 9. c Details and supporting documentation available upon request, write dept. 29-8.

dition to board meetings, three morning and one afternoon sessions; an ANSS-sponsored luncheon, an evening Naturalists' "At Home" (28 December); and the annual field trip with NABT (30 December).

The annual national meeting of the *National Association of Biology Teachers* (Jay Barton II, CUEBS, 1750 Pennsylvania Avenue, Washington, D.C., and William Stephensen, Earlham College, Richmond, Ind.) is similar to that of the ANSS program in pattern.

The regional meeting of the *National Science Teachers Association*, arranged by the national associate executive secretary, Albert F. Eiss (NSTA, Washington, D.C.), will consist of two or more sessions. The NSTA regional affiliate, the Pennsylvania Science Teachers Association (David Ulmer, Lock Haven State College, Lock Haven, Pennsylvania) will hold its annual installation meeting with the AAAS this year.

The *Educational Policies Commission* (James E. Russell, Educational Policies Commission, Washington, D.C.) will hold a special session of invited papers cosponsored by NSTA with the AAAS around the theme "Education and the Spirit of Science," (27 December).

Details of the symposium of the *National Association for Research in Science Teaching* (Frederic B. Dutton, Michigan State University) are not yet available.

Information and Communication (T)

In general, Section T's program (Phyllis V. Parkins, BioSciences Information Service, *Biological Abstracts*) is expected to follow the successful pattern of the past few years. There will be a two-session symposium, "The Impact on Society of the Communication of Science" arranged by Robert C. Harte (American Society of Biological Chemists, Washington, D.C.); another symposium on "The Place of Information Retrieval and Scientific Communication in the Education of Scientists" (Eugene Garfield, Swarthmore, Penna.), cosponsored by Section Q; a luncheon and an address by a distinguished speaker; and the vice-presidential address of William C. Steere (New York Botanical Garden).

Section T is the primary sponsor of the AAAS Interdisciplinary Symposium "Scientific Exchange and Use of Information" (Phyllis Parkins).

The *Society of Technical Writers and Publishers* (I. D. Welt, American University) is arranging a joint session with Section T.

The *National Association of Science Writers* (Leonard S. Zahn, Hill & Knowlton, Inc., 150 East 42 Street, New York) will have a business meeting, probably an invited speaker, and the annual dinner at which the AAAS-Westinghouse Science Writing Awards are announced.

Statistics (U)

The program of Section U (Rosedith Sitgreaves, Teachers College, Columbia University) again will consist largely of joint sessions with other sections and with related societies. The vice-presidential address will be given by William G. Cochran (Harvard University).

Under the joint sponsorship of the *Biometric Society ENAR* (D. S. Robson, Cornell University) and the Ecological Society of America, there will be a two-session symposium (30 December) on "Statistical Ecology" arranged by E. C. Pielou (Canadian Department of Agriculture, Ottawa).

A second two-session symposium, joint with the AAAS Sections on Zoological Sciences (F) and on Statistics (U), and cosponsored by the American Fisheries Society, "Over-exploited Animal Populations," is nearly complete. Among the speakers are: (on whales) D. G. Chapman, Department of Mathematics, University of Washington; (on Atlantic haddock) M. D. Grosslein, Bureau of Commercial Fisheries, Woods Hole Laboratory; (topic undecided) M. B. Schaeffer, Scripps Institution of Oceanography; (on Central Pacific tuna) B. J. Rothschild, Bureau of Commercial Fisheries, Honolulu; (on Pacific sardines) G. I. Murphy, Department of Oceanography, University of Hawaii; (on Pacific salmon) P. A. Larkin, Biological Station, Nanaimo, B.C.; (on Great Lakes fisheries) Stanford H. Smith, Bureau of Commercial Fisheries, Ann Arbor, Mich.; (on North American ducks) A. D. Geis, Bureau of Sports Fisheries and Wildlife, Laurel, Md.; and (on seals) I. A. McLaren, Marine Sciences Centre, McGill University.

The American Fisheries Society will cosponsor the symposium of the Society for Industrial and Applied Mathematics, "Combinatorial Problems in the Life Sciences."

Science in General (X)

A number of organizations, too general in their interests to be placed in any sectional series or under any specific discipline, constitute the "X series" in the printed *General Program* of the annual meeting. In this preliminary synopsis, the programs of one of these—the Academy Conference—has already been mentioned, under "Other General Events."

At its annual meeting, *Sigma Delta Epsilon*, graduate women's scientific fraternity (Eltora M. Schroeder, national president, Agricultural Research Service, USDA, Beltsville, Md.), will observe its 45th anniversary. The speaker at the luncheon for all women in science will be Margaret Stone (national second vice-president and charter member of the Alpha Chapter). A Sigma Delta Epsilon symposium on member research in the field of cancer and disease is planned for 27 December at 2:00 p.m. There will also be national council meetings and the grand chapter dinner and meeting. A headquarters room will be maintained throughout the meeting period, 26–30 December. Chairman of the committee on local arrangements is Madelyn Womack (USDA, Beltsville, Md).

The 67th annual convention of the *Society of the Sigma Xi* (Thomas T. Holme, Society of the Sigma Xi, New Haven) will be held on the morning of 29 December preceding a luncheon. On the evening of 29 December, the Society will join with the *United Chapters of Phi Beta Kappa* (Carl Billman, Phi Beta Kappa, Washington, D.C.) in sponsoring their annual address with the AAAS. These distinguished lectures, of interest to all participants, have been a valued feature of the AAAS annual meeting from the inaugurations of the, at first separate, series in 1922 and in 1935, respectively.

The *Washington Academy of Sciences* (Ernest P. Gray, Applied Physics Laboratory, Silver Spring, Md.; and John Menkart, Harris Research Laboratories, Washington, D.C.) on the occasion of its 500th regular meeting, is sponsoring an invited address by the Nobel laureate British physicist, P. M. S. Blackett, president of the Royal Society. John K. Taylor, president of the Washington Academy, will preside. The Academy will cosponsor the AAAS Interdisciplinary Symposium, "Science in International Perspective," in which P. M. S. Blackett, Sir Lawrence Bragg, and Victor Weisskopf are participants.