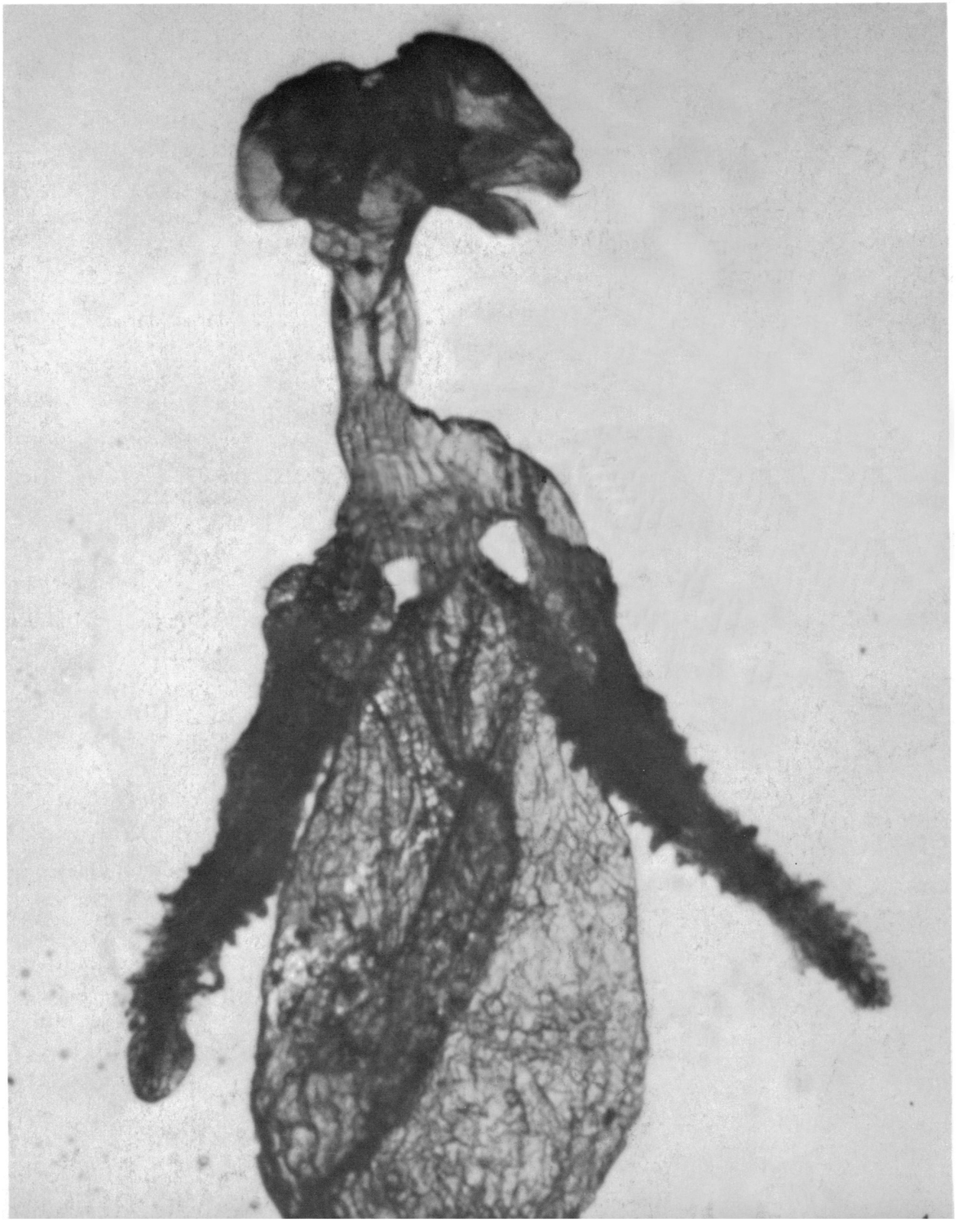
SCIENCE

31 May 1974

Vol. 184, No. 4140

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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321) L. W. Jones, "Liquid Hydrogen as a Fuel for the Future," 22 Oct. 1971
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31 May 1974

Volume 184, No. 4140

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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

REPORTS

COVER

Prepupa of the sawfly *Neodiprion sertifer*. Larvae of the sawfly store a plant resin which effectively deters predators. See page 996. [Thomas Eisner, Cornell University, Ithaca, New York]

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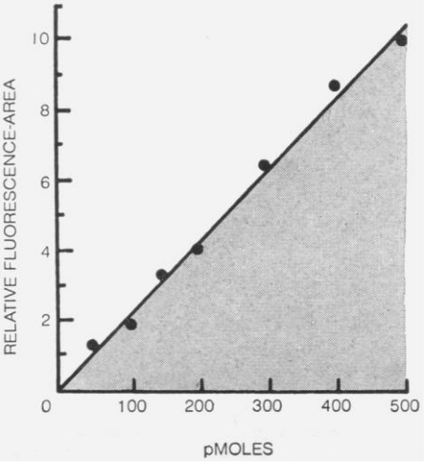

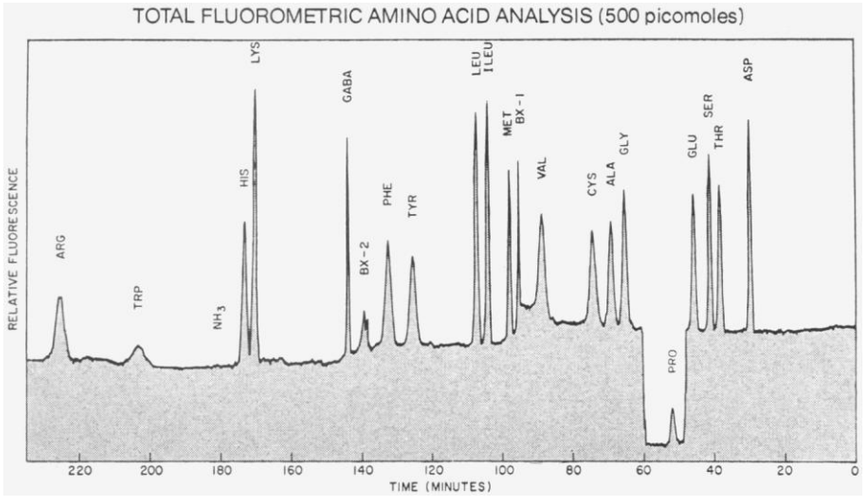

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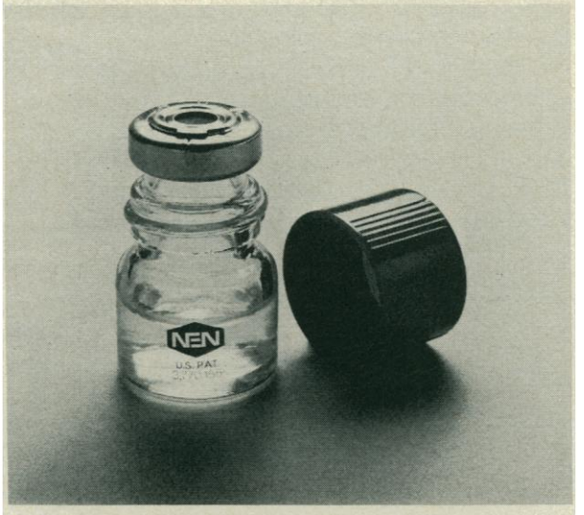

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mentalist. What the myriads of tables in this version of the Good Book provide is information on the trade-off between speed, distance, and recovery times. The tables provide remarkably accurate predictions of performance. Consequently, the absence of much in the way of a theoretical underpinning is the more surprising. Fortunately, at least one stellar miler and cross-country runner (C. R. Taylor) appears to be devoting professional attention to these matters, even though he adopts an unorthodox style [see C. R. Taylor and V. J. Rowntree, "Running on two or on four legs: Which consumes more energy?" (12 Jan. 1973, p. 186)].

PETER H. KLOPFER
Department of Zoology,
Duke University,
Durham, North Carolina 27706

Reference

1. J. B. Gardner and J. G. Purdy, *Computerized Running Training Programs* (Tafnews, Los Altos, Calif., 1970).

Power, Fresh Water, and Food from the Sea

Othmer and Roels (12 Oct. 1973, p. 121) suggest a system by which the oceans would be used to provide electric power, desalinized water, and nutrients for mariculture. Power would be generated by operating a heat engine between the warm surface waters and the cold bottom waters of the ocean. The Othmer and Roels scheme makes use of steam, produced by flash vaporization of the warm surface waters, as the working fluid.

A major problem with this approach is that the low vapor pressure (25 to 30 mm-Hg) of steam at the water temperatures available at the ocean surface (25° to 30°C) necessitates the use of very large turbines. For a power plant producing 1 gigawatt (1 million kilowatts) of electrical power (the typical size of a modern plant) the total area of the nozzle throat at the inlet to the turbine must be of the order of 10^4 square meters. For a conventional power plant, the comparable area is about four orders of magnitude smaller.

Such low-pressure turbines of the size necessary for a 1-gigawatt plant have never been constructed. The use of many moderate-sized turbines would be prohibitively expensive. Although a smaller plant, such as the 7180-kilowatt (net) plant suggested by Othmer and Roels would require a smaller turbine, the turbine size would still be out of proportion to the plant capacity, and the quantity of power produced would be uninteresting by today's standards. Ting (*1*) has estimated that the turbine inlet pipe for such a plant would exceed 13 meters in diameter.

The problem of turbine size is considerably alleviated if a separate working fluid is employed in a closed cycle. Lavi and Zener (*2*) suggest ammonia, and Anderson and Anderson (*3*) suggest propane. A more suitable pressure profile in the available temperature range can thus be realized, permitting a reduction in the turbine size by two to three orders of magnitude. For large-scale power production from sea thermal gradients, it would appear that schemes employing a separate working fluid are the more realistic.

HARRY DAVITIAN
Institute for Energy Analysis,
Oak Ridge, Tennessee 37830
WILLIAM MCLEAN
College of Engineering,
Cornell University,
Ithaca, New York 14850

References

1. H. Ting, *Combustion* **42**, 16 (1970).
2. A. Lavi and C. Zener, *IEEE Spectrum* **10**, 22 (October 1973); see also C. Zener, *Phys. Today* **26**, 48 (January 1973).
3. J. Anderson and J. Anderson, Jr., *Mech. Eng.* **88**, 41 (April 1966).

A suspension bridge may be the best structure for crossing a particular stream; the advantages of a trestle bridge indicate it should be used over another. Then there are oranges which are squeezed, and prunes which are dried. Ammonia is a good thermodynamic fluid, propane another, each for particular conditions; and water has outstanding advantages for the system described in our article.

Whether bridges, fruits, or volatile liquids, individual methods are best for particular situations. A plant using water can be safe on shore rather than anchored far off at sea, where one part would be swept with the hurricanes that occur so often in tropic seas, a second part would be hundreds of meters below the surface, and a third part would be between these two. Cables on the ocean floor a kilometer below the surface would have to carry the *single* product, electric power, many kilometers to shore. Situations may exist where this is the only

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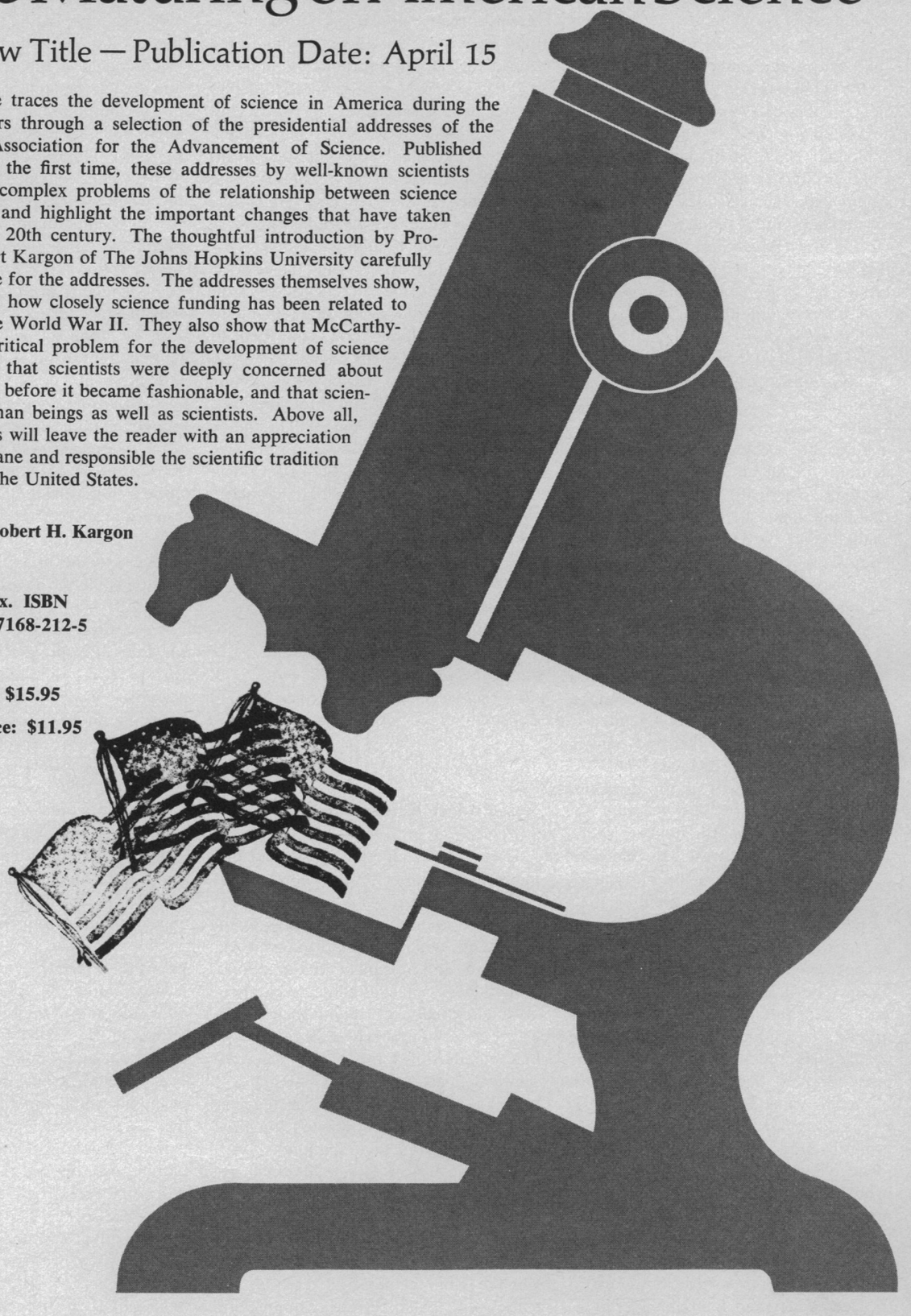

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31 May 1974, Volume 184, Number 4140 **SCIENCE**

Media Coverage of Substantive Issues

A cursory examination of news sources leads to the conclusion that citizens have a great number of opportunities to become well informed. They can view programs on the various television channels. Most radio stations give the news at least hourly—some continuously—and there are many talk shows. Newspapers and newsweeklies attempt to carry on their traditional function.

Yet a closer examination reveals that the news media are not effective in presenting balanced news in depth, but are to a degree contributing to a malfunctioning of society. They have participated in creating and exacerbating a series of crises by overconcentrating attention on particular topics. Typically, after a period of concentrated attention, the media suddenly drop one topic as they rush to indulge in overkill of the next one.

These tendencies were noted by Alan L. Otten in a recent column in the *Wall Street Journal** which began:

> One hallmark of contemporary America, it's frequently been noted, is the short life-span of its crises.
>
> A problem emerges suddenly, builds swiftly to crisis proportions, briefly dominates public consciousness and concern, and then abruptly fades from view. Civil rights, urban decay, hunger, drugs, crime, campus unrest, medical care, the environment, energy—one succeeds another with blurring speed, almost as though some issue-of-the-year club were in charge.

A glance at Otten's list leaves one with the impression of a variable amount of residue from the periods of great mass media attention. Most of the topics listed are now practically dead as far as the media are concerned. True, there is a considerable residue from emphasis on the environment both in legislation and in public consciousness, although with sharply curtailed media coverage, the public concern and interest have lessened. After tremendous attention, news coverage of the energy crisis has almost disappeared, and there is little indication of substantive progress in meeting the issue. The basic problems remain, but the public is bored with the subject, and the net effect of the coverage is to make it more difficult for progress to be made in the future.

Another undesirable feature of the massive attention is its lack of quality. The bizarre and the spectacular news takes precedence over reports with balance and substance. We at *Science* frequently have opportunities to evaluate the performance of the media in unearthing the facts about a given situation, and more often than not we are disappointed. This is particularly true in those areas in which science and technology interact with public policy. These issues are usually complex and enduring and not well handled by slick or sensational journalism.

The current practices of the mass media point up the value of publications like *Science* that are designed to inform rather than to excite. Although our resources are comparatively modest, we feel no handicap in competing. On any topic we choose to cover, we can if we wish produce a more rounded, complete, balanced, and scholarly story. Usually we do not choose to compete on topics that are being well covered by others. We prefer to pinpoint issues before they are in vogue, and we are not averse to dealing with significant topics after others have dropped them, provided there is new and relevant information.

In our efforts to maintain quality, we are fortunate in having a readership that expects good performance. Our authors understand this and tend to behave accordingly. We are also fortunate in having an audience that values rigor and discussion in depth and is willing to contribute ideas, time, and money to the common objective.—PHILIP H. ABELSON

* A. L. Otten, *Wall Street Journal*, 6 May 1974, p. 16.

Skepticism

Skepticism is a stock trade of science. Thus, the promise of the green revolution is weighed against its actual costs . . . the potential of geothermal energy is squared against problems, environmental and political . . . confident 20th-century conceptions of prehistory are critically examined . . . our understanding of natural phenomena — volcanoes, earthquakes, hurricanes — is questioned. This third volume of *Speaking of Science* offers a wide ranging sampling of skepticisms — from population policy to views of man's violent behavior. Knowledgeable people take a sharp-eyed look at twelve different problems involving science and technology. An insight is gained into current attitudes toward some familiar problems . . . and a few new ones.

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