SCIENCE

2 May 1969
Vol. 164, No. 3879

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

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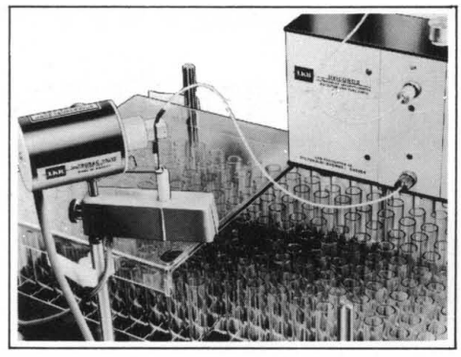

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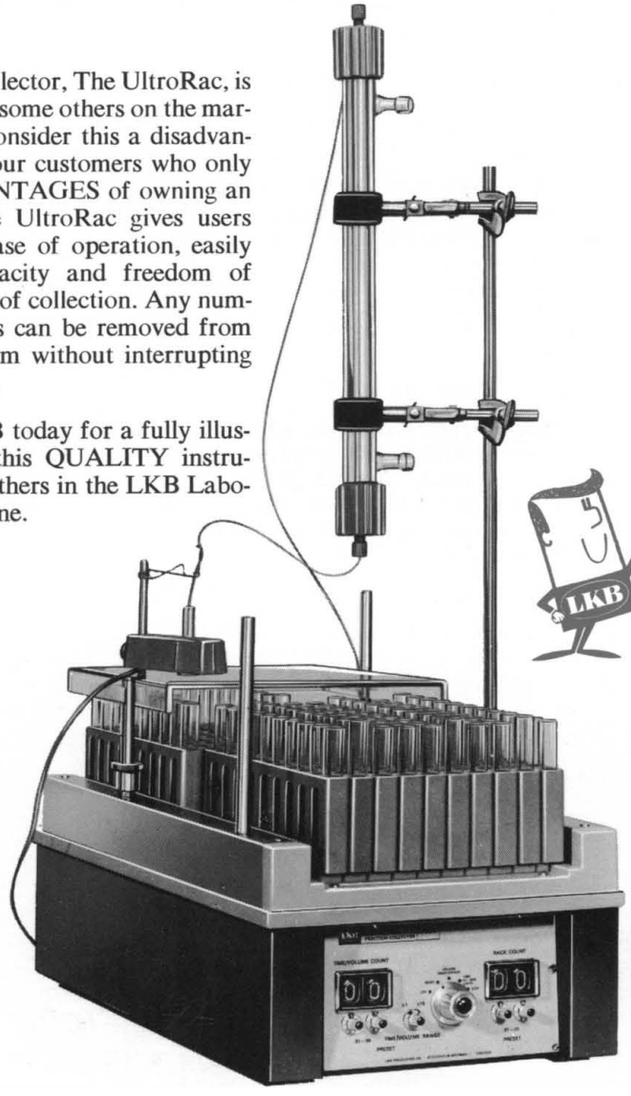

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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

COVER

Waterspouts off the Bahamas provide a striking example of the interaction between sea and air. The Barbados Oceanographic and Meteorological Experiment (BOMEX), which began 1 May and will continue through July, will focus on air-sea interaction phenomena and is one of the most ambitious weather experiments ever undertaken (see *Science*, 28 March, page 1435). [Stephen Gwin, Island Heights, New Jersey]

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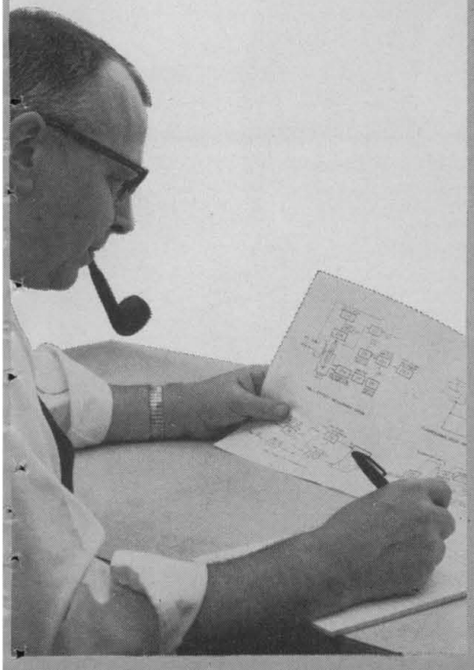

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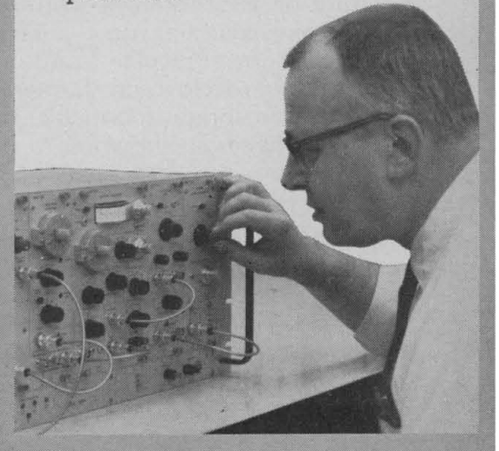

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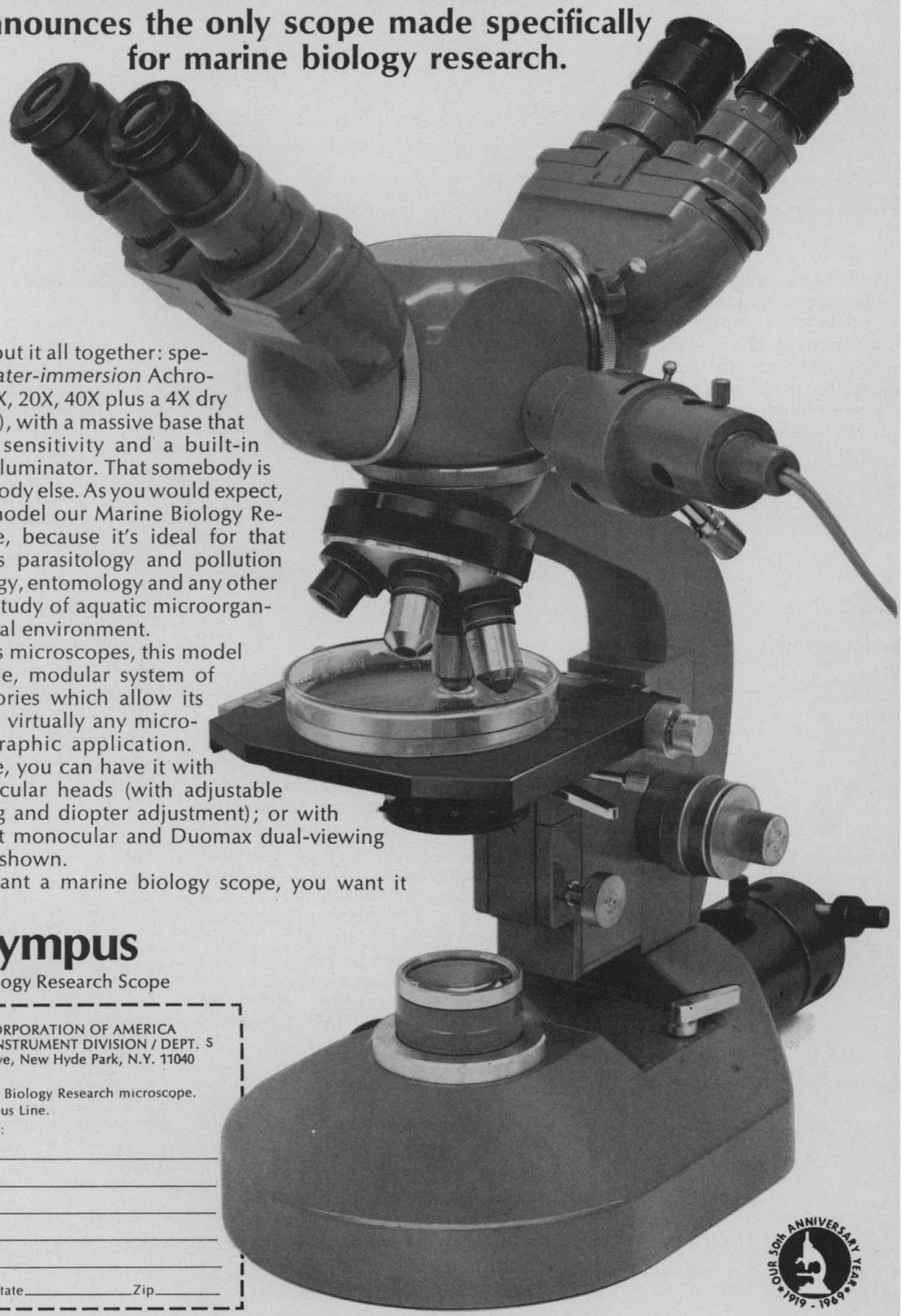

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SCIENCE

Public Challenge of Government Action

The current public debate about the ABM has served to dramatize a growing gap in the American political process. Increasingly, decisions must be made on issues that involve considerable scientific or technological complexity, as a result of which the agencies of government or their contractors in effect have a near-monopoly on the relevant information. The old problem of "who represents the public" in government decision-making now takes on a new and more serious dimension.

Many have been concerned for some time about this, and in recent years there have been useful developments: new techniques for providing independent advice for the Congress; the growth of citizens' groups in specific subject areas, able to make independent analyses; even the establishment of the President's Science Advisory Committee in the White House as a means of challenging agency positions on complex technological questions. As useful as these steps have been, they do not meet the problem for today and for the future.

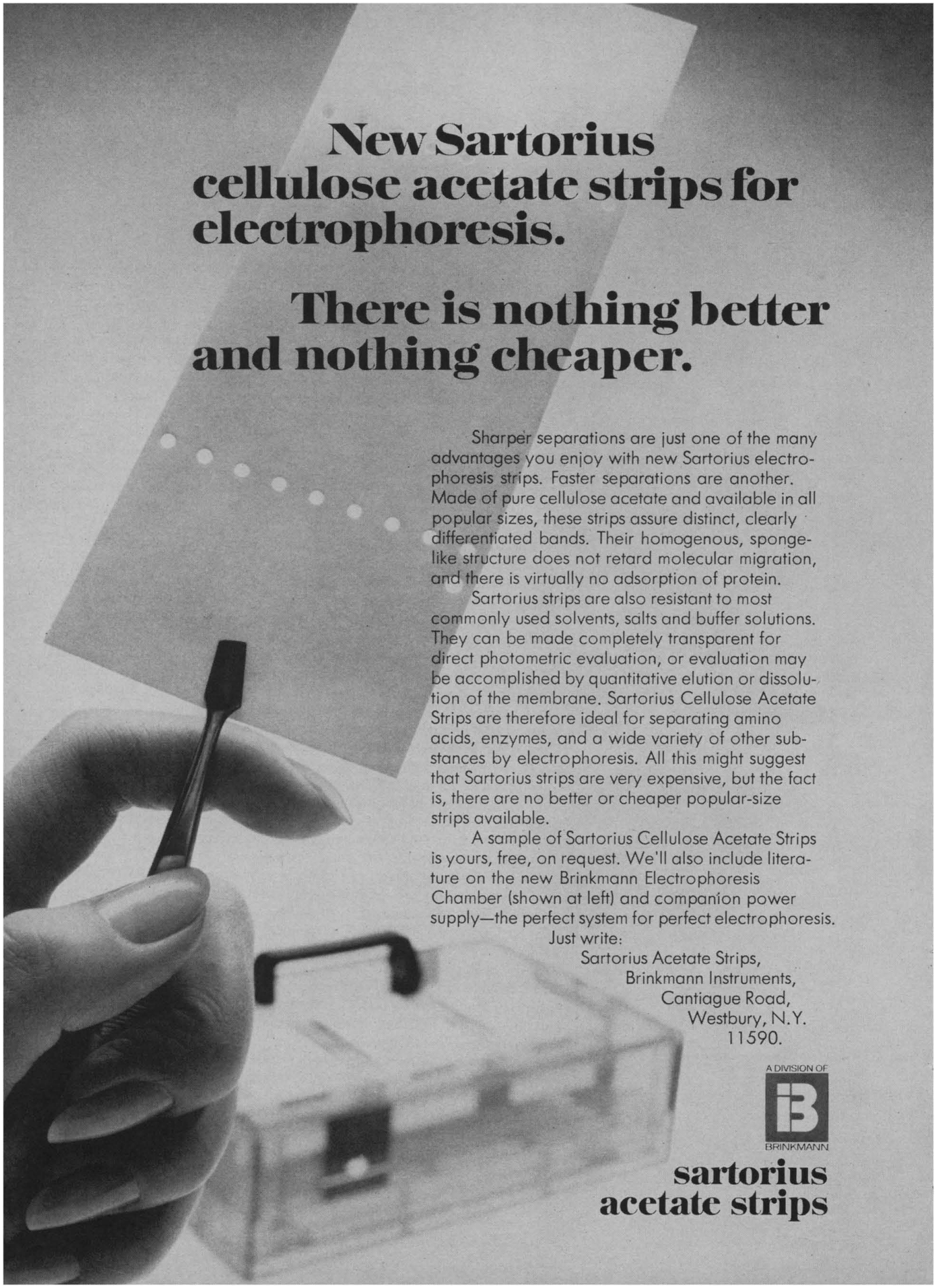
The exciting and encouraging characteristic of the current ABM debate is that, for the first time since World War II, there is a major public challenge of a complex technological project, and a refusal to accept the usual assurances that secret data and intelligence would justify the project. In this debate the nation is fortunate in that many individuals who have had, or still have, a direct role in the subject have been willing to speak out publicly. But these individuals cannot be expected to be familiar with all issues as they arise, or to continue to be in a position to spend the professional and political capital required by direct public involvement. In any case, for most issues the occasional participation of individuals alone is not enough, for extensive continuous analysis is usually required, and a more obviously disinterested base necessary.

It seems clear that what is needed in our political process are new independent mechanisms charged with the task of developing information and analyses of important areas of public interest that have major scientific and technological content. In effect, the nation must consciously develop the capability to challenge government actions from a base independent of the government and of its policies.

In principle, the university is the primary locus in our society for critical examination of social issues from a base of strong analytical capability characterized by a striving for unbiased scholarship. But, are American universities now sufficiently independent? Can means for support for such policy criticism be found that will protect the universities in necessarily sensitive areas? Is it in fact wise for universities to take on major new functions that will be exceedingly difficult to perform, that may threaten traditional functions, and that will require new capabilities and organization while bringing about increased involvement in public confrontations on politically sensitive issues?

The answers to these questions are not clear, but it is essential that they be explored. If the universities remain aloof, are there other candidates capable of meeting a challenge of this magnitude? In any case, if the concern behind the March 4th events means anything at all, it represents a growing demand that the universities in fact find ways to perform this task of public policy analysis and criticism.

—EUGENE B. SKOLNIKOFF, *Department of Political Science, Massachusetts Institute of Technology*



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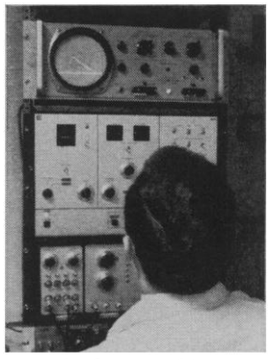


This is the back of the head of Joe Merrigan, candidate for the degree Master of Business Administration.

In another room where Dr. Merrigan hits the books toward his academic goal, a doctoral diploma in physical chemistry already adorns the wall. It is where he gazes at the shape of a distribution output from a multichannel analyzer that the link can be found between his seemingly divergent academic interests. Fortunately for us, *this* room we own. In all the domain of the world's manufacturing industries, few other rooms are known to be devoted to the connection between anti-matter and industrial prosperity.

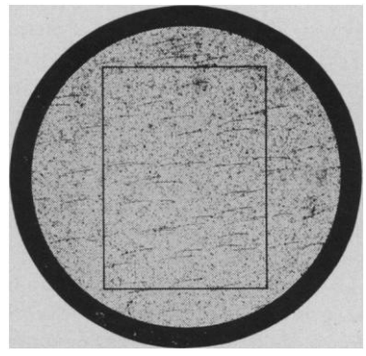
Anti-matter has taken 40 years to penetrate this far into what most men consider reality. First it appeared as a fantastically brilliant deduction knit from a skein of the thought of Einstein and Planck: that if negative energy states can have meaning, so can vacancies in these states. Vacancies are holes, but "holes" seem a shade realer. Soon their reality hardened from the merely conceptual to an actual discovery in cosmic ray showers, where they were called positrons.

After 16 more years, it was found that sometimes before a positron and electron cancel each other in a gamma ray flash they form a configuration that lasts a short time before annihilation. Actually, 140 nsec, the average lifetime in free space of one such configuration, is hardly very short today with the electronic black boxes now on the market. It's plenty of time for the positronium atom, as the configuration can be considered after its formation from positrons emitted by Na^{22}, to diffuse around before blowing up against another electron.

Therefore the scintillation-detector-fed multichannel analyzer, by holding a statistical stopwatch on the positronium between its beginning and its end, supplements and will perhaps surpass x-ray diffraction as an indicator of the degree of order in polymers or other solids. By indicating whether the electrons are tightly constrained or not, it can also be indicating progress when a lot of people are being paid to find polymers and crystals of commercial significance.

Though we sell no anti-matter, the Kodak Research Laboratories have assembled a bibliography on positrons and positronium. For a copy, write V. L. Simonetti, Mail Code 55, Eastman Kodak Company, Rochester, N.Y. 14650. Test question to warn those who cannot answer it against wasting postage: why is the reduced mass of positronium half the mass of the electron?

Nuclear structure and labor



This is a view through a microscope of deuteron tracks in the emulsion of a KODAK Nuclear Track Plate, Type NTB. Though the plate was purchased from a Kodak dealer for only $4.15, the customer's $3,000,000 accelerator worked 2 hours to put those tracks on it. They resulted from the reaction $W^{184}(He^3,d)Re^{185}$. Apparently a large financial commitment and a strong interest in the structure of the atomic nucleus had to precede that $4.15 sale. One wonders of what use advertising this product can be. Here is an attempt to find a role for advertising in such a case.

You don't have to know much about what holds the rhenium nucleus together to look through that microscope in a useful way. All you need is for somebody to tell you what he wants to know about what you see there. You might not be terribly useful to him on the first plate or two, but by the time you have completed your third hour on your 200th plate, your eyes will be much better at it than his, even if your legs or some other parts of you happen to be absent or nonfunctional. Useful work brings home bacon, whether or not worker can walk out of house. Noting that our neighbors at the University of Rochester Nuclear Structure Research Laboratory send some of their plate-reading work out to the Rochester Rehabilitation Center for the handicapped, we have found an advertising idea to try:

Planning a scientific project that will generate a large volume of images to be measured or screened? Wondering where to find patient labor? Stop wondering and have a talk with the vocational director of your nearest rehabilitation center or your state rehabilitation agency.

If you can't find them or the talk gets nowhere, seek further guidance from the Rehabilitation Services Administration, Department of Health, Education, and Welfare, Washington, D.C. 20201.

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