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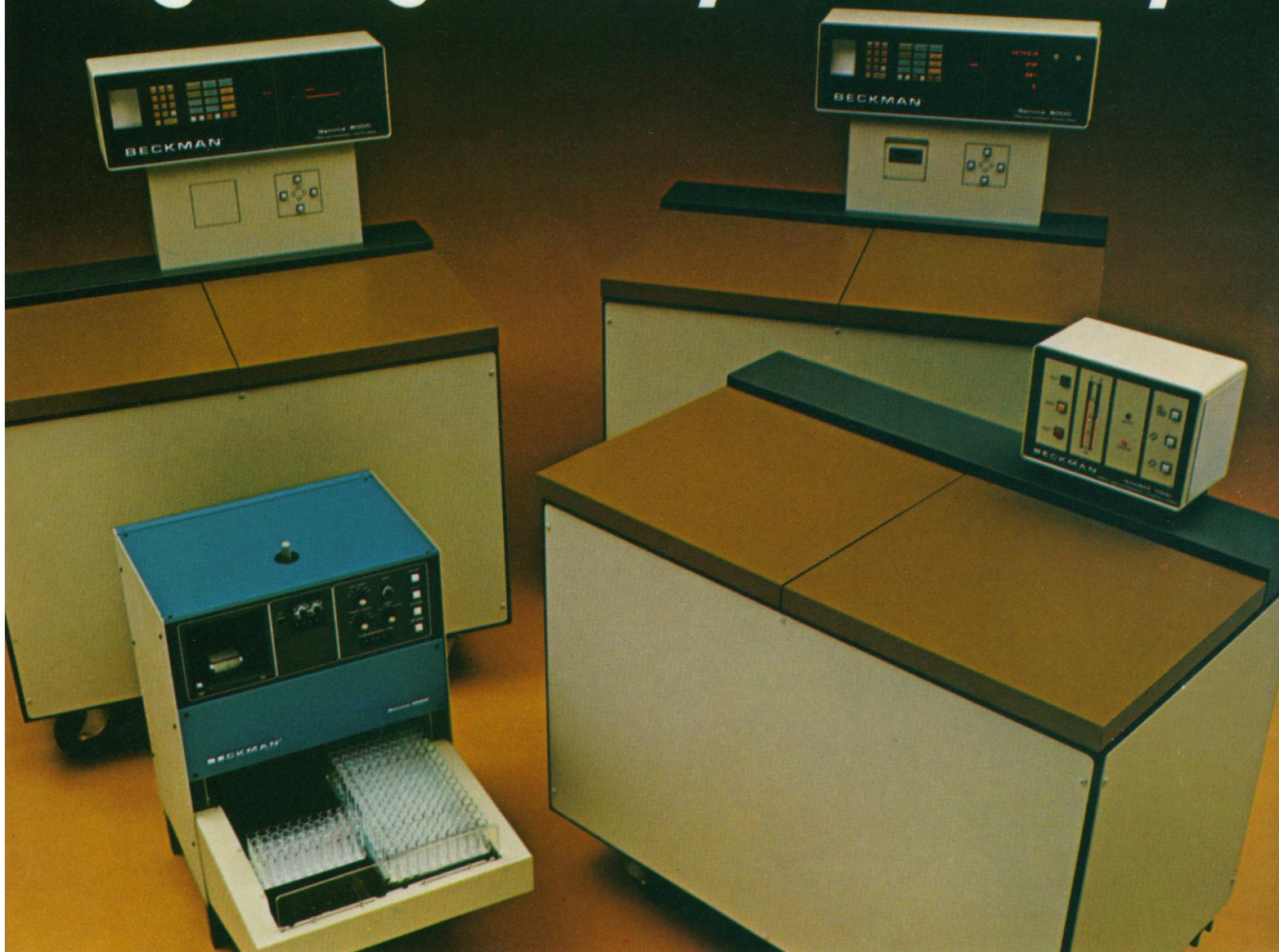
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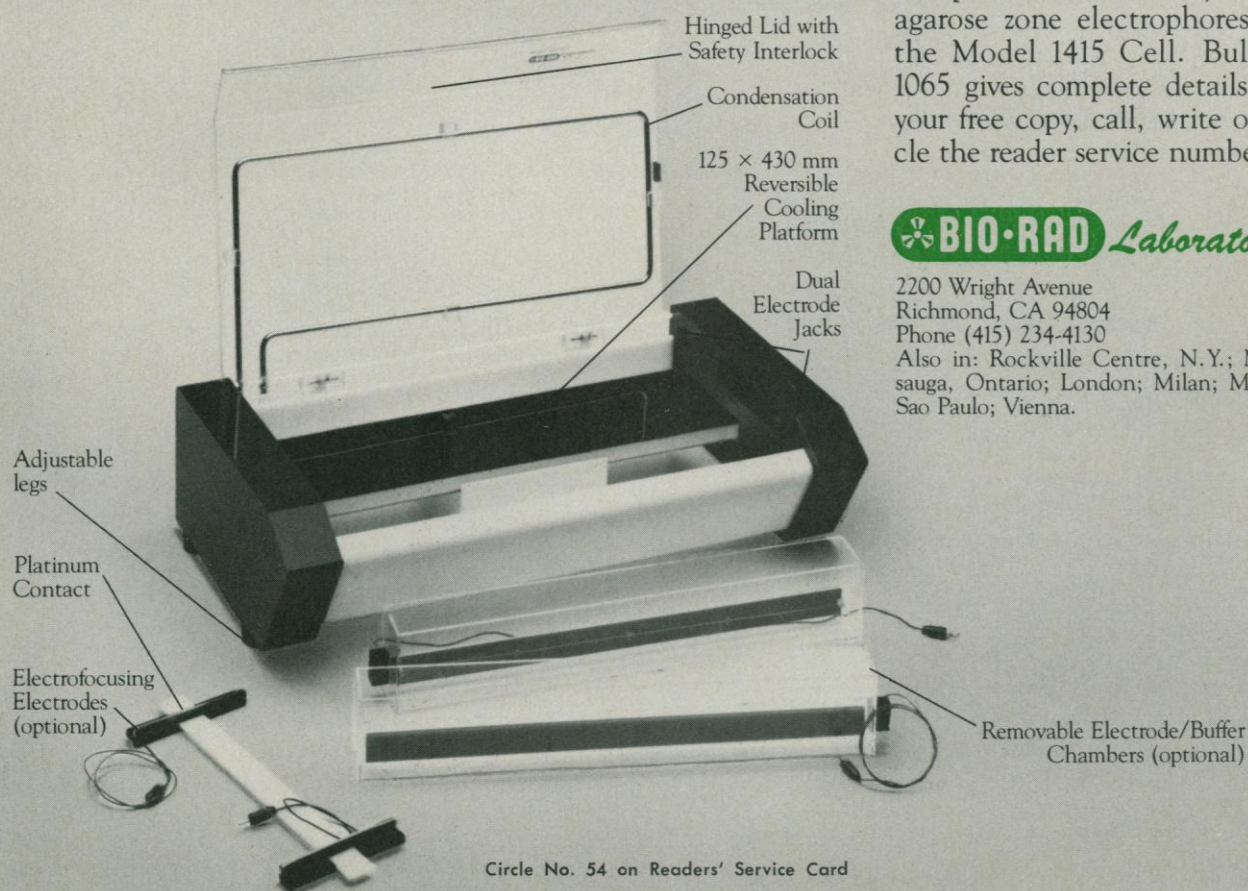
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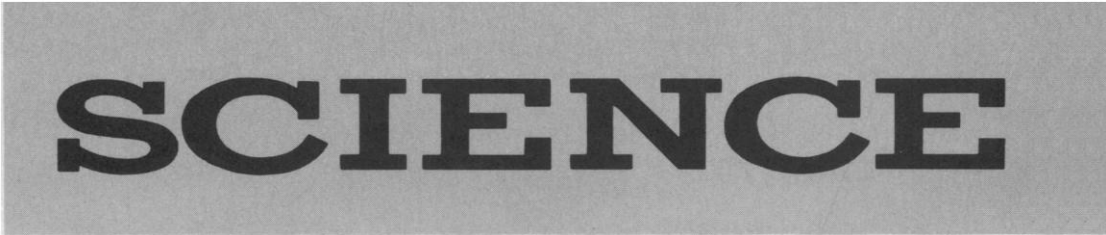
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## COVER

Photomicrograph, taken with polarized light, of an oblique section through three layers of collagen fibers in the skin of a blacknose shark (*Carcharhinus acronotus*). Fibers are about 50 micrometers in diameter. See page 747. [Stephen A. Wainwright, Duke University, Durham, North Carolina 27706]

The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objects are to further the work of scientists, to facilitate cooperation among them, to foster scientific freedom and responsibility, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.





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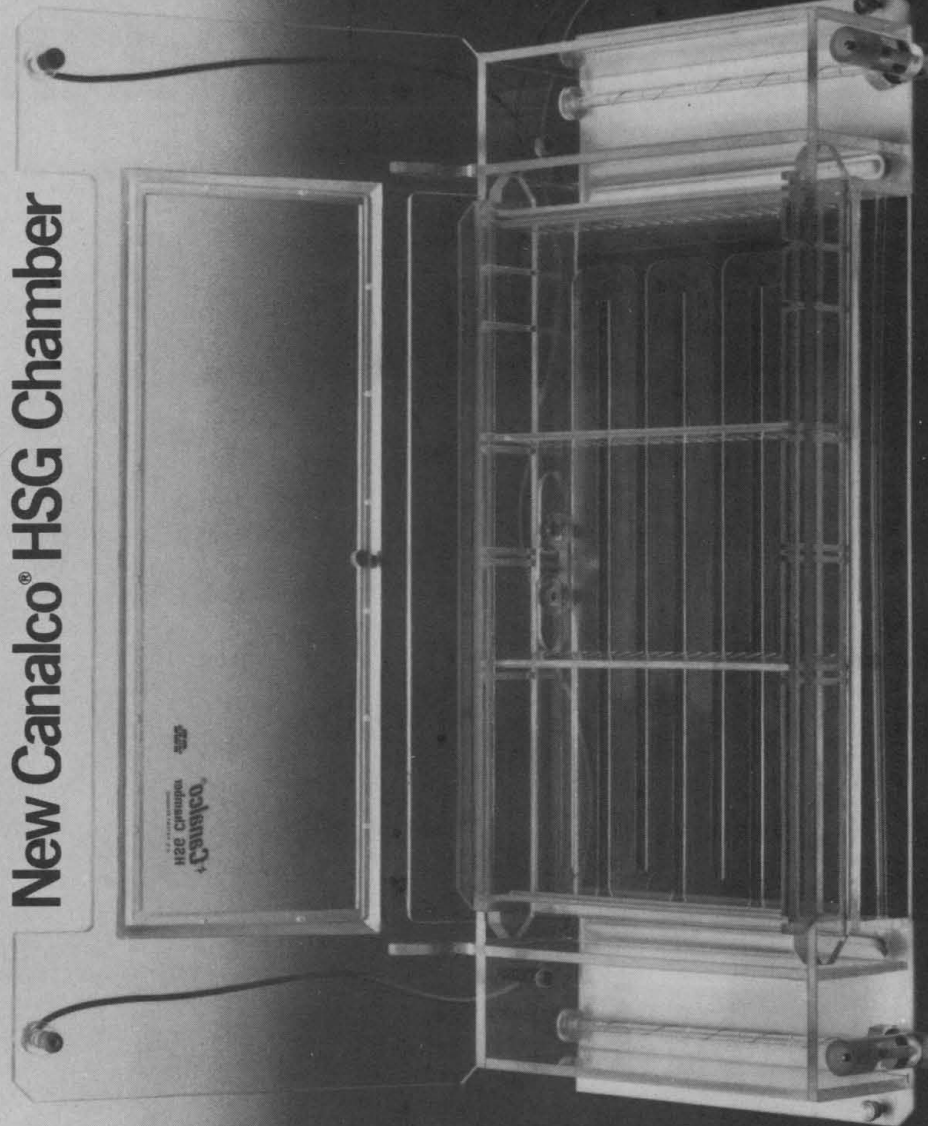
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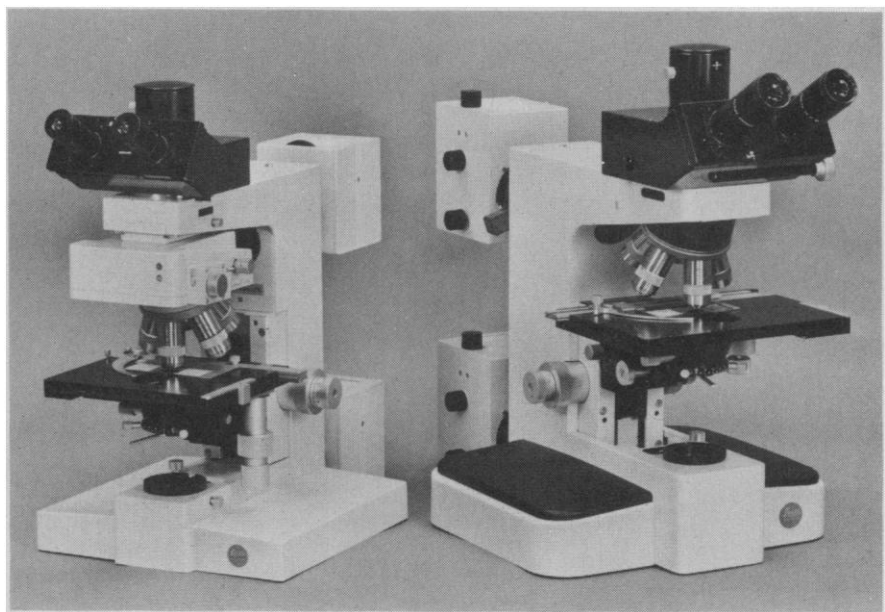
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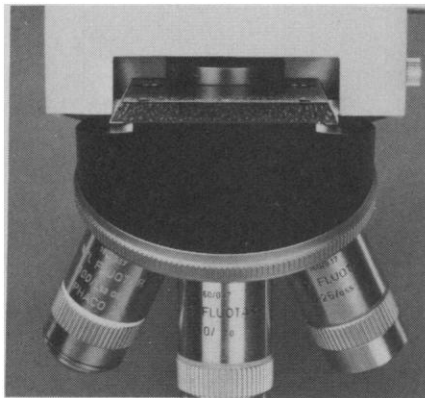
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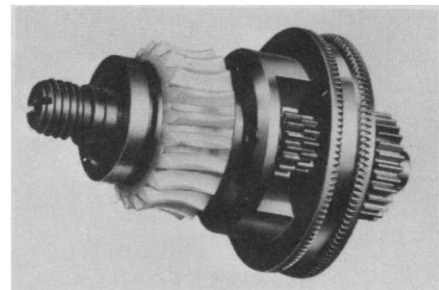


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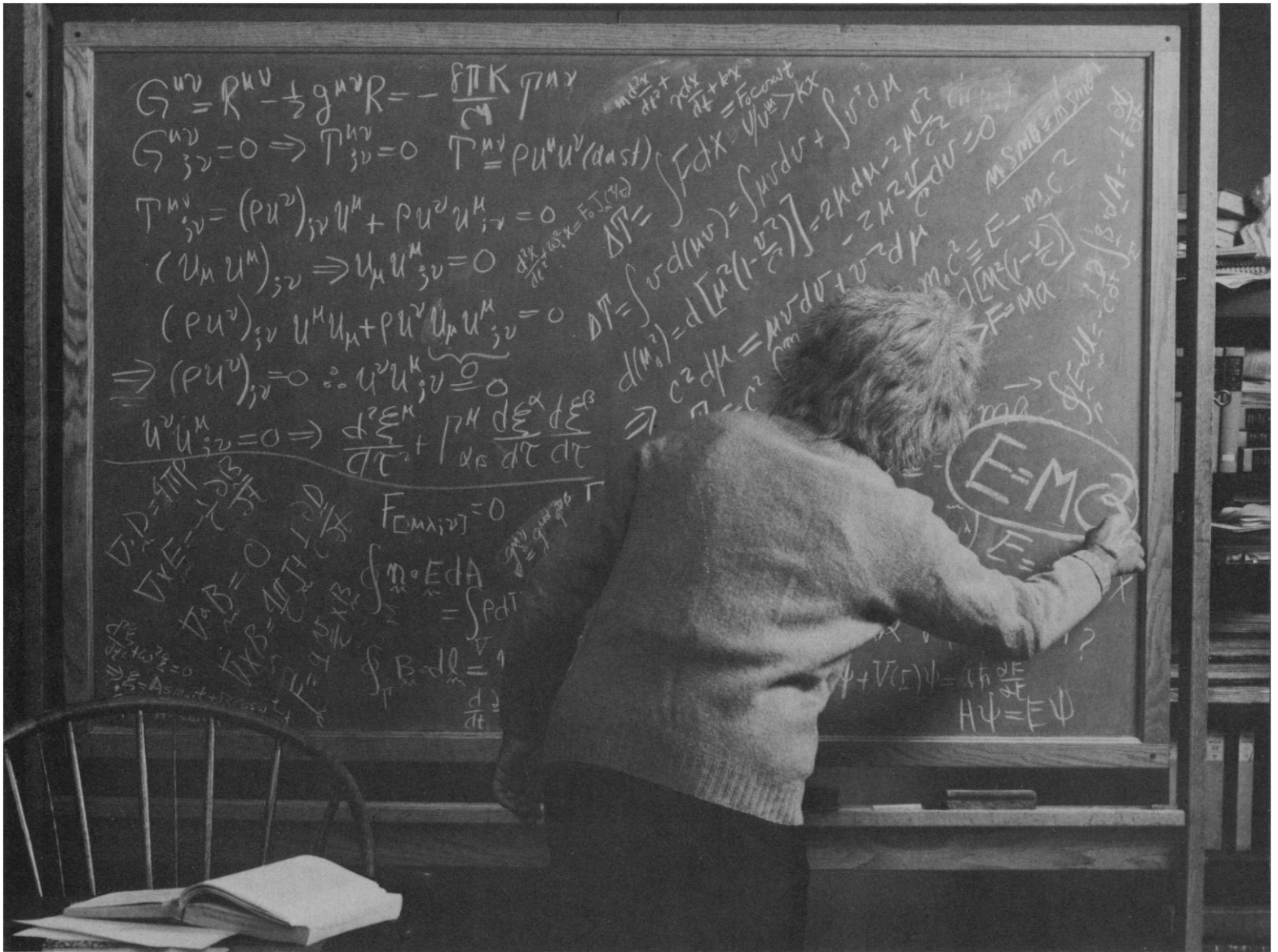


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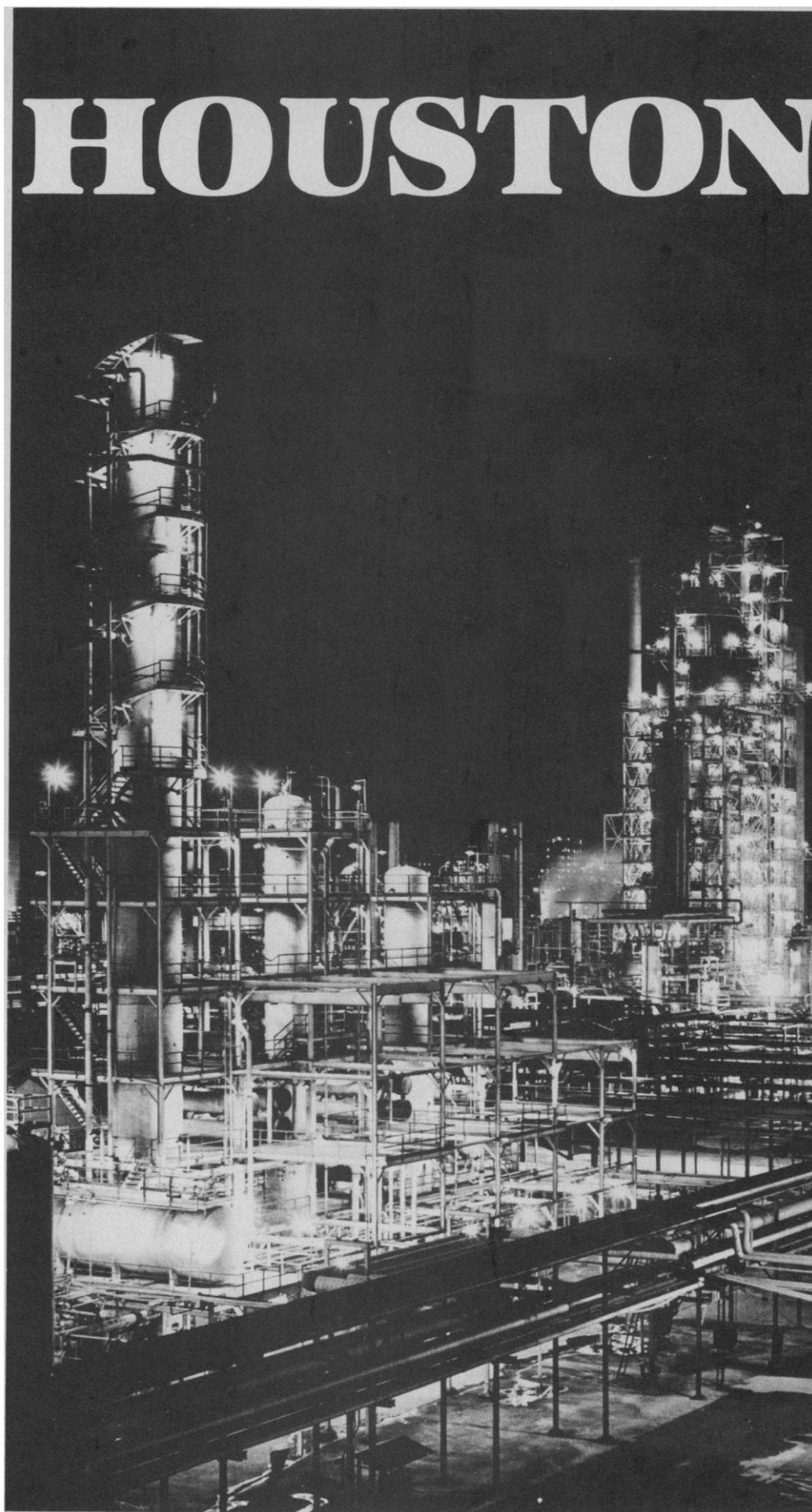


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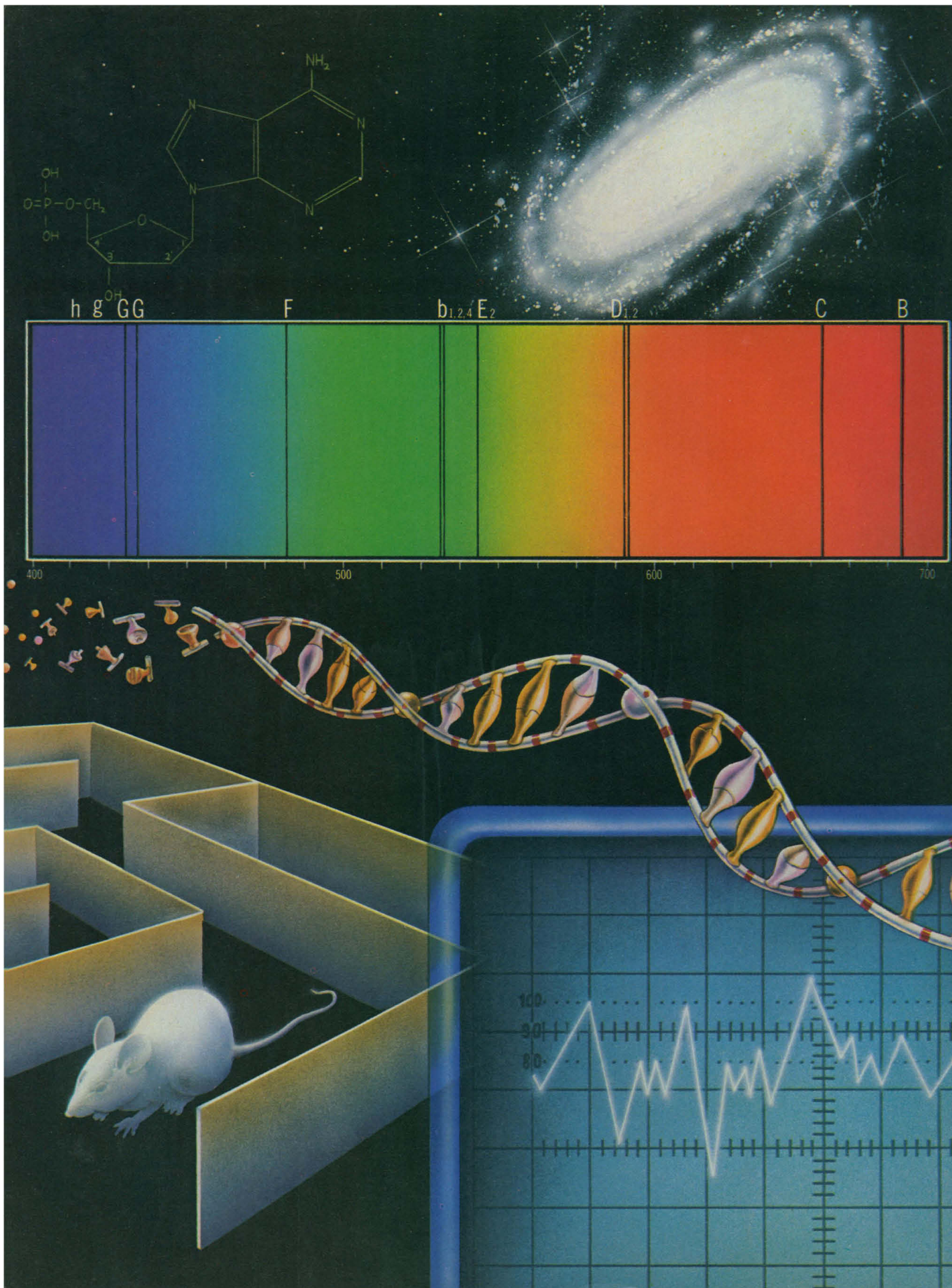
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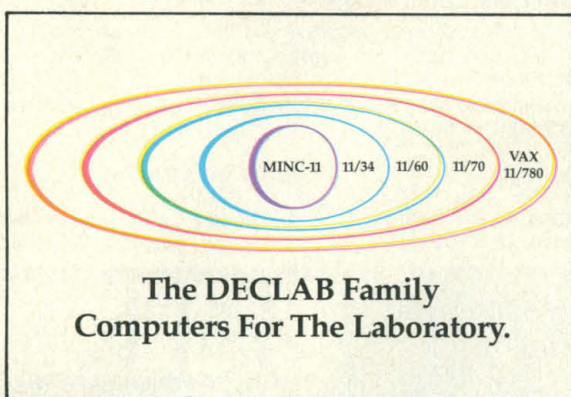






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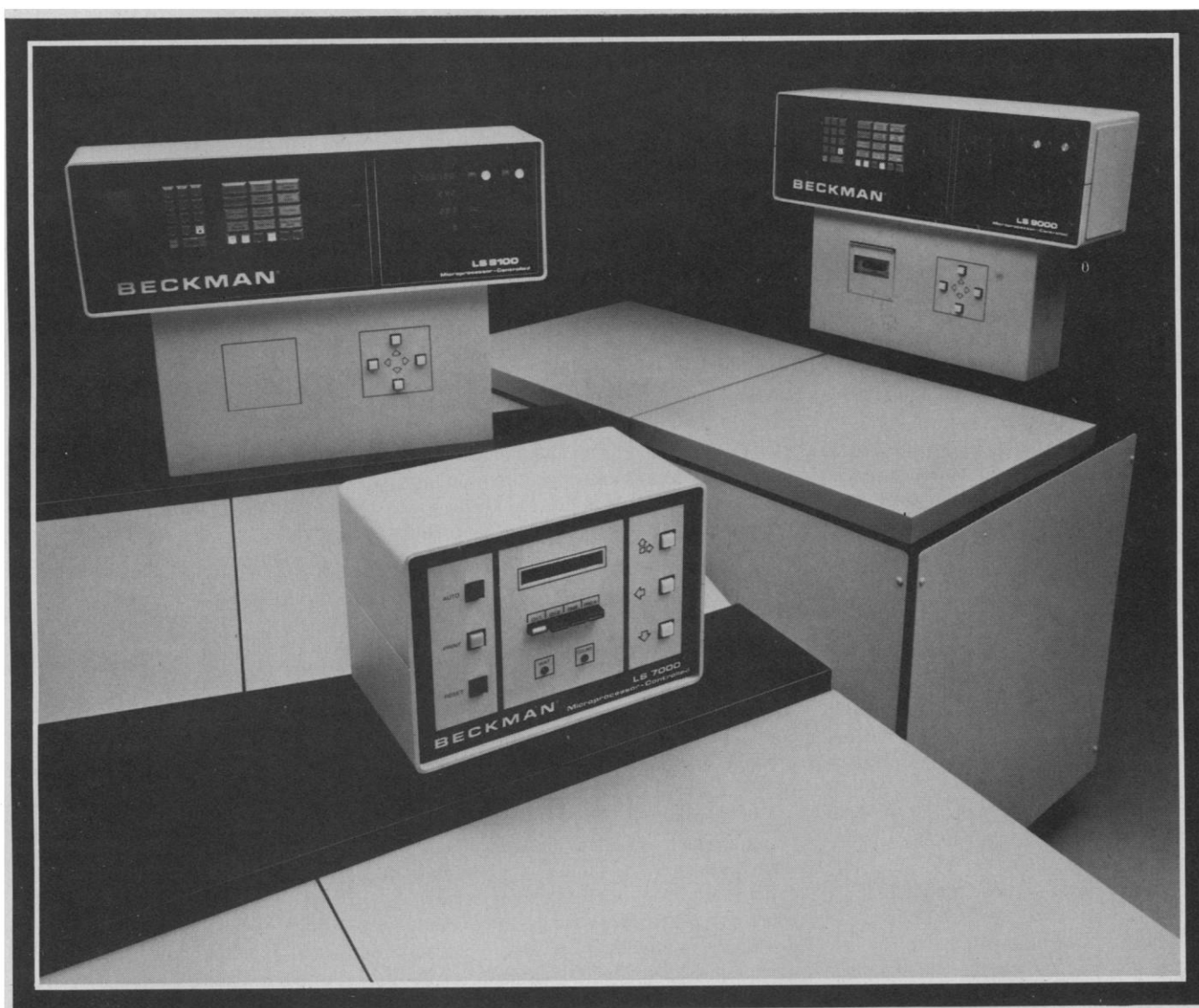
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decades without a similarly significant finding ever having been made. Nor has the Coast Guard, with its substantial appropriations and its general jurisdiction over many aspects of the Merchant Marine, ever brought the asbestos problem to our attention.

As a result of Weill's work, MEBA has been alerting engineers to the necessity of coping with the dangers from asbestos in the engine rooms. We have, in addition, instituted a vigorous program of covering up asbestos overlays around the engine rooms, and of removing all excess asbestos material to properly controlled storage space at shore locations.

What concerns me about the article is that some of our members might mistakenly assume that Weill is some kind of a corporate medical apologist. That was certainly not the case in his work on the research performed by MEBA, which conformed to the best traditions of the medical profession.

It may be that some union people, some members of the medical profession, and some officials of agencies and institutes feel that Weill is company-oriented and not neutral. MEBA found him both professionally skillful and biased only against the spread of asbestos and related lung infections, for which we are grateful.

J. M. CALHOON

*National Marine Engineers' Beneficial Association, 440 North Capitol Street, Washington, D.C. 20001*

## Marsupials in the Lab

It is good news that there is increasing interest in the laboratory potential of marsupials—including the opossums which Jurgelski has been rearing at Research Triangle Park for several years (News and Comment, 29 Sept., p. 1194).

I have long hoped that the breeding difficulties with the mouse opossum (*Marmosa mitis*) of northern Colombia might be overcome so that this little animal could replace the rat in testing of orally administered plant materials suspected of carcinogenicity in humans.

In 1971 I provided a female *Marmosa mitis* for examination by the Chilean pathologist Robert Zaldívar. After a histologic study, he wrote me that "The stomach is totally lined by a glandular epithelium, similarly to man. Therefore, this species may be used for studying the sensitivity of such epithelium to known strong and weak chemical carcinogens. In addition, this animal has a convenient size."



This observation, probably never published, may encourage further (and, I hope, successful) attempts to raise these appropriate animals beyond the second generation (1).

JULIA F. MORTON

*Morton Collectanea,  
University of Miami,  
Coral Gables, Florida 33124*

#### References

1. R. D. Barnes and H. G. Wolf, *Int. Zoo Yearb.* 11, 50 (1971).

### Prevention of Long-Term and Disabling Diseases

Gio B. Gori and Brian J. Richter, in "Macroeconomics of disease prevention in the United States" (9 June, p. 1124), ignore some crucial economic effects of disease prevention. Their calculations focus entirely on the effects of preventing "five major causes of death." This leads to their conclusion that "a successful policy of disease prevention has a regressive economic potential."

If that is true, then the sicker the population the healthier the economy! That is hard to believe. We do not have the training needed to unravel their macroeconomic model, but we are sufficiently expert in epidemiology and biostatistics to point to a bias in their work which partly accounts for their unbelievable conclusion, a conclusion which can impede disease prevention initiatives.

Identifying the main causes of mortality is not, and never will be, unimportant, but morbidity is now the central problem, largely as a result of victories over yesterday's great killers. Preventing life-long illnesses and disabilities has positive effects which do not enter into Gori and Richter's accounting (1). So they give disease prevention a dismal appearance.


We have tried to persuade public health professionals to assign an appropriate high priority to the prevention of long-term illness and disability. The mental disorders are a case in point. They produce many cases of severe disabling illness at every age with a total annual cost close to \$40 billion (2). Mortality statistics would never reveal the extent of this burden. Only a small proportion of all deaths are ever reported with mental disorder as the underlying cause (3). Surely, success in preventing mental disorders would not have a regressive effect on the economy.

If no prevention occurs, this burden will increase by two mechanisms.

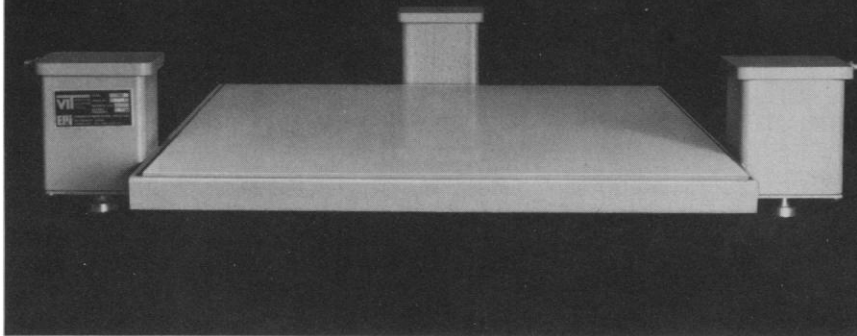
First, current trends in the age-sex-race distribution of the population be-

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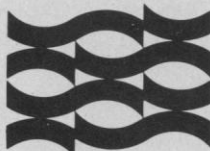
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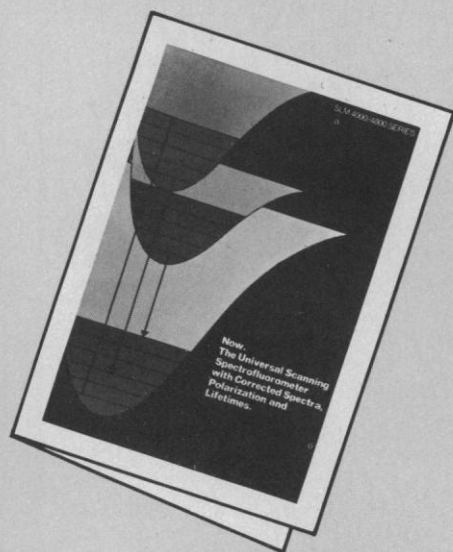
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tween 1970 and 1985 will produce disproportionately large increases in groups whose members are at the highest risk of being patients in psychiatric facilities, of being cases of schizophrenia, of being inmates of correctional institutions or training schools for juvenile delinquents, or of being in homes for the aged and dependent. If the 1970 age- and race-specific rates for these major social problems continue unchanged, the percentage of increases that will occur in the numbers of persons with such problems between 1970 and 1985 will far exceed the 15.2 percent increase expected in the total population of the United States in the same period. The annual admissions to psychiatric facilities will increase by 24 percent, the annual number of cases of schizophrenia under care by 28 percent, residents of homes for the aged and dependent by 30 percent, and inmates of correctional institutions by 42 percent (4).

Second, the conquest of major killing diseases frequently eliminates killers that selectively precipitate death in people who are either already developmentally damaged or are already chronically ill (5). Survivorship rates of people with senile dementia increased so much faster between 1947 and 1957 than that of their age-mates that the age-specific prevalence rate of this debilitating disease doubled. The life expectancy of mongoloid newborns has risen so fast as compared to that of all newborns that prevalence rates of mongolism at age 10 have more than doubled. If future preventive efforts concentrate on the killing diseases and neglect the disabling diseases, the prevalence of disability will increase, and that will place a burden on the economy. But if the search for effective preventives concentrates on the causes of disabling diseases, the economic effect will be positive.

For example, two significant causes of lifelong brain damage are now totally preventable—measles and rubella. The two viruses responsible for these infections could be exterminated in a single campaign. If the search for other preventable causes of long-term disease and disability are given top priority, then an ounce of prevention will still be worth a pound of cure.

MORTON KRAMER

ERNEST M. GRUENBERG

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It is unfortunate that Kramer and Gruenberg do not quote completely from our conclusion that "if current social, legislative, and economic rules remain unchanged, a successful policy of disease prevention has a recessive economic potential, as more people will reach and live well beyond retirement age."

The point of our article was not anti-prevention—far from it. We were attempting to point out that changes in social, legislative, and economic policies are necessary to successfully face the challenge of an older and longer living population.

We have no quarrel with Kramer and Gruenberg's emphasis on mental disorders. Cooper and Rice (1) have estimated mental disorders to be the third most costly group of diseases, both in direct and indirect morbidity costs, behind diseases of the respiratory system and diseases of the circulatory system, and the eleventh most expensive in terms of indirect mortality costs.

Our study was a mortality study, and we did include the caveat that "prevention would also alter a variety of factors of economic significance, in ways that are not easily analyzed," and which our model could not incorporate at that time. These stated factors included the "patterns of morbidity and disability." We are presently developing methods whereby morbidity considerations can be incorporated within our overall modeling system.

Because of our interest in prevention, we were excited about Kramer and Gruenberg's conclusion that "if the search for effective preventives concentrates on the causes of disabling diseases, the economic effect will be positive" and would be most interested in seeing the analysis supporting that statement.

GIO B. GORI

Division of Cancer Cause and Prevention, National Cancer Institute, Bethesda, Maryland 20014

BRIAN J. RICHTER

Enviro Control, Inc.,  
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\*Method of Maxam, A.M., and Gilbert, W., *Proc. Nat'l Acad. Sci. USA*, 74, 560–564 (1977).

\*\*Method of Rigby, P.W.J., Dieckmann, M., Rhodes, C., and Berg, P., *J. Mol. Biol.*, 113, 237–251 (1977)



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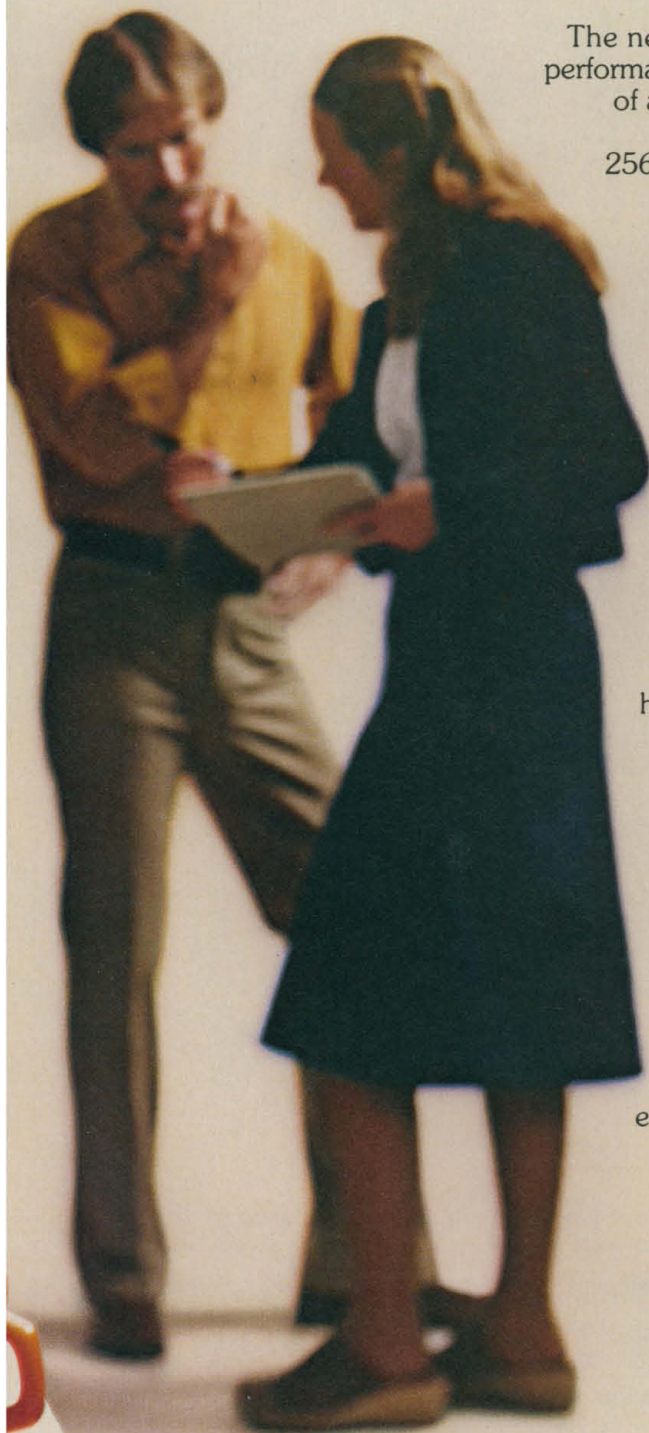


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## Science in the Political Economy

Although scientific research in the United States is not planned and managed after the fashion of controlled economies, it is still highly sensitive to ups and downs in the political economy. For one thing, government provides half of all the financial outlays that go into research and development. This makes for both stability and instability, for good times and lean times, and we will be reminded of the facts of life as the government plods toward its war on inflation in an environment of rising taxpayer resistance to public spending. Science, politics, and economics all shade into one another in a score of ways.

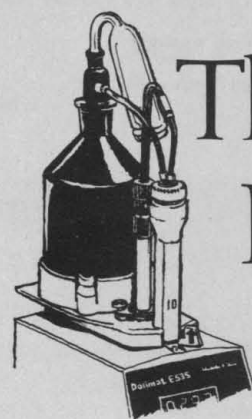
One problem is that science is still perceived in government as a discretionary activity buried in a vast and relatively uncontrollable budget. The concept of research as investment gained respectability only this year in President Carter's 1979 Budget Message, and an idea like this has a burdensome prehistory to overcome. Although there are good reasons to believe that the President's Science Adviser and the Office of Management and Budget will continue to view scientific research in this light, the going will get rough when research must compete with powerful client-oriented categories of the budget under the stresses of rationing.


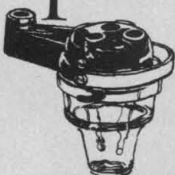
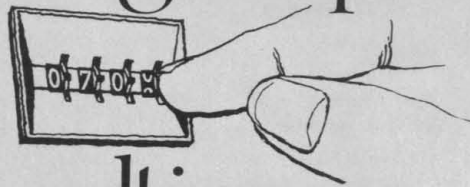
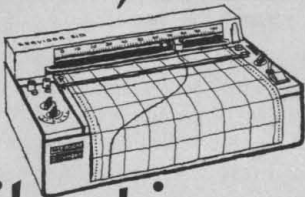
Another problem is the battered state of the political economy itself. Considering the worsening of inflation coupled with low economic growth and lagging productivity, economic logic strongly argues for budgetary restraint and a reduced deficit. If double-digit inflation materializes by the time the 1980 budget is locked up, it will take very heavy doses of appropriations to make up for inflation and allow real budget increases for R&D. Science might be fortunate to escape with a cost of living increase. In short, hard days lie ahead and the scientific community may be in for a refresher on the linkage between resources for science and the capacity limits of the larger political economy.

Given all this, it needs to be said again that more money is not the only strategy by which government can advance science and innovation. There has been an unwise and unthinking tendency to look solely at the curve of federal R&D funding as a kind of Dow-Jones clue to the health of science. Other factors are just as important to the vitality and productivity of R&D. If budget dollars are to be scarce, government can help to the utilization of the R&D it has funded by overhauling its static patent policies. It can make existing research dollars stretch farther by simplifying rather than adding to the dog's breakfast of methods, procedures, and controls that are now imposed on university research at such formidable costs to productivity. Government can apply the brakes to the profusion of regulations that retard risk-taking and innovation in industrial R&D. In doing these things, government would reduce inflationary pressure and free budget dollars that are being drawn off from research into defensive administration. The view from this quarter is that genuine progress in these directions would go a long way toward making austere R&D budgets more acceptable.

For the longer run, the function of science and innovation in the performance of the political economy calls for closer examination. As far as the indicative evidence takes us, it appears that industrial growth and competitiveness owe a great deal to scientific and technological vitality. That lesson has not been lost on the developing countries, and the People's Republic of China is the latest and largest of the world's political economies to stake its future on the promises of science and technology. Closer to home, the celebrations of General Electric's centennial and AT&T's three-quarters of a century tell us a great deal about the convergence of scientific creativity, managerial skill, and entrepreneurship in generating growth with productivity. What matters in the end is not so much the quantity of R&D as the conditions and the environment that stimulate or constrain discovery and use. There is a message here for the architects of the political economy.—WILLIAM D. CAREY





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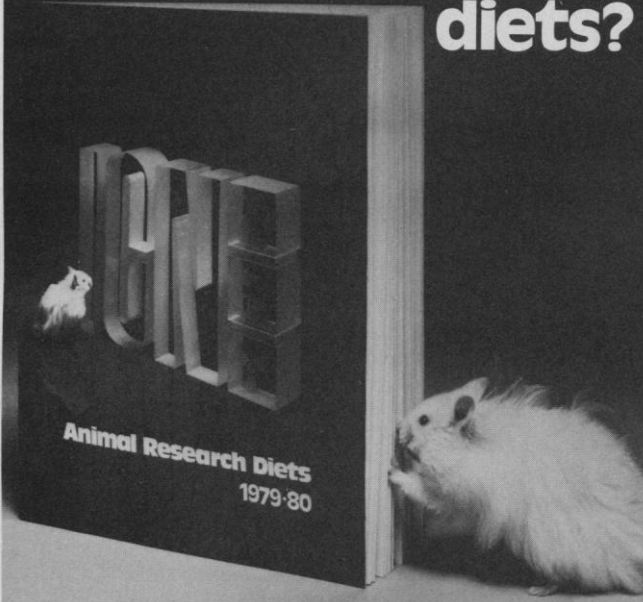


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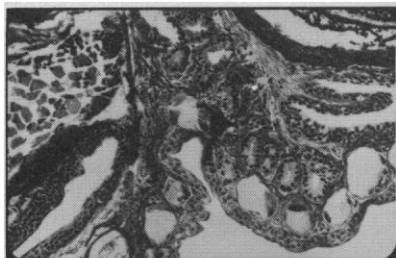


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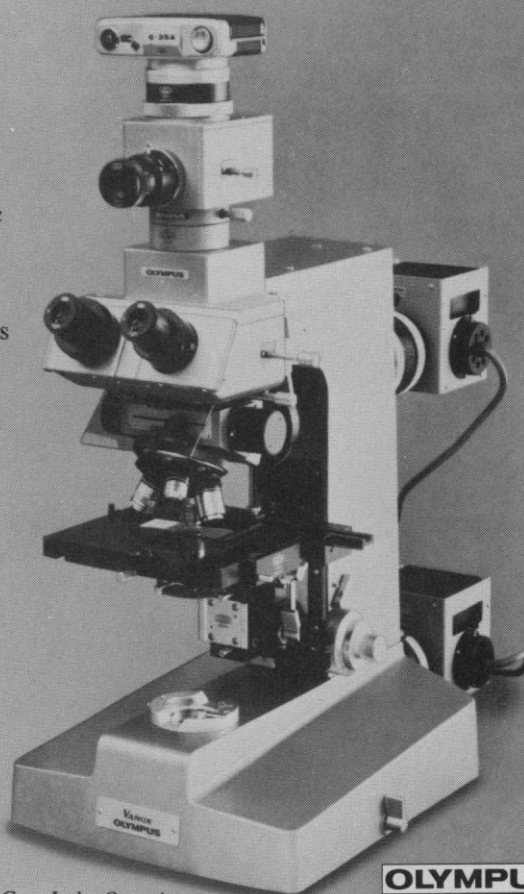
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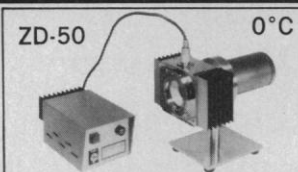
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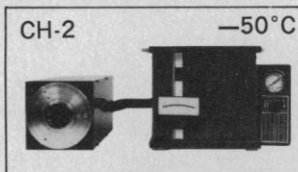


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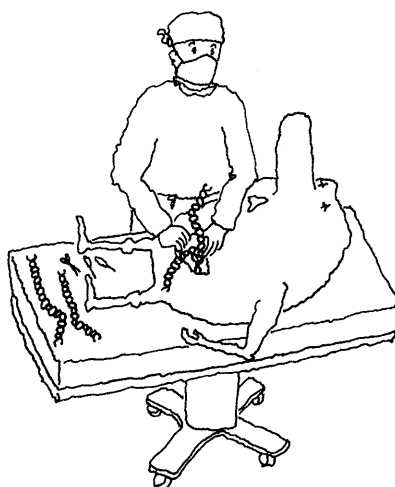
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