SCIENCE

29 October 1976

Volume 194, No. 4264

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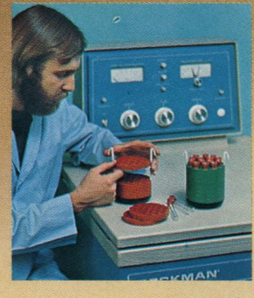

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COVER

Mustache bat (*Pteronotus parnellii rubiginosus*). Each of its orientation sounds consists of a long constant-frequency component for echo detection and velocity measurement, and a short frequency-modulated component for echo localization, target characteristics, and ranging. This bat has an auditory system remarkably specialized for processing echolocation signals. See page 542. [James H. Jaeger, Washington University, St. Louis, Missouri 63130]

29 October 1976, Volume 194, Number 4264 **SCIENCE**

A Report from the Research Community

During the past decade this nation's financial support for basic research (measured in constant dollars) has decreased. More serious have been actions by successive Administrations and Congresses, which have diminished the effectiveness of the funds that have been appropriated. Particularly deleterious have been sudden changes in policies and priorities made in quick reaction to shifting political needs. Research centers responding to urgent federal programs have repeatedly found themselves gearing up to activities that suddenly become passé. Research scientists have encountered similar shifts in priorities with an added hazard. Paperwork for grants and delay times for decisions have increased substantially.

Federal policies for support of research have been discussed sporadically by individuals. Recently, however, the National Science Board tapped the opinions of a large fraction of the leaders of research administration in universities, industries, government research centers, and private research laboratories and published the findings in a report.* Thus, instead of isolated single voices one has a chorus of about 640. Opinions offered by individuals from the different research sectors are remarkably similar. The net impression produced is one of deep concern for the health and future of basic research in this country.

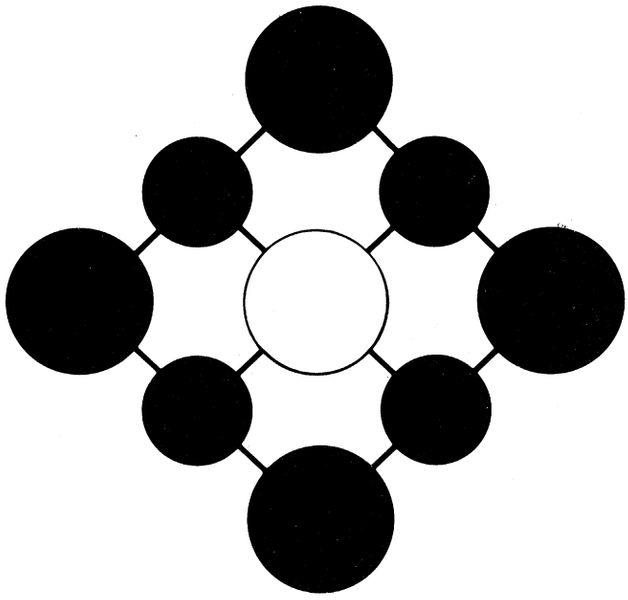
The concerns expressed in the report are given in four main categories: dependability in funding for research, vitality of the research system, freedom in the research system, and confidence in science and technology. In addition, the responses are grouped according to the research sectors they represent. An example is the problem of dependability in funding for research in industry.

At one time basic research was comparatively well supported in industry, at least in some companies. Of late, however, there has been a sharp decrease in long-term support for fundamental work. Instead, much of the effort of industrial laboratories is now devoted to quick-payoff activities, such as improving existing products and cutting costs in their manufacture. The combination of scarce capital and environmental and other regulations has suppressed initiative. Expenditures for environmental cleanup and compliance with safety legislation have the first call on capital funds of most companies. There is a well-known empirical relation in industry between funds for research and capital investments: that is, for each $1 spent on successful research, $100 must be spent to bring a product to market. When long-term prospects for capital funds are dim, it is difficult to justify long-term basic research. Further complicating the situation is the erratic nature of federal policies. On the negative side, industry does not know where the next blow is coming from. On the positive side, the government has not established long-range policies on such matters as energy. Thus it is very difficult to make forward-looking plans.

Changes in industrial research policies have important implications for the nation's competitive status. Our relative strength in high-technology products is already slipping, and the way is being prepared for an accelerated decline. An ameliorating action by the federal government would be to give favorable tax treatment for basic industrial research.

With its report from the research community, the National Science Board has rendered an important service to the country. The report should receive the serious consideration of those who have a role in formulating federal research policies. The scientific community should help in seeing to it that their congressional representatives are repeatedly made aware of the document.—PHILIP H. ABELSON

*National Science Board, *Science at the Bicentennial—A Report from the Research Community* (Government Printing Office, Washington, D.C., 1976). See also P. M. Boffey, *Science*, 22 October 1976, pp. 409–410.



A New World of

Materials:

Renewable and Nonrenewable Resources

Edited by
Philip H. Abelson
and Allen L. Hammond

An important exploration of the new set of realities affecting the flow of raw materials—a probing of the increasing demand for them and the obstacles to their discovery and production.

A reliable flow of raw materials has been the fundamental factor in the health of the American economy and of the economies of all other industrial nations. While economic growth has begun once again in the United States and, more slowly, in Europe, it is predicated on a whole new reality of materials dramatically different from that of a decade ago. No longer can an abundance of basic commodities be taken for granted, and no longer can the supplying of any commodity be assumed continual. We have learned that the flow of existing materials is vulnerable to interruption by financial shifts, increased nationalization of foreign-owned properties, restriction of access to resources on public lands, and a host of other considerations born of the 1970's. In the development of substitute materials we must hurdle these obstacles and also adhere to new regulations for environmental protection.

In February 1976 *Science* devoted an entire issue to a critical in-depth look at these and related problems. The special issue contained 24 papers written by some of the country's foremost authorities. Thirteen more articles created by other, equally distinguished authors were added to the list, and the total is being published as a compendium to provide a meticulous look at *Materials: Renewable and Nonrenewable Resources.*

The compendium's authors probe the implications of national policy, energy constraints, environmental considerations on materials production and use, the perspectives in needs and supplies of resources, high technology materials, and renewable and reusable resources. They examine those materials issues most vital to industrial economics, the future of materials research, and the effect of the new realities on the quality of life.

The result is rare and refreshing—a detailed study which yields an identification of critical problems as well as the authors' consensus that, in principle, these problems are solvable. This overview must be studied by those involved in materials problems today, by those reaching for answers, and by all of us who will benefit from the solutions. Don't miss this vital collection of papers. A brief sampling of the compendium's contents reveals the importance of studying and dealing with these new realities.

Papers in the Compendium include

"Materials: Some Recent Trends and Issues"—Hans H. Landsberg

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