

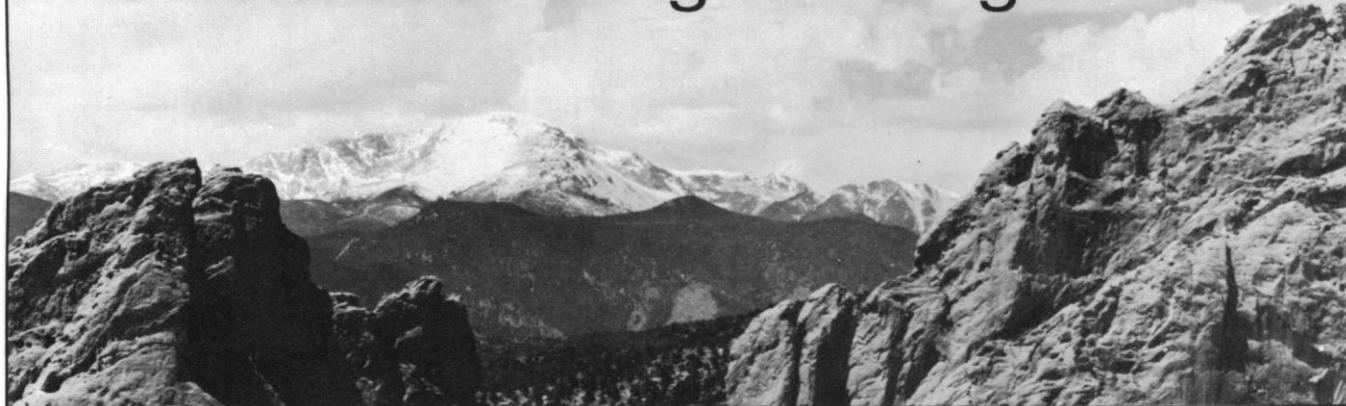
# SCIENCE

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

6 May 1977, Volume 196, No. 4290



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and the Staff of the Publications Department

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tutional status. Other contributors illustrate the part the Society played in the development of zoological knowledge in the last century, and examine some of the notable characters, controversies and discoveries of the period. The book goes on to discuss developments in the care, management and housing of animals at the Society's two zoos. Finally, the future role of the Society is considered.

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Volume 196, No. 4290

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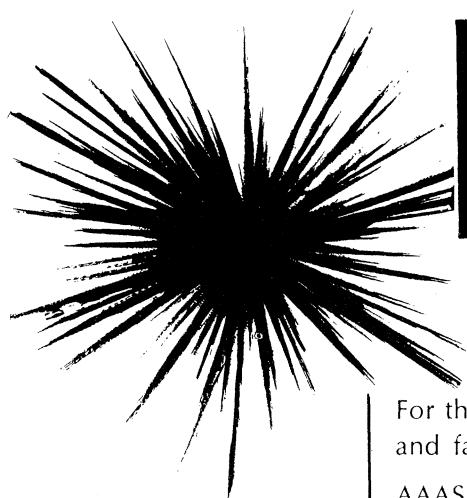
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## COVER

When feeding upon *Cecropia* (background), an early successional tree of neotropical forests, keel-billed Toucans (*Ramphastos sulphuratus*) manipulate the fruiting spikes by tossing them. Birds disperse a wide variety of seed plants but may provide special ecological and evolutionary opportunities for the animal-pollinated species. See page 622. [Drawing by Dana Gardner]

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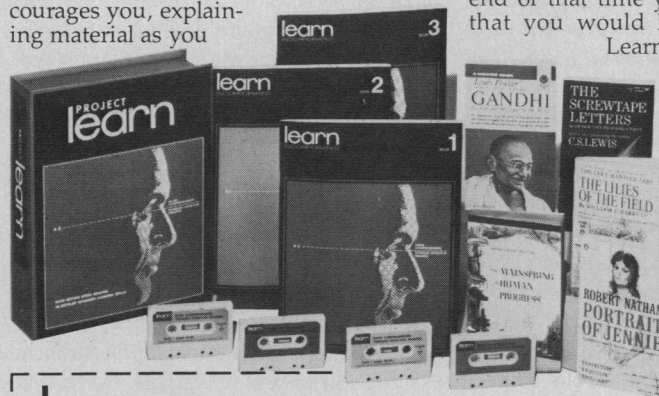
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The colloquium will provide a forum for constructive discussion of selected topics in the report, including future trends in R&D budgeting, the congressional role in R&D budgeting, and problems in rationales and criteria for R&D budget decisions.

Featured speakers and panelists will include appropriate officials from the Executive Branch, Members of Congress, and leading figures in the scientific, technical, and public policy communities.

### PRELIMINARY AGENDA

#### Wednesday, 15 June

10:00 a.m. Opening session; opening address.

12:30 p.m. Lunch; major address.

2:30 p.m. *R&D Budgets and Future Outlook.* This session will consider current budgets and future outlook for R&D. Selected speakers, panelists, and participants will address major issues in the FY 1978 budget; the trends and 5-year outlooks for federal R&D; and their implications for national needs, scientific progress, and R&D institutions.

5:30 p.m. Reception and buffet dinner; major address.

7:30 p.m. *Congressional Role in R&D Budgeting.* This session will address questions of current interest regarding the role of Congress, its committees, and associated agencies in R&D budgeting. Discussion will focus on the congressional vs. the executive role; the proper balance and degree of control over R&D programs; problems and limitations; and effective interaction between scientific and technical communities and the Congress.

#### Thursday, 16 June

10:00 a.m. *How Should R&D Decisions Be Made?* This session will attempt to develop a consensus among representatives of the scientific and technical community, the Executive Branch, and the Congress on how R&D budget decisions should be made. Issues to be addressed will include conditions to be met and avoided, a "straw man" conceptual system of processes, criteria for R&D budget decisions, and unresolved questions that require attention.

1:00 p.m. Lunch; major address; closing of program.

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150,000 tons. Six estimates were above 1 million tons and 12 were below 100,000 tons (11). The extremely large variance of these data suggests that a resource estimate based on the subjective opinions of geologists must be treated with great caution.

Recently, the Committee on Mineral Resources and the Environment (COMRATE) of the National Academy of Sciences was charged with examining estimates of uranium resources. A conference was convened in Albuquerque, New Mexico, on 12-13 December 1974. Participants in the conference agreed unanimously that present understanding of uranium deposits is insufficient to serve as a basis for estimating resources of uranium (7, p. 20).

In the Shirley River Basin, Wyoming, where Getty Oil has operated since 1959, the AEC estimates far exceed Getty's own estimates. In the Powder River Basin, Wyoming, where the AEC estimated a substantial potential resource, an extensive exploration effort which began in 1967 has not been successful (6).

ERDA lacks information obtained from exploration of areas subsequently abandoned, including barren drill hole data. Thus substantial undiscovered resources are estimated for areas which have, unknown to ERDA, been explored. A recommendation of COMRATE is that the uranium industry "be encouraged" to furnish such information to ERDA (7, p. 7).

*Nonsandstone uranium.* Gaskins and Haring assert that ERDA has surely underestimated the nonsandstone potential resources. ERDA estimates are given for some areas which have been identified as favorable, and are based on geological analogy. For reasons mentioned above it is quite arguable that these are overestimates. Other areas are identified as favorable by ERDA, but with insufficient basis for estimation of potential resources. Gaskins and Haring apparently believe that there is a large potential uranium resource in these areas, as well as in areas not identified as favorable. Their reasoning seems to be based on the simplest sort of geological analogy. It is true that the majority of reserves in the rest of the world are found in nonsandstone deposits. But it does not follow that these other deposits will be found in the United States. In fact, the existence in the United States of significant, uranium-bearing quartz pebble conglomerates, calcrete deposits, Bancroft-like pegmatites, and black shales is extremely unlikely in view of the geology of the country (7, p. 21; 12). One has only to look at the worldwide distribution of oil

or coal to understand that nature is capricious.

If one assumes that a substantial resource exists in nonsandstone deposits, there is a serious question of timely discovery. Whatever one's belief regarding the maturity of the domestic exploration industry, it is certain that the foreign industry is even less mature. By far the majority of all known foreign deposits have been discovered by surface exploration techniques. Surface exploration has long since been completed in this country. Substantial numbers of museum rocks, surface and underground mine sites, and petroleum well sites and drill holes have been surveyed for radioactivity. Yet, few viable, nonsandstone deposits have been found. If these uranium deposits exist, they are lacking surface shows and must be located by sophisticated exploration techniques, including an extensive drilling program. Such a program does not now exist.

The very high uranium resource estimates of Searl have been rejected by COMRATE (7, p. 20). The committee could not agree regarding the ERDA estimates, with views ranging from pessimistic to optimistic (7, p. 18). "It may be a matter of prudence to inquire more deeply into the validity of such estimates before accepting them as a continuing basis for the formulation of national energy policies" (10, p. 180).

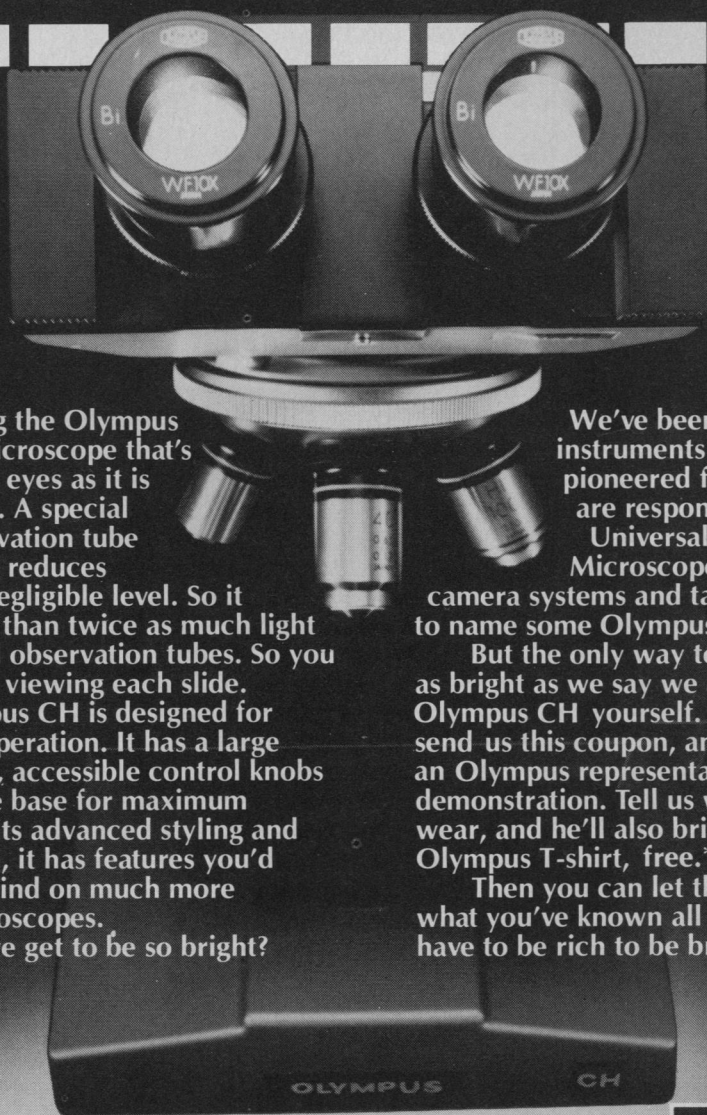
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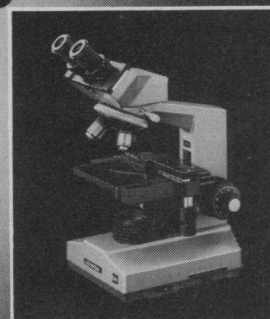


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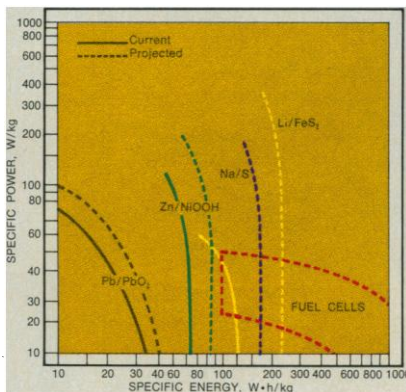
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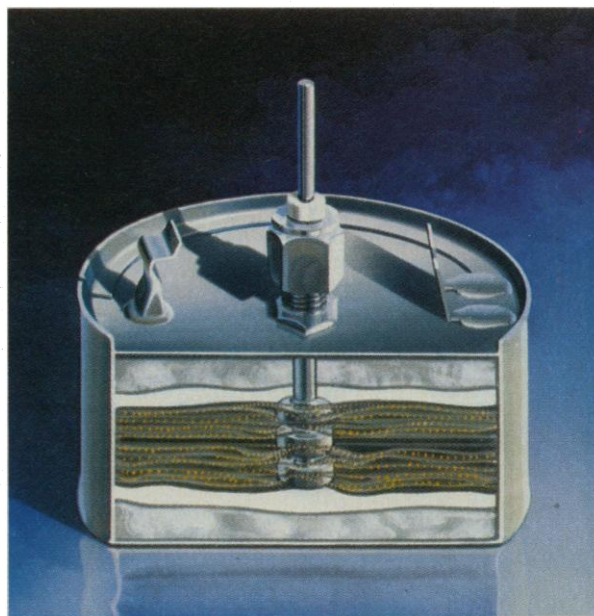
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## Energy Development in the Americas

Latin America's development needs are so immense that just to stand still—in relative terms—let alone aspire to catch up with Europe and the United States, will require vast new economic growth and energy supplies. The hemisphere's energy resource potential is still very unevenly identified or known, but it looks somewhat like the following:

- While half of the countries in the hemisphere import all of their oil supplies, a few nations—Venezuela, Mexico, Ecuador, Bolivia, Colombia, and Trinidad and Tobago—are at present self-sufficient in energy. Although Brazil and Argentina have substantial hydrocarbon reserves, oil reserves in Brazil would supply the country for only 2 years at current consumption rates.

- Much coal is available in Venezuela, Colombia, and Chile and some is located in Brazil. The quality is not always high-grade and transportation is difficult, but it may still have chemical value, provided liquefaction and coal gasification become cheaply available.

- Three large nations—Argentina, Brazil, and Mexico—have rapidly turned to nuclear energy. However, the lead-time requirements for implementation are formidable.

- The unprecedented increases of energy costs since 1973 have had an adverse impact on almost the entire region, but the willingness of Venezuela and other oil-producing countries to assist their Latin American neighbors to overcome difficulties is an encouraging boost for hemispheric harmony.

The Organization of American States has long been concerned with specific aspects of the energy question, notably with the effort to promote greater peaceful use of nuclear energy in the Latin American countries. We also recognized the need to examine nonconventional energy sources, such as gas generation from municipal wastes and solar energy—both direct solar power and power obtained indirectly through solar conversion and biomass.

The fact remains, though, that two-thirds of Latin America's countries suffer from a substantial deficit in their energy supplies. It is therefore essential for Latin America to move forward jointly with the United States in a cooperative response to the hemisphere's energy challenge by a three-part focus on:

- *Energy planning and energy management.* Latin America needs to develop and train greater numbers of people to manage and conserve energy resources.

- *Research into energy development.* Latin America does not need to compete with the United States in energy research but must stimulate the development of indigenous energy resources. Particularly challenging are the fields of biomass and solar energy, and promising results have been obtained in Brazil and Puerto Rico in research on producing an efficient alcohol fuel based on sugarcane and potentially on cassava.

- *Support for feasibility studies on energy development in the hemisphere.* The time seems opportune for the United States and Latin America—working through the Organization of American States and other organizations—to join together in positive action programs for hemispheric energy development. Working sessions, looking toward a high-level meeting, should be initiated without delay.—ALEJANDRO ORFILA, *Secretary General, Organization of American States, Washington, D.C. 20006*

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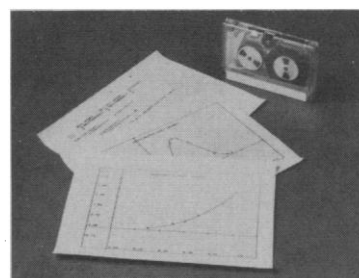
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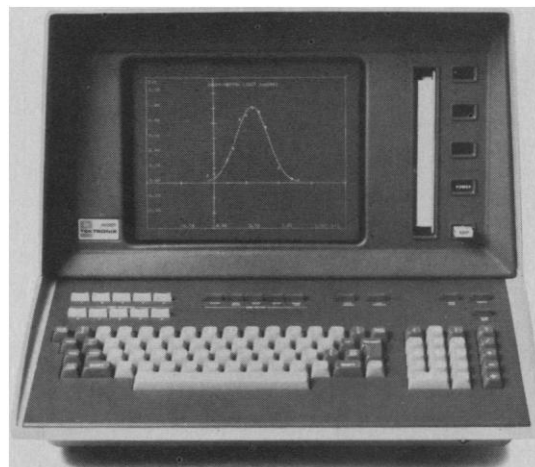
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## AAAS NEWS

(Continued from page 643)

titled "New Directions for AAAS." At its Annual Meeting session, the Council voted to commend the Committee for its report and to encourage its use as a guideline in planning future priorities of the Association. The report is available from the AAAS Committee on Future Directions.

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