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Sustainable Future for Planet Earth

Participants at the United Nations Conference on Environment and Development (UNCED) to be held in Rio de Janeiro on 1 to 12 June 1992 will attempt to address many issues fundamental to achieving sustainable development. What of substance will be achieved is not now clear. The meeting will bring together representatives (perhaps heads of state) of about 150 countries, many of them with differing resources, needs, aspirations, and priorities. However, in view of growing global concern about environmental matters, the occasion will certainly be a great media event with possible repercussions on a presidential election.

One of the reasons for questioning the likelihood of a substantive achievement at UNCED is the breadth of its projected agenda. A United Nations brochure lists topics that the conference will address, and these are paraphrased below:

- Protection of the (i) atmosphere (climate change, depletion of the ozone layer, and transboundary air pollution); (ii) land resources (combating deforestation, soil loss, desertification, and drought); (ii) fresh water resources; and (iv) oceans, seas, and coastal areas and the rational use and development of their living resources.
- Conservation of biological diversity.
- Environmentally sound management of biotechnology and hazardous wastes (including toxic chemicals).
- Prevention of illegal traffic in toxic products and wastes.
- Improvement in (i) the quality of life and human health and (ii) living and working conditions of the poor by eradicating poverty and stopping environmental degradation.

The U.N. agenda provides a stimulus for many disparate groups to hold meetings in advance of Rio. These included distinguished interfaith religious leaders, organized broadcast groups, and scientists and engineers. Examples follow:

On 20 June, the AAAS directorates for International Programs* and for Science and Policy Programs hosted a 1-day symposium on UNCED. Speakers from the United Nations, the State Department, the International Council of Scientific Unions, and other organizations discussed the UNCED agenda and the role of nongovernmental organizations in preparing for the Rio meeting.

A “1991 Forum on Global Change and the Human Prospect” is planned for 16 to 18 November 1991 and will be held near Washington, D.C. Sigma Xi is the primary sponsoring scientific society. Co-sponsors include AAAS and about 40 other scientific and engineering societies whose total membership is about 1 million. The three plenary sessions are titled, respectively, “What Charles of a World Do We Have?”; “What Kind of a World Do We Want?”; and “What Must We Do To Get There?”. Workshop sessions will facilitate participation by attendees. The banquet speaker will be Maurice Strong, who heads the influential Secretariat of UNCED.

On 2 and 3 June, a gathering of leaders of the religious community of the United States was briefly by some top scientists-environmentalists. The presentations were evidently very effective. At the conclusion of the meeting the religious participants issued a statement describing in detail “mounting evidence of environmental destruction and ever-increasing peril to life, whole species, whole ecosystems.” The statement also noted: “We believe a consensus now exists, at the highest level of leadership across a significant spectrum of religious traditions, that the cause of environmental integrity and justice must occupy a position of utmost priority for people of faith.” The religious leaders involved included members of the Catholic, Greek Orthodox, Jewish, and Protestant faiths. They “reach, teach, and counsel millions of people.” The impact of UNCED will also be enhanced by television programs on development and environment. Twenty films will be broadcast during a period of 2 to 4 weeks in May 1992. Among them will be seven 50-minute films co-produced by BBC Television.

Perhaps the greatest impact of the media will occur at the time of the UNCED meeting in Rio and thereafter. Coverage of the event will be enormous. In addition to the official proceedings, a major secondary event involving 20,000 to 40,000 representatives of nongovernmental organizations will make news.—PHILIP H. ABLESON

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British Popular Science: “Prizeworthy”

How ludicrous to criticize British writers of popular science for not being up to the standards of their colleagues across the Atlantic (“America rules the words,” Briefings, 24 May, p. 1063). Has the author of these remarks never heard of, say, Richard Dawkins? Dawkins’ book The Blind Watchmaker was published 3 months too early to qualify for entry in the first British Science Book Prize (awarded in 1988), but it went on to win the Royal Society of Literature Award, the first science book ever to do so. Or of Michael Rowan-Robinson, author of the beautifully written Universe? (Why this remarkable book was not even shortlisted in this year's Science Book Prize is a mystery). Or of Roger Penrose, winner of last year’s prize (The Emperor’s New Mind)? Or of Steven Hawking? Enough!

It is certainly true that few British publishing houses take popular science as seriously as their American counterparts. But perhaps that is at least in part due to the lamentable fact that science books are largely ignored in the book reviews pages of our newspapers here.

MICHAEL RODGERS
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United Kingdom

Munk’s Experiment

Shame on you for publishing the farrago of innuendos, anonymous statements, and unsupported assertions contained in Jon Cohen’s article (New & Comment, 17 May, p. 912) about the Heard Island long-distance sound transmission experiment, carried out under the inspiration and general direction of Walter Munk of the Scripps Institution of Oceanography!

Cohen quotes Ann Bowles, the leader of the biological survey team on the expedition, as saying that beaked whales and pilot whales may have avoided the transmissions; and he quotes Bob Pitman, one of the biologists, as saying that “it's possible that deep diving mammals were affected.” Bowles told Cohen, however, that she and her colleagues on the biological survey vessel couldn't distinguish between the effects of the transmissions and the effects of the survey ship itself, a more likely source of disturbance. Cohen does not mention Bowles' observation that the endangered blue whales in the area did not appear to have any meaningful response. One blue whale was actually observed to feed and socialize during a transmission and to travel 11 kilometers toward the transmitting vessel in the process.

In the absence of evidence of harm to marine mammals, Cohen makes his case with lurid verbiage, referring to the transmissions as “blasts” or “shots,” implying at the same time that they were continuous. In fact, the transmissions consisted of a low-frequency 57-hertz buzz, incapable of blasting anything more than a couple of millimeters from the face of the source. They were emitted in a duty cycle of 1/3 on and 2/3 off (actually lower because of mechanical failures) for only 5 days. Cohen quotes an anonymous marine mammologist, who was “more worried about this experiment than any other human activity other than toxic waste.” In fact, no study of marine mammals has found any evidence of long-term biologically important effects of even high-intensity industrial noise, despite an intensive, 11-year effort in the Beaufort Sea, north of Alaska and Western Canada.

Cohen quotes anonymous staff members of the National Oceanic and Atmospheric Administration (NOAA) as saying that the experiment on the marine mammals was not scientifically sound because it had no controls. In fact, marine mammals were observed and listened to with sonobuoys and other underwater hearing devices for 5 days before the start of transmissions, and for several days after the transmissions were completed. Cohen’s statement denigrates the hard work under terribly difficult conditions of the team of nine biologists, who spent every daylight hour watching the rough sea for marine mammals coming to the surface. According to the biological survey team, a “completely adequate” experiment would have required a baseline survey lasting 4 months, spread over 2 years, followed by a similar period of transmissions and a follow-up. This would have exposed marine mammals to 12 times the noise at an expense of over $8 million.

Cohen gives the impression that NOAA staff members insisted on anonymity in their comments because they were afraid of retribution from Munk, who is described as the country’s “most powerful oceanographer.” In fact, Professor Munk, my friend of more than 50 years, is the gentlest and kindest of men. He is completely incapable of retribution against anybody, especially for a difference of scientific opinion.

ROGER REVELLE
Scripps Institution of Oceanography,
University of California, San Diego,
La Jolla, CA 92093-0210

Letters

Circle No. 87 on Readers' Service Card
I read the article about the use of extremely loud underwater sound to measure ocean temperatures from the viewpoint of a researcher investigating the effects of loud noise on the vertebrate inner ear. The intensity of the sound at its source was incredibly loud, 209 decibels or approximately 10 billion times the threshold of human hearing. Levels of 124 decibels were detected at a distance of 1000 kilometers from the source. Although I do not know of any studies on the effects of loud waterborne sound on the inner ears of marine mammals, sound levels of 124 decibels are known to induce permanent hearing loss in terrestrial mammals. Marine mammals have a highly developed sense of hearing. Dolphins, for example, use their hearing for communication and echolocation to navigate and find food. Prudence suggests caution in exposing marine mammals to sound levels that are known to induce permanent hearing loss in land mammals.

MICHAEL J. MULROY
Department of Anatomy,
Medical College of Georgia,
Augusta, GA 30912

Erratum: In the Research Article "Atomic structure of adenosine deaminase complexed with a transition-state analog: Understanding catalysis and immunodeficiency mutations" by David K. Wilson et al. (31 May, p. 1278), figure 3D on page 1281 was inadvertently omitted. The figure and a corrected caption are printed below.

(D) Schematic diagram of the interaction between ADA and HDPR. Numbers near dashed lines indicate distances (in angstroms) between refined nonhydrogen atoms. As discussed in the text, Glu217 and Asp296 are likely to have pKa values greater than normal, His238 and Asp296 are likely to be in the ionized or charged species, and His17 (a zinc ligand) is neutral.

Erratum: In "This Week in Science" (21 June, p. 1591), it was stated incorrectly that a News & Comment article by Paul Selvin about "the legal battles of Jenny Harrison" could be found in that same issue. The article appeared in the next issue, 28 June, p. 1781.

Erratum: In the heading of the review of A. T. Sumner's Chromosome Banding (7 June, p. 1437), the name given for the publisher was incomplete. The correct name is Unwin Hyman Inc., to be addressed at 955 Massachusetts Avenue, Cambridge, MA 02139-3107.

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Barry T. Nall and Ken A. Dill, editors

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cumulative index obtained by combining the habitat indications of all of the species in a "fauna" and it is determined for extant species "by scoring them for the range of habitats from which they have been recorded." This approach is an intriguing way to quantify the habitat variability for individual species, but it assumes modern analogs for past ecosystems, although Andrews recognizes that past habitat preferences may not have been the same. A potential problem is that many soil species, as Andrews notes, may not be opportunistic feeders and their diets may represent the past environment selectively. It would have been useful to apply the THI analysis to modern owl pellet accumulations to assess its ability to reflect modern environments.

There is an extensive appendix providing summaries of the general biology of different species of raptors and mammalian carnivores, with important references. These data form the foundation for many of Andrews's taphonomic principles, but the appendix is also a valuable resource for anyone interested in raptors and small carnivores. Information on how these species sample their environments is especially interesting.

Owls, Caves and Fossils will be a keystone in the paleoecological interpretation of small mammal accumulations. Like any good piece of research, it raises many new questions and avenues to pursue. The field of microtaphonomy will surely mushroom as a result of its publication.

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Nitrogen-Fixing Systems


This well-designed book presents a review of most of the papers that have been published up to 1990 on the biology of actinorhizal plants and their nitrogen-fixing nodule symbionts. It contains 14 readable chapters on various topics in the biology of these plants and 4 chapters that focus on the current and potential uses and management of actinorhizal plants in forestry.

In a historical overview by A. Quispel a clear description is given of the discoveries made before 1950 and in the "modern period" from 1950 to 1978. This period was characterized by the work of G. Bond, to whom the book is dedicated, on root-nodule physiology and by the discovery of new actinorhizal plants. The "new age," from 1978 to 1990, started with the first isolations of the nodule symbiont, _Frankia._ A significant part of the book deals with progress in the physiology and biochemistry of these newly isolated actinomycete strains and with the environmental factors affecting nitrogen fixation in actinorhizal nodules. W. B. Silvester, S. L. Harris, and J. D. Tjeukema in their excellent review describe the regulatory effects of oxygen in nitrogen fixation and show the unique position of _Frankia_ within nitrogen-fixing organisms.

Treatment of the ecology of _Frankia_ is restricted to one chapter on the occurrence and distribution of "spore positive" and "spore negative" nodules, which represent different groups of _Frankia_ strains. This chapter clearly demonstrates the limits of conventional methods in microbial ecology and the need for molecular techniques in this area.

The chapter by A. Séguin and M. Lalonde on micropropagation and genetic transformation of actinorhizal plants and _Betula_ illustrates the progress that has been made in the genetic improvement of actinorhizal species. This chapter and a chapter by J. Bossu- quet and Lalonde on the genetics of actinorhizal _Betulaeaceae_ demonstrate the potential of _Betula_ as an experimental recipient for host genes or host-genome modifiers involved in the association with _Frankia_, especially in view of the gene delivery systems already available in the _Betulaeaceae_.

The book demonstrates the significant progress that has been made in actinorhizal research, though it is still behind that made in research on legumes. The review by B. Mullin and C. S. An of the rapidly developing application of molecular genetics shows that this topic has been left almost completely to the students of the '90s. It is likely that most of the problems related to working with recalcitrant, slow-growing actinomycetes and woody plants can be overcome in the near future by using new molecular techniques.

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**Books Received**


*Biogeography and Ecology of Forest Bird Communities.* Allen Kest, Ed. SAF Academic Publishing. The Hague, The Netherlands, 1990. vi, 410 pp., illus. $120.


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BOOK REVIEWS


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