

Effects of global change

SIR—Interest in environmental changes of global scale is increasing dramatically—in the scientific community, in agencies of government and among the general public. And in their planning, business and industry are beginning to expand their horizons in ways that would not have been considered a few years ago.

An earlier wave of environmental concern in the 1960s and 1970s prompted many corporations to add in-house staff or to contract with external companies to carry out environmental studies. In many cases, the resulting reports were of questionable objectivity and completeness, and of limited usefulness. The questions posed were often too narrowly circumscribed, and answers were produced only sporadically and were received at too low an administrative level to be effective.

The situation has changed in fundamental ways. New sources of data and new techniques of analysis have led to exciting scientific insights in a variety of fields. Cause and effect are being linked more closely as understanding of the physical and biological systems and their interactions increases. Time horizons have been greatly extended. For example, numerical results using climate models suggest that increasing atmospheric CO₂ due to burning of coal, oil and gas may change global distributions of temperature and rainfall in coming decades with accompanying changes in agriculture and rise in sea level. Radical proposals have been advanced to counteract the projected increase in CO₂. As another example, evidence that the "Antarctic ozone hole" has resulted from release of certain chlorine compounds led last September to the Montreal Protocol, by which 38 countries have agreed to reduce production of the offending compounds by 50 per cent by the year 2000. Other examples concern clearing of tropical forests, extinction of animal and plant species and so on.

Consequences of large-scale environmental changes are beginning to affect policy decisions of business and industry more profoundly than ever before. A new wildlands policy introduced by the World Bank in 1986 states that "failure to preserve natural capital by wildland conservation in the present greatly increases the capital costs of economic development in the future" (S.G. Fitzgerald, *Bioscience*, **36**, 712–715; 1986). In accordance with this policy, the bank will weigh ecological considerations in deciding on future loans for hydropower development, roads, logging and other projects affecting wildlands. It will need to consider the probabilities of large-scale environmental changes which might affect each of its projects. Many corporations also will find their strategies and tactics influenced

significantly by the prospect of large-scale environmental changes.

For example, timber companies planning reforestation for harvests 50 years in the future must now consider the effects of increasing atmospheric CO₂ on climate and tree growth. Although current climate models provide only limited and fragmented understanding of climate change and climate variability, if used wisely they could be helpful in reaching decisions on where replanting should occur and on types of trees to be planted.

Companies engaged in coastal land development must take account of the projected rise in sea level and the resulting flooding of lowlands, increased coastal erosion, saline intrusion into estuaries, inundation of wetlands and so on. Model predictions might be used to project future rises in sea level and long-term changes in coastal processes. It would clearly be unwise to rely simply on model predictions—uncertainties are considerable—but neither should the implications of climate models be overlooked.

How can a corporation insure that its decision makers are sensitive to the implications of large-scale environmental changes? And how can it acquire the capability to respond appropriately to further new research results and new insights? Simple reliance on an in-house staff or on contract studies is likely to be ineffective for the reasons stated earlier. A better format could utilize an advisory group, composed of individuals of maturity, integrity and broad perspective. Members should have effective contacts with relevant research, including interdisciplinary research. Individual perspectives should be refined and further developed through regular internal discussions and through briefings. Such a body might utilize work carried out by an in-house staff or by contract, but its chief function would be to ensure that major corporate decisions were made with appropriate consideration of the effects of large-scale environmental changes. Few corporations provide this quality and depth of expertise at policy levels. There no known blueprints; institutional innovation may be called for.

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Who exploits whom?

SIR—J. A. Barnett (*Nature* **332**, 106; 1988) presents a singularly one-sided assessment of the financial returns and scientific satisfaction to be obtained by authors and editors of multi-author books.

The role of the editor and the amount of

work he or she puts into a particular book will clearly vary. At the outset there is usually protracted correspondence between the editor and the proposed contributors. For the book I am currently editing, this has been spread over a period of about four months. Once the contracts have been issued, one then has a breathing space of about a year before the manuscripts begin to arrive. (It is, however, worth bearing in mind that the editor himself may well be writing a chapter.) The amount of editorial work then required is very much determined by the quality of the manuscripts and whether or not they have been prepared according to the instructions to authors. On occasions I have spent ages correcting a weighty manuscript, even then to be forced into rejecting it as being unsuitable (only, I may say, after much heart-searching discussion with members of the editorial advisory board and correspondence with the author concerned).

Other problems are caused by authors who back out at the last minute and those who request a lengthy extension to the submission date, thereby throwing the whole production schedule into chaos.

The idea that the editor obtains an unreasonably large amount of money from the publisher, and that authors get much less than a fair deal, is, I believe, incorrect. In fact nobody does very well from these books. Both the scientific publisher and the editor have an important role to play, along with the author, in disseminating knowledge, which in the form of the authoritative and up-to-date review chapter can be of great value to the scientific community.

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Inconsistency

SIR—The irony of your leader attacking the reductionist programme in molecular biology (*Nature* **333**, 11; 1988) was not lost on those of us who remember some other leaders. Poor Isidore Nabi was banished by you to a reductionist purgatory (*Nature* **293**, 2; 1981) and Sheldrake's book was burned by you (*Nature* **293**, 245; 1981) for criticisms of reductionist orthodoxy far less stringent than yours. Where can this inconsistency lead? A galilean recantation? A leader on the silliness of particle physics? Reductionists, like good schoolmen, crave belief in the proper order of things: a clockwork heaven and a reliable *Nature*. Don't abandon them in their hour of need.

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