Meetings

Pacific Science Congress

Canberra, Australia, was the gathering site of about 1100 scientists from 44 countries (95 of them from the United States) who met from 18 to 27 August, for the 12th Pacific Science Congress. The congress, under the presidency of Nobel prizewinner Sir MacFarlane Burnet, marked the 50th anniversary of the first Pan-Pacific Science Conference held in Honolulu in 1920. It was the second such congress held in Australia; the first was in 1923. The head of the organizing committee was Sir Otto Frankel.

As indicated by the titles of the four sections—(i) productivity and conservation in the Pacific; (ii) man in the Pacific; (iii) environmental quality and resource management: political, legal, and administrative realities; and (iv) geological and mineral resources in the Pacific—the topics discussed placed emphasis on man as the modifier, exploiter, and controller of nature. There were 21 symposiums, a relatively limited number so that it was possible, in the 9 days, for a participant to attend sessions not in his area of specialization and to gain glimpses, perspectives, and overviews from various disciplines. Also, there was opportunity to view the Pacific once again as geographic reality, an aim the association's founders had many years ago. Conservation has been an important concern of the association throughout its first half century of existence. This meeting in Canberra, however, was the first that attempted to deal with the question of how to translate the work of scientists into legal, political, and administrative action; lawyers and political scientists were invited to participate. The importance of this innovation is recognized in a resolution which "seems to me [Sir MacFarlane Burnet] to breathe a new note of practicality into our efforts to maintain an ecologically acceptable biosphere. . . . Be it resolved that the representative Institutions of the Pacific Science Association encourage the development of indices, résumés, and reviews of the laws and court cases affecting the environment and natural resources and that they further encourage discussion of these matters within the legal fraternity of the respective countries."

The enormousness of the region, population pressures, and levels of technology make for such diversity and complexity that we can barely begin to make a comparative analysis of its legal and administrative realities; their dynamics were hardly touched. Nevertheless what was presented—analyses of resource management and environmental quality trends—was interesting. The Australians viewed themselves with much land—with conurbations as well—vast mineral resources, and strong state controls. The Russians considered themselves as centralized planners with an emphasis on social factors through nationalization of all natural resources. The United States is faced with reconciling adherence to States' Rights and a federal government's carrot-stick policy. Canada has a position somewhere between that of Australia and the United States in her realization of the urgency of resources management with a long-term view; consequently she is trying to minimize competency struggles through federal-state conferences and similar means. Japan, a fifth partner to the above four, at least in the concern of the impact of technology, has had to concentrate on post facto controls in situations made difficult by edaphic, demographic, and political factors. Still, in July 1971, a national environmental agency was formed there, consisting of planning units for air and water purity and control, conservation, and overall land use.

On the Pacific islands and in some of the larger countries of the Asian perimeter of the Pacific, the clash between developing technologies and ecological balance is perceived by scientists, including many from the Western Hemisphere.

Immediate economic and political considerations will probably preclude very effective legal or administrative resolutions of this clash, especially since laws and administrative patterns there are based on Western models. A symposium on the Preservation of Island Ecosystems, held just before the congress under the joint auspices of the South Pacific Commission and the International Union for the Conservation of Nature and Natural Resources, in Noumea, is an apt illustration of the above. One saw there the destruction of fairly unique, in part endemic, plant associations, resulting in denuded mountain sides with the carrying out of surface nickel mining.

Much was said about the need for reserves; about the dangers of uncontrolled resource exploitation, including tourist development, a process that threatens to destroy what needs to be preserved as its own basis for existence; and about conflicts in long- and short-term planning of man's interactions with selected portions of the environment. Resolutions were passed asking for the "care and regeneration of forests after logging, the rehabilitation of areas destroyed by mining and the maintenance of adequate national parks and the like."

Even the plenary evening lectures touched on environmental issues. Dr. M. Batisse, director of the Natural Resources Division of Unesco spoke about environmental problems and the scientist, characterizing his colleagues as often being myopic and essentially dishonest to themselves, and many times being quite devoid of courage. The economist H. C. Coombs, chancellor of the Australian National University, speaking on matching economic and ecological realities, pointed out that such matching, if done, would entail individual sacrifices that are not likely to be made. In the lecture concerning the navigation of men and mountains, N. M. A. Peterson of the Scripps Institution of Oceanography related the most recent data on Pacific Basin spreading, including mention of deep-sea drilling and other methods of investigating crustal movements on a geologic scale.

It seems quite clear from Sir MacFarlane Burnet's closing address, "Report of the Pacific Science Council," that there is, indeed, great concern over the preservation of the environment, although "it will be a long time before we attain any such goal of the world as a viable dynamically balanced ecosystem that can support a human or posthuman population of the size that is appropriate to the resources and human values of the time."

Many of the several hundred individual papers were rather general, yet there was a substantial amount of new material. For instance, the assessment of

trophic relationships at higher levels of the food chain in the tropical Pacific presented by P. Bourret was both elegant and comprehensive. Undertaken by a crew of the Organisation de Recherche Scientifique et Technique d'outre mer, Noumea, they went to 1200 m with their systematic netting and ascertained what constitutes day and night faunas in various depth segments; the relation of tunas to this faunal distribution was also discussed.

In the same oceanographic section, B. Salvat (France) spoke of the shallow-water fauna in Polynesian atolls, stressing in particular the prevalence of bivalve mollusks, especially *Tridacna* with its zooxanthellae. These giant clams can be so dense on certain shallow reef facies as to exceed a flesh biomass of 5 kg/m^2. The effects of islands on the movement of water masses with implications on surface enrichment and on possible supplying "signals" to migrating marine animals was the topic of R. A. Barkley (National Oceanic and Atmospheric Administration).

Productivity in the widest sense of the word was the topic also of several other symposiums such as that on forest resources, crop productivity (mainly rice), and problems and production potentials on certain soils in the Pacific.

The symposiums on demography and nutrition contained topics ranging from aspects of future world population dynamics to an appraisal of the effects of trepanomatosis and gonorrhea as causes of population losses in the Pacific islands, the latter viewed as the cause of reduced fertility, particularly in eastern Polynesia, Hawaii, New Zealand, and Micronesia.

Urbanization and modernization were discussed from medical vantage points. It was pointed out, for instance, that hypertension and degenerative cardiovascular disease accompany assimilation of Polynesians into Western society (I. A. M. Prior and H. P. B. Harvey, Australia). An equally negative result of acculturation to "Western" food habits seems to be balance in the diet and adequate protein intake, especially when the latter is dangerously low, as in children in Papua or New Guinea, to single out just one such location. The recommendations contained in these reports pointed to the need for more and better nutrition studies, especially in societies that were remote but are now experiencing rapid disintegration of old cultural practices.

The symposiums on geology covered structure and resources. They were the least directly man oriented and dealt with what there is and how it came to be that way, by forces existing long before man's influence began.

Activity of the association is hampered by lack of funds for the secretariat at the Bishop Museum in Hawaii; it has certainly not grown at the pace at which new member nations have joined. Nevertheless one should not underestimate a half century of tradition that led to good and fairly frequent communications among the scientists of an area that covers about half the globe; yet one must also be aware of the fact that many United Nations organizations now operate in the Pacific and deal with subject matter that overlaps with the association's concerns. The format of association meetings and committees may change, just as types of scientific endeavor may and should change. But the quest for Pan-Pacific exchange of scientists' findings and ideas, especially in certain ecotypical areas of natural and social sciences, will persist. One must wish good luck to the Canadian organizers of the next Pacific Science Congress (the 13th), to be held in Vancouver in 1975 under the overall chairmanship of Ian McTaggart Cowan.

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Long-Baseline Interferometry

On 14 April the Rumford Award of the American Academy of Arts and Sciences was presented to three groups of scientists for their pioneering work in very-long-baseline interferometry (VLBI). In conjunction with the award, a 2-day symposium on this subject was held at the Academy's headquarters in Brookline, Massachusetts, on 13 and 14 April at which scientists now working on VLBI and related subject areas, both from this country and abroad, joined the members of the award groups in discussions of their results and their astrophysical implications. Speakers at the symposium reported many interesting new results in addition to reviewing the pioneering development work.

Among the interesting new results reported were those relating to observations of rapid angular expansion in the small-diameter radio components of certain quasars, particularly 3C279; this quasar has two equal components moving apart with an apparent linear velocity of some six or eight times the velocity of light, on the assumption that the distance of 3C279 is given by its redshift $[\Delta\lambda/\lambda(\text{rest}) = 0.54]$ according to the Hubble law. The angular resolution obtained is remarkable; the motion in 4 months amounts to 150 microarcseconds, the errors to ± 10 microarcseconds. The rapid expansion and fine structure of quasars has now been observed by several independent groups and was reported by Irwin Shapiro (M.I.T.), David Jauncey (Cornell), Alan Moffet (Caltech), and Jack Locke (National Research Council of Canada).

Theoreticians Martin Rees (Cambridge) and Jeremiah Ostriker (Princeton) reviewed various models of quasars. Models of moving fragments can account for the speeds but not for the high degree of equality of the components of the expanding doubles, although Thomas Gold (Cornell) proposed an explanation involving no motion faster than light but producing a geometrical velocity much faster than light. Geoffrey Burbidge (University of California at San Diego) expressed some doubt about applying the Hubble redshift distance relation to quasars like 3C279. Observers have not yet measured the expansion rates of enough quasars to test for correlation with the optical redshifts. If the radiation from the small diameter radio components arises from the incoherent synchrotron process, it is limited by the inverse Compton effect to a brightness temperature of about 10^{13} °K. This is close to the observed brightness with the use of intercontinental baselines. Some observers feel that all sources will yet be resolved with earth baselines, while others feel that longer baselines would reveal small knots at still higher temperatures.

James Moran, Jr. (Smithsonian Astrophysical Observatory) reported that all of the masering H_2O vapor sources, except that in Orion, are still unresolved at 0.001 second of arc. An experiment planned between the United States and the Soviet Union this summer may have sufficient baseline to resolve more of these sources. Theoretician Marvin Litvak (Smithsonian Astrophysical Observatory) discussed the status of interstellar maser theory, and Peter Goldreich (Caltech) reported on some quantum mechanical studies that he has pursued to help solve the polariza-