

threatened national parks. The IUCN Commission on National Parks and Protected Areas released its new list of the most threatened protected areas. There are 85 designated—up from 58 when the last General Assembly was held in Madrid in 1985. The Species Survival Commission also issued its list of most endangered species of plants and animals. Twelve were selected to represent some 4,500 species that are endangered world-wide.

Proposed International Convention on Biological Diversity

An important issue emerging from the meeting is the proposed International Convention on Biological Diversity. A first draft, prepared by IUCN's Commission on Environmental Policy, Law, and Administration, aroused lively debate. Controversy centred on the financing and distribution of a fund to assist countries undertaking to protect areas that are rich in wild genetic resources of plants and animals, or to compensate them from a proposed levy on commercial exploitation of these genetic stocks, which are considered an international patrimony. The draft will undergo review by scientists and governments in the coming months.

Economics was a thread that weaved its way through all the official hearings and the busy market-place of contacts, lobbying, and fund-raising, 'in the corridors'. Costa Rica provided one of the first examples of a new mechanism for financing conservation, called 'debt-swap for Nature'. This involves a donor purchasing government dollar debt from private banks at a discount—currently around 75%—and turning it back to the Government through a foundation in exchange for bonds paying interest and principal in national currency at full value. This money must be used for national conservation, such as purchase and protection of threatened forests.

Further Economic Considerations

The Costa Rican Minister of Natural Resources, Energy, and Mines, Dr Alvaro Umaña, lobbied at the meeting for direct donations of debt-for-conservation by creditor banks. In the US, such donations are partially tax-deductible. He announced a US \$254,000 donation from the Fleet-Norstar National Bank of Rhode Island, and said that another, for more than a million dollars, was being negotiated in the US. He also announced new debt-swap agreements for \$5.4 millions (non-discounted value) with the World Wildlife Fund-US, the US Nature Conservancy, and other conservation groups and foundations.

The debt-swap innovation was praised by H.R.H. Prince Philip, Duke of Edinburgh, who addressed the delegates as Vice-president of IUCN and President of the World Wide Fund for Nature (WWF) International, and by Dr Mostafa K. Tolba, Executive Director of UNEP. Environmental ministers from 13 countries were among participants who followed new financing ideas closely. Economic incentives to show how conservation can bring benefits to people who are now causing environmental destruction, were also discussed. Promotion of buffer-zones around forests and parks are being encouraged, within which buffer-zones local people will be helped to use forest products for profit in a sustainable way.

Pan-American Participation

During a full day devoted to conservation in Central America, Guillermo Archibald, a Kuna Indian leader from Panama, described how the 30,000 Kuna are managing an entire district. 'The forest provides us with housing, food,

medicines, and boats', he said. 'We patrol it to keep out squatters and loggers. We have built tourist lodges and helped scientists survey the area to see what other benefits it can provide.'

Indigenous peoples from North and South America also took part in the General Assembly, often defending their right to harvest wildlife, while another example was given by private environmental groups in Honduras engaged in protecting the watershed for the capital Tegucigalpa, in La Tigre National Park. They were able to block logging in the Park by showing that the forest supports a water-supply that is now reliable and very much cheaper than water taken from a polluted river serving the city.

Some Financial Aspects and Necessary Rehabilitation

These matters were examined on a more theoretical level by economists and bankers in a workshop seeking systems for putting a value on the benefits of leaving a natural area alone, instead of the current practice of fixing value by the profits to be made by commercial exploitation. IUCN believes that statistics revealing the full value of conservation could have a major impact on government policies.

Economic disincentives for destroying the natural environment were exemplified by the results of the 'Hamburger Connection' campaign by US environmentalists opposed to the clearing of Costa Rican forests for rangelands to raise beef for export to the fast-food industry. Minister Umaña reported that the withdrawal of Burger King's contracts for beef in response to the protests had cut the country's beef exports by 40%. The Costa Rican answer, he said, is to replant the forests and concentrate cattle-raising on appropriate land with modern intensive methods: 'You can have your hamburger and plant forests too', he forecast. Rehabilitation of degraded lands is becoming an environmental 'growth industry', according to IUCN Deputy Director-General Jeffrey McNeely (Conservation). 'The amount of virgin areas left to save is fast dwindling', he said: 'The challenge now is to restore to productive use the vast areas that have been overexploited'.

There was much internal business conducted as well as elections for IUCN Council through 1990. Details of Regional Councillors, awards, etc., can be obtained from Mr Delmar Blasco, IUCN Headquarters, Avenue du Mont-Blanc, CH-1196 Gland, Switzerland: telephone 022-64 71 81, telex 419 605, telefax 022-64 46 15.

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INTERNATIONAL WORKSHOP ON CLEAN TECHNOLOGIES AND PRODUCT DESIGN, HELD AT THE VIENNA INTERNATIONAL CENTER, VIENNA, AUSTRIA, DURING 24-26 FEBRUARY 1988

This three-days' Workshop on Clean Technology was held in Vienna during 24-26 February 1988. Sponsored by the International Association for Clean Technologies and the Austrian Chamber of Commerce, with administrative support from UNIDO, the meeting brought together 50 academics and government officials interested in Clean Technology from European countries and the US.

Although there is still no generally-accepted definition of the term, clean technology is any production system which has been effectively designed to use resources efficiently and to minimize or preferably eliminate waste. Unlike conventional 'end-of-pipe' pollution systems, these clean

technologies seek to incorporate process changes and internally recycle potential waste materials rather than collect and treat wastes after their production. There is another term, 'low-waste technology', which is often used to describe systems that go beyond 'end-of-pipe' technology but stop short of 'clean technology'. In the US the term 'waste minimization' is used to describe both low-waste and clean technologies.

The general purpose of the Workshop was to exchange views on the topic of clean technology and product design. Manufacturers and users should be aware of the entire life-cycle of products—especially how they will be disposed of after their useful economic life has ended. Participants gave brief status-reports on the evolution of clean technologies in their nations, and representatives from UNEP, UNIDO, and EEC, reported on their organizations' activities in this field. Mr Hans Sutter, the President of the International Association for Clean Technologies and Director, Hazardous Waste Management (FRG), set the overall theme by stating that the long-term objective was to move away from single media (e.g. air/water/solid wastes) and from 'end-of-pipe' systems towards integrated environmental technology.

The participants agreed that the role of industry, both as a seller and as a user, will be critical to the introduction of clean technology. Mr Jean M. Junger, from the European Economic Community, described their new Network for Environmental Technology Transfer (NETT), which is designed to bring 'vendors' and 'purchasers' of low-waste or clean technology into contact and create new markets. Copies of a paper entitled *The Promotion and Diffusion of Clean Technologies in Industry*, by OECD staff, had been given to all participants prior to the meeting. This paper identified many of the impediments, including cost considerations, which must be overcome in order to encourage wider adoption of clean technology by industry.

Separate workshops were held on the topics of:

- Policies and strategies to foster the development and implementation of clean technologies and products
- Information systems and networks
- Identification and prioritization of clean technologies and research needs
- Product design criteria.

A press conference on the workshops was held at the Austrian Chamber of Commerce on 26 February 1988. For further information please contact Dr Thomas Gutwinski, Austrian Section of the International Association for Clean Technologies, Reisnerstrasse 4, A-1030 Wien, Austria.

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JUBILEE EVENTS DEDICATED TO ACADEMICIAN V.I. VERNADSKY'S 125TH BIRTHDAY ANNIVERSARY, INCLUDING INTERNATIONAL SYMPOSIA HELD IN LENINGRAD, KIEV, AND MOSCOW, DURING 4-12 MARCH 1988

This momentous series of events, held under the auspices of the USSR Academy of Sciences, had been diligently planned by their special Organizing Committee for the Vernadsky Anniversary Commemoration under the chairmanship of Academician Guri I. Marshuk, President of the Academy of Sciences of the USSR, with Academician Aleksandr L. Yanshin, Vice-President of the Academy, as Chairman of the 'Commission for Studying [the]

Scientific Heritage of Academician V.I. Vernadsky'. It took place in the three major centres of Leningrad, Kiev, and Moscow, and heralded a new era in Soviet science.

Of main concern to those with environmental-conservational interests were the three whole-day symposia, but there was also liberal punctuation with special visits and ceremonial and social events. The invited participants numbered about 50 from numerous other countries and considerably more from various parts of the Soviet Union; as befitted such an occasion, the contributions were generally of a high order despite the printed programme (in Russian and English) only becoming available at the beginning of the actual proceedings.

International Symposia on V.I. Vernadsky and Contemporary Science

This first Symposium of the Commemoration series took place in the Great Conference Hall, Leningrad Centre of the USSR Academy of Sciences, and was under the leadership of Professor Mihael I. Budyko*, Chairman of the Leningrad Division of the aforementioned Commission, and Director of the State Hydrological Institute's Department of Climatic Change and Atmospheric Water Cycle Research, Leningrad, who spoke on 'Earth's Atmosphere in the Past and Present'. This was followed by a series of Soviet and Czechoslovak scientists speaking on Vernadsky's thinking in a wide range of sciences and his influence on their history or development. These accounts were largely eulogistic, as his scope had been 'encyclopaedic', embodying 'a whole academy of sciences'.

Speaking later of 'Vernadsky as a Founder of Genetic Mineralogy', Professor A.G. Bulach indicated that Vernadsky had been considerably influenced in his early work by the pioneering Russian pedologist, V.V. Dokuchaev, while other notable papers included those of Academician A.M. Ugolev on 'Trophological Problems of the Biosphere' and of Dr A.V. Koltsov on 'Vernadsky as an Organizer of Science'—at a time when one could still do such things in sufficient depth to be worth while over a wide range of scientific disciplines. Under the heading of 'Communications of participants', we advanced the idea of a 'Vernadskyan revolution in the form of a special Biosphere component of the well-established environmental movement or revolution', which we were informed was soon 'broadcast to millions [and] millions'.

The following two days were taken up by various ceremonial and social events, visits to Vernadsky's old school (the former 1st St Petersburg Gymnasium, with its memorable Directrice), to the 'Biosphere Museum of the Institute of Natural and Technological History, USSR Academy of Sciences', to places where he had worked (Fig. 1), and to the Radium Institute which he had founded in what for some of us is easily the world's most beautiful city. The transit to Kiev, capital of Ukraine, was then made by air.

International Symposium on the Teaching of V.I. Vernadsky About The Biosphere and Environmental Protection

This second Symposium took place in Kiev, in the Great Conference Hall of the Ukrainian SSR Academy of Sciences, and was under the leadership of Academician K.M. Sitnik, Vice-President of the Ukrainian SSR Academy of Sciences, and Chairman of the Ukrainian division of the aforementioned Commission, who called first for the

* Recipient this year of the World Meteorological Organization's highest award—see page 181 of this issue.