Craigton, Chairman of CoEnCo. The award was in recognition of his outstanding efforts in promoting improvement of the environment, including litter abatement. The award was presented by the Secretary of State for the Environment at the Guildhall, London on 29 June 1983.

New York

The Committee for the United Nations Population Award has been presented to Her Excellency Mrs Indira Gandhi, Prime Minister of India and Mr Qian Xinzhong, Minister in Charge of the State Family Planning Commission and Deputy for the National People's Congress of the People's Republic of China. The population award for 1983 includes a diploma, a gold medal and a monetary prize of US $12 500 each. The presentation took place in June 1983. The award is presented for the most outstanding contribution to the awareness of population questions or to their solution.

Suphan Buri Province

Thailand's largest fish breeding area has suffered a loss of about US $2 million from a deadly fish epidemic. Of the 325 fish ponds, about 200 are contaminated by a disease which causes red wounds in the fish. The exact cause of the disease is still to be determined.

Geneva

The International Meteorological Organization (IMO) Prize, which is awarded annually for outstanding work in meteorology or operational hydrology and international cooperation, was awarded by the Executive Council of the World Meteorological Organization (WMO) to Professor Juan Jacinto Burgos, Professor Emeritus at the University of Buenos Aires, Argentina, and to Mr Mohamed Fathi Taha, Counsellor in Meteorology to the Ministry of Civil Aviation, Egypt. Both will receive a gold medal, a cash award and a diploma giving the citation of the award.

Melbourne

The Australian Federal Government according to a High Court ruling has the power to block the building of the dam in Tasmania. This is indeed a remarkable victory for conservationists in Australia. The Court ruling was that the Federal Government was, in banning the dam, discharging its obligations under the World Heritage Convention.

Washington

The US Energy Information Administration (EIA) has made detailed statistical data available on US residential energy use at the Census division level. Previously, such detailed geographic data has been available only at the National level. The report is titled: *Residential Energy Consumption Survey: Consumption and Expenditures, April 1980 Through March 1981, Part 2: Regional Data.* Copies may be obtained from the US Government Printing Office for $7 per copy, GPO Stock No. 061-003-00319-2.

Book Reviews

Terrestrial Nitrogen Cycles, F. E. Clark and T. Rosswall (eds.), Ecological Bulletin No. 33. Swedish Natural Science Research Council: 714 pp., $55.00, 1981. ISBN 91-546-0290-4, ISSN 0346-6868.

Systematic study of the relationships between atmospheric nitrogen and nitrogen compounds in the soil and biota began almost exactly one hundred years ago with the researches of Schoesing and Muntz, and Berthelot. Much time has been devoted to the subject and a vast amount of data gathered, yet despite the fact that much knowledge has been gained in certain areas the impression is that, for the most part, research has only just scratched the surface. This situation is certainly reflected in the contents of this bulletin.

In all, it consists of forty papers given at an International Workshop held in 1979 and organised by SCOPE/UNEP International Nitrogen Unit of the Royal Swedish Academy of Sciences and the Commission for Research on Natural Resources.

For the most part, subject treatment is at ecosystem level with an occasional consideration of what happens at the cellular level. As a result, biological mechanisms, such as the absorption of compounds by roots and their transfer across membranes, receive little attention. Similarly, there is no real discussion of chemical mechanisms by which one form of nitrogen is transformed into another. Thus, most of the chemistry is of the 'black box' type with the inputs and outputs noted and the 'black box' being variously represented by such things as organisms, organelles and leaf litter. The breadth of treatment, however, remains impressive.

The papers themselves are arranged into sections namely Introductory Papers, Processes, Ecosystem Strategies and Management Impacts. There is a thought-provoking concluding paper by P. Newbould entitled "Terrestrial Nitrogen Cycles: Problems, Present Knowledge and Future Research Needs".

The Introductory section consists of four papers. The first, by F. E. Clark, reviews the changing concept of the Nitrogen Cycle over the years. He identifies four basic types of cycle, the Process Diagram which simply shows the interconversion of nitrogen compounds, the Process and Compartmental Scheme showing in addition the areas of the ecosystem in which the compounds are found, the Budgeted Flow with more complex compartmentalisation and specific values assigned to the various steps and, finally, the Simulation stage which is similar to the budgeted flow but without the quantification.

The other three papers are devoted to various aspects of modelling.

Most of the papers in the Processes section are concerned with tracing the fate of nitrogen in the soil in specific situations. The topics dealt with include nitrogen release from litter, mineralisation, uptake and translocation in forests, the effects of mycorrhizas, leaching and erosion. However, there are two papers which are of more general interest since they summarise two important areas. The first, by U. Granhall, surveys the effect of biotic and abiotic factors on the biological fixation of nitrogen. The second is by E. A. Kirkby and deals with the factors affecting the uptake of nitrogen by plants.

The last two sections contain papers which deal with matters of more practical importance to those actively involved in agriculture, forestry, land management and conservation. Thus, nitrogen cycling in different biota is discussed as is nitrogen involvement in agricultural ecosystems.

Despite the wealth of data presented during the course of this workshop one cannot help but be struck by the fact that, in many respects, our understanding of the different processes is very rudimentary. Indeed, this is admitted by more than one contributor to the proceedings. For example, in the papers by J. Skujinš ("Nitrogen Cycling in Arid Systems") and R. Herrera and C. F. Jordan ("Nitrogen Cycle in an Amazonian Rain Forest") the point is made that no more than tentative conclusions can be drawn in view of the amount of data available so far. This is not at all surprising given that not all ecosystems have been studied equally in terms of their nitrogen budgets. For example, it is only recently that arid regions have become economically important due to the increasing human populations that some have to support. Then, of course, in biomes such as forests the time scale for changes, when left undisturbed, extends over years. It is frightening, therefore, to contemplate that Man's activities can destroy these areas before the consequences of the destruction can be evaluated properly. In this respect, the paper by Herrara and Jordan makes somber reading since their preliminary findings suggest that clearing the Amazon rain forest would lead to the rapid leaching of nutrients from the soil with consequent desertification.

One area in which knowledge has been advanced, however, is in the cycling of nitrogen in forests. Papers by D. W. Cole ("Nitrogen Uptake and Translocation in Forest Ecosystems") and J. R. Gosz ("Nitrogen Cycling in Coniferous Ecosystems") show that in many instances the preferred form of nitrogen for uptake by trees would appear to be the ammonium ion, and that much of a tree's nitrogen requirement is met by internal recycling and translocation. In this respect conifers are more efficient than deciduous trees and have a greater ability to withdraw nitrogen compounds from their leaves before abscission. J. M. Melillo in his paper ("Nitrogen Cycling in Deciduous Forests") shows that most of the soil nitrogen is bound to organic matter and that only small amounts of free inorganic nitrogen are present at any one time in the soil. This is probably due to much of it being immobilised by microflora.

W. Verstraete in his discussion of nitrification mentions some of the more controversial aspects. For example, recent findings would suggest that the production of nitrogen oxides in the soil is greater than might have been imagined. Indeed, it is suggested that biological production of NO_x is fifteen times greater than industrial emissions. Also, there are suggestions that in natural ecosystems nitrification is controlled, at least to some extent, by allelochemic inhibition. The evidence for this, however, is not very strong; rather, it appears that control is exercised through nutrient limitation and changing elemental balance. Phosphorus concentrations would seem to be of some importance here.

In a second, even more controversial paper the same author makes a plea for the control of nitrification processes in the soil by the application of chemicals to inhibit the nitrifiers. He argues that high levels of nitrate in the soil reduce general microbial activity to the detriment of soil structure. Recent work has suggested that increased applications of inorganic nitrogen lead to a deterioration in soil quality. At the same time, there is evidence that in some cases more nitrogen is added to the soil than is necessary to maximise yields. Therefore, rather than interfering with the soil processes even more by adding microbial inhibitors perhaps it would be better to control nitrogen applications. To this end more work is needed to identify those factors which could act as indicators of the nitrogen status of a soil at any given time.

It must be said that this bulletin is packed with information so making it of interest to most people engaged in soil and agricultural research. Those working in land management and conservation will also find much of interest. A number of contentious points are made but these can only stimulate much lively discussion and debate: such is the way of progress.

L. A. Hambrook
Farnborough
Hants, UK.

The Yearbook of Environmental Education and Environmental Studies, Arthur B. Sacks, Lei Lane Burrus-Bammel, Craig B. Davis and Louis A. Iozzi (eds.). ERIC Clearinghouse, Ohio State University, Columbus, Ohio: 387 pp., $7.50, 1980.

This publication is one of a series of environmental education reports that are issued to analyze and summarize information related to the teaching and learning of environmental education. It is hoped that the reviews will: provide information related to the teaching and learning of environmental education; indicate trends; and stimulate ideas.

The specific goals of this publication are indicated by the editors as: (1) to provide a diverse readership a high quality yearbook that presents the researcher, scientist, and student of environmental education or environmental studies with the current year's explorations of issues and problems; and (2) provide both the practitioner and the scholar with a

environmentally related research and scholarship.

Since the information reports do differ somewhat in context and their content the current report reviewed is best described in its overall value in the foreword, by Lynton Caldwell as: "...a record of the diversity, direction, and underlying principles of the environmental movement". This year's foreword is a continuation of an approach, started last year, where distinguished members of the environmental community are invited to foreword the yearbook. Dr Cladwell is best known for his efforts to establish the National Environmental Policy Act (NEPA).

Another feature introduced in this Yearbook is the inclusion of the NAEE president's inaugural message. In his message Professor Clay A. Schoenfeld traces the past, present and future of the environmental movement. He details his perception through what are termed 'triumphs' and 'tragedies'. In looking at the future Schoenfeld asks that we look carefully at the belief of Evison (1978) where "...it will be the covert ecological message imparted by the actual conduct of organizations such as ours (NAEE) that will override our overt environmental education voices". The NAEE is challenged by Schoenfeld to dedicate themselves to a decade of 'integrated envrionmental management' education. There are thus no 'anti's' but a balance of environmental concerns and human needs.

The first section of the year book is devoted to papers that describe a wide range of environmental programs, experiments or issues of interest to the environmental community. It is the purpose of these papers to distill and report on the authors' experiences in order to share, and stimulate further lines of inquiry. The emphasis of this section is to represent areas and issues that have gone unnoticed or have been undervalued. The section consists of ten essays. This reviewer did find a great degree of diversity in this section of the yearbook. The infusion of such articles and descriptions does make one aware of less publicized efforts in environmental education. Possibly this will also reinforce others in doing similar projects to continue, and consider describing their efforts, as the editors of the yearbook have provided a vehicle to do this.

The second section of the yearbook, Research and Evaluation: Refereed Papers, is comprised of twenty-two papers divided into six categories. The categories include: energy and transportation, environmental action and citizen action, land use, environmental health, attitudes–values–judgements, and assessing environmental education teachers and curricula. These categories do indicate the diversity of the environmental studies/education umbrella. It was also quite refreshing to see that in this section, comprising about eight-five percent of the book, many of the papers had an empirical base.

In summary of this section, the reviewer did find intense efforts on the part of the researchers. The papers presented do show quite an increase in quality. Some promise is found for the environmental effort in backing up their claims, as well as creating evidence for supporting areas for future study. Many of the studies are statistically significant. However, the reader must be aware of possible limitations and extension to only certain populations. Often the scope of the problem is immense, and the instruments limited. More work in replication of studies is needed.

In summary of the Yearbook, the reviewer finds it as purported in the first paragraph, and quite adequate for those of us who cannot attend the various conferences existing across the country, but wish to keep informed of the efforts of others.

Leonard L. Amburgey
Massachusetts Audubon Society
Lincoln, MA 01773, USA

ERIC/SMEAC—New publications

Four new publications in the area of environmental education have been announced for availability by the ERIC Clearinghouse for Science, Mathematics, and Environmental Education (ERIC/SMEAC).

Thinking Globally and Acting Locally: Environmental Education Teaching Activities, prepared by Lori D. Mann and William B. Stapp, is a collection of teaching activities for students in grades K-12 which provides a variety of approaches to help students view environmental education within a global context. This 322-page volume is the seventeenth in SMEAC's "Environmental Education Teaching Activities" series, dating back to 1973, and is priced at $12.50.

Environmental Education in Action V: International Case Studies in Environmental Education, selected and edited by Margaret E. Cowan and William B. Stapp, presents more than 40 case studies from more than 30 nations around the world, including all continents. Both formal (school-based) and out-of-school activities are included in this 327-page, $12.50 volume; target audiences of the programs reported range from young children, through university students and adult audiences, to total communities.

Environmental Education in Action VI: Change Agents in and for Environmental Education, compiled and edited by John F. Disinger (307 pages, $12) contains a set of reports, selected from the ERIC data base, which focus on schools, individuals, agencies, and organizations which, through their actions, have affected change in the presentation and development of environmental education. A spectrum of age levels and target audiences is represented.

Improving Instruction: A Collection of Ideas and Materials for Vocational Trainers, prepared by Herbert L. Coon as a product of a grant from US EPA's Office of Water Program Operations (202 pages, $5.50), cites ideas, materials, and methods that may be useful to trainers involved in designing instructional programs for water quality or other environmental protection concerns.

Each of these publications is available at prices quoted from:

SMEAC Information Reference Center
The Ohio State University
1200 Chambers Road
Columbus, OH 43212, USA.

In addition, they will become available in ERIC microfiche collections over the next several months.