

ISSN 0376-8929

Published Quarterly
Volume 17, No 4 — Winter 1990

Environmental Conservation

The international Journal
devoted to maintaining global
viability through exposing and
countering environmental
deterioration resulting from
human population-pressure
and unwise technology

Founded and Edited by **NICHOLAS POLUNIN**

Conferences & Meetings: **J. David Laughton**
Reviews & Notices: **Miss C.A. Trangmar-Palmer**
Editorial Assistants: **Dr N.V.C. Polunin**
Mr Ian L. Holmes



Published for the
FOUNDATION
FOR ENVIRONMENTAL
CONSERVATION
by
ELSEVIER SEQUOIA S.A.
Lausanne, Switzerland



with the collaboration of the
United Nations Environment Programme (UNEP)



World Conservation Union (IUCN)



International Association for Ecology (INTECOL)
International Conferences on Environmental Future (ICEFs)
World Council For The Biosphere—International Society For
Environmental Education (WCB—ISEE)



World Wide Fund for Nature (WWF)



&
International Society of Naturalists (INSONA)

Environmental Conservation

advocates timely action for the protection and amelioration of the environment of Man and Nature throughout the world. Topics range from pertinent case-histories of the past and present to rational use of resources, foreseeing ecological consequences, enlightened environmental policy, anti-pollution measures, low-impact development, environmental education and law, and ecologically sound management of all land and fresh water, sea and air, for the lasting future of Earth's fragile Biosphere.

The following are the main types of contributions which may be accepted for publication in this Journal:

- Policy-advocating leaders on outstanding topics;
 - Survey articles on important aspects of its subject;
 - Research papers whether basic or 'confirmatory';
 - Case-history accounts of wide significance and interest;
- &

Items for the following regular sections:

- Short Communications & Reports (SCRs)*: normally not exceeding three pages of the Journal each;
- Notes, News & Comments (NNCs)*: preferably at most one page of the Journal each;

Conferences & Meetings (C&Ms); summary reports, important prospects;

Reviews & Notices (R&Ns): of new books etc.

Each issue is generally headed by an *Editorial or Guest Editorial or Comment* and/or *Open Letter or Editorial Notes or Notice*.

Founded and Edited by Nicholas Polunin

Conferences & Meetings: J. David Laughton

Reviews & Notices: Miss C.A. Trangmar-Palmer

Editorial Assistants: Dr N.V.C. Polunin

Mr Ian L. Holmes

ADVISORY EDITORS

African Developments: Senator Prof. Mohamed Kassas (Cairo, Egypt)

Animal Ecology: Prof. Raymond F. Dasmann (Santa Cruz, California)

Animal Impact: Prof. Jean Dorst (Paris, France)

Australasia: Dr Donald F. McMichael (Canberra City, Australia)

Biological Productivity: Dr E. Barton Worthington (Nr Uckfield, England)

Biosphere Maintenance: Prof. Hon. Beatrice E. Willard (Boulder, Colorado)

Central America: Dr Anne LaBastille (Big Moose, NY)

China: Prof. Ma Shijun (Beijing, China)

Climatic Variation: Chancellor F. Kenneth Hare (Toronto, Ontario)

Conservation Evaluation: Dr Michael B. Usher (York, England)

Conservation Policy: Prof. M.E. Duncan Poore (Inverness, Scotland)

Economics Aspects: Prof. Marshall J. Goldman (Cambridge, Mass.)

Ecosystems Research: Prof. Eugene P. Odum (Athens, Georgia)

Education and Training: Prof. William B. Stapp (Ann Arbor, Michigan)

Endangered Biota and Ecosystems: Prof. Norman Myers (Oxford, England)

Energy: Prof. John P. Holdren (Berkeley, California)

Environmental Engineering: Prof. Philip H. Jones (Toronto, Ontario)

Ethnobotanical Conservation: Prof. Richard E. Schultes (Cambridge, Mass.)

Fresh Waters: Prof. Werner Stumm (Zurich, Switzerland)

Geographical Aspects: Prof. Gilbert F. White (Boulder, Colorado)

Human Behaviour: Dr Ivan Polunin (Singapore)

ICEFs: Nicholas Polunin (Geneva, Switzerland)

Indian Subcontinent: Dr Jai Kishan Maheshwari (Lucknow, India)

Indian-Malaysian Wildlife: Dr G.M. Oza (Baroda, India)

INTECOL: Prof. Frank B. Golley (Athens, Georgia)

International Wildlife Conservation: Jeffrey A. McNeely (Gland, Switzerland)

Island Ecosystems: Dr F. Raymond Fosberg (Washington, DC)

IUCN: Dr Martin W. Holdgate (Gland, Switzerland)

Land Use and Recovery: Prof. Kai Curry-Lindahl (Lidingö, Sweden)

Law and Enforcement: Prof. Homer G. Angelo (Davis, California)

Marine Waters: Prof. G. Carleton Ray (Charlottesville, Virginia)

Medical Aspects: Dr Bent Juel-Jensen (Oxford, England)

Meteorology and Climatology: Prof. Reid A. Bryson (Madison, Wisconsin)

Microbiological Implications: Prof. Donovan P. Kelly (Coventry, England)

Ornithological Aspects: Dr Christoph Imboden (Cambridge, England)

Parks and Reserves: Dr James W. Thorsell (Gland, Switzerland)

Pesticides and Toxicants: Dr Daniel Osborn (Abbots Ripton, England)

Plant Ecology: Prof. Makoto Numata (Chiba, Japan)

Plant Physiology: Prof. Terence A. Mansfield (Lancaster, England)

Pollutants and Disposal: Prof. Kenneth Mellanby (Cambridge, England)

Population Impact: Prof. Paul R. Ehrlich (Stanford, California)

Resources Conservation: Prof. S. Fred Singer (Charlottesville, Virginia)

Social Studies: Prof. Lynton K. Caldwell (Bloomington, Indiana)

Soils and Erosion: Prof. Victor A. Kovda (Moscow, USSR)

South America: Dr José C. de Melo Carvalho (Rio de Janeiro, Brazil)

South-East Asia: Prof. 'Otto' Soemarwoto (Bandung, Indonesia)

South-West Asia: Christopher D.W. Savage (Petworth, England)

UNEP: William H. Mansfield III (Nairobi, Kenya)

WCB-ISEE: Prof. Craig D. Davis (Columbus, Ohio)

West Africa: Dr Emmanuel O.A. Asibey (Accra, Ghana)

WWF: Dr Luc Hoffmann (Gland, Switzerland)

SUBMISSION OF MANUSCRIPTS

All contributions must be in precise English and original, submission of a manuscript implying that it is unpublished and is not being considered contemporaneously for publication elsewhere. Manuscripts (three copies, including one or two on light airmail paper) and allied materials should be sent to:

Prof. Dr Nicholas Polunin, Editor
ENVIRONMENTAL CONSERVATION
7 Chemin Taverney
1218 Grand-Saconnex
Geneva, Switzerland.

or to one of the Advisory Editors (listed above). There is a set of Instructions for Authors on the inside of the back cover of each issue: failure to follow these in reasonable degree may lead to, at best, protracted correspondence or return of a manuscript for restyling before it can be considered or even referred.

PUBLISHING AND SUBSCRIPTION INFORMATION

Environmental Conservation is published by Elsevier Sequoia S.A. Lausanne, Switzerland, for the Foundation for Environmental Conservation, with the collaboration of the United Nations Environment Programme (UNEP), the World Conservation Union (IUCN), the International Association for Ecology (INTECOL), the International Society of Naturalists (INSONA), International Conferences on Environmental Future (ICEFs), World Council For The Biosphere-International Society For Environmental Education (WCB-ISEE), World Wide Fund for Nature (WWF), and others. It is covered in numerous international indexing or abstracting journals emanating particularly from Great Britain, the United States, Italy, and West Germany. The ISSN is 0376-8929.

Environmental Conservation is published quarterly, correspondingly to the year's four seasons in the Northern Hemisphere.

Size 27.5 x 30 cm, comprising usually 384 pages (with additional covers, etc.) per annum. The volume subscription price for 1991 is SFr. 245 including postage — subscribers in the following countries receive their copies by airmail without extra-charge: Australia, Brazil, Canada, China, Hong Kong, India, Israel, Japan, Malaysia, New Zealand, Pakistan, Singapore, South Africa, South Korea, Taiwan, and USA).

Subscription orders and inquiries should be sent to:

ENVIRONMENTAL CONSERVATION
Elsevier Sequoia SA
PO Box 564
1001 Lausanne 1
Switzerland.