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IUCN Viewpoint

Tourism – A blessing or a threat to natural areas

Many advocates of land-use management, which involves the maintenance of natural ecosystems, point to the case of East Africa where tourism based on national parks and their wildlife, marine parks, regulated trophy-hunting, etc., contributes a substantial amount of the national income – in fact the highest single item of foreign exchange for Kenya, and a substantial amount for the other countries in East Africa and lately elsewhere in Africa. Similarly tourism based on beaches, coral reefs, and island scenery is a principal source of support for many Caribbean countries.

Tourism based on natural scenery, wildlife and other interesting and attractive natural phenomena is also prevalent on most continents where it contributes significant income to local economies. Often a combination of natural, archaeological, historical and cultural features form its base. As is true of every successful type of revenue-earning resource, there is a natural tendency to increase accommodation for tourism in such areas and thereby obtain a greater income by providing tourists with different kinds of facilities in the hope of attracting an ever-greater number year after year. Statistics in most tourist-oriented areas show that ever-increasing numbers of visitors are attracted by the natural marvels found in these areas. Many projections have been made by economists which suggest a brilliant future for these areas based on growing international tourism.

Naturally enough, various tourist organizations are capitalizing on unique natural resources. In most countries there is a National Tourist Board – or similar body – that is increasingly looking at national parks or equivalent areas as an instrument that would help it to fulfill its terms of reference, essentially to increase tourism, both local and international.

Those who aimed at creating national parks to preserve valuable natural ecosystems and to manage these for the enjoyment of visitors often did not foresee such a 'boom'.

To facilitate increasing tourism, new hotels, more roads and other constructions are being planned or erected, new types of tours are being programmed, and, of

course, new types of pressures are exerted on the natural resources which are the basis of the industry. Naturally a point will be reached where the resource, on which it all rests, will be effectively jeopardized and sometimes destroyed. The goose which lays the golden eggs is slowly being killed.

Symptoms of this evolution are seen in many regions. In the very fragile grasslands of Serengeti, Tanzania, hundred of cars loaded with tourists drive over the grass in search of a closer approach to the wild animals so that the customers can get a better view and photograph them at leisure. Sometimes unscrupulous drivers – and their patrons – chase animals across the flat plains, adding to the excitement(!) of the tourist. There is scarcely a pride of lions without its circle of ogling tourists, and the patience of the animals with this annoyance is noteworthy. Like vultures, the tourist guides know that the best place to locate quickly some interesting animal is to see where other 'vultures' – tourist cars and their guides – are concentrated in flocks or circles. Marine parks on the coast near Malindi in Kenya are being intensively used, and sometimes abused, by ever-increasing numbers of tourists. In the Galapagos, ever more numerous tourists are going close to colonies of nesting or mating birds such as the Galapagos albatross, and the effects of such interference are being studied* but are still not known. Thousands of other documented cases can be brought forward to support this tendency. Similar problems exist in relation to cultural monuments. Stonehenge on a summer afternoon resembles a monkey island in a zoo with tourists attempting to climb the ancient columns, running over the fallen stones or even hacking at them to enlarge what once were significant apertures. The Acropolis in Athens and the Forum in Rome are subjected to similar pressures from ever-growing and largely uncontrolled numbers of visitors. Poor planning and a lack of understanding on the part of visitors contribute to the increasing disturbance.

The greatest threat usually comes from the consequences of poorly planned road systems and hotel-building in areas of great scientific, educational and recreational interest. This diminishes the value of unique natural or cultural areas and produces a series of disturbances, the long-term effects of which cannot always be ascertained but which show every indication of creating a detrimental trend. Recent clashes between managers of national parks who would like to keep natural areas as intact as possible and those who would like to do the contrary – that is, place hotels and buildings, including swimming-pools and other recreational facilities, right in the middle of parks – have taken place in almost every country where tourism based on natural resources plays an important role.

National parks and the local tourist organizations often belong to different ministries or agencies. Tourism as an important revenue-earner often has more financial means and better publicity channels to express its viewpoint. More often than not, the tourist organization has won its case. In some countries there has been a 'takeover' of natural areas by the tourist organization.

For IUCN this issue presents a clear case for proper decision-making to benefit the best long-term interests of any country where national parks are found. In a recent letter addressed to President Pastrana of Colombia, where such a conflict arose regarding the exceptional Tayrona National Park (stretching from sea-coast to an altitude of 800 metres of the foot of the Sierra Nevada de Santa Marta), the case was expressed in the following terms by IUCN and WWF.

* IUCN and the World Wildlife Fund, in close association with the Charles Darwin Foundation, are presently sponsoring a study to clearly ascertain the effects of such interference and devise ways and means to bring tourists close but without disturbing the unique wildlife of the islands.

"The experience of many places throughout the world clearly shows that if national parks are to function effectively and productively, the bulk of tourist installations must be built *outside* the limits of the park. The park authorities must be entrusted to take care of visitors inside the boundaries, while tourist authorities should be in charge of directing them towards the park. An harmonious collaboration must be established between the tourist authorities and those of the national parks, ...

"We beg you to favour any solution that would maintain the integrity of Tayrona in its natural state and therefore allow its best uses for education, science, recreation and tourism, capable of serving the short and long-term interests of Colombia and, through Colombia, of the whole world interested in this exceptional natural heritage."

To attempt to further clarify this difficult problem, IUCN has suggested a system of zoning for national parks and other protected areas in which the needs for nature conservation must be considered paramount. Recognizing that it is not always possible to locate tourist facilities outside national parks, this involves a separation of functions within the park.

It recognizes that intensive tourist development is incompatible with nature conservation and must be limited to a relatively small area of any national park. On the other hand, those willing to travel without mechanical assistance under wilderness conditions can be permitted to visit most areas within a park in limited numbers. The exceptions would be those zones set aside for long-term scientific study or for other ecological purposes for which the exclusion of any form of disturbance is essential. IUCN will continue to urge that such zoning to separate tourist areas from the areas established for nature conservation will be implemented in all national parks, and will work with tourist agencies to encourage greater understanding of this necessity.

Conferences and Meetings

Pacem in Maribus III

The third convocation of Pacem in Maribus took place in Malta from 26 June to 3 July, 1972. The basic purpose of this, as of previous meetings, was to seek new ways toward world peace and disarmament through the common interest of nations in the uses of the world's seas and seabeds. However, the interest of Pacem in Maribus extends beyond the reconciliation of nations to the protection of the environment and natural resources of oceans and seas. This inevitably leads to a consideration of global environmental problems. Because of the location of the convocations in Malta and their sponsorship by the Government and the Royal University of Malta, the concern of Pacem in Maribus has developed a Mediterranean focus, with a view to using this sea as a model for understanding and resolving problems of world-wide interest.

During the three years of Pacem in Maribus the prospects for achieving an international ocean regime appear to have grown, from some viewpoints, more remote than before. Nations have hardened their positions and have advanced unilaterally their claims to broader territorial waters, so-called "patrimonial waters", and fisheries zones, as well as to ever larger areas of continental shelf and continental slopes. The division of interests between developing and technologically advanced countries have sharpened, with the former advancing claims for compensation for any effort they may expend toward protection of the global environment. Yet, this growing emphasis on sovereign rights and privileges leads to an untenable conclusion. Either we must face the prospect of an ocean divided into territories belonging to various

seaboard states with the sacrifice of all other interests, or we must achieve some agreement for international control over the resources of the ocean. Thus, the worsening of the situation may in itself lead to a greater chance for early international action.

Projects of particular interest to IUCN that were discussed at Malta were those involving (1) the economic potential of the oceans, (2) the development of the Mediterranean and its impact on the marine environment, (3) an international sea service, and (4) establishment of an international ocean institute. The International Ocean Institute is now in existence and is based at the Royal University of Malta. Recommendations of the various working groups will be forwarded to governmental and intergovernmental bodies for appropriate action. The transactions of the convocation will again be published and may be obtained from Pacem in Maribus.

The International Council for Bird Preservation

The XIth Conference of the European Continental Section, ICBP, which met 15-19 May in Mamaia, Rumania, brought together representatives of 17 countries who passed 24 strong resolutions calling for correction of abuses of wild birds and their habitats.

Several resolutions were of special interest to IUCN. In its first action the Conference recommended creation of an ad hoc working group on chemical hazards to birds which would look into the organization of a co-operative programme to sample threatened species throughout Europe. National Sections would work in their respective countries to develop analysis and investigative programmes. The third resolution called on all European countries which have not done so to end spring shooting seasons on migratory birds. The fifth urged all governments to sign and ratify the Convention on Wetlands of International Importance, especially as Waterfowl Habitat (Ramsar, 1971). In its 20th resolution, the Conference urged the Governments of the Netherlands, Denmark, and the Federal Republic of Germany to create an international Park covering the Waddensea as a whole.

IUCN and WWF were among the organizations represented at the Conference.

German Bi-Annual Conservation Congress 1972

The German Conservation Congress took place in Husum (Schleswig-Holstein), the "gate to Germany's new second National Park of the Wadden Sea", 30 May to 3 June 1972. About 1,000 participants were present including the President of the Parliament, who lectured on "Conservation in the process of political decision", and other leaders.

Main topics of the Conference were the forthcoming new Federal Conservation Act, and planning of the new national park in the Waddensea area of NW Germany. Discussions included proposals for the integration of conservation planning into the existing system of regional planning, and for the right of private conservation organizations to bring an action before court against administrative measures and decisions not in accordance with sound conservation policy.

Environmental Education Methodology Course held in Holland

Sponsored by the "Biological Werkkamp voor het Onderwijs (KNNV), the Northwest Europe Committee of the IUCN Commission on Education, and the School and Children's Garden Service of the Hague, a training course for teachers was held at Wilhelminaoord, the Netherlands, 11-21 July, 1972.

The course was oriented towards field studies of the natural environment, but also paid attention to environmental education within the school curriculum and to the formulation of aims in operational terms.

A total of 78 participants from 7 countries in the region took part, with guests from Italy and the USA.

Programme Activities

Commission on Ecology

The Commission on Ecology of IUCN held its 14th Meeting in Stockholm, on 10 June 1972 at the time of the UN Conference on the Human Environment.

The Commission discussed policy matters, reviewed its programme in regard to new and continuing projects. Special attention was given to Dr. R. F. Dasmann's paper describing a system of classifying natural regions. This paper is shortly to be published in *Biological Conservation*. Machinery for linking IUCN projects more closely with MAB Programme was discussed. IUCN responsibility for carrying on the IBP/CT Check Sheet Survey, arctic problems, tropical rain forests, desert and semi-desert ecosystems were other matters discussed.

Volcan Baru area surveyed in Panama

Following a request of the Minister of Agriculture of Panama, IUCN with financial support from the World Wildlife Fund (US National Appeal) undertook an ecological survey of the Volcan Baru region and recommended areas for inclusion in a proposed National Park. A report has been submitted to the Panamanian authorities.

The Volcan Baru area is covered by primary cloud forest, a vegetation type of outstanding interest, which is the habitat of the rare quetzal bird (*Pharomacrus mocinno*), the horned guan and other unusual and often rare fauna. Besides the volcano peak, which is of great geological interest, the forest includes many giant oak trees and a great variety of orchids and bromeliads.

Dr. Anne LaBastille, of Cornell University, a member of SSC, was principal investigator and was assisted in the field study by Mr. Clyde H. Smith, photographer, and a small team from the Panamanian Forest Service and the Department of Natural Resources.

The study was part of a co-ordinated FAO/UNDP Programme which involves the planning and establishment of four national parks. It complements and amplifies a long-term plan for Panama prepared by two experts from the US National Park Service in co-operation with FAO.

World Wildlife Funds News

QANTAS becomes 29th Airline to support WWF resolution

The Australian airline QANTAS has given its support to a World Wildlife Fund resolution calling on airlines not to promote hunting of endangered species, becoming the 29th to do so.

The World Wildlife Fund resolution, passed last September *called* on agencies, "... to abjure the promotion of all travel which threatens wild nature, including expeditions to hunt and kill animals threatened with extinction, and listed in the Red Book of Endangered Species published by the IUCN".

IATA's Executive Council commended the resolution to member airlines.

The Airlines supporting the resolution are: Aerolineas Argentinas, Air Afrique, Air India, Alitalia, Ansett Airlines, American Airlines, British European Airways, British Overseas Airlines Corporation, British West Indian Airways, China Airlines, Air Congo, Aerovias Nacionales de Colombia, Eastern Airlines, El-Al, East-West Airlines, Ethiopian Airlines, India Airlines, Iran National Airlines, KLM, Malta Airlines, Aeronaves de Mexico, Middle East Airlines, Pan American, Qantas, Sabena, Swissair, Trans-Australia Airlines, Transworld Airlines, Servicos Aereos Cruzeiro do Sul.

Morges – Photographic Library

The World Wildlife Fund Photographic Library has been built up over the past five years from a very modest beginning to a comprehensive collection of more than 20,000 black and white photos, covering many aspects of conservation and a great many species of animals, with particular emphasis on endangered species.

The black and white collection includes photos on projects, events, personalities and subjects such as poaching or special campaigns, e.g. spotted cats, erosion and pollution. An ever-growing part of it is devoted to national parks, game reserves and sanctuaries, arranged by countries.

A small cabinet contains a collection of original negatives, or in some cases, negatives copied from good quality original black and white photographs.

There are some 10,000 colour transparencies in two sizes – 24×36 mm and 6×6 cm. The small transparencies are kept in a special filing cabinet in plastic sheets holding 20 slides, easily removed for viewing on the glass-top inspection table. As a rule these slides are not to be removed and sent out for reproduction. Most of slides have been duplicated for loan purposes and are kept in separate boxes.

A large cabinet contains most of the colour slides size 6×6; no duplicates are available. They are arranged in sliding metal frames for easy inspection against a lighted background and cover chiefly national parks and their fauna and flora.

Drawings: In many instances no adequate photographic material exists of some of the rare and endangered species. Some of the most eminent animal artists have contributed to a collection of excellent animal studies in colour and black and white which are available for reproduction. Photographs are available of the drawings.

Exhibition material: A large number of photographs and some coloured litho drawings in various large sizes have been fixed on lightweight metal plates and protected by a special varnish against damage. These are available for exhibitions.

Use of material: Requests for material from the Photographic Library should be addressed to The Director-General, World Wildlife Fund, 1110 Morges, Switzerland. They should be as specific as possible regarding species, places, etc., and sent in good time. Charges are usually made for reproduction.

US Park Service aids Venezuela

The US National Park Service, in co-operation with the National Tourism Corporation and Division of National Parks of Venezuela, has sent a three-man planning team to Venezuela to aid in preparing a master plan to guide the preservation and use of Canaima National Park. They will work with team members assigned by the Government of Venezuela.

Canaima National Park, with an area of one million hectares, lies in Bolivar State, and is at present accessible only by air. The park contains Angel Falls, the highest in the world, and a great variety of flora and fauna.

It is hoped that this assistance will considerably strengthen the National Park Division of Venezuela.

Dial Environmental Emergencies

Anyone in Germany who wants to call attention to environmental degradation is encouraged to use the telephone and to call Bonn 44 22 77. The system has the blessing of Interior Minister Genscher, and is run by the two-million-member German Nature Conservation Federation. The latter screens the calls and letters and passes them on to the proper authorities for action.

A similar system in Munich yielded 5,000 calls in 130 days, of which 32 % were on noise, 26 % on air pollution, 25 % on solid wastes, 10 % on water pollution, 4 % on unauthorized building, and only 3 % on nature conservation.

Book reviews

Unless otherwise indicated, book reviews in the Bulletin are prepared by Professor Tom Harrisson.

Odum, Howard T. (1971). *Environment, Power and Society*. New York, Wiley-Interscience, and Chichester, Sussex, John Wiley & Sons; 332 pp.; text figures and charts. £4.50 cloth (£2.65 paper).

Some deep and original thinking produces complex, varied and variously stimulating sets of data around the central theme of the title's second word: power. Chapter 1 gives a 25-page sum-up of the world system, furnishing a network language for power in a series of mosaic diagrams by the author and cited from others, and centring on the concept: "Power is a common denominator of all processes and materials" (p. 21). Naturally enough, therefore, the following chapter defines "What power is." In the world of science and engineering it is, apparently, the *rate of flow of useful energy* (p. 26). This is, no doubt, adequate terminology for those worlds. Professor Odum goes on to extend the approach, however, to the whole field of human and global life. But then we come up against another question: what is useful? This cannot be answered so easily in engineering or mathematical terms, as recent world history has only too depressingly illustrated.

The following chapters, begging that basic question, continue with a tremendous wealth of well-documented and cleverly presented data. The power concept is applied to all ecological systems and the biosphere *in toto*, to evolution, to economics, politics and even as the explanation of religion. The religious chapter (chapter 8) begins with a delightful diagram showing what looks like a valve circuit system; four valves = individuals "with a master switching programme control of energy flows... the flow of work from the group programme is available for direction into group projects" (p. 237). This leads into an intricate pattern which derives out of the main social economy, "action operated by the ethical programme," including the Church (p. 239). Everything is explained, including the appearance of religious prophets, and the religion of "primitive forest people such as the early Druids of Europe."

Such expertise runs pretty wild, confidently dissecting, tentatively predicting every conceivable pattern of human enterprise. One has to rub red-empting eyes to realize that again and again the same sort of statistical and engineered approach to power politics and economics has glaringly failed in fulfilling its "programme" during recent years - in, for instance, American budget projections, the British shipbuilding industry and aero engines, the Vietnam War despite Mr. McNamara's nearly sublime faith in unassailable "statistical analysis".

But if this book may make conservationists blink, it should also make them think. There is room for new thinking today, whether master-switched or not. Conservation needs fresh, modern, technical and philosophical concepts among its rank and file - a refinement of the cruder, physical and psychological views upon which so much of the effort has grown unplanned. All power to reason...

Bursche, Eva M. (1971). *A Handbook of Water Plants*. London and New York, Frederick Warne & Co. 128 pp.; with many black and white text figures. 65 pp.

Translated from the German (East) by Hella Czech (sic), this pleasantly made little book is illustrated by simple yet effective drawings by Paul Richter and Renate Brauner. In this British edition the scientific names are based on the *Flora of the British Isles* by Clapham, Tutin and Warburg (second edition 1962).

The author has specialized in this watery field. She here discusses the commoner species found in and alongside fresh water. There is a reasonable general introduction about nutrient cycles, water margins, plant plankton and so on, then a useful key for identification and the main text of straightforward species description. Short bibliography, good index.

Glutz von Blotzheim, Urs N. and others (1971). *Handbuch der Vögel Mitteleuropas*. Vol. 4 Falconiformes. Frankfurt/Main, Akademische Verlagsgesellschaft, 943 pp., 128 figures, 3 colour plates. DM 138 (subscription price DM 119).

This monumental volume in this monumental project has been published early in view of the accelerated decrease in many species of birds of prey. Densely loaded with factual information, especially ecological, it tells all that is known, and almost more than can be taken in, about the central European forms, taxonomically arranged. Special material is presented by other authors, always in German. The typography is traditionally German, too, but the layout clear. This must become and long remain *the* basic reference work for its subjects. And by covering a wider range of references in all languages it is not simply restricted in use. But the hard cover is rather poor and too weakly attached to the weighty body paper.

Mathews, Dick (1971). *Wild Animals as Pets*. New York, Doubleday and Company Inc. 280 pp., with 80 half-page photo plates. \$6.95.

A neatly published book, derived from a neat idea, followed up by an American author with a light touch which irregularly borders on the superficial. The idea: to take 16 wild animals, over a wide range of types; identify each one kept as a pet in a private home (in the USA) and describe how this works in detail, supported by close-up photographs from Patricia Caulfield; then add generalized sections on care and feeding of the species, plus a potted natural history for each. It is an amiable pattern, easy reading.

Like literally everybody else writing animal books these days, Mr. Mathews pays generous pen-service to the importance of recognizing the true role of animals in the wild, of respecting conservation interests, of not buying rare animals illegally and so on. Alas, however, in order to make his book interesting, he has to include some unusual, indeed outlandish pets. He is thus led to chapters on the ocelot, bobcat, tiger, jaguarundi, chimpanzee and wolf (40% of his sample), which are, on his own tacit admission, highly unlikely to be manageable as pets once mature. The end result - which your reviewer has only too often seen with the honey bear and the gibbon in Southeast Asia - is that after a darling infancy of love, the adult ends up in a second-class zoo, caged cruelly unto death. This is surely the most selfish of all ways of so-called animal loving.

Several primates and other forms are included in a subsidiary end chapter; these along with several of the species already mentioned, are already included in the list of species in appendices to the IUCN Draft Convention on Export, Import and Transit of Certain Species of Wild Animals and Plants (Bulletin 19, 1971, p. 162).

As one might expect in the context, most of the "pets" have to have some sort of special treatment before they become pettable - to be defanged, castrated, descended (skunk, p. 86) or declawed. Some of them get the whole treatment apparently. It's a wild, wild civilized world!

Thornton, Ian (1971). *Darwin's Islands*. Garden City, New York, American Museum of Natural History; 322 pp., 36 plates, many text figures. \$7.95.

The reader soon ceases to notice that the writing of this thick-papered (and thus thick) book is a trifle stodgy, since the material is presented with a certain freshness, conveying the good impression that the author knows every in and out and round about his theme: the volcanic Galapagos, with a total area of about 3,000 square miles. One may be forgiven for a certain reluctance to read any *more* about the natural history of these certainly fascinating but verbally somewhat saturated islands, controlled by Ecuador. Yet Professor Thornton - an Englishman who is now Dean of the School of Biological Sciences at La Trobe University, Melbourne, Australia - has taken trouble to cover previous studies and infused them with his own, so that the enterprise does come through alive.

After the historical setting, and then a description of the Islands, he deals with various aspects in erratic sequence, first sea birds, then plants (just over 40% of the species are endemic) and insects (especially grasshoppers), two reptile chapters (including an admirable restatement on the giant tortoises), land birds and, inevitable, Darwin's finches (with a good analysis of R. I. Bowman's new work disputing David Lack's classic thesis).

The last chapter, entitled "The Dangers", undramatically states the case for better funding of Galapagos conservation and the need to extend present activities. Those interested are urged to join Friends of the Galapagos, c/o 1 Rue Ducale, Brussels 1, Belgium. The text ends with this sentence: "Darwin's Islands both deserve and need the attention of educated men everywhere, and the need is urgent." (p. 276)

The bibliography is valuably comprehensive, but the absence of a contents sheet for illustrations is irritating. Some of the photographic plates are not too clear (e.g. plate 2, 3, 6).

Ward, Barbara & Dubos, René (1972). *Only One Earth: The Care and Maintenance of a Small Planet*. New York: W. W. Norton & Co. Inc., 225 pp.; \$ 6.00.

This book constitutes an unofficial report commissioned by the Secretary-General of the United Nations Conference on the Human Environment, Maurice F. Strong. It was prepared with the assistance of a 152-member committee of corresponding consultants in 58 countries. As such one might reasonably expect that it would be hopelessly dull and say nothing beyond the lowest common denominator of material acceptable to all. It is a tribute to the writing skill of the authors that it is neither dull nor platitudinous. Instead it is a well written account of environmental problems, as viewed by the United Nations, and their past and continuing conflict with the developmental aspirations of the poor nations of the world. It is essential reading for anyone who would understand the debates and polemics and the ultimate agreements reached at the United Nations Conference in Stockholm in June 1972.

Both the Stockholm Conference and this book make it quite apparent that the developing nations of this world are far from being sold on the realities of the environmental crisis that confronts mankind. A willingness to establish a new environmental organization in the United Nations and to fund it, to agree on a broad declaration of principles, to accept the need for studies, monitoring and to explore areas of further international agreement is present. A willingness to sacrifice even a fringe area of national sovereignty or to accept any proposal that would interfere with economic development is not foreseeable.

The emphasis of this book, like the emphasis of the Stockholm Conference, must be somewhat disappointing to the ecologist or naturalist. Economic considerations and the physical needs of mankind predominate. A concern for the natural world, on which humanity remains dependent, is present, but is not emphasized. Yet the biosphere has limits and these are being rapidly approached. If politicians are not yet ready to accept this reality, so much the worse for all nations and all mankind.

One cannot expect to find in a United Nations report a determination to force ecological truth down the throats of unwilling nations, not even in an unofficial report such as this. But there is enough in Barbara Ward's and René Dubos' writings to give anyone food for thought. The answers to the problems of the human environment are not yet acceptable; we must wait until things grow worse. Meanwhile this book, like the Stockholm Conference, is not an end but a beginning. From the lessons contained therein we may plan new tactics and strategy, fully recognizing that while people live in misery and fear they will not be responsive to warnings of doomsday. For them doomsday is now.

R. F. Dasmann.

Duvigneaud, P. (Ed.) 1971: *Productivity of Forest Ecosystems. Proceedings of the Brussels Symposium*, 707 pp., 120 F (US \$ 30, £ 9), Paris: UNESCO.

This publication, in the Unesco series *Ecology and Conservation*, contains the papers presented at the Symposium on the Productivity of Forest Ecosystems organized by Unesco and the International Biological Programme (IBP), with the assistance and support of the Government of Belgium, at the Palais des Congrès, Brussels, from 27 to 31 October 1969. Professor P. Duvigneaud, Director of the Laboratory of Systematic Botany and Ecology at the University of Brussels and chairman of the symposium, has also chosen for inclusion in this publication several complementary articles not presented directly at the symposium.

A list of the 120 participants from some 25 countries who attended the symposium is given in at the end of the volume.

Following the IBP Woodlands Workshop held in Tennessee (United States) in August 1969, the main objective of the Brussels meeting was to draw together and compare the data obtained in projects on productivity and energy flow in woodland and forest ecosystems. The programme consisted of some 20 papers which attempted to summarize present knowledge of aspects of forest productivity at all trophic levels, in both temperate and tropica zones. These papers, most of which were circulated in advance for discussions at the meeting, were not essentially original scientific contributions, but rather reviews or progress reports of projects on forest productivity. They summarized results obtained to date and outlined future work plans, thus helping to facilitate further international integration and co-operation among projects in the biome. A number of shorter reports were also presented to the meeting.

The symposium was opened by a welcoming address by P. Vermeulen, Minister of National Education and Flemish Culture in Belgium, followed by an opening address by G. Budowski (then a member of the Unesco Secretariat).

The programme of the meeting fell under the following ten main sections: I. Forest bioclimatology and phenology; II. Forest edaphology; III. Primary productivity (concepts and methods, primary productivity of boreal forests, resinous forests and plantations, mixed forests, deciduous forests, evergreen deciduous forests, tropical and equatorial forests); IV. Secondary productivity; V. Litter decomposition - forest soil fauna and flora; VI. Nutrient and "N" cycling; VII. Mathematical models; VIII. Data extension including cartography; IX. Reports on the synthesis of results of integrated projects; X. Remarks and conclusions.

This volume should prove of practical value to those concerned with the study of forest ecosystems, particularly at the time of the launching of the new intergovernmental and interdisciplinary programme of Unesco on "Man and the Biosphere".

Joseph Lucas