

Liquid Assets

Our wetlands are shrinking through drainage and reclamation projects and a vital resource is being destroyed. These important areas – comparable in value to forests and farmlands – are now so scarce that every effort must be made to preserve what still remains.

By wetlands we mean wet terrestrial and littoral eco-systems – marshes, bogs, fens and all stretches of water, whether fresh or salt, static or flowing, temporary or permanent. Important categories include estuaries and marine shallows (up to 6 meters deep), brackish and saline lagoons, natural and artificial lakes, small ponds or pot-holes, reservoirs, flooded gravel pits, rivers, streams, flood-meadows and swamps. These wetland habitats support a vast range of plant and animal life, and serve a variety of important functions, the full values of which are even now only beginning to be recognized.

The major functions of wetlands can be summarized in the following listing:

Water regime regulation	Recreational uses
Flood control	Educational uses
Erosion control	Plant production
Nursery areas for food fishes, crustacea, etc.	Scientific research
Fish production	Aesthetic enjoyment
Waterfowl production and maintenance	Wildlife habitat
	Landscape diversity

Despite the values represented by wetlands, these eco-systems have steadily been diminished in area through drainage, filling, stream "straightening" and scores of other usually unjustifiable attacks in the name of "land-improvement".

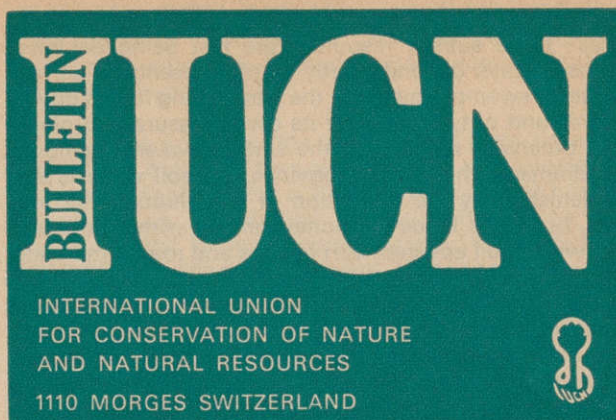
The drainage of shallow lakes and marshes has long been regarded by many decision-makers as a step towards national prosperity, a view upheld by the yields of grain or the number of animals pastured, which provide visible proofs of success. Were this the full reckoning the case for drainage might be supportable, at least from the economic viewpoint; as it is there are many reasons to suggest that conversion to agriculture is neither the wisest nor most economical means of utilizing the wetland resource.

If food production is the sole aim, then almost certainly there are other, better ways than schemes of this nature.

Drainage schemes designed to benefit agriculture must not only be 'worthwhile', they must be more worthwhile than any other project with the same end in view. They must take into account the natural wetland assets which are going to be destroyed, and more especially the long-term effects of tampering with the water-table. This particular aspect is important, because the changes are often gradual, and the full effects may not be felt for 20 or 30 years. That is why so many projects fail to maintain their early promise.

Plentiful fresh water is one of the most valuable assets a nation can possess – but at the same time settled communities demand that water shall be kept safely in its place. This second requirement has been regarded as all-important, and drainage authorities have had an almost unlimited mandate for flood control works. Now the emphasis is beginning to change, and the primary problem is no longer the rapid disposal of water, but its conservation to meet the huge and growing demands of industrial, agricultural and domestic users. This new task is not made easier by the effects of long years of drainage and 'land-improvement', but at least we can learn from experience.

One essential lesson is that all drainage schemes are followed inevitably by repercussions farther downstream, the effects being felt eventually by a whole range of apparently unconnected interests.



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Examples of the unforeseen results of drainage are found in almost every river system of Europe, and in many cases the ill-effects are still accumulating, since the cure to one problem is often the cause of several more. Usually the trouble begins with, or is aggravated by, the drainage of marginal land on the upland gathering grounds, where the rainfall is heaviest, and the soil remains wet for most of the year. These boggy areas can often be 'improved' without much difficulty to provide good summer grazing, and possibly some arable land, but by doing so the run off of rain and melting snow is greatly hastened. In their natural state such areas serve as regulators, absorbing water during wet periods and releasing it slowly in times of drought; drainage destroys this function and results in a much wider variation in river level along the middle and lower reaches. Sudden spates become more frequent, the volume of floodwater increases, and the farms and townships of the valley are faced with new threats of flooding. To correct this the river is embanked, and the channel may be straightened to help the water away. This in turn causes flooding downstream, and eventually the river is 'corrected' along the greater part of its length. The riverside communities have thus had forced upon them a stereotyped landscape, with fewer amenities and a greater poverty of plant and animal life. The embankment of the river also prevents the low-lying fields from draining naturally, and so a new system of ditches and sluices is needed to keep them clear of water.

With the risk of flooding removed, it is tempting to improve the drainage still further, and to use as much of the low-land as possible for arable farming. This in itself is reasonable but, due to the sharper drainage, the loss of top-soil through erosion is proportionately greater. Erosion also results from drainage improvements along the sides of the valley, and, since the run-off is led to the river as quickly as possible, the particles of soil are never allowed to settle. Formerly, a good deal of this silt was dropped on the low-lying fields, where it formed a valuable fertilizer; now it is rushed to the sea and thrown down in banks and bars around the estuary, encumbering the channel and comprising a hazard to navigation. The loss of humus is especially serious because, unless great trouble is taken to replace it, the fertility of the fields will be reduced.

The rapid disposal of the surface water results also in a marked lowering of the river level during times of drought. This leads to higher concentrations of industrial and domestic waste, high enough in many cases to comprise a serious threat to fisheries and public health. The disposal of this nuisance entails either a complete revision of the sewage system, or the building of balancing reservoirs to maintain the flow. Both solutions are costly, and the latter may involve considerable loss of farmland. The low level of the river may also make it difficult to maintain a constant supply of pure water to all those who require it. In some districts this problem is met by building still more reservoirs; in others, much greater reliance is being placed

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on boreholes and artesian wells. However, in certain areas these subsoil resources are fast being depleted. Subsoil water depends partly on the presence of surface water in swamps and lakes, the water being forced downwards and outwards under its own pressure into places not otherwise reached. If the surface water is removed by drainage, the effect is obvious. Subsoil water is also replenished by the infiltration of rain through the topsoil, but if the fields are honeycombed with land drains (or worse still covered with houses and roads) the water can no longer permeate.

The reclamation of coastal and estuarine marshes has further undesirable effects. Estuaries are among the most naturally fertile areas of the world, even more productive, acre for acre, than a field of wheat. The wheatfield, of course, produces more food for human consumption, because at present only a very small part of the estuarine production reaches human mouths. The potential is nevertheless there, and, by interfering, we are throwing away the opportunity of exploiting new sources of food. On land, a crop is grown and harvested in the same field; in tidal estuaries there is constant movement and, although the harvest may be gathered in the deeper water, the primary source of productivity is centred in the marshes and mudflats. Estuaries must therefore be regarded as single units, comprising not only the mud and sand flats, but the marshes, the creeks, the open channels and the seaward approaches. If some of these components are cut off and reclaimed for agriculture, we must accept a loss of the basic energy on which much of our coastal fisheries may depend.

These chain reactions, set in motion by ill-considered drainage, are the strongest possible argument for re-appraising the present policy of 'land-improvement'. Farming has made great advances during the past century - advances which have made possible expanded population and higher standards of living but paradoxically it is these same advances which threaten what we have gained. Water and food are both essential to us and the one cannot be considered except in context with the other; if more food now implies less water in the years to come, we can look forward not to better harvests, but to drought and failure. Mankind has already ruined the fertility of large areas of the northern hemisphere through wrongful husbandry, and the deserts and dust-bowls of his making continue to encroach. Only by placing the long-term productivity of the soil above all other issues can we hope to avoid the same mistake, and in this wetlands have a natural and vital role.

Wetland Convention open to Signature

The Convention on Wetlands of International Importance, which was finalized at an intergovernmental meeting convened by the Government of Iran at Ramsar in February 1971, is open for signature at UNESCO headquarters at Paris.

Resolutions from the UN Conference on the Human Environment (Stockholm, June 1972), the IUCN 11th General Assembly (Banff, Canada, September, 1972), and the Second World Conference on National Parks (Grand Teton, Wyoming, USA, September, 1972) urge nations to sign and ratify the Convention.

States that adhere to the Convention designate suitable wetlands for inclusion in a List of Wetlands of International Importance. They undertake to conserve and manage these wetlands, keeping in mind their international responsibilities. In the event that because of urgent national interest, a State removes a wetland from the List or reduces its size, it undertakes to compensate for this by protecting additional equivalent wetland areas. The States also agree to cooperate in various other aspects of wetlands conservation.

IUCN hopes that the Convention may be brought into effect as soon as possible; this requires seven States to adhere to the Convention.

Directory of Wetlands of International Importance

Six international agencies are cooperating with IUCN in the compilation of a Directory of Wetlands of International Importance. The agencies are: Food and Agriculture Organization (FAO), United Nations Educational, Scientific and Cultural Organization (UNESCO), International Biological Program (IBP), International Council for Bird Protection (ICBP), International Waterfowl Research Bureau (IWRB), and Societas Internationalis Limnologiae (SIL).

There are many objectives in making this inventory but the principal one is to provide a basis for the conservation of wetland ecosystems throughout the world.

It is linked with three major wetlands projects: MAR, AQUA and TELMA. The loose-leaf Directory will provide an up-to-date reference but will be supplemented by periodic issue of separate lists of sites relating to each of these projects.

Project MAR covers the conservation and management of temperate marshes, bogs and other wetlands. This project was launched at the MAR Conference (1962) under the joint sponsorship of IUCN, ICBP and IWRB.

Project AQUA is concerned with the conservation of aquatic habitats (lakes and rivers). The sponsoring bodies are SIL, the Commission on Ecology of IUCN, and the Freshwater Productivity Section of IBP.

Project TELMA is for the conservation of all actual or potential peat-forming ecosystems. This project was launched at a Technical Meeting in June 1967, under the joint sponsorship of UNESCO, the PT and CT Sections of IBP and the Commission on Ecology.

Initial concentration in compiling the Directory will be on MAR sites in north Africa and south-west Asia, but data collection on other regions will also be undertaken as opportunities arise.

Criteria for the selection of wetlands of international importance and a classification of wetlands types have been evolved for use in the compilation of the Directory.

India launches tiger conservation project

India has launched Project Tiger, a programme to save the animal from extinction.

Dr. Karan Singh, Minister for Tourism and Civil Aviation, is Chairman of the Steering Committee for Project Tiger. Project Director is Mr. K. S. Sankhala, a member of the Indian Forest Service and former Director of the Delhi zoo. The work will concentrate on the extension, consolidation and management of nine existing wildlife sanctuaries where tigers are still found. Anti-poaching measures will be strengthened and scientific studies of the tiger and its ecology carried out to improve conservation management.

India is expected to work in cooperation with Nepal, Bhutan and Bangladesh where small surviving populations of the Bengal tiger are found.

The World Wildlife Fund has pledged itself to raise one million dollars to assist the programme but the bulk of the funds will be provided by the Indian Government. IUCN is providing scientific and technical assistance.

New parks in British Columbia

In Canada, British Columbia's government has authorized expenditure of nearly half a million dollars to create two additional provincial parks and to increase the area of a third park. One park will protect Brandywine Falls on the Cheakamus River north of Vancouver. A smaller park on the southwest corner of Cortes Island in the Strait of Georgia will be established, and 315 a will be added to Cape Scott Park on the northern tip of Vancouver Island.

Book Reviews

Fosbrooke, Henry (1972): *Ngorongoro, the Eighth Wonder*. A Survival Special on African Wildlife (ed. Colin Willock), London: André Deutsch, 240 pp., £ 3.95.

This book fills a long-felt need: if the claim in its title is justified, and it is certainly borne out by the story, that story needs to be told in plain language and in a way that can be used for reference and inspiration by all who have a responsibility for and interest in the Eighth Wonder of the world. No one could be better qualified for such a task than Henry Fosbrooke, whose experience and love of the area, its peoples and all it contains now goes back nearly 40 years. The very depth of his experience does perhaps mean that only someone who is familiar with the physical features and various problems of the area will be able to follow some of the byways of the discussion, but for everyone there is much to be enjoyed and learned.

The fact that most of the book had been written by the beginning of 1969 (though a postscript was added in July 1971) is no derogation of its value. One of its main themes is the extraordinary dynamism of the Ngorongoro ecosystem, demonstrated not only by the broad sweep of its history but also by many nice examples such as the reaction of the famous lion population to the 1962 plague of *Stomoxys* flies. Even if the biological, social, economic or political situation today differs considerably from that of five years ago, it is rooted in the past and a better understanding of that past, and of the basic ecology of the area, is still the key to future management.

Naturally the most satisfying chapters tend to be those which stem directly from the author's own researches, whether, in his early days, into the archaeological sites and the Masai social order or, as Conservator of the area in 1963-65, into the ecological and socio-economic conditions of its survival. Chapters which are more dependent on the work of others or on documentary sources, are constantly enlivened by shrewd comments and personal recollections and, not least, by an evocative selection of colour and black-and-white photographs, the majority taken by the author himself.

Some of the details and arguments are of course open to criticism: it is a pity, for example, that no botanist was asked to check the plant names, several of which are rather absurdly misspelt; and in the chapter on the activities of 'modern man' - the most difficult because of the closeness of the events and the much greater quantity, and sometimes inaccessibility, of the material - some significant points have been totally missed, such as the findings of the 1945 survey which rejected plans for agricultural development of the northern Crater Highlands. Nevertheless the author's commonsense and frank approach to problems very effectively disposes of many misconceptions, like those which surrounded the rhino-killings of the early 'sixties, and even where there is still room for doubt or disagreement, always gives food for thought.

H. F. I. Elliott

Ruhle, George C. (1972): *The Ruhle Handbook: Road and trails of Waterton-Glacier National Park*. Minneapolis: John W. Forney, 164 pp. n.p.

The Ruhle Handbook to Waterton-Glacier is a tour guide to, a history of and a naturalist's handbook for an area of outstanding scenic beauty and scientific interest in North America. It is written with the warmth of long acquaintance. The author's love for the wilderness shines through his description of the geology of the region and his lessons on the plant and animal communities. Anecdotal accounts prevent it from becoming pedantic. It is ideal for the motorist, but would be even more valuable for the backpacker if published in a smaller format.

Harry A. Goodwin

Antarctica (1972): SOX 219: recordings published by Saydisc Specialized Recordings Ltd. The Barton, Inglestone Common, Badminton, Gloucestershire, England. £3.15.

This is the first time that a record has been reviewed in the IUCN Bulletin. The record comes in a double sleeve, the second fold holding a 20-page large-format booklet containing an introduction by Sir Vivian Fuchs, the Director of the British Antarctic Survey, a foreword by Nigel Sitwell, editor of 'Animals' magazine, and a text describing the recordings. Finally there is the text of the Antarctic Treaty 1961, and the Agreed Measures for the Conservation of Antarctic Fauna and Flora.

There are 16 tracks on the record, some presumably being straight run recordings, but others have been skilfully edited so as to incorporate a wide diversity of calls. The sounds include ice movements, fur, Weddell and elephant seals, huskies, emperor and Adelle penguins, and a number of other species of birds. All the recordings are remarkably clear, the only one that does not quite come off being that of a rough sea at Adelaide Island, which is a confused jumble of sound. In each case the place and date of the original recording is given in the booklet together with its duration. As Sir Vivian says in the introduction, "The beauty of Antarctica, majestic scenery, the colour enhanced by a setting sun, its life, even its blizzards, have been presented to us pictorially. Now in these recordings and the accompanying booklet all can hear and learn about the sounds that enable Antarctic species to communicate. These are the languages of the far south, the cries of warning, joy or anguish, that have been spoken unheard and unrecorded for countless millenia." It is a splendid record, and has the added advantage that its purchase will aid the World Wildlife Fund, for all royalties are being made over to that organization.

J. Lucas

Hillaby, J. (1972): *Journey through Europe*. London: Constable, 272 pp., £3.00.

After his walk through Britain John Hillaby felt the need to accept an even greater challenge and chose to walk across Europe from the North Sea to the Mediterranean. A wider range of cultures and life styles is evident here than in *Journey through Britain*, and perhaps this helps to make the book even more interesting and entertaining. As he walks, Hillaby discourses amiably on the habits of man, plants, birds and animals, takes an interest in geology and archaeology, and muses on how things are and how they come to be that way. He discusses, too, problems of conservation, the spraying of vines with organo-chlorines in Luxembourg from helicopters, and the attempts to exterminate foxes in the Ardennes.

J. Lucas

Walker, Michael J. (ed.) (1972): *Sport fishing, USA*. Washington, D.C., U.S. Department of the Interior, Bureau of Sport Fisheries and Wildlife, 464 pp., US\$ 10. (May be ordered from the Superintendent of Documents, US Government Printing Office, Washington, D.C. 20402.)

A bouillabaisse of fact and story - all about fishing in the USA. It has brought together the best of many authors to present a variety of subjects organized under such general heading as The fish; The fisherman; Man tries his hand; and Problems to overcome.

Managing Editor Dan Saults, Illustrator Bob Hines, and Photo Editor Rex Gary Schmidt have produced a notable volume on the aesthetics, art and science of fish and fishing. It is well laid out, well written and superbly illustrated. The binding is durable, so that overall it is fitting for the most selective of connoisseurs of books on fishing. There is something in it for everyone who has an interest in fishing.

Harry A. Goodwin

Idrobo, J. M., Editor (1970): *II Simposio y Foro de Biología Tropical Amazónica*. Bogotá, Editorial PAX. 496 pp. Price US\$ 5.00 (Obtainable from: Office of Secretary Treasurer, Association for Tropical Biology, c/o Smithsonian Institution - MNH 368, Washington, D.C. 20560, U.S.A.).

This book includes 40 papers given at or otherwise associated with two meetings held in the Colombian Amazonian towns of Florencia and Leticia in January 1969.

The papers are extremely heterogeneous. Geographically they encompass a wide region and include many areas beyond the Amazon. Topically they refer to agriculture, genetics, taxonomy of plants and animals; plant, animal and soil ecology, limnology, climatology, wildlife exploitation, forestry, anthropology, organizational, recreational and other aspects. The papers are written mainly in Spanish with some in English and Portuguese.

From the conservation aspect, several papers are worth mentioning. Mike Tsalickis, renowned as one of the main exporters of wild animals from Leticia, argues that "the exploitation of my business should be considered as a contribution to the welfare of humanity since almost all the animals are exported for scientific purposes and to a lesser degree to zoos". The following paper by Plutarco Cala, however, raises an accusing finger at what he labels non-controlled exploitations which are heavily depleting this resource. Another paper by Julia Allen Field makes a plea to stop the ludicrous and murderous trade to zoos where, in the case of the rare 'cock-of-the-rock' birds, it is believed that no fewer than 50 die for every one that survives.

F. R. Fosberg, with the original title of "Diversity and Cooperation among Conservation Organizations", pleads for a better understanding among conservation groups, suggesting that each one has a role to play; that each, indeed, has its 'ecological niche' in the conservation movement.

Bruce Bandurski and Maria Buchinger, in what is clearly the longest paper (71 pages, 158 authors cited), discuss various aspects of man's relationship with nature under the title: "More Recreation: Implications for the Tropical Ecosystem". Most examples and citations, though, come from the United States and even Africa, and have little bearing on the Amazonian area.

An important paper by the well-known limnologist, Harald Sioli, points out the poverty of Amazonian soils and the very real unlikelihood of ever achieving agricultural prosperity in that region.

R. S. Cowan suggests a series of guidelines for biological field studies as part of a code of ethics to be adopted by biologists - it may well be considered as a remedy to the rampant 'scientific imperialism' that today besieges so many tropical biotas.

Arturo Gómez-Pompa and other Mexican botanists-ecologists offer some of the results of their research in tropical lowland forests, particularly in successional studies.

Finally, Horacio Calle makes an eloquent but much too short survey of the doomed Indian cultures linked with tropical forest, certainly one of the most tragic processes brought about by the present 'opening-up' of the region.

The book is undoubtedly a valuable contribution, but one has the impression that it would have yielded much greater benefits if some grouping, indexing, and possibly weeding out of unnecessary material had taken place. However, if the difficult conditions under which the Editor worked are taken into account, one can only congratulate him for producing such a volume at all, particularly for an area where there is at present so little information. No wonder conservationists have such a hard time convincing decision-makers that they should leave the Amazon alone when the knowledge for any successful intervention is so blatantly lacking.

Gerardo Budowski

Man in the living environment (1972): A report on global ecological problems. Madison/London: University of Wisconsin Press (published for the Institute of Ecology). 288 pp., cloth £6.00; paper £1.25.

This report of the Workshop on Global Ecological Problems held by the Institute of Ecology in 1971 presents the collective analysis of important problems of environmental quality and management by a group of ecologists. The workshop grew from a desire to transmit the ecologists' view of such problems to the 1972 UN Conference on the Human Environment in particular and to concerned people in general. It was patterned after the Study of Critical Environmental Problems (SCEP), sponsored by the Massachusetts Institute of Technology and published in the report "Man's Impact on the Global Environment". The ecological section of that report was the starting point of this Workshop.

The planning group organized the Workshop around four major topics: biogeochemical cycles of elements essential to protein production; ecological constraints on man's use of land, particularly as a result of vegetation-soil interaction; terrestrial food webs, diversity and stability; and man's impact on aquatic systems, particularly the coastal zone. A number of obviously important ecological problems were not considered in depth by the Workshop, and others, such as pollution, were not treated separately but only as one of the factors influencing the living environment of man.

The main chapters of this published report fall under five headings: ecology of the human population; cycles of elements; ecosystems for human benefit; ecological aspects of land management; and management of aquatic resources. Within each chapter, sub-topics are discussed and recommendations are made.

J. Lucas

Shelton, Napier (1972): *Saguaro National Monument, Arizona*. Washington, D.C., U.S. Department of the Interior: National Park Service. 98 pp. US\$ 1.25. (May be ordered from the Superintendent of Documents, US Government Printing Office, Washington, D.C. 20402.)

Saguaro is a beautifully illustrated account of the natural history of an area which has been set aside to preserve the forests of giant saguaro cactuses. This region is where the Sonoran Desert extends into Arizona from Mexico in the south. The book tells the story of its plant and animal life, and the everlasting rhythm of nature found in this harsh environment.

Harry A. Goodwin

Myers, Norman (1972): *The long African day*. New York: The Macmillan Co. and London: Collier-Macmillan Ltd., 404 pp. Photographs by Author. US\$ 25.00.

The Long African Day is a beautifully produced and well-written book that sheds new light on many of the controversies surrounding the proper management of the lands, resources, and wildlife of East Africa. The photographs alone will make the book well worth-while and should help establish Norman Myers, place in the first rank of wildlife photographers. However this is not just another coffee table book. Using the device of discussing species, groups of species, places, and phenomena under separate headings, the author reviews much of the recent research on African wildlife and presents his own conclusions on its significance. The problems with elephants, the behavior of naked mole rats, the misbehavior of tourists, the cropping of wildlife in and out of national parks, the use and misuse of fire, spotted cats and the fur trade are among the many topics to which Norman Myers gives his attention. Even those who are well read in African wildlife literature will find new ideas in this book. They may not always agree with Mr. Myers' conclusions, but they must keep their wits sharpened in order to argue back successfully. It is unfortunate, however, that the high price of the book - understandable in view of its size and quality - will keep it out of reach of those who would otherwise benefit from reading it.

Raymond F. Dasmann