

PROCEEDINGS  
OF THE  
LATIN AMERICAN CONFERENCE  
ON THE  
CONSERVATION OF RENEWABLE NATURAL RESOURCES

Organised by IUCN and  
Sponsored by UNESCO and FAO

CONSERVATION  
IN  
LATIN AMERICA

San Carlos de Bariloche, Argentina



Published with the assistance of UNESCO

International Union  
for Conservation of  
Nature and Natural  
Resources

Union Internationale  
pour la Conservation  
de la Nature et de  
ses Ressources

Morges, Switzerland, 1968

The International Union for Conservation of Nature and Natural Resources (IUCN) was founded in 1948 and has its headquarters in Morges, Switzerland; it is an independent international body whose membership comprises states, irrespective of their political and social systems, government departments and private institutions as well as international organizations. It represents those who are concerned at man's modification of the natural environment through the rapidity of urban and industrial development and the excessive exploitation of the earth's natural resources, upon which rest the foundations of his survival. IUCN's main purpose is to promote or support action which will ensure the perpetuation of wild nature and natural resources on a world-wide basis, not only for their intrinsic cultural or scientific values but also for the long-term economic and social welfare of mankind.

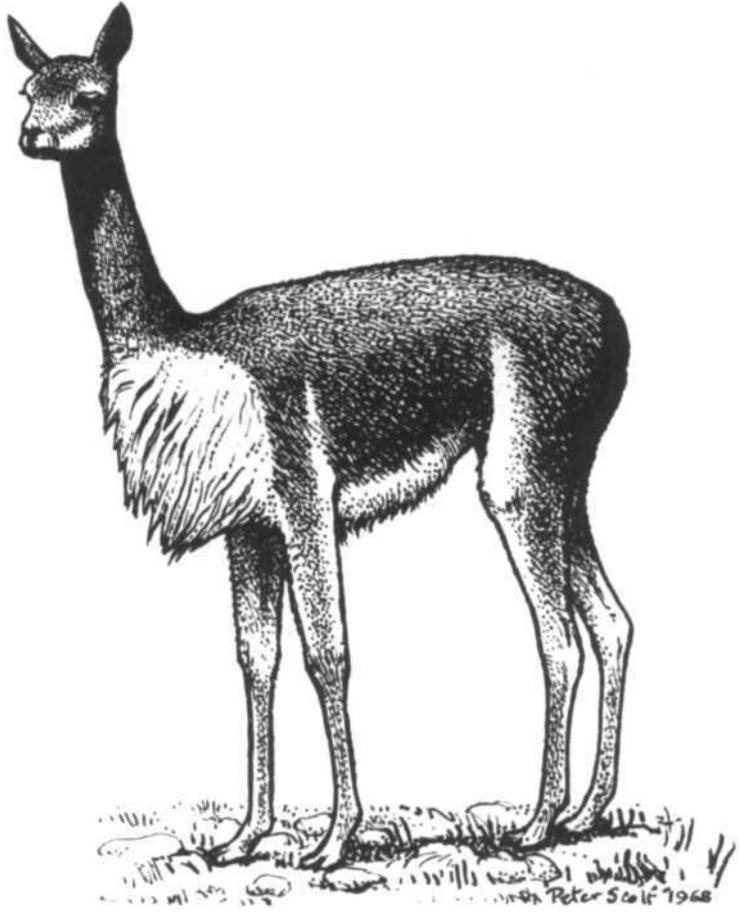
This objective can be achieved through active conservation programmes for the wise use of natural resources in areas where the flora and fauna are of particular importance and where the landscape is especially beautiful or striking, or of historical, cultural or scientific significance. IUCN believes that its aims can be achieved most effectively by international effort in cooperation with other international agencies such as UNESCO and FAO.

The World Wildlife Fund (WWF) is an international charitable foundation for saving the world's wildlife and wild places. It was established in 1961 under Swiss law and shares joint headquarters with the International Union for Conservation of Nature and Natural Resources (IUCN). Its aim is to support the conservation of nature in all its forms (landscape, soil, water, flora and fauna) by raising funds and allocating them to projects, by publicity and the education of the general public and young people in particular. For all these activities it takes scientific and technical advice from IUCN.

Although WWF may occasionally conduct its own field operations, it tries as much as possible to work through competent specialists or local organizations.

Among WWF projects financial support for IUCN and for the International Council for Bird Preservation (ICBP) have highest priority, in order to enable these bodies to build up the vital scientific and technical basis for world conservation and specific projects. Other projects cover a very wide range from education, ecological studies and surveys, to the establishment and management of areas as national parks and reserves and emergency programmes for the safeguarding of animal and plant species threatened with extinction.

WWF fund-raising and publicity activities are mainly carried out by National Appeals in an number of countries, and its international governing body is made up of prominent personalities in many fields.



VICUNA



PROCEEDINGS OF THE  
LATIN AMERICAN CONFERENCE  
ON THE  
CONSERVATION OF RENEWABLE  
NATURAL RESOURCES

SAN CARLOS DE BARILOCHE, ARGENTINA

27 March - 2 April, 1968

Organized by I.U.C.N.  
and  
sponsored by UNESCO & FAO

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for Conservation of  
Nature and Natural  
Resources

Union Internationale  
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de la Nature et de  
ses Ressources

Morges,  
Suisse - Switzerland  
1968

## INTRODUCTORY NOTE

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The Latin-American Conference on the Conservation of Renewable Natural Resources, took place at the Hotel Llao Llao near San Carlos de Bariloche in Argentina, from 27 March to 2 April 1968. The site of the Conference adjoining the spectacular National Park of Nahuel Huapi, the nucleus of which had been presented to the State by a loyal and far-seeing citizen, was commended by all as being ideal for such a gathering. It was organized by IUCN and co-sponsored by UNESCO and FAO, both of whom sent strong delegations, and under the auspices of the Government of the Republic of Argentina, to whom IUCN's thanks are particularly due. The Department of State for Agriculture and Livestock was responsible for the running of the Conference. The success was largely due to the Organizing Committee, under its Chairman Ing. Agr. I.N. Costantino, as well as to the technical skill and hard work of Señor Carlos E. Firpo, Secretary-General of the Conference and his assistants. It was attended by 155 participants from 13 countries in Latin-America, 4 other countries and 10 international organizations.

The Conference provided an opportunity for discussing how best to achieve successful cooperation at the local, national, regional and international levels, to support the growing interest in conservation in Latin-American countries and organizations, and to help promote the wise use of the renewable natural resources of Latin-America. These resources are valuable for economic, cultural, scientific and recreational purposes, and they affect the quality of life and the natural environment on which the health and welfare of future generations must depend. The Conference emphasized the similarity of problems in the various States and stressed the need for cooperation, both national and international. This was made evident in a Proclamation known as the Nahuel Huapi Manifesto, which was adopted unanimously at the end of the Conference.

This volume in IUCN's New Series contains the Proceedings and Papers of the Conference. Many of the Papers were presented in Spanish and it has not been possible to provide English translations of all. When an English translation was not available, the summary which was prepared at Bariloche and supplied to the participants before the session, is included. A Spanish Edition in which all papers will be included in full will also be published.

E.J.H. BERWICK

Morges, 10 October 1968

Secretary General IUCN

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FOREWORD BY

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THE PRESIDENT OF THE INTERNATIONAL UNION FOR CONSERVATION OF

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NATURE AND NATURAL RESOURCES,

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MR. HAROLD J. COOLIDGE.

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There could not have been a more wonderful and natural setting for the Latin-American Conference on the Conservation of Renewable Natural Resources than the Hotel Llao Llao with the backdrop of the beautiful lakes and the towering mountain landscape of Nahuel Huapi National Park, a shining jewel in the park system of Argentina, and a fitting location for the most generous Argentine hospitality.

As President of the International Union for Conservation of Nature and Natural Resources, and for personal reasons, I had been looking forward to participating in the Bariloche Conference, particularly for the pleasure of meeting a large number of Latin-American conservationists with whom I have been corresponding over the years, and to meet a number well known to me because of their effective conservation work. This first IUCN Regional Conference in Latin-America, jointly sponsored by the United Nations Educational, Scientific and Cultural Organization (UNESCO), Food and Agriculture Organization (FAO), and the International Council for Bird Preservation (ICBP), presented these organizations with both a challenge and a responsibility. While I could not attend the Conference, it was especially gratifying to me that the Chairmen of our IUCN Commissions, our Secretary-General, and almost the entire professional staff from the Union headquarters in Morges did attend, and will henceforth be better able to coordinate various aspects of the Union's conservation work in Latin-America.

For seven days and nights close to 150 distinguished delegates, experts, and observers from all parts of Latin-America, as well as from the sponsoring organizations and other organizations devoted their time and efforts to discussions with scholars and scientists of significant subjects dealing with a wide range of topics related to conservation of natural resources. This meeting was rightfully classified by the Chairman of the Organizing Committee as a "transcendental gathering".

The Conference focused world attention more than ever on Latin-American conservation, and has given us convincing evidence that most governments of Latin-American countries have already demonstrated a genuine interest in establishing and improving sound conservation policies and practices. Likewise it has highlighted the activities of private organizations, and the personal efforts of individual conservationists actively working to achieve similar goals, including further implementation of the recommendations of the UNESCO Conference at Castala, Chile and the Inter-American Specialized Conference To Deal With Problems Relating To The Conservation of Renewable Natural Resources In The Western Hemisphere, which was held in Mar del Plata, Argentina, by the Organization of American States in October 1965.

These Proceedings of the Bariloche Conference clearly indicate the responsibility that now rests with IUCN and other international organizations, the Latin-American governments, and private conservation organizations to render future technical and financial assistance for the conservation of renewable natural resources. We hope that the spirit of the Nahuel Huapi Manifesto will be carried on, and that the recommendations adopted by the Conference will be implemented.

Let us also hope that the Bariloche Conference will be a significant landmark in the development of conservation not only in Latin-America, but that its results will also contribute to the welfare of the world's biosphere.

The IUCN is most grateful to the Government of Argentina for hosting this important conference. Special thanks are expressed to H.E. Rafael Garcia-Mata, Secretary of the Ministry of Agriculture and Livestock, and to the members of the Conference Organizing Committee under the able Chairmanship of Ing. I.N. Costantino, who was aided by Secretary-General Carlos E. Firpo, and Secretary Maria Buchinger. They did an outstanding job of handling the arrangements for this most successful conference.

3 July 1968

Harold J. Coolidge  
President, IUCN

LATIN-AMERICAN REGIONAL CONFERENCE ON CONSERVATION OF RENEWABLE

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NATURAL RESOURCES

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SAN CARLOS DE BARILOCHE - ARGENTINA

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27 March - 2 April, 1968

NAHUEL HUAPI MANIFESTO

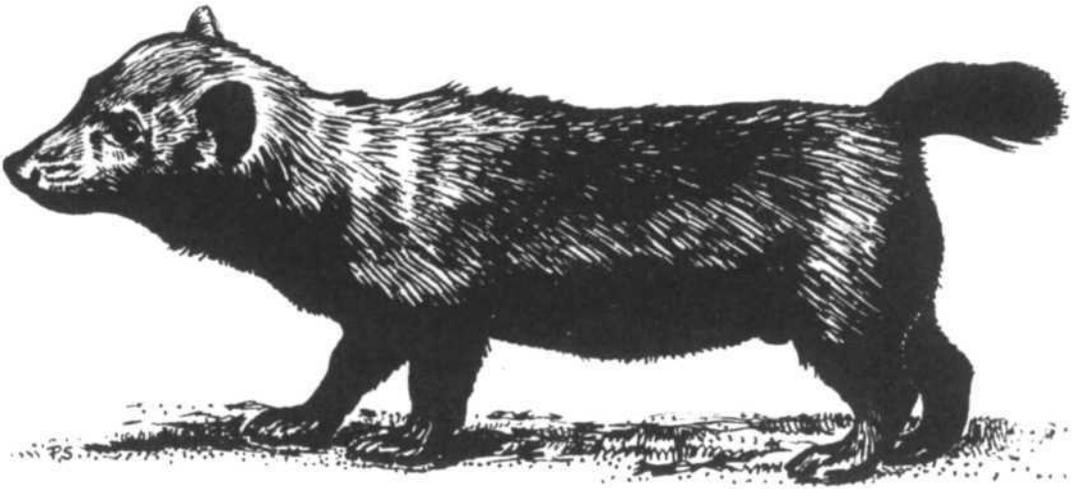
RECOGNISING that accelerated population growth, coupled with greater aspirations for a better life, as a result of technical advances, greater leisure and improvements in transportation and communications, results in heavier demands on renewable natural resources,

RECOGNISING that these renewable natural resources, the air, the water, the soil, the flora and the fauna, are being endangered by man's unwise use, although they are his priceless heritage, held in trust for future generations,

THEREFORE the participants of the I.U.C.N. Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

EXPRESS THEIR DETERMINATION to work together, within the framework of a common philosophy, to safeguard their renewable natural resources by means of the correct application of science and technology, joint policies and coordinated legislation, aiming at the same time to achieve the highest quality of living for all.

Nahuel Huapi, 2 April, 1968.



BUSH DOG

## OPENING SESSION

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Wednesday 27 March, 1968 : Morning Session

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The Chair was taken by Dr. F. Fraser Darling, Vice-President of the International Union for Conservation of Nature and Natural Resources.

1. Adoption of the Agenda for the Conference.

The provisional agenda was adopted unanimously.

2. Election of Officers for the Conference.

The Chairman proposed that the representative of the host country, His Excellency Ing. Agr. Rafael Garcia-Mata, Secretary of State for Agriculture and Livestock for the Republic of Argentina, be requested to be the President of the Session. This was accepted with acclamation. His Excellency Ing. Agr. Rafael Garcia-Mata then took the Chair. The Leaders of the State Delegations were elected Vice-Presidents of the Conference.

3. Inaugural Addresses.

3. 1. Address by the Chairman of the Organizing Committee,  
Ing. Agr. Italo N. Costantino.

Your Excellency, Excellencies, Ladies and Gentlemen,

As Chairman of the Organizing Committee of the Regional Latin-American Conference on Conservation of the Natural Renewable Resources, I am honoured to greet and welcome the distinguished delegates, experts and observers attending this transcendental gathering, and through you, to convey our gratitude to all the governments of the countries represented by you, for the great interest and importance which they attach to the discussion of the different topics included in the agenda, which, starting today and through the next seven days, will be discussed by distinguished scholars and scientists, concerned with the problems of conservation of the renewable natural resources.

It is my duty, and indeed a pleasure, to thank the Argentine Government, and in particular the Department of State for Agriculture and Livestock for the extensive understanding of the fundamental decisions which must be adopted by Latin-America to reach up-to-date levels of progress. It has not only organized and sponsored the realisation of this Conference, but also contributed, with the support of its main branches and collaborators, to attain its objectives. Our gratitude must also be given to FAO, UNESCO, and all the other official and private International

Organizations which, with great interest and assistance, have contributed to the realisation of this meeting, where success is assured by the outstanding records of the participants.

The Latin-American Committee of National Parks, at their third meeting held in Madrid (Spain) in 1966, unanimously approved a recommendation requesting the IUCN to organize a Regional Latin American Conference, to consider and analyse the various problems related to the resources of habitats.

Again in Lucerne (Switzerland, 1966) and finally at the meeting of the Executive Committee of the IUCN, which took place in November 1966 in Morges (Switzerland), the holding of this Conference was approved, in view of the previous recommendation and others proposed in previous Symposia and Congresses with warm and unanimous support of all the members present. The Conference, which we inaugurate today, should include in its agenda topics and subjects which concern not only single nations but two or more. The approved agenda has taken into account that purpose and although it is true that numerous aspects of the natural renewable resources have been excluded, it is not in disregard for their importance and relevance, but only because of lack of time to consider them.

In any case, we are sure that when analysis and discussion of the subjects which are included take place, it will be possible to cover other aspects closely related to them, since you all realise that the natural renewable resources maintain among themselves strict interdependence and interrelation which is necessary to respect if we do not want to break or disturb the balance which is the reason for their existence and perpetuity.

This Conference gives us the chance to reap the benefits which will no doubt contribute to the maximum use of the potential values in this part of the world. It is our duty to emphasise highlights, no longer general, but practical and effective, which do not result in good intentions or good purposes only, but which will assure conservation, that is to say, the wise and prudent use of the natural renewable resources for the benefit of present and future generations. The history of America shows us the immense and costly errors committed through the wrongful and irrational use of valuable resources which nature has so generously spread over its surface; this destruction need not have happened, if the ecological knowledge had been respected, observed and applied. In spite of this devastation, it is well known that in Latin-America the largest reserves of the different natural resources of the world can be found, and that although a large amount have been seriously affected, there are still great reserves which remain more or less unaltered.

It is urgently necessary therefore to take measures to restore, replace and manage the former; as for the latter, which remain in primeval conditions, it is essential to adjust their use to the conservationist norms that each case requires. There is no longer any doubt that the conservation of natural renewable resources becomes not only a necessity, but an imperative obligation, when larger and better nourishment of a population in constant growth is taken into account.

Agricultural farming, cattle breeding, and life itself, will become more and more difficult as time goes by, if there is no planning on conservation principles for soil, water sources, forests, fauna, etc, in one word, the base on which it is possible to guarantee sufficient food for humanity.

Each of you from all over the world, can, no doubt, give examples of the great and serious damage caused by the improper use of the soil, the deficient management of the waters, the destruction of forests, the extermination of fauna, etc. You are also aware that in spite of the continuous insistence for conservation and the existence of laws and standards to that end, natural renewable resources are declining day by day in their dispersal, in their quality, and in consequence, in their benefits. This is why conservation has become one of the main subjects of our time, and we are sure that more and more government officials will be concerned with its development, for only thus can they assure a life full of prosperity and welfare for their people.

Ian McTaggart Cowan, in a lecture at the "Smithsonian Bicentennial Celebration", said among other things: "Increasingly the combined forces of violent technology and population boom, confront conservation with problems more and more difficult to resolve. We are increasingly contaminating the earth, the air, and the oceans; the rivers are turned into sewers and we spread our refuse biologically undisposible, along the most remote shores. An urgent call is made to our talents and our personalities in response to the need for the elimination of these refuse-materials which are dumped by civilization. To many parts of the world the most elementary conservationist concepts have not even penetrated. Fire and destructive agricultural practices produce in these parts a lack of balance between the human nucleus and its food resources in quantity and quality. These systems, previously balanced and in a favourable productive state, become degraded and useless; whole biotic associations are ruined and disappear for ever. We have not yet started to guess at a satisfactory solution to this fascinating as well as vital problem, related to man as part of a closed and unitary ecosystem. In a very realistic way we are inhabitants of a capsule into which nothing penetrates except solar energy".

From the very first moment when man started to integrate nature or his environment he began to perform an outstanding task which tended to dominate the other components of his environment, gradually provoking substantial changes and altering the laws of life for other species. This participation of man, which often ignored and forgot ecology, modified, transformed and often destroyed vast regions but yet, in the 19th century, gave rise to the birth and development of a great conservationist crusade, to educate and qualify mankind, so that all should understand that man was part of the ecological environment and anything he did to modify or destroy it, might sooner or later be detrimental to his survival.

The conservation of the natural renewable resources of Latin-America is clearly urgent and I am sure that anything done in this cause will contribute to a solution to economic and social problems, which now greatly concern all the countries. Solutions must be integrated in the development and welfare of each country, and on them will depend, directly and indirectly, how the countries are to be managed in the future. This is the patrimony that nature gave to each one. Conservation involves the maintenance of the natural harmony within the boundaries of national territory and should be fundamental to all wise and long-range governmental policy.

Ladies and Gentlemen : I wish to take this opportunity to extend my gratitude to that man who has distinguished himself by his faith, enthusiasm and the support which he always granted to the scholars and conservationists of Latin-America, the President of IUCN, Dr. Harold Coolidge, who is unfortunately unable to be with us today, and to whom we wish a speedy recovery. Dr. Coolidge's document, "International Protection of the Natural Renewable Resources" published in 1939, said : "The conservation of the natural renewable resources, especially of the native flora and fauna, is of vital importance for all American Republics".

Since then, Dr. Coolidge has continued to work hard at every opportunity, helping and contributing to the conservationists' task and, as soon as he became President of IUCN through his personal action, the Executive Committee of that Organization, arranged the meeting of this Conference; to him we owe our warmest gratitude.

Finally, I reiterate again, my most cordial welcome and gratitude to all those who have worked, and are working and fighting to establish in the future, clear and precise definitions for our conservationist ideals. Thank you, sir.

3. 2. Address by the Vice-President of the Union,  
Dr. F. Fraser Darling.

Your Excellency, Excellencies, Ladies and Gentlemen,

I speak today on behalf of the President of the International Union for Conservation of Nature and Natural Resources, Mr. Harold J. Coolidge, that dedicated man who inspired this Conference. You know what a wide traveller he is and how long his association with this work has been, and I feel that I should just recall a little anecdote which may show the length of time he has been at work. In 1930, he established the American Committee for International Wild Life Protection. Now in 1949, I was at the Lake Success Conference of IUCN in New York and, at a small dinner, I was asked to say something and I mentioned Mr. Coolidge's quality of persistence. No one has been so persistent in and so dedicated to wildlife conservation through the years as he has. Here once more I speak on his behalf and this is still a further 20 years of his absolutely unflagging efforts towards conservation. He, with generous help from others, started recently a Spanish edition of the Bulletin of the International Union which has come to hand even while we have been here in Bariloche; I trust that this Spanish edition will meet with your approval and that it will bind the two continents together in a greater way that it has done perhaps in the International Union in the past.

Mr. Coolidge's message in this Bulletin, I will now read to you. He says : "The increasing activities in the field of the conservation of natural resources in many Latin-American countries have impressed on the International Union for Conservation of Nature the necessity of having a Spanish edition of our Bulletin. This plan was first projected at the Caracas General Assembly in 1952, but the possibility of accomplishing it has just become a reality thanks to a contribution from a friend of the Union and to the generous offer of the Agrupacion Espanola de Amigos de la Naturaleza in Madrid. To this organization, we owe our special gratitude for offering to undertake the translation and printing of the Spanish edition.

"A number of conferences, dealing with conservation matters, the establishment of new national parks, and the enactment of new legislation in several countries are encouraging signs of the increasing interest and positive progress in Spanish speaking countries. This can help to create an exchange arrangement with other parts of the world where similar problems are being faced.

"The Latin-American Regional Conference on Conservation, which the Union is sponsoring, in cooperation with other international agencies in early 1968, will play a significant role in implementing the recommendations of previous conferences and in developing

ways of strengthening New World activities in this important field of international endeavour.

"Those who are most interested will be able to keep in close touch with the Union's programme through the Spanish edition of the Bulletin".

We have enough copies in Bariloche for each delegation to have one, and those who wish to receive this Bulletin in the future should write their name on the lists supplied for the purpose in various parts of the hotel.

This Conference, set in this superb setting in the wonderful park of Nahuel Huapi, had long been an aim of Mr. Harold J. Coolidge and he is deeply disappointed to be unable to be present. I saw him just over a week ago and it was a very great sorrow to see his disappointment at not being here. Not only is he President of the Union but also this Conference bestowed on him the honour of Honorary President. I propose that with your permission we ask the Secretary-General to despatch to Mr. Coolidge an appropriate cable of sympathy for a speedy recovery and of our best wishes for the future.

We are deeply indebted to the Government of the Republic of Argentina for the help which they have given us and for the provision of this so suitable venue for the Conference. The hard work of building the Conference step by step and paper by paper has been done by the Chairman of the Organizing Committee, Dr. Italo Costantino, and by Mr. Carlos P. Firpo who have given so generously of their time and hard work, but more especially of their expertise in organizing conferences. They have been ably backed by that international group of well-known and dedicated scientists, the members of the Organizing Committee whose names you will have seen on the programme. Many of them are with us here today, but we are deeply sorry to hear of the death of Dr. Victor Falla of Brazil in December last year. I should like to thank them for their assistance in this Conference. Also may I thank Dr. Maria Buchinger, the Secretary of the Conference, for all she has done not only for this Conference but also for IUCN's Latin-American Committee on National Parks which she runs with such dedication and enthusiasm.

Although you who have come here from all parts of the Americas are clearly friends of IUCN and sympathise with its aims, I should like to tell you shortly about IUCN as a background to the addresses which the Chairmen of our six Commissions will be giving this afternoon. After the first world war, the League of Nations was asked to support the establishment of a Preservation Organization (note the name, Preservation Organization), and the Office International pour la Protection de la Nature was opened in Brussels in 1934. The International Union

for the Protection of Nature was founded in 1948, following an international conference at Fontainebleau, sponsored by UNESCO and the Government of France. I may almost say that I am one of the survivors of that conference, because it is over 20 years ago and we are falling by the way one after another. But that was a tremendous occasion in which we tried to hammer out into good statute form our attitudes towards the conservation of nature although at that time "protection" was the word preferred. Some of you may remember that the French jurists on that occasion were invaluable in getting the logic into the Statutes of the Union; our first Secretary-General was appointed on that occasion, and it is a particular pleasure to me to see him right in front of me, now; would he please rise for a moment? Dr. Jean-Paul Harroy. He too has survived the 20 years and is now President of the International Commission on National Parks in the Union. He has been an indefatigable worker through these years.

Well in 1956, the idea of conservation rather than protection had come through, as it were, and in the meeting we had in Edinburgh in 1956, the title of the Union was changed to the International Union for Conservation of Nature and Natural Resources. It was seen that the animate resources of the world were equally our interest together with the protection of what might be called the more interesting species of earlier days.

Now IUCN, as it is generally called, or UICN, depending whether you are Latin or Anglo-Saxon, is an independent international body whose membership comprises States, Government Departments and private Institutions as well as international organizations. Its present membership of 25 Governments and 225 Organizations from 67 countries makes it globally the most widely representative agency in the international conservation field. IUCN represents those governments, organizations and persons who seek objective solutions to man's modification of the natural environment through the excessive exploitation of the earth's natural resources, upon which the very foundation of our world survival remains. Since the founding of IUCN, the importance of conservation has become increasingly recognised on both national and international basis. Conservation has reached the stage of general acceptance and various governments and international organizations are now developing truly large-scale conservation oriented plans. The world conservation climate has greatly changed in these 20 years, since IUCN was established.

If the Union is to give the much needed central leadership in international conservation, it must adapt the scope and organization of its operations to meet these new conditions and seek a firm financial basis for continuing its operations. On that last score, may I say that successive Presidents of the Union and the immediate past President, Professor François Bourliere, on my left, he and both before him, and since, have not ceased

working toward this firm financial basis. We work now on a long scale plan, that we hope will bring what we might call the established finance for the Union to work in the future rather than on the rather day-to-day basis which it has to do at the moment. I think this is a moment when I should also mention the World Wildlife Fund, which was originally conceived to be the funding agency of IUCN and I may say that it is now the largest individual contributor to IUCN's activities. But, in addition to giving this money to us to something over 40% of our total exchequer, the World Wildlife Fund has given money to definite projects in various parts of the world on its own account.

Those are the points I more or less had to mention as a matter of necessity but I would like to add a few words from my own heart on this meeting. Those of us who are naturalists, start being naturalists at a young age; we are rather a trial, I think, to our parents at that early age, but that was when I first read works by Darwin on his voyage in the Beagle and Waterton's travels in South America, and of course I had copies of Bates and of Wallace, and being British I had remotely heard of Humboldt, but he came more and more into my thinking at a rather later age. Now these British men of an earlier age, were fascinated by South America. They came again and again and have left us these wonderful records of those early days of the 19th century and what a wonderful South America it was! It inspired them in their natural history and, I think, South America pre-eminently has inspired much of the biological thought of the last century and a half. Take Darwin, after all, his association with South America was fundamental to his later work and the theory of evolution. How glad he would be now to see the Foundation in the Galapagos and the work which we hope will be done there in the future. Now, Waterton was an English squire. He owned a large park in Yorkshire round which he built a high stone wall and made it the first wildlife sanctuary in Britain. That was about 1840-50 and we would perhaps smile a little at the attitude then, that you build a high wall round a park and that that made it into a wildlife sanctuary. We know now how much broader our notions of conservation of wildlife are, that the best walls are those within our hearts if we feel that way; then we do not need the physical walls.

National parks and reserves of today, are in a much more scientific setting and are inspired by science as much as by any sentiment towards conservation. In the last 25 years, particularly I think, it has come to our realisation that man is the dominant animal on the face of the earth. He is no longer, as it were, fighting against nature in order to survive and to persist. Now he realises that if he is to survive and persist, he must do it by cooperation with nature and that man himself is his greatest enemy; that by our pollution of atmosphere, of water and of soil, we are laying the present foundations for our ultimate eclipse.

You see this paradox, that as soon as we have become the dominant animal, our survival is as it were endangered from within, within ourselves; cooperation with nature is in learning how not only species but communities of species, the ecosystems, live together, how they cancel out those qualities which, if left unhindered, would endanger the species. Within the ecosystem, there is a cancelling out and a living together and the community persists because of its wide variety of life and way of life.

Now this wholeness of approach is quite definitely the attitude of the International Union for Conservation of Nature and Natural Resources and I hope that the addresses of the Commissions this afternoon will demonstrate the singleness of that approach to conservation and our own survival. The question of the working of conservation I think must depend to a large extent on our establishing forthwith, before it is too late, several natural areas of the various kinds of habitat in the world that we may have these not only as repositories, as living museums to which we can return; they also are datum lines from which we can gauge the progress or the opposite in the future and they will be the workshops of the scientists in this field who, without doubt, will have a considerable influence on our survival and persistence as a species in the future.

Therefore, Your Excellency, Ladies and Gentlemen, I wish all the joy that you may wish (to quote Shakespeare rather badly I think), but if I may say, to wish you all the joy that you may wish to this Conference and for its several days of deliberation. Thank you, sir.

3. 3. Address by the Leader of the Delegation of the Republic of the Argentine, His Excellency Ing. Agr. Rafael Garcia-Mata.

Your Excellencies, Ladies and Gentlemen,

In this International Conference, where scientists coming from various countries are congregated to take part in deliberations about such interesting subjects of vast derivations, my words - in a certain way as eventual master of these Argentine parks - would not have another sense or merit than be the vehicle for a polite welcome to those who have assisted and to make public the wish that the wonderful beauties of this privileged place constitutes the best stimulation for conservation success and for the investigations that promote this conference; on its good organization I congratulate the leaders of the International Union for Conservation of Nature and Natural Resources.

In an ever faster world, the potential capacity for development increases in an extraordinary way, owing to the astonishingly modern outlook of technologists. Scientists in love with nature, with research passion and concerned for the rational use of its natural resources, are a part of the age.

Nowadays, scientists are in a curious and difficult position, practically overwhelmed by the advances that the consequences of their investigations have provoked, and by the promises of modern technology. When facing the problem that man was created by God in His image and resemblance, "primicia de sus frutos", we must choose ways to collaborate for the uninterrupted survival of creation. This conflict is hard nowadays but it has found frequent opportunities for discussion in meetings such as this of a high scientific level.

There is indeed a great possibility for the assay of thoughts and for reaching rational solutions. The population increase, the improvement in health conditions, education and other criteria that characterise modern life, present to our world such demands that the immediate development of a conservation policy which avoids the bad use of renewable natural resources becomes difficult but essential. The speed with which these changes are produced overtakes scientific knowledge of the factors controlling those resources which support human life. Thus, while we quickly advance in conservation and use of the soil, applying to agriculture advanced technology with the introduction of new fertilizers and herbicides, we discover other problems yet unknown concerned with life in the soil which suffers modifications, the effects of which are still investigated.

New types of communities which constitute the first step in increasing production, are progressively substituted by other new

species which the modern technology discovers to be more productive. Yet, at the same time, the results of other investigations show us some cases in which a return to the original communities seems to be the indicated step. Contamination of earth and water generates the biggest danger for an accelerated development of the world's potential production.

For this reason, it is time that we occupy ourselves in providing our nations with a real conscience about the importance of preserving this natural capacity for the future, to avoid providing ourselves only with material goods whose destruction and immediate use are true temptations.

We can say that in Latin-America we still have time to reconcile development programmes and their requirements with the great objectives of conservation.

History in our Latin-American countries shows examples of proclamations, some prescribed at the very beginning of the independent life of the State which give us an excellent view about their performance.

Let me remind you, simply as a sample, of the Argentine decrees of the 1820 decade, that forbade the killing of seals at the Islas Malvinas and the sacrifice of otters in Buenos Aires province, when persistent slaughter had endangered their existence.

In this Conference a paper will be presented, that reminds one also of the decrees which General Bolivar dictated at Ciudad de Cuzco in 1826, by which the killing of the vicuna was forbidden and their growing in captivity was promoted; with these two signatures the hero of liberty in so many American countries resumed the policy of conservation and development of the natural richness that this valuable species of endigenous fauna represents.

Unfortunately, the eagerness of traders who for centuries promoted conquest all over the world and stimulated discoveries and piracy, right down on their negative side to the extinction in our Islas Malvinas of the zorro-lobo and the disappearance from its coasts of the South American Fur-Seal, similar to the Fur-Seal of Alaska or of the Pribilof Islands, that almost disappeared in the North Hemisphere after the fever for hunting that followed the discovery of Behering and the trips of Pribilof, names that remain impressed in the place-names of the extreme North-East of the American continent.

Gentlemen, I do not want to go on too long; as I said at the beginning, my intention in addressing you is to salute and well-come you. Considering that will be a pleasant announcement at

at this opportunity, I do want to tell you before closing, about the project of a new organic structure for the Secretariat under my charge, which is ready for final approval; in it all the services we deal with will be grouped in four big branches, one of which, named "Conservation and Development of Natural Renewable Resources", will group those related with fishing resources of our seas and rivers, woods, national parks, hunting and conservation of fauna.

Having showed already the difficulties in the modern world for the rational action of this matter, the basic thought that has moved the Government towards this project is no other than the wish of reaching the most efficient coordination of the factors that interfere for reaching this aim.

I trust that in this way, we will travel along the ideal route chanted by the organizing institutions of this Conference.

## OPENING SESSION

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Wednesday 27 March, 1968 : Afternoon Session

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### 4. Addresses by the Chairmen of IUCN's Commissions and Representatives of UNESCO and FAO.

#### 4. 1. The Commission on Ecology

The Chairman of the Commission, Prof. F. Bourliere, asked the Secretary of the Commission, Sir Hugh F.I. Elliott, to read the prepared paper, (Paper 4/1).

IUCN's Commission on Ecology was established by Resolution No. 137 of its Fourth General Assembly, held at Copenhagen in 1954.

The original approach to the Commission's functions and responsibilities emphasised the element of Landscape Planning, for which it set up a special sub-committee a year or two later. This committee has now become IUCN's newest permanent Commission and its Chairman, who was for many years a member of the Ecology Commission, will be addressing you shortly. The main reason for the initial emphasis in the Commission's approach was that the idea of setting up a Commission on Ecology really stemmed from one of IUCN's earliest Technical Meetings, held in 1951, which recommended "scientific study of landscape as it is increasingly affected by man through such influences as hydroelectric schemes, water pollution, water diversions etc." It is interesting that this early definition of purpose was a strictly practical one, was much concerned with water development problems which still occupy a great deal of the Commission's attention, and, above all, stressed the human factor in an ecological approach to conservation, which remains one of the cardinal principles of the Commission to this day.

The terms of reference of the Commission, as laid down at Copenhagen, accordingly envisaged a permanent international body of qualified ecologists who would give "special attention to the relationship between scientific knowledge of landscapes and programmes of land management, including exchange of information, encouragement of fundamental ecological research of value in landscape preservation, and other activities contributing to the understanding and application of ecology to the practical programmes of land management and nature protection." Two years later at its Fifth General Assembly what had hitherto been called the International Union for Conservation of Nature and Natural Resources,

reflecting both the more scientific concept of the relationship between man and resources (conservation or wise use rather than protection) and also the ecological view of 'nature' or wild flora and fauna as an integral part of renewable natural resources as a whole. It is noteworthy that at the technical sessions of this Fifth Assembly, three out of the four themes discussed concerned ecological problems, both of a very broad and also of a detailed kind. Ecology had already become a major preoccupation of the Union.

The development of the Commission's activities during the next few years came increasingly under the influence of Edward Graham, of the Soil Conservation Service of the United States. One of the foremost ecologists of our time, whose masterly book, Natural Principles of Land Use, opened up a significantly new line of thought on the solution of the world's conservation problems, he became Chairman of the Commission in 1958. He guided its destinies until, in 1966, his untimely death deprived the Union of a fund of wisdom and source of inspiration which could ill be spared.

Basically, Edward Graham introduced two main developments in the Commission's work. He insisted on the importance of its function in maintaining a link at the scientific level between the Union and the international organizations increasingly concerning themselves with the conservation of natural resources, especially of course the United Nations Economic and Social Council and the two great U.N. Agencies, UNESCO and FAO, which had accorded IUCN consultative status. It was from the same point of view that he so wholeheartedly supported the concept of an International Biological Programme, first put forward in 1960, played a leading part in the events which led to its launching in 1963, and subsequently himself undertook the task of serving as the Deputy Convener of the section of the Programme concerned with conservation of terrestrial communities.

Secondly, on the organizational side of the Commission's work, Edward Graham realised that maintenance of contacts would be greatly facilitated both by the Commission's own technical meetings and also if it accepted responsibility for advising the Executive Board of the Union, and indeed any organization which requested it, on suitable subjects for technical investigation and discussion. The aim in either case would be to clarify crucial conservation problems by focussing a broad range of expert opinion on them and to fill gaps where such problems had not yet received sufficient, coordinated and constructive analysis.

Another development of the Commission's procedures worthy of mention arose from experience of the great range of ecological problems on which advice might be sought and appreciation of the resulting need for smaller specialist groups within the Commission

itself. A much more formal status, with terms of reference, was therefore given to the sub-committees, including that on Landscape Planning, to which I have already referred, and those concerned with the Ecological Aspects of Soil and Water Conservation and the Ecological Effects of Chemical Controls. To these has recently been added a Committee on 'Introductions', namely the problems which have to be faced and the policy which ought to be followed in introducing plant or animal species into areas where they are not known to have occurred naturally in historic times or re-introducing them into areas from which they have disappeared.

Turning now to the present, I think it would be useful to review the duties and responsibilities of the Commission evolved in the fourteen years of its existence and as now embodied in the Union's six-year programme. For each of the four main heads under which these may be conveniently grouped, a few examples are given of the kind of work undertaken in recent years or still in active operation.

The first duty of the Commission is to serve as IUCN's advisory body on ecological aspects of projects, whether these projects have been initiated by the Union itself for the purpose of promoting a conservation objective or are under consideration by some other organisation, at national or international level, and known or reported to be likely to affect conservation interests. The demand for this kind of advice has been steadily increasing, chiefly perhaps because of IUCN's unique status as a non-governmental body which is nevertheless supported by Member Governments. This puts IUCN in a special position to act as a bridge between official and private organizations and, through its contacts, to draw on all the experience available, without the political limitations which sometimes impede or restrict the scope of governmental enquiries or the difficulties which private organizations and individuals may meet in getting their views considered at the official level. IUCN's Commission machinery provides a convenient route for such consultations and contacts, so that references by the Secretary-General for advice on almost any conservation project or project affecting conservation can, through the members of the Ecology Commission, readily produce an informed and broad range of opinion on scientific and ecological factors which have to be taken into account.

Good examples of the kind of project which the Commission has been instrumental in promoting are those currently concerned with the conservation of waters and wetlands. The choice of these was dictated by the fact that the direct and indirect pressures on water resources have become so acute in many parts of the world that they have all too seldom been guided and controlled by a sound policy based on thorough ecological investigation. In the process, water resources, on which life itself depends, have

frequently been wasted or even lost altogether. The obvious example of this type of mistreatment of the environment is the wholesale and over-hasty drainage of wetland areas because of their intrinsic fertility, although unless great care is exercised the agricultural enterprises for which this is done may end at a level of productivity for human use inferior to that of the original undisturbed area. Hence the first project, Project MAR, launched in 1962 in collaboration with the International Council for Bird Preservation and the International Wildfowl Research Bureau, was aimed at conserving the resources of marshes, bogs and shallow water areas particularly subject to drainage. The wetlands of the temperate region of Europe and North Africa were chosen as the first target, because high population and industrial development, combined with a favourable climate, had already resulted in a careless attitude to and excessive wastage or destruction of these assets. The planned stages of the Project are, first, the identification and listing of surviving wetlands, secondly the classification of those of international importance (for which their value in maintaining good stocks of waterfowl has been used as a quick and convenient indicator and does in fact provide a useful guide to scientific interest and research possibilities) and, thirdly, the application of this list and classification to the encouragement of suitable management policies.

Last year a technical meeting organized by the Commission in Turkey took the first steps in extending Project MAR to the Middle East and South-West Asia, a region of which the generally arid characteristics have not prevented severe wastage of precious wetland. In the meantime, two more projects for securing effective conservation of other kinds of water bodies have become fully operational. Project TELMA, jointly sponsored by UNESCO, IUCN, and the International Biological Programme, aims at the preparation of a world list of peatland sites, which are of international importance to science, and the promotion of their conservation. On this basis its further objective is to encourage collaboration amongst research workers investigating peatlands, particularly in connection with productivity and bioenergetic studies. At present the Project is directed to the peatlands or mires north of 50°N., thus covering a vast area of Canada, Alaska, the U.S.S.R. and Scandinavia, but one can foresee its future application to similar environments in southern latitudes. Finally Project AQUA, the third project in this category, organized by IUCN in liaison with the IBP and the Societas Internationalis Limnologiae, aims at fulfilling the same role in relation to lakes and similar aquatic habitats, the conservation of which is not covered by the other two projects and has tended to be neglected, although they are often particularly threatened by pollution and by utilisation schemes of which the ecological aspects have been inadequately studied.

With regard to the other class of project which may have been initiated quite independently of conservation interests but could nevertheless seriously affect them, three recent examples referred to the Commission may be mentioned. The first of these was a pollution issue. A proposal to establish an industrial plant near a North Sea river-mouth involved the daily discharge of waste materials comprising 800 tons of dilute sulphuric acid and 320 tons of iron salts into the open sea off Helgoland, an island in the vicinity of extremely valuable fisheries and itself famous among other things as the place where the first bird migration was established over a century ago. Although the Commission supports the view that pollution or the introduction of foreign matter into an ecosystem on this scale must, in principle, be considered objectionable, its enquiries, which are continuing, have also shown that much more scientific evidence is needed of the possible effects on marine organisms and ultimately on the biology of adjacent shores. The second case concerned a plan for replacing large areas of natural but industrially unproductive forest in southern India by plantation of Eucalyptus grandis, a matter of particular concern because it would affect one of India's best National Parks. As a result of the Commission's investigations it has been recommended that the programme should be postponed, at least in the Park area, until an expert assessment has been made of the ecological effect of the 15,000 acres already planted. The Commission hopes to arrange for this assessment to be carried out by a small group of specialists before IUCN's next General Assembly, which is due to be held in India in 1969. Thirdly, at the request of a local conservation organization, the Commission has canvassed expert opinion on a proposal to mine the Great Barrier Reef off Queensland for the manufacture of agricultural lime. Local efforts were successful in securing a decision that no such disturbance of an ecosystem of the very greatest scientific interest should be undertaken, unless proved to be unobjectionable by a detailed ecological survey, but the fact that this decision now has international backing enhances its stability.

Reverting to the four main heads of the Commission's responsibilities, the second one is based on the fact that conservation principles and policies which are ecologically sound must always be subject to modification and improvement as new knowledge is acquired. It charges the Commission with the duty of selecting themes for discussion at the Union's technical meetings, organizing meetings to discuss conservation issues in particular contexts and, where necessary, setting up its own committees to keep specific problems under review and to work towards a scientifically sound and internationally recognised solution. The process is well exemplified by the problem which I have previously mentioned, of introductions or re-introductions of plant and animal species. Proposals for this kind of activity are very frequently referred to IUCN from all parts of the world and the

Commission therefore recommended the subject for discussion at the 1966 General Assembly. Nine papers were presented on the ecological effects of plant introductions and twelve on the similar effects of animal introductions, but despite the lively discussion they provoked it was impossible to get nearer to agreed conclusions in the time available than to draw up four sets of resolutions, in which some important differences still have to be resolved. The Commission has therefore established a committee which it is hoped will eventually succeed in working out an internationally applicable and accepted policy.

Third among the Commission's duties is that it should take a leading part in maintaining the Union's contacts with organizations and individuals concerned with the scientific aspects of conservation and particularly, since its formal inception in 1963, with the International Biological Programme. The need for this stems from the fact that one of the greatest difficulties in the way of establishing an ecological approach to world development and obtaining universal recognition of its essential importance lies in drawing on all the knowledge and experience now available and coordinating the effort and interest.

The Commission's particular responsibility is to keep in close touch with the sections of IBP concerned with the conservation and productivity of terrestrial communities, CT and PT. For the latter my own dual role as Chairman of the Commission and international convener of IBP/PT is of great assistance, while the retention for the time being of the Commission's office in London, in the same building as the IBP/CT office and not far from the IBP Central Office, also facilitates communication. One important aspect of the general problem of communications is representation of IUCN at the meetings of other organizations. Here the distribution of Commission members throughout the world helps to ensure that someone connected with the Union can usually be found to act as our representative at any meeting which pertains to conservation and in which the Union is now as a matter of course invited to participate.

Fourthly, although for geographical and financial reasons, the Commission can seldom bring more than a small proportion of its twenty or thirty members and committee members together at any one place and, therefore, finds it difficult to undertake specific investigations itself, research has always been one of its principal concerns. Through its network of correspondents it can at least aim to provide informed advice on the kinds of research which need to be carried out locally and the kinds which have a broad general application. Up till 1958, the Commission did in fact maintain a research committee and was able to undertake one or two small research projects, for example an examination of ecological problems of the Cansiglio lagoon and state forest near Venice. But it was found that such short missions to

investigate particular problems usually involve the field of interest of more than one Commission and, conversely, basic research of the wide application can best be promoted and managed in the form of a Project, with its own organizing committee. Thus, to quote another example from Italy, when in 1965 the Government requested IUNC's advice on the Abruzzi National Park, a special mission was appointed in which the National Parks and Ecology Commissions were represented, as well as UNESCO and the IUCN Executive Board and Secretariat. On the other hand, for the African Special Project of 1961-63, organized jointly with FAO and designed to investigate and make recommendations on conservation and management of wildlife resources as an integral part of the natural resources of the African continent as a whole, a special management Committee was appointed.

Having tried to explain the nature and scope of the Ecology Commission's activities, I would like in conclusion to comment on their possible application in the Latin-American context, a possibility which I am sure that this Conference will do much to develop. When studying the recommendations of the Inter-American Specialised Conference on Problems relating to Conservation of Renewable Natural Resources, held at Mar del Plata in October 1965, I was much impressed by their close accord with the objectives of IUCN and, particularly, by their emphasis on the ecological approach to development and conservation problems, which it is the duty of my Commission to assist in every possible way. This comes out clearly in several of the general principles adopted, notably the insistence that, because of the effect of development on the natural environment, it is necessary at the planning stage of development to evaluate the scope of possible changes. Again, the emphasis on the bioecological complex of nature resources and therefore on the fact that the utilisation of any of the components or actions affecting them should take into consideration the aggregate of resources, in order to maintain a biological balance, is entirely in keeping with conclusions reached at the Commission's technical meetings, the reports of which may therefore be of value in supplying supporting evidence.

In the case of some of the specific recommendations of the Mar del Plata Conference, I believe that the Commission could also if desired contribute some helpful information and advice. Thus the proposed study of the effects, as well as the causes, of forest fires could perhaps be usefully supplemented by the results of similar studies in other countries where conditions are comparable. Again, although the Commission's current work in ecological effects of introduced animal species has hitherto been mainly concerned with mammals and birds, the work which the Mar del Plata resolution recommended should be carried out on the introduction of fish and aquatic organisms would obviously be of the greatest interest to our Committee and, conversely, might

derive some assistance from relevant papers published as Volume 9 of IUCN's Technical Series. The account I have given of the MAR Project for wetland conservation shows a notable measure of agreement between the aims of the Project and those of the Mar del Plata resolution on the relocation and management of water bodies, In fact the latter could almost have been adopted as it stands as part of the conclusions of the Ecology Commission's recent technical meeting in Turkey. This points the way to the many opportunities that I am certain will occur for exchanging information on this vital subject to mutual advantage.

Finally, much of the Commission's documentation supports and seems highly relevant to the recommendations made at Mar del Plata about multiple use, especially of wetland and forest ecosystems, and about increasing agricultural productivity by modern techniques. Very similar conclusions have been reached by several of the Commission's enquiries, which have for example shown the serious risk of losing rather than amplifying resources, when land is cleared or drained which may only be marginally suitable for agriculture. In these and many other instances which are likely to be disclosed at this Conference, the international support and sources of information offered by IUCN and its Commission on Ecology can I believe be of real value to the countries represented here, as they have been in other parts of the world.

Prof. F. Bourlière then discussed the relationship between IUCN and the International Biological Programme ; inter alia he said "The International Biological Programme started in 1960, but its operational phase began only in 1965; from 1965 to 1967 we have the preparatory stage, during which our Sections organize what they call "methodological symposia" during which international bodies of scientists discuss the best methods to be used in the field as well as in the laboratory. Emphasis put in field methods to study both population structure and population metabolism of plants and animals, wild and tame, so to speak, living in the study areas. The objectives of these methodological symposia is the production of a series of IBP handbooks which will summarise modern methods of study of productivity at the various levels, and I am glad to be able to tell you that out of the 25 volumes which are due to be ready at the end of next year, already seven of them are out of the press. Needless to say we hope to produce such handbooks in various languages but IBP is a non-profit organization and there is no copy-right. Any national group or any national Committee of IBP, which wants to translate our IBP handbooks into other languages, can do so at its own cost.

Starting this year, we enter what we now call the operational stage, that is to say that the 32 National Committees of IBP have presented to the SC/IBP, the Special IBP Committee, their various programmes out of which a certain number of major programmes have

already received what we call "the IBP label". These programmes will be mainly carried out in the Tropics and Temperate zones. In the Tropics most of them will take place in Africa and a few of them in Tropical Asia and in Australia. For the time being we have very few projects which are planned in Latin-America but I learned yesterday through my Brazilian friends that they are in planning some very important field studies which will fill a great many gaps in our work programme. What we need in IBP are active research workers meeting in the field and discussing both methods and results with their counterparts. So starting from this year, in the PT Sections will organize what we call "progress symposia" and "regional symposia". To take one example for instance this year 1967, we have a progress symposium on forest productivity in the United States of America taking place in July; there will be regional symposium taking place in Japan, where all the various programmes of the Japanese group, a very active group, the Australian group and South-East Asian groups will meet together, compare their methods and their first results. So we hope within the next five years for better knowledge of the biological basis of productivity, for better knowledge of adaptation of the various plants and animals of the various zones of the world which will lay a basis for a better, more scientifically guided policy of conservation. We hope that at the end of this five year plan, IUCN and the other permanent organizations in ecology and conservation will be able to take over. If we succeed even partially in this venture, most of us will be glad to have taken part in a very interesting experience".

#### 4. 2. The Survival Service Commission

The Chairman of the Commission, Mr. Peter Scott, referred to the paper on the work of his Commission and on the role which it might play in Latin-America in the future.

He considered that until mankind evolved a new outlook on the conservation of the earth's natural resources, emergency measures to save endangered species were essential. The combined effect of numerous small actions could be considerable.

He listed the reasons for conserving natural resources and referred to the immensity of the problem in Latin America. He described the history of the SSC, its composition and its principal functions, namely to collect data on endangered species (this information was recorded in the Red Data Book) and to initiate action to prevent their extinction. He named numerous mammals and birds from the Latin American region, which were currently listed in the Red Book.

Finally, he referred to the value of conference resolutions and expressed the hope that the delegates at the present conference would reach agreement on the following topics:-

- (1) to restrict, or impose quotas on the traffic in rare species and their products
- (2) to strengthen the enforcement of legislation relating to the protection of wild life
- (3) to cooperate in studying and resolving ecological problems
- (4) to initiate ecological surveys and consultation before development projects affecting land use were undertaken
- (5) to reserve samples of unique ecosystems, through the IBP/CT programme, for scientific study
- (6) to solicit government and public support for the conservation effort
- (7) to request advice and funds from international conservation organizations for conservation projects
- (8) to impose a time limit by which the resolutions presented at this conference should be effected and to consider plans for a future meeting to examine the results.

The paper on the Survival Service Commission read as follows (Paper 4/2).

Two thousand years ago there were about 13,000 species or subspecies of mammals and birds on earth. Since then some 200 have become extinct, -a loss of 1 in every 10 years-; but of these 130 become extinct in the past 400 years, -a loss of 1 in every 3 years-; in the past 100 years, about 100 have become extinct, -a loss of 1 a year-; in the past 50 years, 76 have become extinct, -a loss of 1 in 2/3 of a year.

The survival Service Commission was formed in 1949 as a result of Resolution No.15 of the Technical Conference on the Protection of Nature, Lake Success, USA.

The Resolution reads:

"Whereas: The world is faced with an increasing list of threatened and vanishing species of fauna and flora. The Conference resolves: That the International Union for the Protection of Nature should establish a 'survival service' for the assembling, evaluation and dissemination of information on, and the study of, all species of fauna and flora that appear to be threatened with extinction, in order to assist governments and appropriate agencies in assuring their survival."

The Commission's present terms of reference are as follows:

- (a) To collect data on, and to maintain lists of all wild animals and plants which are, or may be in danger of extinction.
- (b) To initiate such action as may be considered most likely to prevent the extinction of those species and subspecies in the Commission's lists of threatened animals and plants.

The Commission is the only one with an established working unit situated at IUCN headquarters. The membership of the Commission comprises scientists and conservationists from various parts of the world, whose work is, at least in part, directly concerned with threatened species. Membership has increased steadily since the Commission's formation; at the present time, it numbers over fifty.

A number of Specialist Groups or Committees has been formed to study specialised subjects in the Commission's programme, to keep it informed of new developments within their field and to recommend action to be taken to conserve the endangered species or their habitat. Sixteen groups exist at present for Arabian oryx, chimpanzees, deer, European bison, freshwater fish, marine

turtles, marsupials, orang-utans, orchids, reptiles and amphibians, rhinoceroses, seals, whales, wild horses and zoo liaison. There is a regional group for Madagascar; the formation of other regional groups is contemplated. The Chairman of each group is an ex-official member of the Commission.

The collection and collation of data and the maintenance of records on animals and plants threatened with extinction is one of the Commission's principal tasks. This information is contained in the IUCN's Red Data Book. In January 1966, Volumes 1 and 2 were published, on mammals and birds respectively. Volume 3, on reptiles and amphibians, is nearing completion and it is hoped to prepare a botanical volume in 1968. The completed volumes provide the fundamental background information on threatened species, as a basis on which to develop conservation or rehabilitation programmes. A sheet is assigned to each species, and data, where available, are provided on distinguishing characteristics, present and former distribution, status, breeding rate in the wild, reasons for decline, protective measures already taken and those proposed, and their number and breeding potential in captivity. Each species is classified according to its status, population trend, origin, management, exploitation and the degree of protection it is afforded. In addition, seriously endangered species are classified according to the degree to which they are believed to be threatened. It will be appreciated that, for many species, the data are inadequate and that some data which are included may be of questionable validity; nevertheless, the Red Data Book provides the most up-to-date and accurate information available at the present time. It serves to indicate what is known and, equally, what needs to be known, thereby stimulating others to undertake investigations. The information contained within the book is constantly revised, sheets are replaced as fresh data are acquired and new sheets are added when appropriate.

The second major function of the Commission is to initiate action to prevent the extinction of individual species or groups of species. This task may be divided into two categories: the first concerns the instigation of prompt action as and when conservation problems demanding immediate attention arise, the second is concerned with anticipating conservation problems and initiating long-term projects to circumvent crises before they occur.

The task of 'ecological watch dog' has occupied much of the Commission's energy and time in the past and will probably continue to do so in the foreseeable future. Warnings of situations which are likely to imperil the future of some species of animal or plant are obtained from a variety of sources, but very largely from scientists, conservationists or interested observers in the affected area, or from publications, including the popular press. Not all of these situations arise as sudden crises,

some are long-term problems which have steadily deteriorated over the course of years before appropriate remedial measures can be taken. Further details are usually requested from the original source, from local IUCN members or from other national or international organizations. Advice is frequently sought from Commission members who have special knowledge of the species or country concerned. If the facts are clear, representation is normally made to the Government concerned, either by the Commission or the IUCN, direct, or in combination with other organizations (as in the case of Aldabra). Alternatively, direct action, normally financed by the World Wildlife Fund, is sometimes possible, for example, in the proposed control of introduced vegetation on Saint Helena. Very often, the facts are not clear and countries with a well developed scientific service may be requested to investigate the situation in more detail. In developing countries, a scientist with special knowledge of the problem may be sponsored by IUCN, or a member of the IUCN staff may be sent to report on the situation (surveys of this type were made in Ujung Kulon Reserve and Madagascar in 1967). The recommendations in these reports are implemented as soon as possible.

As an integral part of an international organization, however, the Commission has special scope for action in problems which concern more than one nation. For example, the Commission did much to publicise earlier weaknesses in the international control over the whale and seal harvests and to press for improvements in conservation practices. It has helped to bring international pressure to bear on curbing the trade in rare species. The Commission has also been active in the field of liaison between national organizations. In recent years, the Zoo Liaison Committee has established a permanent link between conservation organizations and zoos throughout the world, which has yet to be fully exploited. One of its notable achievements has been to extend the range of stud-books prepared for the very rare species held in zoos. There is frequently much good will between the scientists and conservationists of different nations, but it requires an independent body to bring them together, to formulate a constructive approach to their common problems. In January 1968, the Commission was instrumental in bringing together the five nations concerned with Arctic research to a conference in Morges, which resulted in a wide measure of agreement on future plans for research into the status, population trend and ecology of the polar bear. A Polar Bear Specialist Group is to be formed, composed of the leading scientists engaged in this research. The Commission has agreed to act as the central agency for the collection and dissemination of the data which they produce.

In the future, it is hoped that the Commission will devote increasing attention to long-term projects designed to resolve conservation problems involving rare species, before they deteriorate to the point where the species becomes virtually irretrievable.

vable. Work has already commenced on this aspect of the Commission's programme. The information on mammals and birds in the Red Data Book has been analysed and is being placed on IBM cards. The 'Action Treatment' (a list of measures to prevent the extinction of the species) is being applied to those species for which adequate data are available. It is hoped that a comprehensive programme to save some of the more seriously endangered species will be presented at the Biosphere Conference in September 1968. Conservation on a regional basis is receiving more attention, so that habitats and groups of threatened species, as distinct from only the most seriously endangered, can receive early attention. In August 1967, the Commission introduced a system whereby the Government of a country which contains a rare species agrees to accept ultimate responsibility for its survival. At the end of the year, ten States had been approached in respect of eighteen species or subspecies. By early February 1968, the Government of Cyprus had accepted responsibility for the Cyprian Mouflon (*Ovis orientalis ophion*), the Government of Iran for the Persian Fallow Deer (*Dama mesopotamica*), the Persian Wild Ass (*Equus hemionus onager*) and the Asiatic Cheetah (*Acinonyx jubatus venaticus*), and the Government of Spain for the Spanish Lynx (*Felis lynx pardina*).

As the delegates to this conference will be well aware, there are many species of fauna and flora in danger of extinction in Latin-America. A number of birds and mammals are already extinct. Volumes 1 and 2 of the Red Data Book list over sixty species or subspecies of endangered mammals and birds from the countries represented at this conference. The lists are undoubtedly incomplete and the status of many of those already listed is inadequately known. Indeed, it is possible that unless decisive action is taken in the near future, some species may disappear whose identities will never be known. The conference of the Organization of American States on Renewable Natural Resources in the Western Hemisphere, in Argentina, in October 1965, also listed numerous endangered species of amphibians, reptiles and plants.

The principal reasons for the decline of these species, namely destruction of the habitat or over-exploitation, are common to many other countries. The Commission's experience in combatting these problems should prove a valuable aid to the work of Latin-American scientists and conservationists. At the same time, the Commission can do little without the assistance of local specialists and observers. It is hoped that this conference will result in a long period of greatly increased cooperation between Latin-American conservationists and the Survival Service Commission, working towards a common goal, to save vanishing species.

#### 4. 3. The Landscape Planning Commission

The Chairman, Mr. R.J. Benthem, spoke briefly owing to lack of time. He hoped that all participants would read the paper which is reproduced below; he offered the help of his Commission to those who would like to ask for it.

The objectives of IUCN

Over the years, the objectives of the IUCN have widened. During the first years of its existence, the Union's activities were mainly concentrated on the conservation of natural areas and the protection of important flora and fauna. However, due to the present rapid and intensive exploitation of the world's natural resources, this has turned out to be inadequate. We cannot content ourselves with protecting the last remnants of nature that are still unmolested, however necessary that may be in itself. For the future of mankind, it is necessary to pay careful attention to the management, conservation and improvement of the human environment in its entirety. This future depends on the use we make of the land on which we live and which we need for our food, for living, working and for our recreation.

Therefore, it is necessary for the measures being taken to keep nature intact to be enlarged to include the management of all natural resources, including air and water. The knowledge at present available to us allow of rational utilisation of the earth and the conservation of its riches, fertility and beauty for the human race and for all the other creatures.

Taking this task into account, the IUCN has widened its base, which previously was narrow. At present, the Union considers as one of its tasks the promotion of a 'better understanding and a better conduct in everything referring to the conservation and improvement of man's natural environment. Originally a Union for "the protection of Nature" it has been converted into a Union for the "conservation of Nature and natural resources". The Union's activities in this wide field of work are supported by the work of the Commission on Landscape Planning, in which a group of experts in the fields of cultivation of the land, ecology, silviculture, landscape conservation and architecture, collaborate.

The consequences of development operations for the landscape

Technological methods permit man to introduce profound changes in his environment. These methods are generally applied for specialised purposes such as irrigation, extraction of mineral riches, urbanisation, use of hydroelectricity, etc.

Frequently, the technicians charged with such projects do not take into account the consequences of their activities for

the landscape as an operative, interdependent whole. In other cases, special natural or social conditions of a region are not sufficiently taken into account.

In such a way, the fundamental values of the landscape as human environment and recreative and cultural resource, as well as in its function of permanent source of food, water, wood, etc., are seriously endangered. Examples of landscapes completely lost are, moreover, well known.

The result of abuse and excessive exploitation can be a landscape deprived of any interest at all as far as flora and fauna are concerned, ruined not only in its quality of a viable part of the earth's surface but also in its function of cultural and recreative resource. There are also cases in which the situation has come to be so urgent that only a few years remain to prevent disaster.

To cope with such risks, a comprehensive Landscape Planning and Management is necessary, tending to establish or maintain between country and society a particular equilibrium for each region.

In view of the great variety of demands placed on the landscape by contemporary civilisation, coordination of activities in the different branches of development is the only way to obtain satisfactory results. The best way to achieve such coordination consists in establishing an ecological point of departure for all the problems related to landscape development. That is to say, technicians and planners will have to become used to considering their problems within the framework of a collection of environmental aspects and to carrying out their projects as part of a comprehensive development of the landscape.

#### Planning of man's natural environment

In many countries of the world, social life is dominated by planning. Planning of economy and planning of the space that we inhabit. Limiting myself to this last form of planning, I would like to point out that at present detailed plans are being developed for the enlargement of towns in order to satisfy present and future housing, work and recreation needs in these urban areas. Plans are being made and carried out in all parts of the world for the construction of networks of highways in and between cities as well as for the development of rural areas. And the same can be said of the construction of ports and airports, industrial zones and, from time to time, recreational areas.

However, in many countries there exists a pressing need to elaborate plans, not only for urban areas but also for those which are not urbanised, or joint plans orientated towards the use of the entire territory of such countries. In a few cases

this is already being done by regional planning offices. But what continues to be lacking in these plans is the combined contribution of biologists, ecologists, agronomists, experts in silviculture, landscape architects, geographers, sociologists and meteorologists. These specialists should be put in charge, as a team, of the planning for the landscape of the future, the use of the soil and the management of natural resources.

### The landscape plan

In various European countries, these activities are known as landscape planning. Several interesting examples of this planning can be cited. It can be carried out in the framework of regional planning, but also as a complement to various types of public works, for instance works of agrarian improvement, highway construction, hydroelectric works, enlargement of urban areas or creation of new urbanisations, exploitation of regions, irrigation works, reforestation projects, etc. The plans which contain the directives for the conservation or improvement of the landscape are called landscape plans. Scientific investigation and the application of ecological principles constitute the bases for such plans, and a procedure and special technique for the carrying out of these landscape plans, have been developed.

These plans are composed of conservative or creative methods, or of a combination of the two. In various countries of western Europe such plans are carried out in the framework of land improvement projects. Woods and other terrains of natural interest are respected in these. But also included in these projects, are new green belts and other plantations.

In the same way greater attention is paid to the landscape in the environment of the motorways of numerous American and European countries. The planners do not limit themselves to the conservation of the existing flora and the creation of new plantations, but also pay attention to the location of the highway in the landscape, or to the beauty of that same highway.

Some well-known examples of landscape planning can be seen in the Netherlands, where land is reclaimed from the sea, creating entirely new landscapes. Universal fame has been won by the polders in what was the Zuyderzee, where enormous surfaces of land were created from the bottom of the sea. Among the objectives of these works there figures not only the creation of new lands for cultivation, but also that of towns and villages, woods, zones protected for birds, flora and fauna, borders of highways, green belts, tree plantations, recreation areas, artificial beaches and pleasure lakes.

In other parts of the world viable landscapes are being created with towns, villages and parks in lands destroyed by

erosion for centuries, for instance in Israel, in the Negev Desert. In Italy large new woods are being planted on the slopes of the Apennines, which have had to suffer a great deal from erosion. Also in the mountains and plateaux of Spain imposing reafforestation projects are being carried out, which contribute to the creation of a better environment for man, combating erosion and improving the climate.

### Park planning

A special aspect of landscape planning is that of new national, provincial or local parks. There exists a great need for a larger number of parks, effectively distributed, throughout the world. The principal aim of such activities should be the conservation of national riches, which are disappearing so rapidly. Apart from this, it is also necessary to set aside space for man, who seeks recreation, in order to find relaxation and compensation for his tense and unnatural life in densely-populated urban areas.

The magnificent results of the national parks in the United States prove that the work of the landscape architect is of fundamental importance in the establishment and management of national parks and their access roads. Landscape planning should make it possible each year for millions of people to enjoy the beauty of these natural zones, finding inspiration and benefiting from the pleasures of life without detriment to nature, flora or fauna.

Also in the new cities which are being constructed in every continent, the creation of open spaces is an essential condition for the present way of life. In the cities of the future, the distinction between town and country, previously so sharp, will be less clear. The work of the city planner and that of the landscape architect are becoming more closely interwoven, to contribute to a common end. In the old cities, parks used to constitute extraneous elements, a few little green worlds which contrasted with the stone world of the city without having any relationship to it. Instead, the great green spaces of the new cities are equivalent to the built-up surfaces, forming with them an inseparable whole.

Therefore, landscape planning is as necessary for urban areas as it is for rural ones. It is also as necessary in densely-populated industrialised countries as it is in young developing countries, although the respective plans present fundamental differences.

The Commission on Landscape Planning of the IUCN

The task of the Commission on Landscape Planning is to promote, within the framework of the objectives of the IUCN, the

idea that the landscape constitutes the basic resource for the habitat of man and other forms of life.

This Commission endeavours to achieve its purpose via the medium of publicity and information, promoting the methods practised in the field of landscape planning, in collaboration with other international organizations involved or interested in works which alter the aspect of our earth.

In order to carry out its work with greater efficiency, the Commission is at present forming several regional working groups: one for Latin-America, one for the West and one for the East of North America and one for Western Europe.

Later on it may be that further such working groups will be organized for other parts of the world.

The programme of the Commission includes the promotion of the establishment of a world centre of documentation and information in the field of landscape planning, which would form the basis for a network of such centres in the different continents. To this end, studies are being carried out in the University of Newcastle, England. Several United States universities and the State Service for Protection of Nature and Landscape Planning are also interested in collaborating with these centres of bibliography and documentation. In this project the Commission collaborates with the International Federation of Landscape Architects (IFLA).

Another of the Commission's purposes is to promote the establishment by governments of Services of Landscape Planning such as those which already exist, for instance, in Germany, Switzerland and Holland. These Services should be charged with the direction of a planned development of the landscape. Adapted legislation and financial resources should be available to them, permitting them to ensure that Landscape Planning plays a leading role in all work which alters the landscape in any form whatever.

The Commission also wishes to achieve close collaboration with such international organizations as FAO, UNESCO, ECOSOC, WHO and UNDP, in order to promote the incorporation of landscape planners in the numerous development plans which are under preparation in all parts of the world under United Nations auspices. In view of the growing importance of the landscape as a financial resource through tourism, contacts will also be established with the International Union of Official Travel Organizations (IUOTO).

The collaboration established with the other commissions of the IUCN, on ecology, legislation, education and national parks ensures the integration of landscape planning aspects in the work of these commissions.

In the field of publicity, the Commission published last year the book called "Urban and rural problems", as second volume in the series "Towards a renewal of the relations between man and nature in countries of temperate climate" (publisher: IUCN, Morges, Switzerland). This book contains the current ideas referring to the bases and practice of Landscape Planning in our era. It is the result of collaboration between top level experts of the world.

A more popular description of the work of Landscape Planning, which will be published in several languages, is already in an advanced stage of preparation.

The Commission on Landscape Planning also participates actively in the preparation and realisation of the Technical Meetings of the IUCN. These meetings are held every three years, at the same time as the General Assembly of the IUCN.

Apart from this, the Commission organises its own annual assemblies, in which the programme of work is settled and current problems connected with the landscape are discussed.

For the daily work of the Commission it is intended to appoint a secretary and a technical official as full-time staff.

#### 4. 4. The Commission on Legislation

Mr. W. Burhenne, the Chairman of the Commission, spoke as follows.

Ladies and Gentlemen,

While listening to me now, every Latin-American participant at this Conference may think that this keynote address on conservation legislation would be better done by one of them.

I had the same opinion until the President of the IUCN comforted me by answering to that remark that the Conference does not aim at specialising too much but does aim, by bringing here some permanent collaborators of the Union, at giving us a possibility to exchange information and knowledge on the one hand and on the other hand at giving us a possibility to find out ways in which the different organs of the Union can be helpful in the future development of conservation here.

Bearing that in mind my task is now to focus on the Commission on Legislation of the Union and to explain to you briefly at what it aims, what it does and what it could do with your help for this continent.

It is generally said that law is the assembly of rules which governs the relationships between members of a community. And these rules are recognised to be necessary, in all communities. This means on the one hand that if every individual would know how to behave and if he would follow the lines freely, no law would be necessary.

This means on the other hand that it is not the case and that most of the time man does not know what his behaviour should be.

Ladies and Gentlemen, you may think that I am stepping aside of the subject, but let me apply those simple ascertainings to conservation law. They imply three fundamental things for the law making process.

First, that the legislator, to fulfil his mission, has to ascertain what is that "best behaviour" towards nature, and for that purpose must be aware of and advised on the most recent scientific knowledge on the question.

Second, that the same legislator has to "translate" these principles into law, taking into consideration not only the juridical background in which the rules takes place but also making them as simple as possible to facilitate the third fundamental thing of the process which is the implementation of the law.

The IUCN, since its creation, was able to take part in the first step of the law making process by advising the competent national and international organs on scientific knowledge with regard to conservation of nature and natural resources and by recommending to those bodies measures to be enacted in specific cases.

Continuous action however proved necessary in the field of conservation legislation and the need was felt to create a technical body inside the Union which could collect, analyse, compare and assess the value of existing legislation on conservation of nature and natural resources and to help strengthen where necessary as well as implant legal measures. In short, and simply said, the need was felt to create a body able to perform the second stage of the law-making process about which I spoke earlier and which is, so to speak, the privilege of law technicians.

A Committee was therefore created by the General Assembly of the Union in Cracow in 1960, and in recognition of the work it had done, that Committee was raised to the status of a permanent Commission by the General Assembly of Nairobi in 1963.

The Commission's mission is double.

Its first role is to inform governments, parliaments or their members, and national and international organizations at their request on legislation in force in the world on the subject of conservation. This can be done directly upon request, or indirectly by reports and studies on special points for bodies with which it cooperates, and by publications. Its second role is to advise governments, parliaments and organizations on legislative measures to be proposed to the competent constitutional bodies, as well as on conventions or agreement in the field of conservation.

The Commission then may take the initiative and either advise the competent authorities to take necessary and adequate measures, or give advice on projects set up by national authorities or other organizations. The Commission also draws up projects itself at request.

The first aspect emphasises the role of the Commission towards those outside the Union. In this respect, the Commission is aiming at being an intelligence service available to those whose work, even temporarily as is the case for parliamentarians is connected with conservation legislation. Ideally it should be a "quick reference and advisory centre".

The second aspect emphasises the role of the Commission inside the Union, that is to take action in the frame of the

Union's general policy or to deal with matters which have been specifically referred to it for action by the Union's organ.

To accomplish its mission, the Commission needs a wide documentation basis. It therefore collects the texts of legislation in force concerning conservation of nature and natural resources. It collects also those legislative measures not dealing directly with conservation but necessary for the study of certain points, such as measures concerning property, restriction of users and penalties, as well as the constitutional and administrative law of each state as far as they are necessary to any legal study.

This collection is on a world scale at both national and international level and it consists of legislation of Unitarian states, federal and federated states, as well as of dependant territories and conventions and international agreements.

To be able to make maximum use of this basis depends on the speediness with which information can be retrieved. Because of the difficulties of retrieving material in the ever growing mass of information, the Commission has begun to mechanise the classification system of information.

A test of codification and processing of 110 legal instruments proved satisfactory and the first set of 800 legal instruments is being prepared. The system chosen, which allows manual retrieval as well as computer retrieval will enable us to subdivide the field envisaged in a more detailed manner. It will furthermore enable the required references to be obtained, whether by country or by subject matter, much more quickly than previously, and will considerably increase the rate of work. The Commission will be able, moreover, to supply a copy of the sets of punch cards, or parts of it, to anyone interested.

To accomplish its tasks, the Commission moreover cooperates with other organizations working in the field of conservation legislation and profits from the help of its members. It in fact consists of 16 full members and a similar number of corresponding members. The Commission Members are all honorary and the work which they carry out for the Commission is generally in addition to their own professional work.

I will not try here to make an exhaustive list of the Commission work in the past years, but only to illustrate its achievements with some recent examples.

To begin with daily work, requests for information from various bodies pour into the Commission office. They are most varied and may concern regulations for National Parks, the legal status of a specific protected species or legislation on water pollution.

During the last few months, furthermore, the Commission, with the help of a young German lawyer, completed a study on the legislative and regulatory measures taken to protect landscape areas in Western Europe and published some articles in technical newspapers and bulletins.

About the advisory mission of the Commission, much could be said. Important and recent aspects of this work have to be stressed.

On its own initiative, the IUCN entrusted the Commission with the preparation of a draft convention on import, export and transit of certain species, in collaboration with the Survival Service Commission. The last version has already been sent to governments as well as to UNESCO and FAO for comments. A new version, taking those comments into consideration, will be prepared in the next few months.

At the request of the Organization of African Unity, the IUCN prepared a draft African Convention for the Conservation of Nature and Natural Resources which has been completed with the help of an ad hoc Committee of the Commission. That draft has been examined recently by the Council of Ministers of the OAU and it is planned to have it approved by the Heads of State and Government next September. On request, the Commission often gave opinions and advice on bills or draft legislation submitted by various bodies on various subjects such as wildlife legislation in Austria or Zambia, National Parks legislation in Portugal or even protection of trees in New Zealand.

On the national level, none of these examples applies to Latin-America.

On the international level, one only, the Convention on Import, Export and Transit of Certain Species involves Latin-America.

That is a pity because I think that the Commission could help on this continent as it helps on others; that is also a pity because we, on our side, need your collaboration too.

Being aware of the fact that conservation legislation is one measure among others to conserve natural resources of this continent but a measure which must run parallel to the other efforts, we must ask ourselves is the law in Latin-America in that regard perfect? is it adjusted to recent scientific knowledge? is it sufficiently coordinated at the national level? at the Latin-American level and at the international level? for some specific problems which require world wide cooperation.

And finally we must ask ourselves whether those measures are implemented.

No State in the world, Ladies and Gentlemen, would dare answer yes to these questions. And no Latin-American would, because they know, as I do, that in this continent as in others, laws are sometimes overlapped and are not sufficiently coordinated and harmonised.

If they recognise the facts and the needs for those measures to be taken, why, will you say, are they not taking action?

Well, some do; but their actions, insofar as they are individuals, remain a drop in the ocean.

It is commonplace to say that natural resources have no boundaries, but in the legislation field it is particularly important, and measures have to be coordinated.

That is here that the need arises for a centralising body, able to assess what exists, what is missing and what could be done.

That is here that the Commission on Legislation, inside the framework of the Union and with the help of other international bodies, could help. I have said "could help".

"Could" because for playing this role, we would need support, material and contacts. In one word, we would, in our turn, need Latin-America.

"Help" and help only, because the main work load, that is the implementation of any guideline, will for ever remain in the hands of the concerned national authorities.

What we can do, here as elsewhere, is limited. But if you join your efforts and good-will to ours, we can achieve something together.

That is the reason why we are here to-day.

He then drew the attention of the Conference to the paper prepared for the Conference (4/4).

The Commission on Legislation

1. The General Assembly of IUCN in Cracow/Warsaw in 1960 created a Committee on Legislation and Administration.

The object of this was to collect, analyse, compare and assess the value of existing legislation on conservation of nature and natural resources and to help the Union strengthen, where necessary as well as to implant, legal and administrative measures. Continuous action in this field proved necessary, and a small office was set up in Bonn.

In recognition of the work it had done, the Committee was raised to the status of a permanent Commission by the General Assembly in Nairobi in 1963.

2. The mission of the Commission is double.

Its first role is to inform governments, parliaments or their members, national and international organizations at their request on legislation in force in the world on the subject of conservation. This can be done directly upon request, or indirectly by reports and studies on special points for bodies with which it cooperates, and by publications.

Its second role is to advise governments, parliaments and organizations on legislative and statutory measures to be proposed to the competent constitutional body, as well as on convention or agreements in the field of conservation.

The Commission then may take the initiative and either advise the competent authorities to take necessary and adequate measures, or give advice on projects set up by national authorities or other organizations. The Commission also draws up projects itself at the request of competent authorities.

3. This paper does not aim at making an exhaustive list of the Commission's work in the past years, but only at illustrating the mission of the Commission with some recent examples.

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During the last months furthermore, the Commission, with the help of a young German lawyer, finished a study on the legislative and regulatory measures taken to protect landscape areas in Western Europe and published some articles in technical newspapers or bulletins. It had been hoped to initiate a study on conservation legislation in Latin-America. Due to lack of subventions, however, it was not possible, although complementary information requests had already been prepared. This is one of the priority objectives of the Commission which urgently needs a detailed study on this matter.

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4. To accomplish its mission, the Commission needs a wide documentation basis. It therefore collects the texts of legislation and regulations in force concerning conservation of nature and natural resources. It collects also those legislative measures not dealing directly with conservation but necessary for the study of certain points, such as measures concerning property, restrictions of users and penalties as well as the constitutional and administrative laws of each state as far as they are necessary to any legal study.

This collection is on a world scale at both national and international level and it consists of legislation of Unitarian states, federal and federated states, as well as of dependant territories and conventions and international agreements.

Because of the difficulties of retrieving material in this ever growing mass of information, the Commission has begun to mechanise the classification system of its documentation. A proof of codification and processing of 110 legal instruments proved satisfactory, and the first set of 800 texts is being prepared. The system chosen, which allows manual retrieval, will enable subdividing the field envisaged in a more detailed manner and will enable the required references to be obtained, whether by country or by matter, much more quickly than previously, and will considerably increase the rate of work. The Commission will be able, moreover, to supply a copy of the sets of punch cards or parts of it, to anyone interested.

5. To accomplish its tasks, the Commission moreover cooperates with other organizations working in the field of conservation legislation and profits from the help of its members. It in fact consists of 16 full members and several corresponding members. The Commission members are all honorary and the work which they carry out for the Commission is generally in addition to their own professional work.

The level of work which has been reached did no longer permit only part time work, and an office was set up where a full-time lawyer is now working.

#### 4. 5. The Commission on Education

In the absence of the Chairman, Dr. L.K. Shaposhnikov, the Vice-Chairman, Dr. T. Pritchard, took the Chair and addressed the Meeting as follows:

As Peter Scott, the Chairman of the Survival Service Commission, said earlier, communication is always a problem and in educational circles it is often more difficult to bring about than in other spheres. This is partly because it involves co-ordination of various specialist disciplines, on the one hand, with pedagogic theory and practice, on the other. IUCN's Regional Education Committees facilitate communication in two major ways:

1. The Regional Committee enables communication to be improved within a defined and manageable region, which includes nations with some elements in common, such as a cultural and historical background, language and type of environment.
2. The Regional Committee can crystallise the major issues of a region and thus have more effective liaison with similar committees crystallising issues in other parts of the world.

Now, how can the Commission on Education collaborate with conservationists and educationalists in Latin-America? It is not appropriate for me to deal with this matter in any detail this afternoon. We must wait until the education session on Saturday. At this point I will simply try to summarise some of the contributions I think we can make.

1. The Commission has given much thought to unravelling the objectives of environmental education. For instance, we are considering six major categories, namely:

- a) The role of environmental education in the education and training of those who will become biologists, geologists, geographers and others proposing to become engaged in the environmental sciences.
- b) We are investigating the role of environmental education in education of scientists other than those whose career will be directly concerned with the environment (chemists, physicists, etc.).
- c) We are considering the training of those who will enter the land-linked professions - agriculturalists, foresters, civil engineers, planners, landscape designers - people who have direct influence on the appearance of the landscape.
- d) We must not forget the education of statesmen and civil servants, who have to formulate policies, legislation, and to authorise actions, which can have a far reaching effect on the human environment.

- e) Then, there is the vast population of school teachers who mould the personalities of future citizens.
- f) Lastly, there is the education of the public at large who have their effect on policies, through public opinion, who want to be prepared to enjoy their environment in their leisure time, and who can do a great deal of damage by human erosion and so on.

2. We are increasingly giving attention to the development of our interpretative role within IUCN, which incorporates the achievements and proposals of other Commissions of the Union. In this respect, we must refine our work as an interpretative service, to provide the communication required.

3. We are extremely conscious of our truly international role, in promoting exchange of ideas and information across national frontiers, across continents and oceans.

He referred the Conference to the following paper for further details about the Commission.

The Commission on Education was the second of IUCN's Commissions, being established as a result of the Und Session of the General Assembly in 1950.

The activities of the Commission are based on the idea that nature conservation is a vital economic and social problem of all nations.

We believe that as a fundamental basis for the solution of this problem, the Commission should promote:

- (a) The establishment of a strong and effective system of conservation education at all levels in educational establishments of all kinds;
- (b) The development of the scientific approach in nature conservation.
- (c) The realisation of the need for many-sided information sources in relation to the wise use of natural resources, and the necessity of the conservation and restoration of these resources to meet the cultural and material requirements of all people;
- (d) The popularisation of the activities of the IUCN as an international body occupied with solving theoretical and practical problems in nature conservation all over the world.

Such a programme has been and remains the basis of the Union's aims in the field of education and information and in line with the Resolution of the XVII U.N. General Assembly on "Economic Development and Conservation of Nature" (1962), endorsing the similar Resolution of UNESCO.

At the VIth and VIIth General Assemblies of the Union, unanimous support was given to the idea of introducing a special course "Nature Conservation" as an obligatory subject in the curricula of universities and colleges.

Resolution No. 7 of the VIIth General Assembly on the subject adopted in Poland in 1960 says:

"The seventh General Assembly

- notes with satisfaction the steps which have lately been taken in a few countries to meet the urgent need for providing advanced training in conservation and natural resources management, especially by setting up University Chairs, courses of post-graduate instruction and institutes or other courses of higher studies ;

- Invites all authorities concerned to review as a matter of urgency the extensive gaps which remain to be filled in different parts of this field, and to take early action to secure adequate facilities through the institution of more courses of advanced training and the provision of expanded support for these vital requirements".

To help realise the Resolution, the IUCN Commission on Education worked out a general programme, on approval of the IUCN Executive Board, was published as a supplement to the "IUCN Bulletin" for April-June 1962.

Successful solutions to the problems of nature conservation depend to a great extent on the activities of scientists and specialists working in different branches of industry and agriculture as well as on the work of teachers, doctors and others. Much depends on how well they are acquainted with the principles and techniques of nature conservation, and to what extent their work is influenced by this realisation.

The popularisation of conservation education is therefore of great importance for the future graduate during the course of his training.

Accordingly, with each succeeding year more and more higher schools of different types in many countries of the world include a special course of studies on "Conservation of Nature" in their curricula.

Taking into account the importance of accurate and comprehensive elucidation of the main principles as well as other facets and techniques of nature conservation during this course of studies, the Permanent Commission on Education of IUCN decided to work out a general programme for a course of conservation studies. It is suggested that this programme should be used as a basis for study in different countries of the world, provided that certain modifications are made to allow for local conditions.

In doing so, the Commission started from the premise that the primary aim of the study course, no matter at what type of educational level it is introduced, is to impart knowledge in the field of nature conservation to students in a way that these students, once they become skilled specialists could, in their future spheres of activity, make a valuable contribution to the conservation, rational utilisation and rehabilitation of natural resources. At the same time, they would help to popularise the concept of nature conservation among a wide section of the general public.

The Commission is convinced that the object of the course of studies will be achieved if young specialists come to comprehend the principles of nature conservation as an integral part of their approach to world affairs, and civic responsibilities.

When preparing a draft of the general programme for this course of studies, use was made of materials provided by the Commission on Nature Protection of the USSR Academy of Sciences as well as information and other available material concerned with conservation education in other countries.

In July 1961, copies of the draft of the general programme of the course of studies entitled "Conservation of Nature" were sent to members of the IUCN Commission on Education, to the members of the Executive Board of IUCN as well as to a number of other specialists in different countries for their comments, amendments and suggestions.

The suggestions received were very valuable and were taken into account when the text of the programme was revised.

In this general programme, we have tried to elucidate as far as possible the wide range of problems facing the conservationist.

The Commission on Education considers it necessary to point out that different sections of the lecture programme should be elaborated or reduced according to the type of educational establishment and the character of the natural, economic and social conditions existing in the country concerned.

For this reason the number of hours devoted to lecturing on different sections and themes of the programme, as well as to the practical training and field excursions are not indicated. The amount of time devoted to studying the material contained in this programme will depend very largely on individual circumstances. Nevertheless, it is desirable that the study course be based on a full academic year with an average of two hourly periods per week.

At the time of the VIIIth General Assembly, held in Nairobi, the Commission held a workshop on Conservation Education for Specialists of the African Countries, the IUCN published the papers and an account of the discussions as a supplement to the Proceedings of the VIII General Assembly, and this includes examples of experience in education and propaganda in nature conservation from many countries, as well as an assessment of international aspects of the problems.

This supplement is of interest to teachers in different educational establishments, and to scientists and other specialists who are busy with practical tasks in conservation and restoration of natural resources. It has been welcomed by many people in different national organizations. In the Commission's opinion it would be useful to publish the book in other languages, and arrangements are already in hand for releasing a Russian translation in the USSR this year.

In Lucerne, preceding the IXth General Assembly, the Commission on Education held a Symposium on the "Conservation Education at the University Level", which was also published by IUCN. The material of the Symposium is important not only for its participants but also for others concerned with educational training in institutes of higher education, where important developments can be foreseen in the training of skilled specialists with a sound knowledge of the scientific principles and practical methods of conservation and the rational utilisation of natural resources. It is proposed that the Proceedings of the Lucerne Symposium should be circulated widely to such institutions. These Proceedings were published with the assistance of UNESCO in 1967. The Commission aspires to publish them also in other congresses.

One of the four sessions of the Conference on the Conservation of Nature and Natural Resources in Tropical South-East Asia, held in Bangkok from 29th November to 4th December 1965, was devoted to education and training in ecology and conservation. Many of the 150 participants at the Conference, who came from a number of countries in South-East Asia, took part in providing extremely valuable and interesting papers and contributions to the discussions. In the conclusions and recommendations special emphasis was placed on the importance of higher education and training of specialists, the need for education material and exchange of experience and knowledge, and the need for advisory services.

Another matter considered was the importance of strengthening education about the economic benefits of conservation. Suggestions were also put forward for the creation of a South-East Asia Committee of the Commission, comparable to the very successful North-West Europe Committee, to ensure much greater collaboration in this region.

Tremendous progress has been made by the North-West Europe Committee. Its 4th Session was held at Oslo in 1964 and its 5th at Stockholm in 1965. The major current task of the North-West Europe Committee is the preparation of a Compendium on Environmental Education in North-West Europe. International working parties are obtaining data on roles and characterisation of environmental education in schools and in institutes of higher education, in the professions such as landscape design and planning, engineering, agriculture and forestry, and in adult education. It is hoped that the research and survey work will be completed and the results published during the next two years.

The Commission has put forward a proposal that efforts should be made to develop multi-disciplinary research institutes whose task would be to bring together all aspects of the environmental sciences concerned with the conservation of natural resources. Such institutes, in the opinion of the Commission, should approach the problems of utilising, conserving, and renewing natural resources taking into account that different natural resources collectively constitute natural complexes or ecosystems as well as being an integral part in the economy of each country.

In most cases existing research institutes in different countries study natural resources in distinct compartments, and not on a multi-disciplinary basis. For example, there are soil and agronomic research institutes, hydrological institutes, botanical institutes and zoological institutes, but these, when they consider conservation at all, consider only the separate resources which are related to their own specialist interest and research.

In order to promote multi-disciplinary research aimed at finding solutions to the problems of developing harmonious programmes of natural resources utilisation, which would take into account the inter-relationships of animal, plant, and the physical components of the environment, and the influence of man, it is essential to establish nature conservation research institutes. Such institutes should be staffed by botanists, zoologists, geologists, pedologists, agronomists, foresters, economists and other specialists, including educationalists, working together as a team. Their task would be to provide knowledge and techniques which can be used to develop policies and programmes for the use of natural resources, so that such resources will continue to meet the economic and cultural needs of every country.

To carry out this programme for 1966-1969 the Commission has established two lines of policy. One part of its work will be concerned with education and training at universities and all other institutes of higher education, including those responsible for the training of teachers. Dr. T. Pritchard (U.K.) has been elected vice-chairman in charge of this part of the programme.

The other part of the Commission's work will be concerned with general education matters and with information. Dr. Jan Cerovsky (Czechoslovakia) has been elected vice-chairman in charge of this part of the programme.

The Commission will pay special attention to the needs and achievements of the developing countries in the execution of all aspects of its policies.

The Commission will concentrate on the following specific tasks in the next three years:

1. It will develop a plan for higher education and training to implement the recommendations made at the Lucerne Symposium on Conservation Education at the University level and other similar recommendations made at previous meetings, especially at Nairobi and Bangkok.
2. It will also develop its work on general education and information in the light of recommendations made in the past and in the light of the mounting demand for educational materials and other aids.
3. Steps are being taken to intensify the activities of the Commission to establish more Regional Committees.
4. Further discussion will be held with educationalists and conservationists in South-East Asia to consolidate the educational achievements of the Bangkok conference.
5. Discussions will be held in association with UNESCO towards the creation of an African Regional Committee.
6. Cooperation between Regional Committees will be promoted by exchanging literature and other information and when appropriate by means of joint meetings between Committees.
7. It will develop close cooperation with UNESCO not only in the creation of Regional Committees in, but also in providing advisory services for, the developing countries.
8. It approves the contact with the International Youth Federation for the Study and Conservation of Nature.

9. It will hold a Seminar at the next General Assembly of IUCN.
10. When possible a working group on conservation education will be developed to promote the aims of the Permanent Commission on Conservation Education and support the education needs of IUCN and its members.

In conclusion the Commission would like to note with great satisfaction that in its work it has always met with support and assistance from the IUCN Executive Board, the IUCN Secretariat and other permanent Commissions, as well as from the nature conservation organizations of many countries. The future tasks in the field of nature conservation, education and information are great and serious. The Commission's honorable duty is to participate actively in their solution.

#### 4. 6. The International Commission on National Parks

The Chairman of the Commission, Prof. J.-P. Harroy, introduced his paper.

The various demonstrations of the scientific and technical progress during these last few years has lead to a considerable increase of the standard of living, hence of the consumption of a population which, on the other hand, is steadily increasing. The consequence is that all over the world, increasing deductions have been made upon natural resources, as well as all kinds of pollutions and intoxications of the environment. The measure taken by the governments in order to restrict the damage caused by these over-exploitations and pollutions soon proved to be insufficient, and already a hundred years ago it appeared that beside these actions of general interest but only partly effective, it would be necessary to set aside some portions of the national territory and ensure that in these "sanctuaries" a severe and effective protective status prevail in order to prevent all exploitation and pollution. The national park concept was born, whose exact meaning was perhaps still somewhat indefinite, but whose basic notion was now clearly conceived or felt by each one of us.

It might be necessary to briefly remind the important services a national park can do to humanity. The first category of services is what we now call "conservation action", preserving ecosystems from alteration or even destruction, as well as from the destruction of animal or plant species, sometimes threatened with complete extinction. The second important opportunity born from the creation of national parks is the possibility to carry out within these sanctuaries observations and ecological experiments which could not be achieved in an ecosystem perturbed by human interferences. Finally, the third kind of service a national park can do to modern man is to set aside and maintain green areas where, between his more and more agitated professional activities carried out in a more and more noisy and polluted town, he will be able to find again the calm, fresh air, the sight of natural beauties, from a virgin country to an unfrightened herd of wild game. It is easy to notice that the agenda of the technical meeting of Saturday afternoon 30th March, of Bariloche Conference, among these three points, precisely chose two of the basic themes of the reason to exist of national parks: scientific research and tourism.

It is not difficult to show or to admit that the creation of such national parks or equivalent reserves is of the utmost importance to every country of the world: industrialised or developed countries as well as the others. But it is also obvious that such creations are ever more difficult, due to the occupation and exploitation by an increasing number of Homo

economicus. Rare are the zones where Nature is still left untouched and where, due to some occupation which the authorities have explicitly or tacitly accepted, rights of user or of ownership appeared and are difficult to abolish in order to allow the creation of a national park free from any human exploitation. It is therefore necessary to admit the urgent necessity of creating national parks and equivalent reserves wherever they do not exist in quantities or qualities meeting the future requirements of the population of the country regarding conservation of natural heritage, ecological research and development of tourism.

We should also recall the real difficulties which the authorities have to face when they wish to set aside a national park deserving to be called by this name. It is sometimes already difficult in a democratic State to obtain from Parliament or from the executive power that a national park be officially declared. But such a decree, so difficult to obtain, is only child's play compared with the Herculean task one has to achieve in order that this national park be established in fact. A boring, unpopular task, impeded by continuing political intrigues and lack of financial means must be achieved in order to abolish pre-existing rights and thus ensure a sufficiently severe status. Then come the problems of material organization on the spot, demarcation, appointment, equipment and instruction of guards and wardens, establishment of a network of roads and trails, building of an administrative station, lodgings for the staff and later for the tourists, tourist camps, research laboratories, etc. All these works require tenacity, perseverance and often much money. No wonder then that there are many national parks in the world whose creation has never gone beyond the official decree.

Fortunately, if very much is still to be done to give the world the necessary network of national parks, much has already been achieved up to now, thanks to far-sighted governments, and sometimes thanks also to generous and dynamical men who were able to associate - and even substitute - private initiative to official efforts. In a little more than three year's time will be celebrated the centennial year of the first national park to be called by this name, Yellowstone National Park, created in 1872 by the joint action of American citizens and authorities, to whom we must be very grateful. The size, the status, the effectiveness of supervision of national parks all over the world greatly differ. But their number is however impressive and it is indicated that in Bariloche it will be possible to enumerate the main latin-american realisations in this connection.

It is impossible for me in such a brief statement to achieve this analysis and evaluation. I hope we shall in the course of this conference find an opportunity to meet again and talk about it. I shall therefore briefly enumerate hereafter the number of

national parks and equivalent reserves mentioned for Latin-America in the U.N. List of National Parks and Equivalent Reserves which has just been issued in Brussels. Here is a copy of this volume, whose history and significance will be explained later. Here are the number of national parks and equivalent reserves included on the U.N. List and the total superficies thus preserved:

Argentina	12	national parks	2.641.000 ha.
Brazil	11	" "	308.000 ha.
Chile	4	" "	77.000 ha.
Cuba	4	" "	24.000 ha.
Dominican Rep.	1	" "	5.000 ha.
Ecuador	1	" "	10.000 ha.
Guatemala	4	" "	25.000 ha.
Guyana	1	" "	11.000 ha.
Mexico	13	" "	147.000 ha.
Surinam	6	" "	308.000 ha.
Uruguay	4	" "	3.000 ha.
Venezuela	7	" "	1.422.000 ha.
	<u>68</u>		<u>4.981.000 ha.</u>

The U.N. List was revised up to a year ago and some countries which could today be included, such as Columbia with its important programme under development, are not yet included on this List. The wish is expressed that in the next edition the number of Latin-American national parks and equivalent reserves increase, today is 68 on the 1.205 mentioned for the world, will considerably increase, especially as a consequence of the recommendations made at this conference.

The time has come now to talk about the International Commission on National Parks of the International Union for Conservation of Nature and Natural Resources, the constitution of which was decided in Delphi's theater in 1958 at the sixth General Assembly of IUCN and was definitely declared at the next General Assembly held in 1960 in Warsaw. It has a Belgian Chairman, two Vice-Chairmen, respectively from Argentina and from Sweden, and some twenty members chosen among people at the head of the most famous national parks of the world. From 1958 to 1966 it was presided with an exceptional dynamism by Dr. H.J. Coolidge who only left it to preside IUCN itself. Its secretary is Mr. Fred Packard from Washington. It has two offices, working jointly, one in Brussels and the other in the USA;

The International Commission on National Parks has many hopes and reasons to exist. Its aim is, through its action and that of its distinguished members, to acquire an authority which will give it the possibility to play an ever more important part regarding promotion, coordination and preservation.

Its first concern therefore must be to ignore nothing of what is occurring and what is being prepared in the 'world regarding national parks and equivalent reserves. The Commission should collect a documentation as complete as possible on every existing national park and on every project under process. Its files should be an inventory of the world's national parks including official information, detailed and precise enough to allow an objective evaluation of each reserve, considering its status, size and effectiveness of supervision. And the regular publication of such files, especially if it obtain an international ratification, can then play an essential part in the development everywhere of serious network of national parks, stimulating, locally, the creation of new national parks as well as the careful maintenance of those already in existence.

Now comes the opportunity to refer to the United Nations List of National Parks and Equivalent Reserves which is a kind of world Roll of Honour of the national parks which are effectively organized and controlled. This newly issued U.N. List was prepared by the ICNP and ratified by the Secretary General of the United Nations before being submitted to the Ecosoc. The drawing up of this official list was decided as soon as 1959 by this Ecosoc. A first edition was issued in 1961 and 1962, as an Ecosoc document prepared by the ICNP and an addendum issued by IUCN. At Seattle, at the first world conference on national parks, it was decided to modify the structure and presentation adopted for the first edition and henceforth select the protected areas according to objective criteria to be chosen by the ICNP. These criteria were established at the 8th General Assembly of IUCN in 1963 in Nairobi. They were methodically, and sometimes with difficulty, applied after 1963 to end with the present publication in 1967.

Second basic purpose of the ICNP: the constant elaboration of the doctrine regarding national parks and equivalent reserves. That is why it must organize as many confrontations, meetings and investigations as possible. It had a unique opportunity to play this part in 1962 when it organized the first world conference on national parks held in Seattle, at which there were 145 delegates from 63 different countries beside an equal number of American specialists representing every member-state. It is a pleasure for our Commission to find in Bariloche a similar opportunity. Its aim is to succeed one day to induce an international agreement on the definition of what could officially be called, everywhere, a national park, compared with reserves having a poor or badly enforced protective status, which would be internationally denied this name. Untiringly, in spite of the difficulties, it wishes to go on with its task of coordination agency.

Beside this possibility of collecting and standardising, the ICNP's wish is to play a direct and active part, whenever it is

authorised by governments. Its hope is, let me repeat it, to obtain an increasing fame which would give a greater importance to its interventions. It wishes to eventually intervene in favour of a national park threatened by some exterior pressor or assist the efforts made in favour of a new park. If its advice could be useful, the Commission is ready to answer any question or send a representative to make, on its behalf, an enquiry or planning project. It can also, in order to assist the maintenance or creation of a national park, attempt to secure the assistance of international agencies or induce contacts between authorities of contiguous countries in favour of parks located on both sides of the border. Its interventions, logically, should deal with the three main purposes of national parks: conservation, research and tourism.

An important addition to these three purposes is another mission of the ICNP: a close collaboration with the "Conservation of Terrestrial Communities" of the "International Biological Programme". Everyone is aware that this Section IBP/CT chose as the basic theme of its action, to establish a list as complete as possible, of every important ecosystem of the world and ensure that at least one sample of each of these ecosystems be somewhere strictly and effectively safeguarded. Obviously, this IBP/CT objective must be closely linked with the ICNP's work, which is to establish a list, as correct as possible, of every ecosystem already affectively protected in the world. The comparison between these two IBP/CT and ICNP lists will give the ecosystems still to be protected. A joint action of these two international agencies will enable the filling up of the gaps thus found. The wish is expressed that this comparison will be possible thanks to the U.N. Special Fund.

An essential reason to exist of the ICNP is to place the national parks problem within the general framework of Conservation of Nature and Natural Resources. In other words, it is the ICNP's task to achieve as many joint actions as possible with the five other IUCN Commissions. Needless to make long comments to explain the research link it has with the Commission on Ecology the conservation of species concern it shares with the Survival Service, the place taken by national parks in the Landscape Planning Commission's work, the important part played by the juridical aspects in the ICNP's task, which are duly dealt with by the Commission on Legislation. Last, but no least, nothing can be done regarding national parks and equivalent reserves without the assistance of the élite at the head of the country as well as its citizens, without the adults and youth, which should be duly prepared by an appropriate informative and educative action: an executive cadre should also be duly prepared for the tasks which await them. This shows the importance of a close relationship between the ICNP and the Commission on Education of IUCN;

Finally, it is necessary that this statement made by the Chairman of the ICNP present to participants to the Bariloche Conference, a brief balance of what has already been done by his Commission. This enumeration will be longer than one might have thought, thanks, let me repeat, especially to its first Chairman, Dr. H.J. Coolidge, now President of IUCN. We shall therefore, in this preliminary statement only mention, beside Seattle Conference, Bangkok Conference in 1965, called "First International Conference on Conservation of Nature and Natural Resources in Tropical South East Asia" and the preparation 1961, 1962, then in 1967 of two editions of the United Nations Lists of National Parks and Equivalent Reserves. We should also mention L. and M. Talbot's mission in Asia before Bangkok Conference, several missions made in Central Africa by the Vice-Chairman of ICNP, Dr. Kai Curry-Lindahl, several important publications, including Seattle Proceedings and Reports, especially those of G. Ruhle and A. Petrides, and a most precious "Systems Approach to Park Planning", which its author, William Hart, could conceive during the several missions he made as "consultant of ICNP" in Korea, Columbia, Zambia and Turkey. The less deserving realisation of the ICNP is certainly not to have given birth to the CLAPN, the Latin-American Committee on National Parks, whose numerous activities, and, especially the part it played in the inter-american conference held by DEA at Mar del Plata in 1965, must certainly not be mentioned to participants to the Conference of San Carlos de Bariloche.

#### 4. 7. The United Nations Educational, Scientific and Cultural Organization.

Dr. J. Garrido, a representative of UNESCO presented his organization's policy statement.

On behalf of Unesco I am extremely pleased to be among you, the leaders of conservation in Latin-America, and I can assure you that, in the attempt to face the numerous conservation problems that besiege Latin-America, Unesco has fully embraced your cause. This is, of course, only logical since Unesco itself is so deeply involved in many of the activities which are the themes of the present conference. It is perhaps unnecessary to point out how much each of the three activities of Unesco, namely education, science and culture, are involved when it comes to natural resources. What is more, one cannot help thinking that there is a powerful relationship between a better conservation of natural resources and the attainment of one, probably the most, important objective of Unesco, namely the achievement of mutual understanding and respect among the different people of the world and its immediate corollary, namely, peace.

At first this relationship may appear remote to those not acquainted with Unesco's work, but if the intermediate steps are analysed, it becomes more and more real. This is naturally due to the fact that the achievement of a good comprehension of nature and its laws followed by the building up of a harmonious relationship between man and nature, demands above all, ecological thinking; it demands the understanding and planning of mutual interaction of man and his environment including other men, and above all, the understanding by man that this environment is to be preserved for posterity, indeed that his own survival depends on his efforts since man has now the power to shape the world of tomorrow.

But, has he really this power? A closer look reveals that he is usually overconfident when he deals with his environment. There are definite limits in using the resources of the biosphere and abuse will break the ever more precarious balance. The outcome reveals itself in a chain of disastrous consequences of which unfortunately we are witnessing ever-increasing examples throughout the world. All this is only too evident for those who have gone through this process of ecological thinking. The end result is what so many have called a decrease in the "quality of life", a concept which I would hope is to be given much more serious consideration by those land use planners who wrongly believe that technology applied to the modification of landscape can overcome any difficulty.

But even ecological thinking is not enough. To be effective, it must be preceded by thorough understanding of ecological laws. These are based on sound scientific principles, about which we only know very little at this stage. Hence, it is only through knowledge of basic science and the application of the correct technology derived from it, that we can materialise the philosophy expressed by "ecological thinking". To achieve this goal and to have it accepted as official policy, we will have to go a long way. In an era where so many countries are driving towards development "coûte que coûte", usually placing immediate political advantages before long-term conservation aims, we are fighting against great odds to achieve a change in trend. Favourable change, as many of you have personally experienced, has come as a cultural manifestation due unfortunately not to man's foresight, but from the catastrophes arising from unwise use or rather excessive abuse of natural resources. Fortunately, this powerful motivation has been strengthened lately by new social values. There has been a new force, a longing for the preservation of aesthetic scientific, educational and other values, which is shared by an ever-increasing proportion of the population. Demographers, for instance, are pointing out that recent years have witnessed a larger proportion of urban dwellers, a trend which is likely to continue in Latin-America. Many of them are of rural extraction and sooner or later will manifest a craving for some renewed contact with nature, away from the city life. While the satisfaction of this desire was first restricted to the class economically favoured to meet it, it has trickled down to other economically less favoured classes of society. Scientists too are becoming increasingly aware that there is no substitute for outdoor laboratories. The International Biological Programme has set up an ambitious programme geared towards increasing productivity and demanding as a necessary condition the setting up of biological preserves in different settings or ecotypes where the necessary scientific work can be carried out. Finally, educators are increasingly conscious of the useful teaching aids that natural environment can and does provide.

A better understanding of the values of natural environment, however, has produced good and adverse reactions. The favourable aesthetic feelings and better use of natural settings for research and training can and, in some instances, have been channelled into promoting better knowledge and setting up organizations geared towards better management of natural resources. But it has also brought about a deterioration of the natural resources usually because of initially unrestricted attitudes towards building, encroaching, spoiling, collecting species, and other forms of modifying the natural setting. All these trends have been recent phenomena and, as it usually happens under those circumstances, action for remedy has very much lagged behind the needs. It takes considerable time, money, and convincing capacity to set up the necessary bodies, usually governmental bodies, to deal properly

with such an explosion and to bring back a state of equilibrium between the natural feelings of the population and the proper management and preservation of the assets so as to obtain their maximum yields in the long run. Our task then is to channel the solutions to re-establish the desired balance, between man and his environment. This is no easy task, especially in a continent which is in the middle of the so-called "revolution of aspirations" - or maybe "unfulfilled aspirations" - where the word "conservation" is frowned upon because for many it implies the stopping of progress and where traditionally nature has been a hindrance to development and where forests and other types of natural vegetation are considered as obstacles to be cleared to allow for the production of food and other values. Even "wild animals" have a connotation of "beasts" or enemies of man and their immense value for preserving ecological balance or for promoting the cause of science and education is acknowledged by only a small selected group. Asking governments to take action and to induce changes immediately brings about the question of conflicts of interest and of priorities to be decided upon. Presently, in the minds of many government leaders and among them there are certainly well intentioned leaders, conservation enjoys a low priority. Natural resources are qualified with such sentences as "waiting to be used by man", "the land's riches lying idle", "the immense potential productivity of the tropical lowlands" and other catch phrases which are full of promises, but lack basic knowledge of the facts. It is also unfortunate, but in a sense logical, that political leaders will often advertise their successes beyond all reality while the immense failures connected with the deterioration of the natural resources are utterly ignored. Because such ignorance has become tradition and is passed on from one government to another, we have unfortunately become accustomed to this inertia carried over from the past as well as to the usual protests or rather lamentations that follow in the sequence. Here again, it should be understood that it is exceedingly difficult to change past routine procedures and to introduce new concepts and new programmes. But it is possible and certainly worthwhile since the present trends clearly show that a unified campaign to make the most from the favourable factors can greatly contribute to achieve the desired change. Even economics should be used, that is wisely but not exclusively. The economic success, both direct and indirect of national parks is an outstanding example.

It is only when the leaders and their advisers begin to think ecologically and when there are sufficient of those, that is, not only in numbers but also in the strength and the common front displayed in their support for such ecological thinking, that we can really achieve progress. Unfortunately, this need for unity among leaders is not sufficiently understood. Although all energies are needed to convince governments in taking appropriate steps, one often witnesses personality conflicts and much wasted talent in promoting the cause of conservation. History has shown

that the turning point between customary destruction and a healthy change in attitude towards natural resources can be achieved only when the ratio between progressive and united leaders and their supporters on one side and "the rest" on the other has reached a certain breaking point, before which many attempts are doomed to failure and will only remain as historic premature attempts. Latin-America has perhaps one of the most voluminous collections of strongly worded forest laws including conservation, but they are usually coupled with a rather ineffective application. These laws may be well intentioned, but they only express the gap between wishful thinking and reality.

And here is where the third activity of Unesco, namely education, plays such an important role in helping those who are breaking this sterile chain. While we are all aware that education usually bears long-term fruits, its action is nevertheless irreplaceable. Repressive methods are no substitute. Only through proper training of local citizens can we achieve this ratio of respected leaders which history has demonstrated are the movers of progress. Outside help, from any organization, including Unesco's, is doomed to failure if such help is not backed inside the country by a core of respected leaders. It is with this aim in view and also because in this age of communication and of closer dependency and interest among the different countries of the world, that Unesco feels that as an intergovernmental institution it can successfully support the aspirations of this new group of leaders who seek reinforcement in helping them to convert a larger number to their cause.

As an immediate objective, Unesco, with the participation of the UN, FAO and WHO, and in cooperation with IUCN and IBP, is organizing in September this year an intergovernmental conference of experts on the rational use and conservation of the resources of the biosphere. From the deliberations and resolutions of the conference, light will be shed as to how modern science can help in defining methods for the rational use of the resources of the biosphere so that man can take advantage of them while at the same time conserving them. The role of present scientific knowledge and planning the rational use of the resources will be evaluated and the main lines of action to be taken at national and international level will be determined. The conference will specify what are the principal gaps to be filled and the priorities to be respected. Three commissions dealing respectively with research, education and scientific policies and structures, will bring out the feelings and suggestions of the participants in order to draft resolutions to be discussed and which we hope will be widely circulated and applied by the 123 member countries of Unesco. If there is a general theme behind this conference, it is one which I know is very dear to all of you, because it involves again and essentially "ecological thinking". Unesco, following up the resolutions of its General Conference and the

recommendations of the Advisory Committees, would like to see man and natural resources looked upon as a dynamic balance which has been unfortunately handicapped by past inertia leading to the deterioration of natural resources.

For the forthcoming Economic and Social Council meeting of the United Nations (ECOSOC), a basic report on conservation and rational use of the environment was prepared by Unesco and FAO.

We believe that knowledge of the scientific facts and adequate actions by the appropriate authorities can bring about a healthy change, a change in which the voice of the true conservationist will be of paramount importance. And by "true conservationist", it is meant of course to designate not only one who thinks, with a scientific base but also one who is at the same time progressive, dynamic, and above all realistic, in view of population's changing needs. In the past years, we have learned about man's ever-increasing ability to modify and control nature. It is time now that he recognises his ever-increasing dependency of nature and that he moves towards changing past attitudes and programmes.

Unesco, in strengthening its programme in ecology and conservation within its regular programme, by promoting the cause of conservation in its different aspects as part of rational use and throughout the world, is definitely moving into this common cause. In doing so, it not only responds to the expressed wishes of the member countries that constitute its governing bodies, but it fully embraces the causes that motivate the present conference and hence Unesco will strive to make this conference as successful as possible, not only during the days we will meet, but also during the arduous process of following up so as to achieve the greatest possible impact.

#### 4. 8. The Food and Agricultural Organization

Dr. Fernando Barrientos, a representative of FAO, presented his organization's policy statement.

##### Introduction

The conservation of nature and natural resources is of obvious importance to FAO, concerned as it is with practical measures for accelerating the rate of food production and agricultural development and constantly aware, as we all must be, of even greater proportional population increases.

We recognise, of course, the two different major aspects of conservation: on the one hand, protection, so that parts of man's natural environment do not disappear from the face of the earth; and on the other hand, management of the resources on a continuing stable basis. We incline to a positive, practical, active view of conservation, as several of the papers we have prepared for this meeting imply or suggest. We see conservation in a very broad way. Not only it is ecological common-sense but, in the long run, it is economic and social common-sense as well.

Within our organization there is an increasing awareness that our activities take place within the ecological limitations of the regions, the large catchment areas, the specific hillsides, plains and river flats of the world; that whilst these limitations may, under certain conditions, be greatly changed, we must recognise that the vastly different potentials are by no means unlimited. We are also aware of social and economic aspects of development which mingle with the ecological factors so that in discussing conservation, as in discussing the development process itself, all three sets of closely interdependent parts must eventually be considered as part of our routine thinking.

Latin-America presents one of the most difficult challenges for conservation of any other large continent in the world. Ecologically the environments vary tremendously from the permanent snowy heights of the Andes to the dust dry deserts of Peru, from tropical to temperate rain forests, and from Caribbean turtles on the beaches to Cape Horn penguins. The avian and mammalian fauna attract international attention not only because they are unique but also because of their great economic importance.

The people of the continent also differ greatly. Over vast areas are people who entirely depend on their own activities: hunting, fishing, gathering, which are marginal to modern technology. For instance, gathering of vegetal products very often presents the main source of vitamins A and C, and such gathering

activities allow many populations to diminish the effect of the pre-harvest food shortage and unforeseen famines. Likewise, fish and small animals (rodents, birds, lizards, snakes, frogs, snails, insects, larvae of various species) often constitute the main animal protein intake of some of the most isolated groups. An important sugar resource for these people is the gathering of wild honey.

All this diversity of ecosystems, human populations, present levels of development, when added to the differing nature of the history and present objectives of development of each country, implies an even greater diversity of needs.

No attempt will be made to review the details of the complex ways in which FAO is organized to become aware of the needs of various countries and to develop the various types of assistance programmes. However, it is important to note that whilst ideas resulting in action can come from international meetings such as this one, as well as from FAO Conferences of various types, ultimately most requests come directly from individual governments. In discussing FAO's interest, it is thus rather more accurate to refer to the FAO programme related to conservation which is based on Latin-American countries' individual and regional interests and needs.

#### The FAO Programme

Examples of FAO activities relating to conservation involve, to some extent, all Divisions and Departments of FAO. Because of the special interest of the sponsors of this meeting in National Parks and wildlife, this aspect of our activities is discussed first and in much greater detail.

##### - National Parks and Wildlife

Following the African Special Project, where a two-man team assisted 19 different African countries, interest in this field has been growing and there is now a wildlife, national parks and forest recreation section in FAO dealing with these subjects, working as an integral part of forest management and relating appropriately to other forms of land use.

Projects already completed by wildlife officers, along with requests in hand, involve national surveys of the wildlife resource, help with the formation of legislation or with the organization of administration. Requests are made for specific research to facilitate various aspects of wildlife management such as hunting schemes, the preparation of management plans for national parks and tourist development, or harvesting wild animals for meat or animal products. Other projects deal with animal problems such as conflicts with other forms of land use, the question of animal introductions or the preservation of rare

species, the effects of insecticides and problems of damage to forests, crops or stored foods. Two projects give assistance in conservation education and public relations, and several projects deal with training at medium-grade or university level.

The programme of assistance with wildlife and national parks management is growing rapidly with four experts and consultants in the field in 1963, six in 1964, nine in 1965, nineteen in 1966, thirty-eight in 1967 and forty-eight already foreseen for 1968. Of 1968's total, ten experts are in Latin-America. The scope of interest within FAO has also broadened and now includes the interest of Plan Protection, Animal Production and Health, Rural Institutions, Land and Water Surveys and Legislation Research.

Although initial emphasis was placed in Africa, projects and requests for assistance are already underway in Latin-America, the Middle East and the Asia Pacific region, and in the meetings of the Latin-American Forestry Commission held in December in Trinidad, there were enough specific requests for assistance to justify a special mission to several countries of this region, preceding the present meeting.

National parks and wildlife conservation measures must take into account local and national needs and, indeed, development of activities associated with national park and wildlife management may provide opportunities for isolated forest populations successfully integrating into more complex and advanced economies.

#### - Training in the Field of Wildlife and Wildland Management

Training in these fields is done to some extent in various universities in Latin-America and in recent years FAO has assisted with the formation or strengthening of such courses.

Four United Nations Development Programme Special Fund (UNDP/SF) projects include forestry training at university or post-graduate level and various aspects of conservation are included in this training. Two in particular may be mentioned. At the Inter-American Institute of Agricultural Sciences, Turrialba, Costa Rica, an FAO wildlife expert now instructs in wildland management, including forest protection, recreation, national parks and wildlife management. At the Universidad Agraria, La Molina, Peru, another FAO expert gives courses in wildlife management and national park management and has, in collaboration with his Peruvian counterparts and another FAO colleague, achieved some progress in the protection and study of the vicuna and in completing surveys describing the economic value of wildlife in the country.

Three Special Fund projects train forestry technicians at the ranger level. The school at Conocoto in Ecuador, for example,

has a course in soil and forest conservation and wildlife management.

Several countries have sent students on FAO fellowships to train in North America or Europe and this year several countries in Latin-America are arranging for fellowships to send students to the Course in National Parks given jointly by the University of Michigan, the U.S. National Park Service and the Conservation Foundation. One of our FAO experts is assisting with the instruction given in this course.

Particularly within the past decade resource surveys undertaken by FAO have broadened their scope to include national parks, wildlife and recreation areas.

Special Fund projects deal with surveys of natural resources, and several of these have included experts to assess the potential for national park or recreational development or for utilisation of some form of wildlife existing in the region. For example, a project in Venezuela included an expert to survey the potential for wildlife and national parks and recreation developments.

Two Special Fund projects assist with the formation of forestry policy and with support for national forestry surveys. One of them, in Chile, includes an expert in development and management of national parks.

Seven Latin-American projects deal with the field of forestry and watershed management and development, and each of these must relate generally to the broad field of conservation.

Another form of study requested by governments are pre-investment studies for resource development, and four such studies are now in operation in the general field of forestry in Latin-America. A project in Colombia on integrated development of two river valleys included a consultant on national parks.

Although greater emphasis has been given here to training in forestry, wildlife and wildlife management, there are other projects in Latin-America in which FAO is providing training in conservation. For example, FAO is assisting with the development of agriculture training programmes and research institutes in Ecuador, Uruguay, Mexico, Haiti and Nicaragua. A consultant in soil and water conservation is with the Instituto Interamericano de Ciencias Agrícolas de la OEA, Turrialba, Costa Rica, and in Argentina, there is a soil conservation specialist assisting the Government with the Soil Resources Survey of the Pampa Region.

- The Wildlife Potential

In some parts of Latin-America, wild animals, birds and fish are almost the only source of protein for local inhabitants. Recent investigations in the Peruvian selva show that varying proportions of fish and game meat make up together at least 85% of the animal protein consumed by local families. In some high altitude areas, guanaco, llama and alpaca are an important source of meat and on some coasts, turtles are heavily exploited for local consumption and for sale. Little is known of the effects of present use or if the present off-take can continue.

Guano deposits created by sea birds are very profitably exploited on islands off the Pacific coast of Ecuador, Peru and Chile. Further south, fur seals are a valuable resource. Alligator skins are in such demand that intensive hunting has drastically reduced alligator populations in many lowland swamp areas of Central America. Argentina sells many nutria and Colombia sells wildlife meat and skin products. Jaguar and ocelot skins are increasingly being seen in fashionable stores in Europe and America.

Trade in wild animals and products of wild animal origin is an important commercial enterprise in some areas. For example, wool from wild and semi-wild populations of vicuna as well as from guanaco calves or alpaca is harvested in Peru, Ecuador, Bolivia, Argentina and Chile; this, combined with meat production, makes the Auchenidae the most important group of animals in land utilisation in agriculturally marginal high altitude areas.

An enormous wildlife market operates from Iquitos in Peru, and it was recently estimated that the value of hides, skins and live animals exported is only a little less than one million US dollars a year. This trade is based on hunting throughout the Peruvian Amazon basin where a class of professional hunters and middlemen have grown up. The great majority of these products are exported directly abroad from Iquitos, almost all the live animals and birds going to Miami in the USA.

The sale of skins of Latin-American carnivores is of considerable importance to several countries and, at the moment, two countries are negotiating with FAO for projects to learn the effect of present hunting on large carnivores and to consider ways and means of placing the harvesting on some kind of stable continuing basis. In their view, this wildlife resource is simply too valuable economically to leave its survival or disappearance to chance.

It is already clear that the wildlife resource is considerably more valuable than can be demonstrated. This is easily understood when one considers differences between countries with

respect to export regulations, and other regulations controlling wildlife, the capturing or shooting of birds and mammals, the lack of records of annual removal from the populations, the different departments involved with different aspects of the wildlife resource and the lack of adequately trained personnel to sensibly manage this resource.

#### - Wildlife Problems

Wildlife problems in Latin-America are similar to those in other regions in that they arise because of some conflict with other forms of land use. It is to the extent that wildlife consumes crops, competes with domestic animals, damages human life or property or spreads disease that wildlife is regarded as a problem.

Introduced animals can become problems, or they can be introduced into new regions without becoming problems and in fact become distinct assets to the faunal resources of the region. In this connection, the two main variables are the species introduced and the exact nature of the habitat receiving them. If we would profit from lessons learned in other continents, it is only a matter of time before increasing efforts are made at a greater number of introductions of various kinds in Latin-America. This may be good, but it can be bad for conservation. It is certainly a subject which merits further careful study and consideration by future national and international conferences in this continent.

A FAO project in the Patagonia Region of Argentina has a problem involving gophers, hares and geese, which are said to interfere with management of sheep and an appropriate solution is being sought. Control of wildlife problems of this type is an important function of wildlife management, and it is essential that the problem be considered within its wide ecological aspects, including land use policy, rather than as a simple exercise in killing as many pests as possible.

Bats are important vectors transmitting disease in livestock and thus affect public health. The role of wildlife as a reservoir for known, and also unknown transmissible pathogens, needs much more study, particularly in Latin-America. This knowledge, as has proved in Africa, is closely related to problems of land use and formulation of wildlife management policies, including wildlife control programmes. FAO operates a UNDP/SF project in Mexico which is concerned, in this context, with paralytic rabies in cattle and ecology and control of bats as transmitting agents.

#### - Legislation

The formulation of new wildlife legislation is often one of the first tasks undertaken by governments, and FAO is already

active in this field in Latin-America. For example, a forestry adviser in Honduras, at the request of the Government and in consultation with the FAO Legislation Research Branch, has prepared a new hunting law which is at present before Parliament.

FAO keeps under continuing review all national park, hunting and wildlife legislation of Latin-American countries and, upon request, assists in the improvement of existing legislation or drafting of new texts.

FAO has recently published a survey on legislation governing the movement of animal semen, and a study on Central and South American veterinary export and import regulations will be published in the near future.

#### - Regional Working Parties

FAO has a number of standing committees or working parties which cover various aspects of conservation and management of natural resources. Chief among these is the Latin-American Forestry Commission, which met for the first time in 1948 in Rio de Janeiro and meets on average every two years. In addition to its normal activities, it has formed three committees on Research, Watershed Management and National Parks and Wildlife. This last committee met for the first time at Curitiba, Brazil, in 1964. At its second meeting in Trinidad in 1967, it adopted a document setting out the basic concepts for a declaration of principles for national parks and a draft bibliography on national parks, wildlife and wildland development in Latin-America.

#### Examples of Action in the Broader Aspects of Conservation

As mentioned above, for FAO the conservation concept is an integral part of sound development and sensible use of all renewable natural resources. While recognising fully the value of national parks and wildlife, if conservation is to be truly effective on a national and continental basis, it must be an integral part of our activities relating to each renewable natural resource. We can no more separate conservation from agricultural or forestry developments than we can separate soils from the ecosystem.

Of the 99 UND/SF projects, approved, operating or under discussion in Latin-America, about 40 have a direct relation to some aspect of conservation and management of natural resources. There is a total of about 241 individual FAO experts under the UNDP Special Fund or Technical Assistance Programme in Latin-America, whose work touches directly on some aspect of conservation, management or wise use of natural resources. In addition, there are about 200 citizens of Latin-American countries at present holding FAO fellowships for further study in their particular subject.

- Soil and Water Conservation

In Latin-America 32 projects in 17 countries (Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela) are directly concerned with soil and water conservation. These projects are manned by 91 FAO personnel.

Soil conservation is commonly equated with the mere prevention of erosion or with the restoration of areas in which accelerated soil erosion is already taking place. Modern thinking, however, assigns to soil conservation a more comprehensive and a more positive role in that sustained improvement complemented by the preservation of available resources is the central concept of the modern conservation effort.

FAO recognises that so vital a matter as the sustained improvement and preservation of soil resources must occupy an important place in all agricultural planning, from the national level to that of the individual unit of land use.

A first step towards rational soil and water conservation programmes is the preparation of topographic and soil maps for the area to be treated. Preliminary studies, based on reconnaissance surveys of natural resources at mapping scales between 1:100,000 and 1:250,000, can serve to indicate the broad pattern of land use best suited to the country as a whole and to indicate areas where natural or man-made hazards threaten soil resources most severely.

Intermediate scales of resource survey (about 1:50,000) provide data suitable for planning broad soil conservation measures within a single region, such as an individual watershed. Indeed, the planning and implementation of soil conservation measures, together with associated measures for the conservation and control of water, are among the key issues of watershed management. An area may deserve high priority for such study either because it offers great potential for development or because, being highly unstable, it poses a severe threat to more valuable land downstream.

In its most positive sense, however, soil conservation dealing with both sustained improvement and preservation requires detailed knowledge of the nature and distribution of the soils. Conservation measures need to be designed in relation to effective soil conservation programme needs to be based on a sound conservation plan developed at the level of the unit of land use (e.g. the farm or the forest) in a series of stages.

Detailed soil surveys are required to identify and map kinds of soil on the basis of differences in their permeability, depth, drainage, texture and other characteristics which are significant

in assessing the productivity of the soils and their relative susceptibility to erosion.

This information must be interpreted to show its practical significance in relation to other aspects of the environment. Such interpretation leads to the preparation of land-use capability maps.

To complete the information provided by the land-use capability maps, the collection of hydrologic and meteorological data is also necessary to build up a comprehensive picture of environmental conditions; and later by proper interpretation of these data, the development of sound methods of water control and use within the conservation area.

Using these interpreted survey data, agronomists, foresters, agricultural and water engineers, economists and other technical experts may assess the technical feasibility of alternative land-use patterns, and of alternative systems of management within these patterns, which promise a maximum productivity without risk to the soil resources. Where soil erosion is already in progress, or the prevailing combination of topography, climate, kind of soil and water regime points to exceptional erosion hazards, the problems differ only in degree, but special attention must obviously be given to planning forms of land-use and of management appropriate to such unstable conditions. The greater the risk of erosion the more limited will be the choice of possible forms of land-use and the more ambitious, and perhaps more numerous, will be the anti-erosion techniques required.

Alternative forms of land-use, or of management, are usually technically possible and a variety of uses may be proposed by different public and private interests. The economic and social merits of each alternative should be evaluated on the basis of cost-benefit calculations and in relation to present and desirable trends in land-use before a selection can be made of the combination of alternatives likely to prove most acceptable from a national, regional, watershed, or area point of view.

Finally, soil and water conservation programmes require that the engineering aspects, especially at the using unit level, be carefully evaluated with a view to designing and constructing the most appropriate soil and water conservation works and practices: such as terraces, strip cropping and waterways; and particularly designing those crop production practices adapted to conditions for better erosion control.

The increasing use of tractors and power-operated equipment seeks to introduce improved equipment and methods of machine use, together with farming practices which permit continuing production from erosion-susceptible soils. It is widely known that

mis-use of tractor power and the improper choice of tractor-operated implements and machines has been responsible for disastrous erosion in many parts of the world. In dealing with the operation of tractors and equipment, advice is provided on suitable equipment, methods of machine use, and farming practices which are the most practical and economic solution to the problem of soil erosion.

#### Resource Surveys including Pre-Investment Studies and Planning for Development

In Latin-America, because of the tremendous potential for the production of protein by using domestic grazing animals, the primary grassland resource deserves and is receiving special attention by several countries.

One of the difficult problems to solve in the development of many countries is how to achieve a gradual improvement of the total animal environment under the existing difficult ecological conditions. With this in mind, local authorities are requesting assistance in a more efficient utilisation of the livestock production resources.

Two specialists in Grassland Survey Ecology have been working in Argentina for the last three years applying the Australian concept of land units and land classification system. Several pilot areas have been surveyed, mainly in the region of Mesopotamia and Patagonia. The information, which covers different fields such as soils, geomorphology, geology, climate, vegetation, is processed and interpreted in an integral way. This information is essential in order to plan development of conservation policies.

A specialist in semi-arid pastures is carrying out range studies in the northern part of Chile (Arica, Antofagasta, Ovalle). The progressive deterioration of the natural grassland, mainly due to overgrazing by goats, has seriously affected the economy of the Indian population of the area and several approaches to grazing control, as well as range re-seeding are being investigated and carried out.

In Brazil a rational range management method, adapted to Rio Grande do Sul local environment, is being carried out by a pasture expert in order to develop range management techniques suited to the area, to meet the physiological requirements of the cattle, particularly during the critical period of winter stress, and to develop conservation methods necessary for the maintenance of a vigorous natural sward.

Fifteen experts in twelve Latin-American countries are presently engaged in an inventory of the forest resources, a first step towards the rational use of this important Latin-American resource. It is important to note that in recent years there has been a

trend towards including non-timber uses, such as watershed protection, recreation and wildlife, as an integral part of the forest estate and techniques for including these aspects in the forest inventory are improving.

Likewise, projects oriented around secondary levels of production must also work both backward to include the primary resource, and forward to the consequences of over-use.

As an example, a Sheep Husbandry Research Project in Patagonia is operating with the purpose of assisting the sheep industry by conducting applied research and demonstration with emphasis on improvement of pastures, on control of soil erosion through proper range management, as well as on the nutritional, health and breeding aspect of sheep husbandry.

#### - Genetic Resources

Changing agriculture, and the destruction of natural habitats with the advance of urban and technical cultures, has already reduced a great part of many plant and animal species until some have become extinct and others are imminently threatened. This insidious destruction of genetic resources is too often overlooked by conservation and others because of the failure to include in the concept of "species" the notion of its full genetic diversity. The implications to production are such, however, that urgent explorations and collections have been mounted by FAO and other agencies to attempt to stem the genetic losses. The unique genetic resources of the potatoes are being explored. The few remaining local races of maize have been collected. Attempts are being made to enrich the racial poverty of coffee through collections in the region of origin. The racial diversity of quinoa, cassava and other crops, is also being explored. Last September in Rome, FAO and the International Biological Programme brought together scientists and government representatives from every part of the world to set up an urgent programme of genetic conservation. Several FAO projects incorporate elements of genetic resource conservation. However, so far the efforts have been directed at urgent problems and species of major economic importance.

For example, a project in Bolivia is collecting quinoa types in the Altiplano region. These are now used as breeding material to obtain saponine-free varieties with high protein content which will offer the possibility to this region of increasing the production and consumption of this important staple food for a great sector of the Indian population living along the Andean ranges. Similar work is under way with native tubers (Oca, Papa lisa, Isano) which are also an essential element in the Indian diet.

The task is of such magnitude that it must be supported from many directions, by all organizations concerned with conservation, to preserve not only species of use and of beauty, but also many of the special habitats in which they have evolved and which they need for continued survival.

### Publications

Recently established in FAO Headquarters, a documentation center has already placed the majority of FAO publications on a quick retrieval system. In combination with other national and international documentation centers, national regional documentation centers are being formed to provide an important service for research and development activities.

### Conclusion

Developing countries will continue to develop, notwithstanding the absence of adequate data on soil, vegetation and climate, just as the more highly developed countries did in their early years of development. Ideally, as we move slowly forward with development, we will integrate conservation principles within our programmes, while at the same time obtaining appropriate additional ecological data on which a higher level of stable productivity can be built. We have great need for ecological understanding on which development which incorporates conservation principles may take place, and there is still a long way to go before satisfactory methodologies evolve.

There is an increasing tendency to recognize that practices of sound management must eventually include profiting from lessons of the past as well as planning for the future. It is impossible for FAO, or for any other organization involved with technical assistance in the field or renewable natural resources, not to have the greatest interest and concern for the deliberations of this meeting. Meetings like this can help us to enlarge our understanding of conservation problems of the region and provide us with the opportunity for re-shaping and re-sharpening our ideas which we cannot have too clearly before us in the interests of the future of Latin-America.

COMMISSION ON ECOLOGY

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Thursday 28 March, 1968 : Morning Session

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Introducing the Session the Chairman of the Commission, Professor F. Bourlière, explained the procedure which he proposed to follow for each of the three subjects selected for discussion (items 5, 6 and 7 of the Agenda). After contributors had presented or summarised their Papers, the subject would be open for questions, comments and discussion. From this it was hoped would emerge a general indication of any resolutions which it was agreed to submit for consideration to the final Session of the Conference. The precise wording of such resolutions could be worked out after the Meeting by the Secretary of the Commission in consultation with and assisted by the interested contributors and experts.

5. Vampire bats and the danger of rabies : ecological problems of control.

Four papers were presented as a basis for discussion and, in addition, a fifth paper was subsequently circulated.

5. 1. "Problems and ecological implications in the control of Vampire bats" by Arthur M. Greenhall (FAO).

The author read the Summary of his Paper with certain amendments and additions which have been incorporated in the text, as published in these Proceedings.

5. 2. "Vampire and other bats and their conservation" by Jorge A. Crespo (Argentina).

The author read the Summary of his Paper, as published in these Proceedings.

5. 3. "Ethology and ecology of vampire bats" by Bernardo Villa-Ramirez (Mexico).

Introducing his Paper, the author commented that bats, which had existed for some 60 million years, have since the dawn of human history always been of great significance to man, being variously accorded the attributes of gods or demons. In Central and South America, where the vampire species range from 37°N. in Mexico to 30°S. in Argentina and Chile, these species have become a threat to the health of man and his livestock, estimates of the losses caused by them being put a very high figures in several

countries. Yet the majority of bat species have an important biological role, playing a great part for example in the control of insects. Much more needs to be learned about them, including the vampires. For example, temperature and humidity factors are clearly of special importance in their distribution, but how do they operate and what are the implications? The aim should always be to discover the conditions for maintaining a natural balance.

5. 4. "The relationship of wild animals and rabies : some ecological knowledge of reservoir species, as a basis for the epizootiology and control of the disease" by Dr. G. Bijlenga (FAO).

Introducing his Paper, Dr. Bijlenga emphasized the lack of knowledge of the biology and ecology of many animals concerned. For example, the degree of susceptibility to rabies varied greatly and no firm conclusions could yet be drawn from the laboratory tests or other data available. Much more research was needed and particular attention was being given by FAO's Paralytic Rabies Research project at Palo Alto (Mexico) to a multidisciplinary approach to the rabies problem, including ecological, epizootiological and virological investigations. The possibility of developing effective and economical vaccines to protect cattle against rabies carried by vampire bats was another aspect of the project.

5. 5. "Paresiantic and Paralytic Rabies", by Héctor Enrique Gomez (Argentina) was subsequently circulated for information, and a summary is included here.

## DISCUSSION

The main points raised were as follows :

Chairman : from an ecological point of view the methods used to control vampires are of crucial importance. Techniques which in principle give cause for concern include the dynamiting of caves, which is said, for example, to have already brought about the total destruction of the famous Chilibrillo caves in Panama, together with their unique fauna, and of even thousands of such sites in the S. Paolo region of Brasil.

Greenhall (FAO) : control methods in Trinidad fall under three heads :

- a) old methods - flame-throwing, dynamiting, gas - now abandoned because they are indiscriminate; also the felling of trees used as roosts, use of bird wings in conjunction with lights etc., which have been ruled out for similar reasons;

- b) modern methods - selective shooting or capture by mist-nets, fish-nets and traps set in caves and tree roosts; screening of cattle stalls (but this cannot be applied where cattle-owners are encouraged to leave their animals out to pasture at night); treatment of vampire wounds, to which the bats tend to return, with a strychnine and sugar mixture (but this is a dangerous technique for the unskilled operator);
- c) methods still largely undeveloped - attractants, repellants, sterilisation of bats (but this involves the difficulty that the necessary experimental work was started 30 years too late and cattle-owners are loth to wait for results).

Villa (Mexico) : although many of these methods have been tried in Mexico, none of them provide the answer on a continental scale, because

- a) huge roosts may be destroyed, but are often quickly re-occupied;
- b) the availability of roosts, especially in mountains or other inaccessible places, is so great that total eradication is impossible;
- c) identification of species is difficult for the layman and cases have occurred where trapped vampires have been released but harmless or useful species trapped simultaneously have been destroyed merely because they are larger in size.

It is still essential to develop selective biological or chemical methods of control, because to destroy the whole faunal complex, of which vampires are only a part, would certainly be a disaster.

Bijlenga (FAO) : the ideal solution must be to develop effective vaccines to protect the prey animal; very encouraging results have already been obtained in this respect, which indicate that a single vaccination may immunize cattle for several years.

Magnanini (Brasil) : the control work carried out in Brasil since 1930, by the Ministry of Agriculture and Animal Husbandry and, latterly with FAO cooperation, has been reviewed in a recent publication. It has consisted mainly in direct destruction of vectors. This is a two-edged weapon and can never achieve total eradication, when one has to deal with millions of square kilometres of Amazonian forest, let alone National Park areas where such destruction is morally wrong, being basically opposed to the whole National Parks concept. I support the view that prophylactic vaccination is the best solution.

Roth (FAO) : as with many other wildlife problems, economic factors are involved and these must be carefully considered by those responsible for planning the livestock industry. In many areas cattle are being introduced into areas which are ecologically well suited to vampires, with a resulting risk of a rapide build-up of bats and heavy losses. Basically there are two answers :

- a) to protect the cattle by vaccination or
- b) to destroy the vampires selectively.

But both of these are expensive and the costs must be properly weighed up : in some cases they may be found to be so great as to make it impossible to make more than a very small profit from ranching or even any profit at all. In such cases it may be better not to develop a livestock industry, but to consider other economic uses of the land, in other words, the problem is often one of land planning.

Carvalho (Brasil) : it would be appropriate for IUCN to stress the fact that destruction of caves used as roosts cannot eliminate vampires, any more than destruction of roosts and breeding colonies has eliminated *Quelea* from Africa, and that, therefore, this should be abandoned as a control method. Selective and preventive control is still very expensive, but this simply underlines the fact that ethological, ecological and physiological research must be intensified until better methods of control can be made economical.

Chairman : in closing the discussion on this subject, I think that the wide measure of agreement between the views expressed has clearly indicated the lines on which a resolution should be drafted for consideration by the Conference.

## 6. The Nothofagus forests

Two papers were presented on this subject as a basis for discussion.

### 6. 1. "The Nothofagus forests" by Hugo Correa Luna (Argentina)

The author read the Summary of his Paper, as published in the Proceedings, emphasizing and expanding on a number of points relevant to the stability and maintenance of the numerous Nothofagus forest types. There was considerable evidence of past destruction, often irreversible and, at best, capable of being remedied by regeneration only after a very long period of time. New Zealand experience could well be relevant to some of the factors in this situation, notably the introduction of exotic plants and animals.

6. 2. "The Nothofagus forests" by Carlos Munoz Pizarro (Chile).

The author read the Summary of his Paper, as published in the Proceedings, illustrating his points with slides and by reference to a fine series of vegetation maps of southern Chile and drawings of Nothofagus species, displayed in the ante-room of the Conference hall. He added a number of interesting details drawn from the full Paper, including reference to the conservation importance - from more than one aspect - of the Nothofagus/fungi association.

But a third contribution

6. 3. by Dr. M.W. Holdgate (U.K.) which was lost in transit to Bariloche, has also been included in these Proceedings, since it adds a number of useful points, particularly in connection with the International Biological Programme and the problem of conservation.

#### DISCUSSION

The main points raised were as follows :

Chairman : the Papers bring out very clearly the great variety of Nothofagus forest types, which makes the study of this genus of such special scientific importance. From the ecological viewpoint, it would be interesting to discuss the effects in introduced species - deer and hares for example -, since these of fire and direct destruction by felling are more obvious. We are fortunate to have with us Mr. Thane Riney, who has made a study of this problem in New Zealand.

Riney (FAO) : introductions are not necessarily bad. They must be evaluated in so far as they contribute to or interfere with various forms of land use. With large ungulates, such as Red Deer, we can expect an initial eruption over 25 - 30 years, followed by a natural decline and stabilisation between the animals and their environment. While this oscillation is at its peak, damage to forests is clear, obvious and sometimes great. Fortunately once the initial oscillation is finished, it will not recur unless conditions are created for it by man. It is the post-oscillation period that is important for assessing long-term damage.

Deer populations are usually controlled by environment and not by predators. The extent to which this natural control is taking place is easy to measure and so is the extent to which particular tree species can withstand browsing. Information on these two points would help to define the deer/forest problem in the South American Nothofagus context. In New Zealand a clear definition of the problem in this and other ways has reduced the extreme concern reflected in the literature of 10 to 20 years

ago. In fact deer are now being used as an important economic resource in the Nothofagus areas of South Island and income from the sale of meat in 1967 amounted to over 4 million.

Chairman : a point which has to be taken into account is that the South American Nothofagus forests, unlike those of New Zealand, had an indigenous ungulate fauna.

Correa Luna (Argentina) : in Terra de Fuego beavers were introduced 18 years ago and have spread in almost uninhabited country, causing tree destruction and flooding, and introduced musk-rats have also become a nuisance, while on the other hand introduced reindeer have vanished. Thus the results of introductions can be very variable. What is wanted is much more in the way of comparative studies of similar areas into which particular species have or have not been introduced.

Hartwig (Chile) : the Chilean delegation have proposals for investigating the introduced species problem, on which they hope to reach agreement with Argentina so that comparative studies can be carried out.

Elliott (IUCN) : reverting to the general question of the conservation and availability for future scientific study of the many Nothofagus forest types, it may be worth mentioning that the paper which was to have been presented by Dr. Holdgate fully supports the point made at the end of Dr. Munoz Pizarro's paper about the relevance of recent research in Chile to the International Biological Programme and particular, to its Section on the Conservation of Terrestrial Communities (CT). Arising from the Chilean research programme the next objective might well be the selection of a suitable sample or samples of each of the distinct Nothofagus ecosystems for detailed assessment under the CT check-sheet system which is organized on a world-wide basis. If the Status of "IBP Areas" were accorded with full governmental backing, to the selected samples, it would help to guarantee that material for the further research which many speakers have advocated will remain available.

Chairman : a resolution to this effect would I believe be agreed by all present to be a suitable outcome of the discussion of this subject.

## 7. Conservation problems of primates

Three Papers were presented as a basis for discussion.

7. 1. "Some problems concerning primates", by Fernando Dias de Avila-Pires (Brasil).

By way of introduction the author read a rather shortened version of his Paper, which is published in full in these

Proceedings. He emphasized the fact that although the majority of the monkeys exported from Latin-America go to the United States and to the United Kingdom and although both these countries are now exercising some measure of control, statistical information on these imports is still inadequate and there is good reason to suppose that misidentification, whether accidental or deliberate, often occurs. He also stressed that to reduce the serious drain on primate resources, much the best solution would be to promote large scale breeding of suitable species in captivity.

7. 2. "Conservation of primates in Latin-America", by Carl B. Koford.

In the author's absence, his Paper as reproduced in these Proceedings was read in full by Richard S. Cowan (U.S.A.).

7. 3. "Problems of primates", by Arthur J. Riopelle (U.S.A.).

Summarizing the main points of his Paper, as published in these Proceedings, the author began by stressing the fact that although the number of primates exported is very great and tending to increase, a situation aggravated by losses in capture and in transit (due in part to insufficient skill and knowledge), the traffic - provided it can be properly controlled - meets a real need and can be a justifiable and continuing source of income for the countries of origin. The need is for material for the study of human diseases and for this purpose many different species of primate must be used. As biomedical knowledge increases better use can be made of the material and fewer monkeys should have to be trapped. In addition, the position should be improved by concentrating on species from parts of the world where they are pests and by breeding much larger numbers in captivity. Basically it should be recognized that the true interests of biometical research coincide with those of conservation, since the need is a continuing one. The seven primate centres established in the United States are collecting a great deal of information and are always ready to make this available for conservation purposes.

#### DISCUSSION

Chairman : the time available is insufficient to discuss the problem of controlling the traffic in primates, which will come up during the Legislation Commission's session, under item 15 of the Agenda, and will also be dealt with at a joint meeting organised by the U.S. Primate Centers and IUCN, to be held in June. However, problems of survival are not covered by the Agenda of the Survival Service Commission's session and could well be considered now.

Simon (IUCN) : at present only nine species of primates from Latin-America are listed in the S.S.C. Red Data Book as in danger of extinction. But there is still great difficulty in getting detailed information on the status of certain species and there are a number of border-line cases, not to mention the fact that several additional species or races might well be included in the Red Book if taxonomic questions could be resolved.

Chairman : the last-mentioned difficulty should be removed when certain taxonomic work at present in progress has been completed.

Carvalho (Brasil) : most of the Red Book species mentioned are found in Brasil, where an endangered species list is maintained at a national level and special research is being undertaken on the status of Brachyteles and Leontides, the species Leontides rosalia being undoubtedly the one in greatest danger of extinction. What is wanted is enforcement of the 1940 Convention, particularly by stopping up loopholes of illegal export such as that through Leticia.

Perry (U.S.A.) : as a result of discussions at the IUCN General Assembly in Lucerne (1966), new legislation has been drafted in the U.S.A. and has already been approved by the Lower House. A supporting Resolution of this Conference would be helpful.

Burhenne (IUCN) : a resolution of this kind would be more suitably dealt with at the Legislation Commission's session under item 15 of the Agenda.

Chairman : although the demand for primates for Medical Research is large and of great interest to organizations not represented here such as W.H.O., it is mainly confined to species which are still relatively numerous - Macacques and Baboons in the Old World and Saimiri spp. and Cebus spp. in the New World. It should also be remembered that a very large number of monkeys are still being absorbed by the "pet trade", which should certainly be strictly controlled.

Hartwig (Chile) : identification is still a problem, since controls cannot be applied unless species can be properly recognized.

Chairman : progress in the last-mentioned matter has been good recently. We now have the "Handbook of Living Primates", while field guides for large mammals of Asia and Africa are on the point of publication. A similar guide for Latin-America would be invaluable and is understood to be planned by the Smithsonian Institution.

Fitter (U.K.) : mention should be made of what can be termed the "multiple cadaver" problem, the use of only one or two parts of an animal killed for research purposes, the rest being wasted.

This results in an unnecessary additional drain on species and the same applies to the wastage of monkeys killed as agricultural pests. There is a great need, for over-all coordinated control of supply and demand,

Riopelle (U.S.A.) : this is in fact one of the main reasons for the U.S.A. Primate Centers, where at present 19 species are held.

Roth (FAO) : FAO is working closely with WHO and OIE on general zoo-sanitary regulations for traffic in animals, which in view of recent virus disease outbreaks in Germany traced to imported monkeys, will certainly cover the traffic in primates. Implementation of much international veterinary/public health regulations on a sound scientific basis could be instrumental for instance in curbing the undesirable pet trade while allowing controlled importations for research purposes, thus significantly supplementing conservation objectives.

Cain (U.S.A.) : reverting to the question of identification, the new U.S. proposals envisage reduction in the number of points of entry for animal importations from 60 to 6, which should help considerably in overcoming the difficulty, since trained staff could then be made available at each point of entry.

Buchinger (U.S.A.) : the Colombian Government, whose representatives have not yet arrived, is aware of the general problem of uneconomic exploitation of primate resources and of the particular problem, mentioned by one speaker, concerning the situation at Leticia: it has made a proposal for a special meeting to be held at Leticia, probably in January 1969.

Chairman : as our discussion has centered mainly on the control of the traffic in primates and the great need for putting exploitation on a sound sustainable basis, the formulations of any resolution would best be left for consideration when these matters are further considered at the Legislation Commission's session.

5. 1. "Problems and ecological implications in the control of Vampire bats".

by Arthur M. Greenhall, Bat Ecologist, UNDP/FAO Research Programme on Paralytic Rabies, Palo Alto, Mexico, Research Associate, Smithsonian Institution, Washington D.C.

Effective control of vampire bats is of major economic and veterinary public health concern from Argentina to Mexico, including Trinidad, not only because vampires can transmit rabies as symptomless carriers, but also because the bats must feed only on the warm blood of mammals (including man) and birds to live. Although any species of bat may become rabid, rabies transmitted by vampire bats is a major cause of death in the cattle of Latin-America and has proved a tremendous obstacle to the expansion of the agricultural economy there. Even without the disease factor, these bats cause great damage and loss of life because repeated nightly vampire predation is debilitating to humans, livestock and poultry, with death the occasional result for the latter. The open bleeding wounds left by vampires are an attraction for flies and blood-sucking insects, which create possible avenues for bacterial, parasitic and viral disease infection.

Despite the tremendous damage caused by vampire bats, very little is known about them. The weak link which may give the clue to control will be found in the life history, physiology and ecology of the vampire bat family, *Desmodontidae*, comprised of three genera, Desmodus, Diaemus and Diphylla, with emphasis on Desmodus rotundus because of its abundance. Although individual vampires can consume up to two ounces of blood daily, still to be ascertained is their exact wild and domestic host preferences which appear to differ throughout Central and South America. This knowledge could assist in finding effective control and should also indicate presently unsuspected vectors of rabies. Also unknown is their daytime behavior and association with other species of bats. Since in most places, vampire bats roost with other species of bats, many of which are known to serve purposes useful to nature and man, control measures, under normal circumstances, should be directed specifically toward vampire bats. It is unrealistic to suppose that the destruction of vampire bats might upset the balance of nature. Conservation efforts therefore should be primarily directed toward species other than vampire bats.

Possible approaches to the control of vampire bats are either to destroy the bats in their daytime roosts or to destroy the bats on or about their victims. The first should yield long term results while the second, being highly selective, should give more effective immediate results. To achieve this requires the use of proven control measures as well as intensive eco-

gical studies to develop new methods. Experience over more than thirty years in Trinidad has established methods of capture and control of vampires, which, though limited, have proved effective in reducing predation. These methods contribute a valuable foundation upon which future research and experiments may be built.

FAO of the United Nations will assist the Mexican Government to establish a project financed by the United Nations Development Programme to investigate all aspects of palytic rabies including a study of vampire bats with emphasis on their control.

### The Problem

Effective control of vampire bats is of major animal and public health concern from Argentina to Mexico. Blood-drinking bats are restricted to the Western Hemisphere and present a unique disease problem since vampires subsist entirely on the blood of mammals (including man) and birds, thus transmitting rabies as part of their normal feeding habits. Although any species of bat may become infected and transmit rabies, these other species do not do so in the normal course of feeding. According to the most recent report of the World Health Organization Expert Committee on Rabies "Vampire-bat rabies is the major cause of death in cattle of Latin-America and has proved a major obstacle to the expansion of its agricultural economy". (5th Report, 1966) In the post-Columbian period, vampire bats apparently found the introduced domestic animals and poultry a more easily accessible, plentiful source of blood than that afforded by indigenous wild mammals and birds. As frequently occurs when there is so bountiful a food supply, an adaptable species, such as the vampire bat, will benefit and its numbers increase. Over-population may be followed by a disease such as rabies which often kills off the surplus population. Although rabies is fatal to most mammals, vampire bats have developed an unusual tolerance to the virus. Unlike any other animal contracting rabies, vampire bats can recover from the disease and transmit it for long periods as symptomless carriers.

### The Vampire Bat Family Desmodontidae

The vampire bat family Desmodontidae is comprised of three genera Desmodus, Diaemus and Diphylla which are known to be infected over most of their ranges. The most important vector of vampire bat rabies is the abundant Desmodus rotundus, which is one of the commonest of all tropical American bats. It inhabits forests, savannahs, deserts and swamps from sea level to 11,000 feet (3,500 meters) from approximately 34° South Latitude in Uruguay, Argentina (32°) and Chile (32°) to about 28° North Latitude in Mexico within 150 miles (240 kilometers) of the United States border. It is not found today in the United States nor in the West Indies, except for the most southerly island of

Trinidad. Paralytic rabies has not yet been reported from Peru, Chile and Uruguay.

In Mexico near Veracruz, an area which had no paralytic rabies (derriengue) for the past 50 years reported in 1963 the loss of over 2,000 head of livestock out of 8,000 animals. In other parts of Mexico there has been a 90 % mortality in individual herds of cattle. In 1966 a number of cattle ranchers went out of business in the state of Oaxaca. In Brasil a similar situation arose in the northern state of Ceara where livestock production was abandoned due to heavy losses. In 1965 paralytic rabies (peste das cadeiras) was reported from 19 out of 22 states. Venezuela estimates that during the past 20 years about 20,000 animals have been lost annually from paralytic rabies (rabia paralitica bovina).

Excluding the disease factor, repeated nightly attacks by vampire bats are debilitating to livestock, poultry and humans, with death sometimes the result for poultry. A single Desmodus can consume up to two ounces of blood at a single feeding and leave a wound oozing and seeping for hours. These bleeding wounds create possible paths of bacterial, parasitic and viral infections as well as attracting the larvae of the screwworm (Calliphoridae) which must attack mammals to survive. Common occurrences are that the milk yield of cows will drop or that suckling pigs are unable to nurse because the teats of the sow have been bitten with such ferocity that the milk cannot flow through the scarified, injured tissues. Since as many as 500 Desmodus may congregate in a single roost, their predation in a single area can be intense.

#### Vampire Bat Control in Trinidad

Trinidad was the first country to establish a government programme to control vampire bats. This resulted from the well-documented outbreak of paralytic rabies in Trinidad which killed thousands of cattle and 89 people between the years 1925 - 1935. In 1934 I assisted in the organizing of the bat control programme but did not direct it until 1954. This government programme has continued uninterrupted since its inception. Methods were improved periodically from mid-1950's onward. The annual average of 2,000 Desmodus collected represent a saving of about 3,720 gallons of blood which otherwise would have been drained from Trinidad livestock.

Discontinued in Trinidad due to ineffectiveness, excessive cost or human risk are the following methods :

- 1) During World War II the armed forces of the United States of America destroyed many daytime bat roosts, (mainly caves) with dynamite, poison gas and flame throwers. This indiscriminate effort to exterminate the vampire resulted in killing thousands of other bat species. There was

little or no effect on the vampire bat population. (Unfortunately, even today, some countries use these methods).

- 2) Hollow trees were either cut down or their interiors ignited.
- 3) Lights, (candle, kerosene or electric) either used alone or with owl or hawk wings to cast moving shadows and placed above livestock in stables and stalls.
- 4) Lime twigs and other spiky branches hung in house as well as livestock enclosures (peasant farms still often resort to this method).

Present methods of vampire control in Trinidad are directed specifically toward vampire bats to the exclusion of other species. They include the use of firearms, nets, traps, occasionally smoke, a poisoning technique and the protective screening of man-made structures (and beds). Further knowledge of bat ecology is necessary for successful results. Vampire bats are found only in roosts having favorable conditions of temperature and humidity.

- 1) Vampires are shot while roosting in caves and hollow trees.
- 2) Japanese mist nets (originally used to catch birds) are set along flyways known to be travelled by vampires as well as around huts, dwellings and animal shelters in which humans or animals have been attacked by vampires.
- 3) Trammel nets, seines and mechanical traps are set to catch vampire bats as they fly from their roosts.
- 4) While the average livestock owner makes no special effort to screen his animal shelters, large scale poultry producers could not successfully operate unless their buildings were carefully screened to protect the birds from vampire bats.
- 5) Caves and hollow tree roosts can be exploited as natural traps. These are disturbed as little as possible when the bat collectors visit them at regular intervals to remove vampires which may have moved in since the last collection.
- 6) Strychnine syrup applied to a fresh wound on livestock is effective since vampires return to feed on wounds made the previous night. One drop properly applied is sufficient to kill a vampire within two seconds from the moment its tongue touches a treated bite. On one occasion 12 vampires were poisoned and recovered in a single night from a cow

and a calf, the latter having 49 fresh bites on various parts of its body. The poison does not injure the treated animal either by absorption or licking. This method has been successfully used on cattle, horses, mules, donkeys, pigs, goats, sheep and poultry. It is not used on Indian water buffalo since they are frequently bitten inside their nostrils. The basic stock solution is 7.2 grams of strychnine sulphate added to 174 cc of water and 174 cc of high concentration sugar syrup. The syrup masks the bitter taste of the poison while providing a thickish solution that will adhere to a moist wound. Since vampire bats have a varied resistance to strychnine, the formula may have to be adjusted for each locality.

#### United Nations FAO/WHO Mission

In 1966 the United Nations Development Programme sent a joint FAO/WHO Preparatory Allocation Mission to Latin-America to make an evaluation of the situation regarding paralytic rabies and vampire bats. It was requested that FAO assist the Mexican Government in establishing a project, based at the Ministry of Agriculture's Research Center (Instituto Nacional de Investigaciones Pecuarias) at Palo Alto near Mexico City, to investigate all aspects of paralytic rabies including a study of vampire bats with special emphasis on control methods. Such ecological, behavioral and physiological studies (preferably conducted in outbreak areas) to include data on weather, roost preference and habits, population dynamics of breeding and family behavior, flight patterns and travel routes, location of prey and host preferences. The Mission recommended in addition to the above that "a comprehensive long-term programme is called for, including the application of technical advances in different livestock regions of Latin-America ... and to support a second phase project to include participation by research centers in other countries".

#### Future Vampire Bat Control Research

There are a number of possibilities which may eventually result in vampire bat control. Priority should be given to methods which will destroy vampires on or about their victims since this highly selective approach gives more immediate results. The destruction of vampires in or about their roosts might yield long-term results, but is more difficult to achieve since their roosts are frequently inaccessible and since they associate with other bat species whose usefulness has been established.

Both approaches require field and laboratory investigations to compare the behavior of wild bats with those in captivity. Little data is presently available although a number of useful basic studies have been done, mainly in Trinidad.

New studies should investigate control measures including biological or habitat manipulation, chemicals as toxicants, attractants or repellents, sterilization, radiation, mechanical or electronic attractants and repellents using light, odor and sound.

While new methods of control are sought the older tested methods should be carried out where required.

### Vampire Bat Host Preferences

Vampire bats are powerful fliers covering a wide range of territory. Ideally they should be studied within their natural regions which frequently cross political boundaries. Despite the tremendous damage caused by vampires, surprisingly little is known of their life history and ecology. It is known that they feed exclusively on blood, but field observation has been the primary method used so far to determine their victims. If the bats' exact wild as well as domestic host preferences were established, this knowledge could assist in the control of vampire bats and might indicate other unsuspected vectors of rabies. By using a laboratory precipitin test, it is possible to determine from ingested blood taken from a vampire's stomach and fecal material, what animals or birds have been attacked. This qualitative method makes it possible to determine with a fair degree of accuracy, the frequency and intensity of animal attacks by the vampire population of any given area. My studies in Trinidad indicated that vampire bats fed upon a variety of domestic animals although cattle were preferred and they attacked wild animals in spite of what appeared to be an adequate and varied blood supply provided by domestic animals and birds.

Such studies should be conducted in other parts of Latin-America and may show that vampire bats feed upon monkeys, otter, tapir, deer, giant armadillo and other mammals considered rare and endangered by the International Union Conservation of Nature and Natural Resources (IUCN). (La Union Internacional Para Conservar la Naturaleza y Los Recursos Naturales (IUCN)

### Bats and Conservation

Under normal circumstances bats are useful and beneficial, and their feeding habits should be carefully considered before the wholesale destruction of any species is contemplated. Diets vary according to species and include insects, fish, reptiles, birds, mammals, fruit, nectar and blood. It has been estimated that some bats consume about one-half of their full weight in insects each night, and without some agency to contain their numbers there would be a great overabundance of insects. Those species which feed upon fish (Noctilio), lizards (Trachops), birds and mammals (Vampyrum) are useful predators. The long-tongued glossophagine bats which feed upon nectar are essential pollinators for certain trees while most of the fruit-eating phyllo-

stomine bats propogate a number of economically important trees by the dissemination of seeds. Indiscriminate bat extermination may create the possibility of an upsurge of insect-borne diseases; the non-pollination of such flora as Agave, Alexa, Caiba, Crescentia, Hymenaes, Musa, Parkia, Parmentiera, etc.; and the failure to widely distribute the seeds of cacti, palms, sapucaia and others.

In Trinidad, Desmodus has been found roosting in association with 17 other bat species comprised of 8 insectivorous, 1 piscivorous, 1 omnivorous, 2 carnivorous, 2 frugivorous, 2 nectarivorous and 1 sanguivorous.

Unless there are specific reasons for collecting other bat species, Desmodus is the target bat in Trinidad for control.

### Vampire Bats and Conservation

The thought that the destruction of vampire bats might upset the balance of nature is unrealistic since the balance has been upset already by the introduction of livestock. "Balanced" vampire bat populations probably exist today only in areas where domestic animals and poultry never have been introduced such as the remote virgin rain forests and the bird guano islands off western South America where the bats must feed upon the indigenous fauna. Since the eradication of all vampire bats is probably impossible (whether desirable or not) due to their tremendous distribution, abundance and inaccessible roosts, it is more practical to think in terms of control, especially of local populations in problem areas.

### Economic Aspects of Vampire Bat Control

Economics should not be the sole factor upon which a policy of vampire bat control is based. It must be emphasized that from an economic viewpoint, a vampire control programme is a valuable adjunct to a rabies vaccination programme to protect a profitable and essential cattle industry. If, however, the only concern is to protect range animals from the disease and vampire bat attacks per se can be tolerated, then the vaccination programme might be more economical than a bat control programme. In areas where peasant farming is pratised and vampire bats are a serious threat to draft animals, pigs, dairy cattle and poultry, then a vampire control programme would be of great value and could be carried out by the livestock owner in cooperation with or instruction from the national agricultural authorities.

### Summary

Effective control of vampire bats is of primary concern throughout Latin-America since paralytic rabies transmitted by vampires is the major cause of death in cattle and a major obstacle to agricultural expansion. Vampire bats may be controlled

by destroying them either in their roosts or around their victims, the latter method preferred since vampires roost with many other species of bats which may serve purposes useful to nature and man. To achieve this selective control will require the use of proven methods already established in Trinidad as well as ecological studies to develop new methods. FAO of the United Nations will assist the Mexican Government to establish a project to study paralytic rabies, vampire bats and their control.

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5. 2. "Vampire and other bats and their conservation"  
by Jorge A. Crespo (Argentina)

In the Neotropical region the Order Chiroptera is characterized by its great variety of forms, about 227 species, which constitutes 28 % of the all mammal species, and by its remarkable ecological diversification. All this suggests that it belong to a complex zoological group and one is closely and very often adversely related with human problems. The great similarity and overlapping between different species, taking into account, geographical distribution, habits, cohabitations, activity rhythms, morphological characters, etc., makes it very difficult in the field, even in particular localities, for them to be identified and distinguished by the layman. Although the stage of systematic analysis of the species is now almost completed and at present more research is taking place on other aspects, we still know very little about the ecology and biology of the Neotropical bats, particularly on their reproduction potentiality, longevity, age structures, population density, metabolism, behavior, enemies, illnesses, etc. Nevertheless it is dangerous to design control plans without having a sound scientific basis of this kind. From a conservation point of view the fight against vampire bats must be considered from at least two different angles :

- a) control of the vampire bat itself; aims, intensity, limits of action, etc.;
- b) effect of such a control over the rest of the Chiroptera and other faunal elements.

The common vampire bat, Desmodus rotundus, has an extraordinarily adaptable capacity that permits it to range over 4/5 ths of the Neotropical region, including three South American biomes and very different ecological environments. Its food resources have been considerably increased by the introduction into America of domestic animals, resulting in turn in a great numerical increase of the species and its attainment of pest status. This increase is related to reproductive habits, longevity and age structure. Assuming a rough pregnancy rate of 0.35 throughout the year, we can attribute a value of 0.85 to the incidence of pregnancy, figures which compared with those of other injurious mammals are not high. However, this indicates that for the maintenance of its numbers, longevity, fertility and mortality factors (still largely unknown) are very important questions, although the indications are that, once a population of vampire bats is reduced, recovery would be slow and this could help the methods of control.

As with other species, one aspect in which the vampire is vulnerable concerns the availability of shelter, but to use this for control is a complex matter because of the variety of habitats and also because there does exist a possibility of seriously affecting other harmless, useful or unknown niche species. There is an obvious need to extend our knowledge of reproduction, population dynamics, behavior, displacement, food preference, habitats, etc. The final objectives of control could then be summarised as

- a) direct reduction of vampire bats;
- b) prey protection;
- c) prevention.

Taking into account the ecological considerations, the control problem of vampire bats is closely linked with the survival of other species of Chiroptera.

Man has become the greatest predator on all Chiroptera, a fact which has a very important significance for this mammal group, adjusted as it is to an existence which is practically free from pressure by other predator species. Man's threat to the species also tends to increase as he learns more, for example, of the role as virus reservoirs of many Microchiroptera; and this threat tends in turn to develop into a direct destructive action. In addition man also has an indirect effect, when he brings about categorical changes in natural ecosystems, destroying some environments and establishing new ones that favor some species but not others.

From a conservation point of view and regarded as a renewable natural resource, the Chiroptera belong to a zoological group which is difficult to assess and whose existence is sometimes

also difficult to justify, so that little by little they are becoming a disinherited section of the mammals so far as conservation is concerned. Nevertheless bats offer man in the purely scientific field, and often in other unsuspected directions, an extraordinary abundance of biological phenomena such as occurs in few zoological groups. If we consider that maintenance of biological diversity in Nature is one of the major aims in a world conservation policy, then there is no doubt that bats constitute and should be treated as a scientific and natural resource of real importance and one that could not be replaced if it were once lost or destroyed.

5. 3. "Ethology and ecology of vampire bats"  
by Bernardo Villa-Ramirez (Mexico)

Bats have attracted the attention of men in all times. They have played a very important part in legend, folklore, primitive art and in the religious manifestations of all peoples.

They have been considered as much representatives of good as being representative of evil.

In the Maya culture there was the god Zotz; among the Aztecs there was the god Tzinacan.

Their images still remain, carved on the stone of the temples and palaces, today in ruins, of those peoples who preceded us in the territories of what today is Mexico and Central America.

They also remain forged in wrought gold by the Inca artificers and have been found among the zoomorphic figures, realistic or stylized, of the primitive cultures of Santo Domingo and Cuba.

Although these mammals cannot be Nature's most attractive creatures, they are certainly of inestimable value to Science.

The study of the biological phenomena and of their role as carriers of certain diseases among which rabies figures in the first rank, has converted them into subjects of careful research in the field and in laboratories. They are no longer merely the subject of academic dissertations; they are considered as a basic theme in the problems of epidemiology and epizootiology, especially in neo-tropical zones. In fact at the present time they occupy the first place in the programmes of investigation of certain zoonoses concerned with the health of man.

In effect, one of the vital necessities for the subsistence of man consists of food of animal origin. In places where it does not exist or there is a lack of it hunger becomes chronic, i.e. malnutrition.

In general terms, under-nutrition or chronic hunger causes diminution in the expectation of life and conditions the organism so that infectious, parasitical and degenerative diseases have an ideal ecosystem for their development and manifestation. In these conditions men in so-called developing countries do not display the intensity of work required to enable their countries emerge from this state (See : Gomez Pando Vidal. Bol. Of. San. Pan. (6) : 479-489. December 1967).

If we take into account that in the United States of Mexico, according to official information, in 1964 alone 130.000.000 Mexican pesos were lost on account of rabies transmitted by vampires to horses and cattle; that in Peru for the year 1962, 733 cases of animal rabies and 10 of human were diagnosed; that in the United States the incidence in wild animals (foxes, polecats, bats and others) was 28.654 cases, with a tendency to increase; if, likewise, we take into account that in Columbia paralytic rabies is widespread; that in Antioquia, in a retrospective enquiry in 1966 of the enzootic zones, it was observed that from 1962 to 1966, 1449 head of cattle, 124 horses and two pigs had suffered from this rabies transmitted by bats, it caused the death of a total 5262 head of livestock and that in 1965 the figure for losses on this account reached two hundred billion cruzeiros we have to admit that the problem is of such proportions that it cannot escape the attention of the investigators in the field of science or of the governments of all the countries affected. Moreover, it is necessary to remember here that, in conformity with world statistics, rabies in general tends to increase its incidence.

This makes it urgently necessary to face the problem in the only way which holds out a good promise of success and is available to present day man - scientific investigation.

As a start, we need to work out the systematics and zoogeography of bats, their ethology and ecology, so that we may then direct our efforts towards getting to know the most adequate means to combat those that most affect human interests.

#### What are bats ?

Bats have been sharing the earth with other mammals for more or less sixty million years; at the beginning of the Eocene period of the Tertiary, bats were already, neither more nor less, the animals we know now, with very few essential morphological variations. We have no knowledge of this long demonstrable existence, which is, at least, thirty times greater than that of man upon the earth. However, it is clear that bats are descendants of the primitive order of insectivores in the light of the similarity in structure of the teeth and the discoidal shape of the placenta.

Many centuries later the Hebrews knew about bats and the Bible gives them the name of "attaleph", the Chaldeans that of "attalepha", words which are certainly a corruption by inversion of the letters of "ophtalel" which means "bird of the night", nocturnal bird. With the exception of the English language which uses the primitive word "bat", all others only possess, to designate bats, compound expressions formed of more than one word.

The Germans call bats "Fledermaüse" which means flying mouse; the Swiss "flader-mus"; the Danes "flagger-mus"; in Provençal it is a "soritz-pennada" or "winged rat"; the meaning of the Malayan name is similar "buron-tikus" (bird-mouse) and it is the same among the Chinese who use the name "sein-shu" (heavenly mice). In short, everything seems to indicate that this group of animals has been looked upon as flying-mice.

Even in the present day, among the Mexican peasants, bats are often known as "old mice", in the belief that mice acquire wings when they come to old age.

Among the Nahuatlan peoples their name is "quimishpapatl" - "butterfly mouse"; once again the mouse that flies. Unfortunately this popular notion has no basis in truth. There is no closer relationship between bats and mice than the fact that both are mammals. In bats the fore-limbs have been considerably modified and become organs similar to wings, which enables them to rival the birds in the dominion of the air by sustained flight. Like the birds, too, they are diversified in their feeding habits.

For the Americas up to date the following families are known :

- 1) Emballonuridae (insectivores)
- 2) Noctilionidae (fish-eaters)
- 3) Phyllostomidae (fruit-eaters, Pollen and nectar-eaters  
and flesh-eaters)
- 4) Desmodontidae (insectivores)
- 5) Natalidae (insectivores)
- 6) Furipteridae (insectivores)
- 7) Thyropteridae (insectivores)
- 8) Vespertilionidae (insectivores)
- 9) Molossidae (insectivores).

The family Desmodontidae is of particular interest because it is the only one which feeds on the blood of other vertebrates and by this means is the vehicle by which rabies can be transmitted to cattle, other animals and even to man himself. This family is exclusive to and characteristic of the New World. It is formed of

three genera : Desmodus, Diphylla and Diaemus.

Desmodus comprises one species, D. rotundus, with two sub-species : D.r. rotundus and D. r. murinus.

Diphylla comprises one species, D. ecaudata, with two sub-species : D. e. ecaudata and D. e. centralis.

Of Diaemus only one species is known : D. younggii.

Desmodus rotundus is the species most abundant in the whole Continent, with a geographical distribution which extends from parallel 27° latitude North, in the north of Mexico, following both coasts of this country, as far as parallel 33° latitude South, extending in South America from the coasts of the Pacific in Chile as far as those of the Atlantic in Uruguay and the extreme south-east of Brasil. In altitude it has been found from sea-level to 3.000 metres in Mexico and in Peru.

Diphylla ecaudata is the second in importance both in respect of its numerical strength and of its geographical range. It is par excellence a species belonging to the Amazon; nevertheless it reaches as far as the north of Mexico, in hot humid country. In Mexico it is found on the slopes and in coastal plains of the Atlantic side, from the central part of tamaulipas as far as Yucatan and Quintana Roo and, from there, its distribution continues into Central and South America. On the Pacific coast it ranges as far as the Isthmus of Tehuantepec, Oaxaca (Villa R.B., 1966 : 324). In South America it extends southwards to northern Peru across Brasil as far as the State of Santa Catarina (Cabrera, A., 1957 : 94).

Diaemus younggii is at the present time a more or less rare species. A very few examples have been collected in Mexico; in other regions of South America the record are also very scanty, although in Brasil it is found with greater frequency, but in numbers much below those of the other two genera of the family Desmodontidae. Its distribution over the Continent is as follows : from the south of Tamaulipas, Teapa, Tabasco, in Mexico and in Belice (Villa R.B., 1966 : 339), southwards to northern Peru and across Brazil as far as the States of Parena and Sao Paulo.

#### Types of Blood which blood-eating bats prefer

Diphylla e. ecaudata and Diaemus younggii, according to what is known up to date by observations in the field, have reached an extraordinary specialization in their diet : they feed by preference on the blood of birds (Goodwin and Greenhall, 1961 : 271 and Villa R.B., 1966 : 341).

Desmodus rotundus, on the other hand, is a less exclusive species in the selection of its food; it can take the blood of

mammals just as much as the blood of birds. Villa R.B., et al. (19-68) studying the stomach-contents of blood-eating bats, Diphylla e. ecaudata and Desmodus rotundus rotundus, obtained in various localities in Brasil, inform us that in the hairy-footed vampire, D. e. ecaudata, they only found bird blood. Among 57 examples examined of the bare-footed vampire, D.r. rotundus 49 contained mammal blood and 8 a mixture of the blood of mammals and birds. The sample examined were obtained at dawn, when the blood was found in abundance undigested in the stomachs. Smears were made of this blood and stained using the Pappenheim method. From one example of D. e. ecaudata and from another of D. r. rotundus smears were prepared which were stained with acridin orange (Bertalauff's method, modified by Pimienta de Bello) and observed under a fluorescent microscope. The conclusions reached confirm the results of the observations in the field on these two particular species. It is possible that they may at least partly explain why there is a greater number of D. rotundus with a wider geographical distribution, in the Americas.

It should be emphasized that these bats feed almost wholly on blood; in captivity they do not even take water. A recent study by Andrew A. Arata and collaborators (Journ. Mamm., 48 (4): 654) carried out in the Department of the Valle de Cauca, Columbia, showed that in 23 individuals of D. r. rotundus examined, the stomach contents of 17 % contained insects and of another 17 % tangled hairs, nails and flesh, but all of them without exception contained blood.

#### How they live; where they live

Bats are gregarious animals; the number of individuals of a colony varies from a few to about three hundred; the cases in which they exceed this figure are very rare. This corresponds essentially to ecological factors and, fundamentally, to food supply. Even if the number of individuals of one particular colony is reduced, the colonies in a given region tend to maintain a stable population, especially where adequate ecosystems offer appropriate shelter. Bats live in ecological niches where the microclimate has a limited daily thermic oscillation, at all seasons of the year, usually around 22° C and over 45 % relative humidity.

#### Limiting factors in geographical distribution

Everything seems to indicate that the geographical distribution of the Desmodontidae is precisely determined by the climate, rather than by food. In the North of the territory of Mexico, for instance, although in the State of Chihuahua there is a very well developed and high quality cattle ranch, the presence of these blood-eating bats has not been proved. The climate, in this Mexican area, undergoes very great variations inside the day-refuges of the bats of other species (non-blood eating bats), especially during the winter, which for some

species results in the phenomenon of hibernation as an adaptive medium, and in others emigration on a large scale. Where climatic conditions are favourable, the size of populations depends directly on the greater or lesser quantity of the other vertebrates from which they obtain their food; in other words, within the ecosystem, the tropic level has a role of the highest importance and this is determined, in its turn, by the ecological disequilibrium which is established in accordance with the activities of man relating to cattle : to a greater number of domestic animals which may offer an easy and abundant source of food, there is a correspondingly greater number of vampires.

Befor the arrival of the Europeans blood-eating bats already existed in America and fed themselves without difficulty on the blood of birds and wild mammals. Dobson, in the Encyclopedia Britannica (11th edition) suggests the possibility that they may have been the cause of the disappearance of the horses that were extinct long before the discovery of America by the Europeans. It is very possible, also, that wild boars and deer may have been victims of the blood-eating bats, as also the large rodents of the Ctenomidae, such as spotted cavy (Cuniculum paca) and the agouti of the genus Dasyprocta.

Today we know that they attack pigs (Villa R.B., 1966 : 32-33) and there is evidence that they attack other small rodents. In the laboratory, as is well known, they feed by taking the blood of rabbits, guinea-pigs and white rats. Information has been received that they attack Pinnipedia of the Otariidae family on the coasts of Chile (Milaga Alba Aurelio, personal communication based on observations of the naturalist William Mann).

#### Economic and epizootiological significance

All the legendary and historical pointers that the old aboriginal cultures that Mexico and Central America have left us, give grounds for believing that from the most remote antiquity these winged mammals have discharged a role of great importance in the transmission of disease and perhaps of rabies (Villa R.B., Op.cit. : 3-11). On the other hand other groups of the order of the Cheiroptera are of equally great importance in maintaining ecological equilibrium. For instance, the insectivores consume insects which, otherwise, would give rise to epidemics whose harm to Agriculture it is impossible to calculate. The eaters of pollen and nectar act as fertilizers of a great variety of plants whose flowers open their corolla during the evening twilight or the night. These other bats therefore play an important role in the functioning of biological communities. Finally, of no less importance is the great quantity of their excrete accumulated on the sites which serve them as refuges, the "guano" which the peasants use as a fertilizer.

With the introduction of horses and other riding animals, bovine cattle, hens and other domestic animals brought from Europe, during and immediately after the conquest, none of which previously existed in America, the problem affecting the economy first became apparent.

The Spanish conquerors themselves suffered the loss of the horses of their troops because of the attack of the vampires (Molina Solis J.F., 1896 : 394). The first colonizers could not preserve their cows and hens in good condition (Martin de Angleria, Pedro, 1944 : 149). In 1658 Guilherme Piso, a physician of Amsterdam who accompanied Prince Maurice of Nassau to Brasil, provides the first written information of the action of vampires and their connection with rabies; he substitutes the name "andira" for the ordinary native name "tupi" for bats and, in his Natural History and Medicine of the West Indies (Historia Natural e Médica das Indias Occidentals)(Portuguese version), relates frequent cases of persons bitten at night.

He refers to the "... poisonous bite which bleeds considerably" and goes on to say " this is how the poison from the tongue and heart of the bats enters into the victim : whether the poison is the same as that which a rabid dog carries and which causes hydrophobia, as some very good authorities state, has not yet been discovered".

Other authors and travellers refer to this matter at great length and add their witness to the singular importance of bats, especially the blood-eaters, in the transmission of diseases.

#### Other effects of the action of vampire bats on cattle

Besides the transmission of the rabies virus, it is important to note that the haemorrhages occasioned by the bite or bites frequently result in pronounced emaciation of the animals attacked as well as in the appearance of secondary infections, in particular, myiasis or infestations caused by flies or their larvae, and especially flies of the species Callitroga (Cocliomyia) americana (screw-worm) whose larvae begin their development in wounds or lacerations of superior vertebrates (cows, horses, donkeys and infrequently in man). The harm that the larvae cause by weakening and destruction of the tissues kill the infested animals in a few days. Consequently, myiasis also results in great losses among cattle, as a result of the bites of vampire bats, quite apart from those inflicted by rabies virus.

5. 4. "The relationship of wild animals and rabies : some ecological knowledge of reservoir species, as a basis for the epizootiology and control of the disease"  
by Dr. G. Bijlenga (FAO)

Rabies is a disease caused by a virus. In recent years it has been possible to study this virus agent more closely thanks to the progress reached in various techniques. Studies with the electronic microscope have revealed that the complete particle of virus (virion) has the shape of a ball and its average size is 180 millimicras long and 80 millimicras in diameter (Hummeler, K. and others, 1967). Interesting studies have been carried out on animals experimentally with the purpose of investigating the form in which this virus penetrates centripetally via the peripheral nerves, from the point of infection (Dean, D.J. and others, 1963; Baer, G. and others, 1965; Johnson, R.T., 1965) to the central nervous system where it is multiplied almost exclusively with neurons. Hence it can be transported again to the periphery and can be found in the spinal marrow, in the salivary glands, the kidneys and other tissues, depending on the different animal species studied.

It is essential that much more intensive investigation should be undertaken of the distribution of rabies virus among wild animals, in order that we may understand how the disease is transmitted and perpetuated among susceptible animals in a determined natural ecosystem. This knowledge is a pre-requisite for developing effective methods of combating this disease.

In order to explain how animals will act as a reservoir of rabies, the various ecological factors, as far as they are known to date, will be described and the corresponding rabies-vector relationships will be indicated.

Johnson (1959), when studying the spotted polecat (Spilogale putorius) in the U.S.A., found that this animal acts as an important reservoir of rabies. Broadly speaking the habitat of this animal is Mexico and the S.W. region of the U.S.A. preferably in the arid prairies and great plains, since the animal can live for an indefinite time without water. It makes its dens in caves on rocky slopes, beneath the roots of trees or piles of wood. According to Johnson (1959) the spotted polecat is one of the permanent harbourers of the rabies virus in N. America. He bases his opinion on the observation of sporadic cases of rabies in man which occur in the S.W. part of the U.S.A. because of the bites of the spotted polecat, although for many years past no case of rabies in dogs or wild animals has been known in this region. Furthermore, the virus, isolated from a spotted polecat and from a woman infected by it, produced a peculiar reaction in mice which had been inoculated with the cerebral tissue of the polecat and of the woman. A microscopic examination of the

polecat's brain for Negri corpuscles was negative. The mice presented symptoms of paralysis after a long period of incubation of over three weeks and the presence of Negri bodies was detected in their brains. In the case of a man who was attacked during the day by a female spotted polecat, the rabies virus was not only isolated from the brain of the animal but also from the salivary glands, the mammary tissue (the animal was not in lactation) and from the kidney. The tissue of the kidney was used to inoculate young spotted polecats in the thigh muscle. The coefficient of this specimen of kidney in young inoculated intercerebrally was  $0.015 \text{ ml} \times 10^6 \text{ m}^{-3} \text{ LD } 50^\circ$ . Two of these four polecats infected experimentally with this viral strain died, one after 32 days and the other at the end of 52 days. The adult mice infected intercerebrally with this virus did not show Negri corpuscles and a long period of incubation was again observed. In later intracerebral samples of the brain of the infected mouse, the presence of bodies of Negri was demonstrated, which may indicate that the viral strain isolated and used for inoculation at first lacked tropism for cerebral tissue. Virus was also found in the pancreas of spotted polecats experimentally infected, which likewise indicates a tropism of a different type from that found in viral strains of common rabies derived from dogs. These discoveries are of great importance for understanding transmission of virus among polecats. It is very probable that the rabies virus is not only propagated among polecats by bites but is also transmitted from mothers to offspring through the milk. Another mode of transmission could be through the respiratory organs or the intestinal duct, which in turn can lead to the natural selection of variants of the rabies virus, with tissue tropisms differing from those of the original virus.

With the help of the techniques of immunofluorescence now available, it is possible to study the frequency with which these strains of rabies virus appear in wild animals. With this method it is not necessary to demonstrate the presence of Negri bodies to discover the virus and consequently it will be possible and easier to find these peculiar strains in the cerebral tissues and other tissues of wild animals.

In their experimental studies, Sikes and Tierkel (1960) made a comparison of infection with a strain isolated from the salivary gland of a fox during an epizootia of this disease among them. Foxes, polecats, racoons and opossums were inoculated in the cervical muscles with different doses of this virus and there was found a mortality rate (MLD 50) of  $10^{-6.4}$  for foxes,  $10^{-4.4}$  for polecats,  $10^{-3.2}$  for racoons and  $10^{-1.3}$  for opossums. This means that there exist obvious differences between these four animal species when inoculated with a rabies virus from the salivary gland of the fox. The fox is 100 times more susceptible than the polecat as is seen by the number of MLD 50, which can explain the fact that in zones of the United States which are

thickly populated by foxes and polecats, cases of rabies are only reported in the foxes and on the other hand there are none or very few among the polecats. None of the opossums inoculated intra-muscularly died. This animal having shown that it is the most resistant to this virus of the salivary glands of the fox; racoons were 200 times more resistant in comparison with foxes. The next step in their investigations was the determination of the excretion of the rabies virus in the saliva of the animals infected experimentally and of the quantity of virus contained in their saliva. The foxes infected with high doses of virus (14,000 doses MLD 50) did not excrete rabies virus from their saliva because they died before an infection of the salivary gland could develop. Smaller doses (10-1000 MLD 50), however, resulted in the majority of vixens showing virus-positive saliva, a factor which no doubt perpetuates the disease among foxes in the natural course. In these studies it was also observed that the quantity of virus excreted in the saliva of the foxes was much less (1000 MLD 50 per 0.03 ml) than in the saliva of the polecats (20.000 - 1.000.000 MLD 50 per 0.03 ml). This quantitative difference in excretion is another significant factor which explains the low level of transmission in foxes and polecats, since it would be probable that only a small percentage of the foxes infected in any given area would excrete sufficient virus to infect the polecats.

It is obvious that these experimental studies have their limitations and that it is not possible to derive definite conclusions from them, since there are many other factors present in nature, such as the fact that there exist various strains in different animal species and their degree of adaptation to these animals, in short the ecological differences existing in nature which cannot be reproduced in these experimental studies. Moreover, the rabies virus, which is generally transmitted by a bite or the lick of an animal, can also be transmitted through the air (Atanasiu, 1965). This mode of transmission in nature has only been observed up to the present in a cave infested with a large number of infected bats (Constantine, 1962). In addition to the studies of the dissemination of the virus by inhalation and of the susceptibility of the respiratory ducts to rabies virus, additional investigations ought to be undertaken on transmission by ingestion, a route of infection that could play a part among certain species of wild animals.

The experiments recently carried out by Constantine (1966) on the transmission of rabies by bites from the free-tailed bat (Tadarida brasiliensis mexicana) to grey fox (Urocyon cinereo-argenteus) and coyote (Canis latrans) have revealed that such transmission is perfectly possible. Additional studies (Constantine and Woodall, 1966) on the possible transmission of rabies virus by the red insectivorous bat (Lasiurus borealis) to certain carnivorous animals, opossums and rodents, revealed that the rabies had been carried to the "cacomistle" (Bassariscus

astutus) and in the striped polecat (Mephitis mephitis) but not to foxes.

In the experimental studies of Sikes and Tierkel (1960) already mentioned earlier, it was found that foxes are more susceptible than polecats when a rabies virus of fox origin is used. This controversial discovery may very well be due to a difference in the origin of these two viruses used in these experimental studies of transmission.

In another study carried out by Parker and Wilsnack (1966) foxes and polecats were infected experimentally with variable doses of rabies virus from the salivary gland of a polecat. They observed a high susceptibility of both animal species for this viral strain of polecat origin. One of the polecats infected with a small dose of virus of the salivary gland of a polecat (80 - 100 MLD 50) showed a long period of incubation lasting almost six months. This long period of incubation demonstrates how intermittent cases or outbreaks occur in nature among wild animals. It was observed that the polecat excreted quantitatively more virus in its saliva than foxes, but, as has already been indicated, no difference was found in susceptibility between these two species of animals when they were infected with a virus from the salivary gland of a polecat.

The fox is the principal carrier of rabies in the United States of America, in Germany and in the arctic regions. In the State of New York, for instance, it has been observed by Parker and his collaborators (1957) that the incidence of rabid foxes is highest at two periods of the year : one during the months of February and March, due to greater contact during the hot season (January and February) and the other, less markedly, around October when the young foxes abandon their family groups. Such observations are directly related to the density of the population of foxes. The investigations carried out by Wood (1958) on grey fox (Urocyon cinereoargenteus) demonstrated that 96 % of the females breed successfully and he found an average of 4.5 embryos per female. From these discoveries he calculated that a population of 100 foxes in March will produce around 215 young actually born.

Parker and his collaborators (1957) worked out a technique for comparing the density of the populations in various zones of the State of New York. They used traps placed at not less than half a mile from one another to ensure adequate coverage of various well-defined zones, both those which are free from rabies and those in which this type of rabies is enzootic. These studies seemed to indicate that for an explosive outbreak of rabies (epizootic) a high susceptible population is necessary, whereas a low level of population is capable of maintaining the disease in an enzootic situation. High populations of foxes were found in certain areas adjacent to enzootic zones. Apparently

there are certain barriers to the dissemination of the rabies virus and it would be important to determine the ecological factors and those of any other kind involved in preventing dissemination. In some cases it was observed that a river limited the dissemination of the disease. Recent outbreaks of rabies in Belgium, Luxembourg and Switzerland, however, have indicated that the river Rhine is not a good natural barrier to prevent dissemination of rabies.

Populations of foxes are capable of recovery within a few years after being reduced by control measures and/or by an outbreak of rabies, returning to the level that the area is capable of maintaining. For this reason any programme for the control of rabies has to be repeated at regular intervals to be effective. Most programmes to combat rabies in foxes tend to be fairly costly and new ways of dealing with the problem need to be found.

An interesting discovery was that rabies in foxes has been occasionally diagnosed in areas considered free from the disease. It is possible that these cases have arisen from a latent asymptomatic infection which becomes clinically active after some type of stress; there also remains the possibility that the disease is derived from infected bats. Additional studies on such sporadic cases in wild fauna are of great importance for a better understanding of how animals act as a reservoir of the disease.

Up to the present we have no definite and reliable information about the minimum population of foxes in relation to persistence of rabies in a determined ecosystem and further detailed ecological investigations are necessary to give the answer to this question. In this connection it has been observed that the home range of the majority of foxes does not extend more than 3 or 4 miles (sheldon, 1950), which should make investigation easier in some areas.

Ecological characteristics of bats and the problems of control of vampires are being dealt with by Dr. Greenhall in his paper for this meeting. However, some ideas are given here of the virus-cell-bat relations and of those between bats and other wild animals.

The existence of asymptomatic carriers of rabies virus in vampire bats and the excretion of this virus in their saliva over a period of several months without any other visible symptoms of the disease was noticed some years ago in 1934 by De Queiraz Lima in Brasil and in 1936 by Pawan in Trinidad. But it is not known whether the vampire bat will remain a truly dangerous animal in its ecosystem for several months, excreting the virus continually or intermittently, or whether disease symptoms will develop and it will die. One may speculate on

certain factors such as differential production of "interferon" (the substance produced by the cells, as a result of having harboured viral or other microbial infections) and of antibodies between one animal and another; and on genetic differences in resistance between various mammals. Likewise the number and incidence of strains of the disease which occur naturally must play some in the process, which, in turn, is related to the density of population of vampire bats and other wild animals involved in the ecosystem.

Johnson (1959b) points out that during the epidemics of rabies in vampires from 1933 to 1934 in Brasil, infection developed simultaneously with outbreaks of rabies in other animal species. The possible infection of bats from other animals is partly corroborated by the vicious behaviour of bats infected in the initial phase of outbreaks, indicating that they may be carrying the virus for the first time. After the carriers have received several infections, the virus seems to undergo a change and produces more paralytic symptoms in the infected bats.

The so-called "carrier condition", involving continuous or intermittent excretion (for long periods) of rabies virus without showing visible symptoms of the disease, has not been observed in other species of bats than vampires (Baer and Bales, 1967). The longest period after which the virus could be isolated in the saliva after experimentally infecting of free-tailed bats (Tadarida brasiliensis mexicana) was 15 days.

The role of the inter-scapular adipose tissue as a depository of rabies virus was studied by Sulkin (1962). Experimental studies showed that active viral proliferation occurred in their "coffee" fat. This is not surprising, since in addition to fats, this tissue contains a variety of enzymes, ascorbic acid, amino-acids, muco-proteins and polysaccharids, together with a highly developed vascularization and an abundance of nerves. During the hibernation of the bat, metabolic activity beneath the tissue can be expected and it is conceivable that both the host cells and virus remain in a latent state. Sulkin made investigations to find up to what degree the temperature of the atmosphere influences the viral infection of the bat. It was found that at a low temperature (5° C - simulating hibernation) viral proliferation in the different tissues was retarded but increased after the temperature was raised to 29° C. Differences were also noted between two strains of rabies virus, the virus of canine rabies and a strain obtained from the "coffee" adipose tissue of a small insectivorous bat infected naturally (Myotis lucifugus lucifugus) when inoculated intra-muscularly in these small bats, exposed to a temperature of 5° C for 14 days and then to 29° C and, in another sample, kept at a constant temperature of 29° C. In the first place it was observed that the strain of canine virus was more neurotrophic than the strain of bat virus. It was also found that the strain of canine virus could be isolated

with the same frequency in bats kept at 29° C after inoculation and in those kept first at 5° C for 14 days and then at 29° C. The viral activity was suppressed during the cold period but renewed at an identical level when the bats were transferred to 29° C. This was not observed in the case of the other bat rabies strain. This linotrophic strain showed the highest percentage of isolation from "coffee" adipose tissue when the bats were kept at 29° C. However, after a period of simulated hibernation at 5° C and subsequent transfer to 29° C, the virus was found equally distributed in the brain, salivary gland and the "coffee" adipose tissue, which implies that the rabies virus can reach the salivary gland more quickly and with greater frequency after a period of simulated hibernation. In addition, the concentration of virus was also found to be greater in bats subjected to hibernation than in those which had not hibernated.

From these experiments we may come to the conclusion that seasonal fluctuations in the surrounding temperature not only create the possibility of a reservoir mechanism for viral strains adapted to bats, but also increase the possibility of the dissemination of these strains.

In conclusion it can be said that there is a need for extensive ecological research in different geographical regions, chiefly in zones of wild-life rabies, but also in zones free from rabies, in order to elucidate the factors which are still unknown, lead to a better understanding of the epizootiology of rabies and control the disease. It is also necessary that additional research be undertaken on the characteristics of viral stocks isolated from wild animals in order to contribute to the better understanding of the natural history of rabies in wild animals, which, in their turn, would create the possibility of developing more effective methods of fighting the disease than those practised up to the present. Some of these viral isolations can be selected for use in the production of adequate vaccines, particularly with the purpose of protecting cattle against the paralytic form of rabies in Latin-America.

The UN/FAO/mexican international project on Paralytic Rabies, begun on January 1st 1968, incorporates such studies, with particular reference to the problem of the vampire bat. Among other themes of study are investigations on the biology and ecology of the vampire bat in relation to the epizootiology of rabies and more detailed studies on the isolation of rabies in vampire bats and bovine animals are also under consideration. In relation to virological investigations, the "plague" technique recently developed by Sedick and Wiktor (1968) will be of great importance. It may be possible to isolate plague changes of strains isolated from vampire bats, bovine and other animals in such a way that they can be used in controlling paralytic or crippling bovine rabies more effectively than has been possible up to the present.

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5. 5. "Paresiantic and Paralytic Rabies"  
by Hector Enrique Gomez(Argentina)

Rabies is a disease generally of mammals, exceptionally known also in birds. The rabic virus is transmitted by bite, scratch or simply by contact.

Following the nervous tissues of the victim, the virus localizes in the CNS, and after arriving to the brain the first symptoms of incoordination in the gait are observed, ending with an ascending progressive paralysis of deadly evolution.

Two types of rabies, in wildlife and in urban areas and two forms, furious and paralytic are distinguished with an ample worldwide distribution excepting the Australian continent where it never has been found.

Paralytic rabies of cattle is of the wildlife type, being exceptionally found in human beings, due to transmission by vampire bats.

Paresia is a local and incomplete paralysis, not deadly but stationary. Since the beginning of this century paralysis in cattle and horses of tropical America are known, and some investigators could establish the diagnosis of rabies. Some other entities involved were not properly differentiated because the symptoms were similar. Therefore both expressions "rabies" and "paresiantic" should never have been associated since they are quite opposite by their meanings. But recently international organisations such as P.S.O., W.H.O. and CEPANZO have developed better prophylactic and diagnostic methods and techniques and the traditional expression "paresiantic rabies" has become more obsolete. Nevertheless it is still used instead of the more adequate of "paralytic rabies" to a certain extent.

When we say "paralytic rabies" we refer to the form assumed. The word "form" is generally omitted in practice.

6. 1. "The Nothofagus forests"  
by Hugo Correa Luna (Argentina)

The Nothofagus of Argentina can be found in the Patagonian Andes, from 37° to 55° S., in a narrow strip of about 2.700 Kms of length and 50 to 100 Kms of width. Their presence is due to the fact that clouds coming from the Pacific Ocean, precipitate their moisture abruptly on the Cordillera and the rain very seldom reaches the steppes.

The species concerned are Nothofagus obliqua, (pellin) Nothofagus nervosa (raulf), Nothofagus combeyi (coihue)

Nothofagus betuloides (coihue del sur), Nothofagus antarctica (nire) and Nothofagus pumilio (lenga).

The paper outlines the main characteristics of the dispersion and ecological preference of these species, and then deals with the various sectors of the Patagonian Andes under the following heads : location and behaviour of the particular Nothofagus species in the area, their reciprocal relationship and details of companion species which are found.

Due to climatic, topographic and edaphic variations, and the vicinity of the steppe, the community of this formation of Andino-Patagonic forests, develops a very unstable balance, which leads to degradation of the ecosystem as soon as it is altered. Among the factors leading to alterations, we have droughts, forest fires, excessive introductions of grasses pasture and introduction of other exotic species, irrational clearing and felling etc. Where such factors operate the consequence will usually be violent erosion, loss of forest soil, and the appearance of exotic, steppe or transition species, which gradually dominate the area. Several sectors are mentioned, where such processes of degradation have occurred, explaining the causes and evolution which have taken place.

Finally, one of the most important economic functions of Nothofagus forests are considered, namely their functions in protecting the river sources, which originate in the Cordillera and cross the Patagonian steppe, provide for the needs of irrigation, hydro-electric power and industries, and make the existence of cities possible. Development projects in these forests, whether involving the introduction of exotic species, opening up of areas for pastoral purposes, establishment of sites for Parks or exploitation of other natural resources, etc. should never be undertaken without profound ecological studies and the most prudent and rational application of modern technology.

6. 2. "The Nothofagus forests"  
by Carlos Munoz Pizarro

This paper analyzes the palaeobotanical features of the genus Nothofagus and compares them with Fagus of the Northern Hemisphere, demonstrating that differentiation of both genera has been taking place since the Cretaceous. It analyzes the taxonomic problems of the genus and chronologically discusses the various problems involved with special reference to the errors committed by authors due to lack of adequate biological material. It studies the geographical distribution of the two related genera of the Family, which may be said to have a type of bipolar distribution, analyzing geographical and altitudinal

distribution in relation to ecological studies and offering a definition of the particular of each species.

On the basis of the studies of several authorities who have dealt with the subject, the anatomy and morphology of *Nothofagus* is summarised : it is pointed out that there have been no previous cytogenetic studies of the genus.

The geographical world distribution is given and mentions a total of 40 recognized species, distributed in South America, New Zealand, Australia, New Caledonia, and New Guinea. Briefly mentioned are the phenomena of hybridism, polymorphism and heteroblasty, well known in other regions. The paper refers to the 11 hemi-parasitic species of *Myzodendron* and discusses the very important association between *Nothofagus* and Fungi, while due to mycorrhizae activity clearly is of great importance in relation to plant succession. In particular it mentions the role of *Cyttaria* and *Bondarzewia* as parasites and cites 12 genera of mycorrhizae fungi, with an approximate total of 336 species, of which a specially large number belong to *Cortinarius* and *Inocybe*.

Referring to the situation in Chile, it is pointed out that in the provinces between Araujo and Chiloe out of 9 forest types, 7 contain *Nothofagus* in pure or mixed stands with other genera. Further south, the typological and physiognomic research programme recently undertaken has covered 46 % of the province of Aysen, proved that 5 out of the 6 forest types include *Nothofagus*. Figures are given of an analysis of arboreal units per ha. and of the basic total distribution area of some *Nothofagus* species. The research programme also covered 33 % of Magallanes, the southernmost province in which is situated the limit of the timber line. Similar details are given of the results achieved and the ecology of the *Nothofagus* species occurring in the province is described.

Based on the results of the above-mentioned research programme, the Paper offers a new classification of *Nothofagus* species into sections and subsections, a new synonymy for the species and a new analysis of their geographical distribution pattern.

The research results will, it is hoped, also provide governmental and private organizations with a firm basis on which to prepare conservation-planning or to establish national parks and equivalent reserves in collaboration with international agencies interested in conservation of natural renewable resources. In particular, the CT section of the International Biological Programme (IBP) is interested in safeguarding samples of all the different ecosystems or habitat types in the world and it is thought that the biological research reviewed in this Paper offers at least a basis for carrying out this important conservation task in Chile.

6. 3. Conservation in the Nothofagus forest zone  
by M.W. Holdgate, The Nature Conservancy, London, U.K.

Introduction

Conservation has been described by the Council of Europe's European Committee for Conservation of Nature and Natural Resources as a positive, evolving co-partnership between man and nature. It requires the strict management of each resource - land, air, water and wild life - to ensure optimum value, and the creation and continuity of supply of those qualities in the environment which satisfy men's aesthetic, ethical, economic and social needs'. Such a definition embraces the dual components of resource conservation, which is concerned with the wise management and optimal utilization of the total environment and especially of soils, forests, pastures and wild life, and wild life conservation which is more explicitly concerned with the selection of samples of plant and animal communities typical of or particularly important in a region, and their enlightened management.

In most continents and regions conservation, in both senses, is fighting a rearguard action and the greater part of the environment has already been adversely affected by man's influence. In parts of South America, including the southernmost and westernmost archipelagos of Chile and the central cordillera of the Andes, however, human impact has been less extreme, and there is an outstanding opportunity for conservation planning in advance of development. The purpose of this paper is to summarize some of the unique biogeographical and ecological features of the "Nothofagus forest zone" and suggest the practical steps that should be taken if this opportunity is not to be lost.

The Nothofagus Forest Zone

As Correa (1968) and Munoz (1968), in the two other contributions to the present session have indicated, forests in which species of Nothofagus are prominent occur in the warm and cold temperate areas of southern Chile and Argentina from about latitude 36° S to latitude 55° S at Cabo de Hornos, and from the Pacific coast to the base of the eastern foothills of the Andes. This is a region of great topographic diversity. Along the Pacific coast there is a chain of mountainous islands which, from about 44° S show conspicuous marks of Quaternary glaciations : valleys have typical glacierized profiles, the islands are separated by deep fiords and there are local ice caps. In this zone peaks rarely exceed 1250 m. : in contrast, the Cordillera rises to 3000 m. and supports several extensive ice caps (notably the two areas of "hielo continental" north and south of Seno Barker). Eastward, the more subdued relief of the Patagonian plains, locally marked by glacial deposits (auer, 1960), falls gradually to the Atlantic.

This whole region is characterised by striking climatic gradients. As Correa has pointed out, temperatures decline progressively from north to south while precipitation is extremely high ( over 5000 mm) on the western flanks of the Andes, especially around 45-50° S, and declines rapidly eastwards of the range to values of below 125 mm. on the plains of Santa Cruz or Magallanes. On the west of the Cordillera, a cool oceanic climate thus prevails, with little temperature variation over the year, and extremely heavy rainfall at all seasons. On the east of the Andes the climate is more continental, the temperature range far greater, and precipitation lighter and more seasonal. Coupled with the topographic, geological and consequent edaphic diversity, the result is a great variation in vegetation type.

Godley (1960) has, following such earlier authors as Skottsberg, defined major biological zones in this region : within each there is a considerable vegetational diversity. Four major systems occur in the region as a whole :

- a) the evergreen forest
- b) deciduous forest
- c) open Magellanic moorland and alpine zones
- d) steppe

Because of the differing terrain and vegetation, these zones differ in their accessibility to man and were colonised at different periods. Bird (1938) has recorded settlements about Estrecho de Magallanes, north of Punta Arenas, by 10.000 BP and these people were probably ancestral to the Ona or Tehuelche, arriving from the north on foot across the open steppes, where they hunted guanaco or rhea. In contrast, the western archipelago was probably colonized along the coasts, by people moving in bark canoes and with a culture similar to that of the Alacaluf or Yamana today, and they may have invaded somewhat later (Holdgate, 1961a). European settlement has similarly favoured the drier, open eastern plains where stock raising is easy (Butland, 1957) and even today has only locally penetrated the western fiord zone south of the Archipel de los Chonos, There are only a few scattered settlements e.g. at Puerto Eden (Isla Wellington), Isla Guarello (Archipel Madre de Dios : an important limestone quarry), Peninsula Munoz Gamero, and on the south coasts of Isla Navarino, and east of Isla Hoste in this zone. As a result, conservation of areas in the Magellanic moorland and forest zones of the western archipelago, south of Chiloé is likely to be far easier and to conflict far less with agricultural interests than in the eastern zone of deciduous forests along the Argentine flanks of the Cordillera and the territories about Punta Arenas, on the plains of Tierra del Fuego, or around Ushuaia, where there are substantial populations.

## Vegetation Types

The evergreen forest dominates the western coastlands of Chile, from the coastal Cordillera about Valdivia to Golfo de Penas at 47½° S. Further south, where the climate becomes cooler, wetter and substantially more exposed, the extreme western coastal belt lacks continuous forest cover and supports open peaty moorland, the Magellanic moorland of Godley, with scattered woodlands in sheltered places where drainage is easy and blanket peat formation consequently inhibited. Evergreen species, however, continue to dominate such woodland as occurs (except at the highest altitudes), and more continuous evergreen forest is to be found to the east where conditions are somewhat less extremely oceanic. The evergreen forests continue southwards and eastwards to Isla Navarino (53° S) and Isla de los Estados. East of this belt there is a zone of deciduous forest, extending from about 36° S in southern Chile, mainly along the Argentine side of the Cordillera and across the centre of Tierra del Fuego to reach its southern most limits on the northern slopes of Isla Navarino and its eastern limits, the Atlantic coasts of Tierra del Fuego near Cabo San Pio. The deciduous forest passes eastwards into the steppe through a series of transitional scrubforest and scrub-types.

These forests are by no means uniform, and while they have often been referred to as the "Nothofagus" forests, some of them are dominated by quite different genera and all of them contain several other important associates. The northern section of the evergreen forest zone, for example, from Valdivia to southern Chiloe (43°) is, as Godley (1960) points out, extremely complex and diverse, but generally contains little Nothofagus, at least at low elevations. In the north west of Isla Chiloé near Chepu, in 1958 low ridges with a brown earth soil were covered by rich evergreen rain forest dominated by Eucryphia cordifolia, Weinmannia trichosperma, Laurelia serrata, and species of Myrtaceae : near the coast Aextoxicum punctatum was dominant. Nothofagus nitida was confined to unpromising sites, occurring in small patches especially in the river basins, where peaty, extremely acid soils were developed and a scrub-forest of Tepualia stipularis was generally characteristic (Holdgate, 1961). On the uplands of northern Chiloé (which had been considerably influenced by man), however, Nothofagus nitida was found to dominate patches of woodland, with Saxegothea conspicua as an understorey : Godley comments that regeneration was largely to Nothofagus where trees fell, and that where the canopy was fairly open on the flanks of the upland there were areas with a remarkable combination of N. nitida trees and a lower layer of entangled Chusquea bamboos. Possibly this community had arisen following fire. Low down on the eastern plains of Chiloé, where cultivation has now largely replaced the original forest, Godley recorded further woodland variants in which Nothofagus dombeyi

was much more prominent and he suggested that this species may originally have been widely dominant in this region. In the southern half of Chiloé, and through the Archipel de los Chonos, it seems probable that there is a progressive transition in the lowland forests towards what Schmithüsen considers may be a characteristic southern sub-section of the Valdivian forest type, with N. dombeyi as the general forest dominant and a progressive diminution and disappearance southwards of Eucryphia, Weinmannia, Laurelia and the large Myrtaceae and Lauraceae.

All this is quoted as evidence of the considerable range of variation in the forest types even within the one area of Isla Grande de Chiloé. As one passes southwards along the western oceanic zone of Chile, there is a poorly-documented progressive transition until, about Golfo de Penas, the species-rich Valdivian forest becomes replaced by species-poor evergreen woodlands dominated by Nothofagus betuloides. At Puerto Eden, around +9°S, there is a little N. nitida by the coast, but N. betuloides dominates woods along the gullies and in sheltered, well-drained hollows up to as high as 500 m., giving place above this level to semi-prostrate Sub-alpine scrub of N. antarctica. Passing southwards, towards Magellanes, there is continues reduction in the species-richness of the evergreen forest, until by Isla Navarino the dominant N. betuloides has very few associates. Only six tree species in all are found in the forests south of Estrecho de Magellanes.

Rather similar changes and gradations are to be seen in the deciduous forest zone, which lies to eastward and extends through a comparably wide range of latitudes. In the north Nothofagus obliqua and N. procera are important in the zone between 36 and 41 S : here also there are remnant forests of Fitzroyia patagonica whose extent is not well documented.

But to southward, along the eastern flanks of the Cordillera and in Tierra del Fuego, Nothofagus pumilio dominates the deciduous forests. About Punta Arenas in southern Chile, a belt of N. antarctica scrub woodlands separates the main forest from the open steppe : bushy vegetation of Chiliotrichum diffusum is also characteristic of this transition. On the north of Isla Navarino the N. pumilio woodland is almost pure, with an open interior and few undershrubs : a pattern in striking contrast to the more tangled evergreen forests of the north and west, and at the super forest line N. antarctica as well as N. pumilio forms dense, semi-prostrate scrub.

This whole great zone shows a comparable diversity of arcticalpine vegetation, and of open herbaceous communities between the forests. Peat formation is increasingly prominent as one passes southwards from the uplands of Chiloé into the Magellanic region, and the blanket bogs are characteristically dominated by species of the general Oreobolus, Astelia, Donatia

and Gaimardia. In the deciduous forest zone of Isla Navarino, however, and on Tierra del Fuego, Sphagnum bogs are widespread, with such species as Rostkovia magellanica and Tetroncium magellanicum in association : at high levels Empetrum rubrum and Azorella spp. are important. These communities still await documentation for much of the region.

### Fauna

The general faunistic character of this zone has been reviewed by Kuschel (1960). The Valdivian forest has a rich and varied fauna, with a wide range of insect species, numerous forest birds, and small mammals (including Marsupials). Passing southward into the Magellanic forests, there is a progressive reduction in the faunistic diversity but distinct southern species are not encountered : all the species of the magellanic forests also occur farther north. The Magellanic moorland zone is the poorest of all, with woodland animals similar to those of the Magellanic forests and a sparse fauna on the open boggy moors. Conversely, the high Andean zone has a distinctive, if limited, range of animals, while the steppes are richer again. By comparison with northern temperate latitudes the region generally (and especially its southern parts) is deficient in land mammals, amphibia and reptiles (Darlington, 1960). It is most remarkable for the presence of numerous species and genera with wide distribution in the southern temperate zone.

### Geographical relationships

For over a century it has been well known that many of the plant and animal genera and species of temperate South America have close relationships with forms dominant in temperate parts of Australasia and the islands of the Sub-Antarctic belt (Skottsberg, 1960). Nothofagus itself dominates woodland in Tasmania, the Australian mountains, New Zealand and New Guinea and formerly occurred on the Antarctic Peninsula. Eucryphia, dominant on Chiloé, is elsewhere characteristic of woods on the eastern seaboard of Australia. The relationship extends also to plants of the open Magellanic moorland (Astelia, Donatia, Gaimardia, Oreobolus), which dominate physiognomically similar communities on both sides of the South Pacific. Godley (1960) has analysed this relationship in general terms and points out that of the 46 families found in temperate forests in Southern Chile, 39 are represented also in New Zealand at comparable latitudes : the New Zealand forests however contain representatives of 24 families not found in this zone in Chile. A rather similar picture results from analysis of the bog vegetation. Kuschel (1960) analysed the faunistic relationships and concluded similarly that "a large number of elements in the fauna of southern Chile show no phylogenetic relationship with the rest of the American fauna, but are related to groups in New Zealand, Tasmania, Australia, New Guinea, South Africa and the Sub-Antarctic islands ". This pattern of biogeographical relationship,

which is continually, being confirmed as the fauna of temperate southern Chile becomes better known, makes the region with which we are concerned unique in South America, and of great scientific importance.

### International Scientific Importance

The southern temperate regions of South America, despite their remoteness, have an international importance in science. This arises from their unique biogeographical features, which had considerable influence on the thinking of Darwin and Hoocker, and still pose major problems, the elucidation of which may greatly influence our understanding of the causes of present distribution patterns of the world's flora and fauna (Pantin, 1960). The conservation of samples of the native vegetation and fauna of this zone is urgent and while the initiative for it must come from scientists in Argentina and Chile, by their actions they will meet a world need.

### The Approach to conservation

The preceding summary, like the more detailed papers by Correa and Munoz, has demonstrated the impossibility of dismissing the whole vast area south of latitude 36° S and west of the Argentine base of the Cordillera under the blanket heading "the Nothofagus forest zone". In truth this is a region of great edaphic, geological and biological complexity, influenced by some of the best marked climatic gradients in the world.

In considering the conservation of this area, the first necessity is obviously survey. At the present time, detailed information is available about the plant and animal communities of only a few sample areas, and the information that has been collected has often been expressed in different forms, and is of unequal depth. Only a few superficial studies of soils have been made in the western island zone (Holdgate, 1961b). Further progress demands a comparative assessment of many more sites, distributed throughout the region as a whole. These surveys should record.

- 1) The climatic, edaphic and topographic and geological characteristics of each sample site.
- 2) The pattern of vegetation, described according to a standard method, and in accordance with a universal classification.
- 3) Any evident correlations between vegetation patterns and the physical parameters of the environment.
- 4) The principal species of vascular plant present in each community type and sample area, and as far as possible the bryophytes and other cryptogams.
- 5) As much information as possible about the fauna. This can probably only be achieved in any reasonably comprehensive

form for the avifauna, mammalia and amphibia (reptiles are rare or absent in most of the southern and western forests) but because the invertebrate groups in this area are of outstanding interest, all possible efforts should be made to collect records for them also. This latter must be a continuing exercise, proceeding long after a series of reserves has been set aside.

- 6) The characteristics of human impact on the area and the other demands likely to be made on the land areas for forestry, agriculture, mining or recreation.

It would be particularly appropriate to undertake this survey in 1968-70 as a part of the programme of the Conservation Section of the International Biological Programme (IBP). A suitable check sheet is available (Peterken, 1968) for use in the field or the laboratory, and facilities for the central analysis of the data and the evaluation of the importance of each sample area in a world context are available. In parallel with the survey of a number of sample sites, an improved classification of the vegetation in the region as a whole should be made. A tentative "plan for action" is set out in the appendix to this paper. It is fully appreciated that the development and realization of this plan must be a matter for South American scientists, and may be limited by their numbers, resources and problems of access to certain areas. After surveys are complete it should be possible to select a series of proposed reserves on the basis of rigorous scientific knowledge, and the following criteria are suggested :

- a) reserves should protect samples of all the main ecological systems in the zone, and of the most significant variants developed in different geographical positions or in response to differences in climate, soil or biotic factors;
- b) reserves should include samples of the habitat of as many as possible of the species native to the zone, and should be extensive enough to protect viable populations of the larger mammals (e.g. guanaco, huemul) or birds (e.g. condor)
- c) reserves should be as diverse as possible including examples of transitions between vegetation types, especially with altitude.

The adequate protection of many areas in the western island and high montane region will demand little interference with human activity. The most important limitation must be a prohibition of burning of the vegetation, of forest clearance, and stock raising, and prohibition or careful control of hunting within the reserves. These prohibitions will inevitably become more difficult to enforce in the areas east of the Cordillera and on the edge of the steppe, where agriculture is more profitable and human populations are higher. Nonetheless, the safeguarding of a representative series of areas is essential if the unique

biota of this zone is to remain available for study and enjoyment. Much of this region contains superb scenery, and is justifiably regarded as having great tourist potential, and to this extent conservation of some of the beautiful and scientifically fascinating forest and alpine vegetation is a logical adjunct to the future development of the zone as a resort for people from all over the world.

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### APPENDIX : Areas suggested for survey and documentation as proposed reserves in southern Chile

(The author has insufficient knowledge of the lands east of the Cordillera to make meaningful suggestions for them. Even this list is highly provisional and requires careful revision, but documentation from these areas would greatly advance reserve planning)

## Valdivia

Cordillera Pelada	Northernmost outlier of "Magellanic" vegetation
Samples of Valdivian evergreen rain forest	Richest northernmost area of Valdivian forest : several samples desirable.

## Llanquihue, Osorno, mainland Chiloé

Samples of <u>Nothofagus obliqua</u> , <u>N. procera</u> , and <u>Fitzroyia patagonia</u> forests and montane vegetation	Deciduous and coniferous forest, fast undergoing clearance. Several samples desirable.
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## Isla Grande de Chiloé

Area south of Chepu, on the seaward flanks of the Cerros de Metalqui (highest parts of the island) and about Cerro Capitan Maldonado	Richest Valdivian forest on the island ? Diverse woodland types, considerable altitudinal transition. Open land on Cordillera San Pedro.
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Relic forest patches on eastern plains N. from Castro	Remnant <u>Nothofagus dombeyi</u> forests ? Distinct forest types in narrow ravines ?
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Area of southern Chiloé	Little known area : probably important forest transition. Several samples desirable.
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## Aysen : Archipel Chonos

Islands between Islas Guaitecas and Peninsula de Taitao	Progressive southward forest impoverishment, poorly documented. Locally damaged by fire. Several samples desirable.
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## Aysen : mainland

Sample sites around base of Cordillera near San Raphael	Evergreen, impoverished forest. Locally well studied
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## Magellanes : south of Golfo de Penas and North of Estrecho de Magellanes

Around Isla Wellington	Typical Magellanic moorland with blanket peat and scattered woodlands
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Archipel Madre de Dios	Limestone areas (I. Guarello) with distinctive flora
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Islands near I. Hanover	Very barren rocky islands with gully forests
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Outer islands, out to Evangelistas	Extreme oceanic Magellanic moorland areas
Peninsula Munoz Gamero	More sheltered zone, with woodland, bog and montane areas
Peninsula Brunswick	Magellanic forest near transition zone to deciduous type. Open alpine zone above
Seno Otway/Seno Skyring area	Magellanic evergreen forest sites
near Punt Arenas ?	Deciduous forests and transitions through scrub forest zone to steppe.

### South of Estrecho de Magellanes

Isla Santa Incs I. Desolacion	Extreme Magellanic moorland area with transition to ice cap
I. Clarence/I. Capitan Aracena	More continuous Magellanic forests and open rocky uplands
Tierra del Fuego : Peninsula Brecknock	Magellanic moorland with alpine zones above
Seno Almirantazgo : Lago Faguano	Magellanic/deciduous forest and alpine zones
Central Tierra del Fuego	Forest/steppe edge. Areas of large <u>Sphagnum</u> bog in deciduous forest zone
Isla Navarino	Contact between deciduous and evergreen forest : alpine zones. Considerable diversity. Southernmost population of guanaco : good avifauna
Isla Hoste (south) round Bahia Orange	Magellanic moorland and contact with Magellanic forests : area of early scientific study
Islas Wollaston	Oceanic southernmost island groups : subantarctic affinities. Magellanic moorland areas with scattered woodland patches.

### Summary

The area of South America from latitude 36° S to Cabo de Hornos and between the Pacific and the eastern foothills of the Andes may broadly be described as "the Nothofagus forest zone". In fact, however, this is a region of striking edaphic, climatic and topographic diversity and supports many different kinds of vegetation. The vegetation and fauna are of international

scientific importance because of their biogeographical relationships with elements in the biota of other southern temperate lands, and especially New Zealand and Tasmania. The protection of a series of samples of the natural vegetation is of great importance for science, as well as for any future development of the zone for tourism. Surveys are urgently needed as a first step toward conservation, so that a classification can be drawn up of the main ecological systems that should be protected in reserves and of a list prepared of the sites as which these systems are best represented. The International Biological Programme has provided a suitable field data sheet and data sorting facilities which could greatly assist in evaluating such surveys and it is to be hoped that scientists in South America will be able to take advantage of these aids.

7. 1. "Some problems concerning primates"  
by Fernando Dias de Avila-Pires (Brasil).

#### The Neo-tropical Primates

Two families of primates, constituting the Ceboidean superfamily - exclusively neotropical in distribution if not in origin - are present on the American continent : the Cebidae family, with 12 genera and nearly 30 species and the Callithricidae family, with 4 genera and 35 species.

The majority of the species live in the humid tropical forests of the Amazon basin and in those of the coastal sierras of Eastern Brasil.

The "cebidos" (monkeys) are found from the Misiones region in the Argentine as far as San Luis de Potosi and Tamaulipas, in Mexico; and from the Atlantic coast to the Pacific in Ecuador. The "calitricidos" (marmosets) are found from the coastal forests of the extreme south of Brasil to the zone of the Panama Canal; and from the Atlantic shore as far as the central Cordillera of the Ecuadorian Andes.

In the zones of cactus bush (caatingas) and savannahs ("closed grasslands") of South America, ecological counterparts of the African savannahs, equivalent representatives of the rock-dwelling primate species of the Ethiopian region do not exist (AVILA-PIRES, 1967). A small number of species of neo-tropical primates are represented in these zones of open vegetation (savannahs, caatinga grasslands), but those which occur do not show any notable adaptations : they merely take advantage of the opportunity which an empty niche offers them.

## Recent Interest in the study of Primates

In 1939 LEVINE isolated an unusual agglutination in the blood serum of a woman who had given birth to a dead child, which had property of agglutinating serum from about 85 % of blood donors of the white race in the United States.

One year later LANDSTEINEE and WIENER announced the discovery that a similar serum could be produced in rabbits and guinea-pigs inoculated with serum obtained from rhesus monkeys. The agglutino-genous factor received the designation of Rh, derived from the first letters of the Rhesus (Macaca mulatta).

From this discovery dates the birth of an increasing interest in the use of primates in research and in control tests in laboratories. Biochemists, pharmacologists and researchers in bio-medical sciences turned their attention towards a new and promising field of research which was offered to them. Later interest in primatology came to extend beyond the frontiers of the biological sciences and social scientists plunged into' the exploration of new and unsuspected possibilities.

Certainly by 1930, an Institute for the purpose of conducting research in the field of physiology and etiology of chimpanzees had been established in the U.S.A. and in other countries primates had been the subject of occasional, limited and modest research.

In the last decade, however, Primatology became an autonomous branch of learning.

In 1957 the first number of a periodical Primates dedicated to the publication of scientific work on monkeys was published in Japan. (In Italy, in 1917-18, only two numbers of a pioneer review had been published) In 1963 appeared in Basle (Switzerland) the inaugural fascicule of Folia Primatologica.

An International Scientific Association was created in 1964 in Frankfurt, Germany. By 1966, this already had more than 300 members.

Two large Primate information centres have been set up at Seattle, U.S.A. and Sukhumi (Georgia), U.S.S.R.

In addition to private Centres, there are now seven Regional Centres in the U.S.A., maintained by federal budgets, whose purpose is to promote research on different aspects of Primatology (Eyestone, 1966)

Since 1960 various congresses and conferences have taken place to discuss the use of primates in applied research.

New branches of learning, such as Sero-primatology (Jankowsky, Wiener and Fineg, 1966) and new Fields of investigation in the psychology, sociology and spatial bio-medicine of primates have opened up.

The first difficulties were not slow in coming, principally due to the inadequacy of the fundamental knowledge available on primates. Problems of zoological nomenclature, for instance, reflecting the existence of doubts as to philogenetic interpretations - of rather limited interest and the solution of which only mattered to a few professional zoologists - took on essential importance for the specialists in other areas, only slightly or not at all familiar with them (Hershkovitz, 1965a, 1965b; Avila-Pires, 1966b).

### Primates as laboratory animals

Certain important aspects must be considered when it is a question of the selection of animals for use in tests of production control in pharmaceutical laboratories or in scientific research.

Apart from the problem of the animal's adequacy to the specific requirements of a project, careful account has to be taken of how to uniformity. Successive samples from the same supplier commonly include animals of different origins or of different species or sub-species.

In devoting myself to the systematic study of primates, I always wanted to know which were exactly the criteria used by experimental scientists in choosing a determined species to serve for any particular experiment. The basic requisites are clear : the animals must stand captivity, must be docile, easy to handle and of natural abundance.

These factors, however, are not sufficient when it is a matter of the selection of an organism from which it is hoped to draw definite answers to specific problems. It would be desirable for the scientists to be more methodical and specific in the selection of individual for their experiments. Unfortunately this is not the general rule. In fact, the only factor considered is the possibility of their natural abundance. And in various known circumstances not even this is taken into account, as in the case of Leontideus rosalia, the lion marmoset.

I frequently receive letters from laboratories, institutes and centres of primatology on the possibility of obtaining a permanent supply of these marmosets to be used in medical and pharmaceutical research. The reason for this particular selection is a complete mystery to me. The taxonomic position of this species is not yet perfectly known; they do not reproduce themselves well in captivity, compared with various more common species; moreover, they belong to the rarest marmosets, restricted to a small area in the S.W. of Brasil.

Scientists should take at least the same care in selecting and knowing their laboratory animals as they take in choosing their instruments and scientific apparatus.

Not long ago I had the opportunity of remarking on a similar problem during the course of a book review, in which I criticized the unsatisfactory nomenclature used in the text, which could endanger some of the principal conclusions. The book was based on a symposium on maternal behaviour in mammals. One of the writers described differences in this type of behavior among different sub-species of the same species. Several others, however, identified their animals in vague terms such as "laboratory mouse" or "sheep from the rocky mountains". Yet all the authors went to immediate trouble to describe and explain in detail the apparatus and photographic cameras used in their observations.

For all work there should be an appropriate tool, and if it can be argued that we still lack much information necessary for really adequate selection of material for our experiments, the answer is not to work blindly, but to make more basic investigations or provide means and funds for them.

Tropical America harbours around 65 species and subspecies of primates, the vast majority badly represented in scientific collections, known only by a Latin name and an inadequate morphological description, and even whose exact geographical range is unknown.

This being so why not spend a little time and money in building up a structure of fundamental knowledge and thus get accustomed to working on a solid basis ?

It is common for a systematist to receive the skin of an animal with the request for its Latin name, to be included in the final account of some experiment in which hundreds or thousands of specimens were used, usually coming from different sources and generally of different subspecies.

I feel that the time is fully ripe to change methods and orientation and to follow a more rational policy.

Since the problem of the preservation of primates is closely connected with that of their use as laboratory animals, a more scientific approach to this question is indispensable.

### Use and Preservation

The fundamental problem of conservation involves the planning of the rational use of renewable natural resources and in the reservation of areas in the different ecosystems, where fundamental investigations can be developed with the certainty that

conditions there will not be suddenly modified. These reserves will constitute, in the future, the source for the re-population and rehabilitation of other areas.

The forest areas of the biosphere are becoming increasingly less extensive and more discontinuous.

The measures of protection of the fauna which we have recommended and adopted have not been sufficient to avoid the extinction or drastic reduction of many species.

The modification of natural habitats through the action of man, especially in the tropics, threatens to extinguish a large number of animals and plants before we can get to know anything about them. Likewise from the strictly utilitarian point of view, this represents a serious threat to us.

The great majority of primates are restricted in distribution and have complex habitat requirements, their existence and survival depending on special conditions of shelter, food and protection.

The quantity of animals necessary to fill the requirements of the research laboratories and for pharmaceutical products requires that breeding in captivity should be increased. Thus investigations on the behaviour of primates in artificial conditions now acquire fundamental importance. Habits, behaviour, feeding, reproduction, sensitivity to infection must be investigated both in wildlife populations and also in artificial conditions.

A strict selection of the species which are suitable for any given general and special requirements must be carried out urgently. Natural abundance, slight individual variability, docility of behaviour, adaptation to the variations of the surroundings, resistance to particular infections and sensitivity to others, are generally essential. The specific characteristics to be looked for depend on the objective of each project of investigation or of each control test. Thus, for instance, Cebuella pygmaea has been used in research on multiparous; the species of the spider-monkey genus are resistant to the virus of poliomyelitis; the Callithricidae are resistant to tuberculosis and to schistosomiasis.

#### Some Statistical Data

Exact data as to the import and export of wild animals are indispensable for the planning of an efficient policy of preservation. Unfortunately such data are non-existent in many countries.

Approximate calculations indicate that in all 200.000 primates were used annually in bio-medical research and in the pharmaceutical industry in the last decade. To this number must be added that of the animals acquired by Zoological Gardens and by private individuals, because of their value and interest.

At the beginning of the 'sixties African and Asiatic species were most used, but since measures for the protection of species such as monkeys, orang-outans and chimpanzees were adopted in various countries of those continents the attention of importers changed to the neo-tropical species.

Primates for whatever purpose are the subject of a regular (or irregular) commerce which follows the same pattern everywhere. The first link in the chain is a native or employee in some forest activity. Usually he can get his reward by merely handing over an animal which is immediately sold to a travelling dealer (called a regatao in Brasil) or to an agent established in the interior. The latter re-sells it to a dealer in animals who in his turn also keeps hunters briefed to attend to special orders. After a period which may stretch over days or weeks, the consignments are shipped abroad.

Conservative estimates indicate a loss of 50 % during the period from the capture of the animal until its final sale. During the phase of capture losses include badly wounded animals, pregnant females or those still suckling their young, all of them resulting in a reduction of the population. In the temporary hunting camps conditions of hygiene, human included, are non-existent, the installations inappropriate and rustic and the treatment given to the animals - feeding and medical treatment - of such a kind as to increase the mortality rate. During transport and provisional "warehousing" there is the risk of contagion, once animals of various parasites, are mixed together. Finally, after delivery to the respective destinations, begins the phase of adaptation to the climatic and housing conditions which are not always propitious, for conditions of captivity do not always take account of the special features of the individual and social requirements of different species.

Two excellent articles recently published treat this problem in detail (Roth, 1964, 1965). They give data on the commercial movement of African and Asiatic species to England and the U.S.A.

As a result of all this, some of the species of neo-tropical primates are already found to be threatened with extinction.

In South America the principal export centre is situated at Iquitos, Peru from which nearly 25.000 monkeys are shipped annually, captured in the border regions of Peru, Colombia and Brasil.

In bio-medical research the species of the genera Cebus, Saimiri and Callithrix are most used. The genus Leontideus is a case apart to which I shall refer later. Thanks to the work of Carpenter and his collaborators, Alouatta and, recently, Spider-monkeys (Ateles) have been the subject of research into their social organization.

Species of Cebus and Saimiri are abundant in numbers and accept captivity well. Callithrix jacchus and C. penicillata, also, have high degree of toughness and adaptability and can be used as laboratory animals.

The information given in the following paragraphs was obtained through Dr. John H. Hughes, of the Public Health Service of the U.S.A., Col. C.L. Boyle, of the I.U.C.N. and Dr. D. Starck, of the International Primatological Society. These data refer to the movement of importation of primates in the U.S.A., England and Germany, countries where this traffic is carried out with greater intensity.

In the U.S.A. there are only specific data for the large anthropoids. In addition to these species imported in large quantities were : Macaca mulatta (rhesus); M. irus (the crab-eating macaque) and Cercopithecus aethiops (grass monkey).

Between 1952 and 1964 nearly 1.800.000 primates entered the U.S.A. The official statistics do not include exact figures for the years 1953, 1954, 1956 and 1957. Thus the known total is 1.370.649, the great majority being African and Asiatic monkeys (Conway, 1965).

The acceptance of the Salk vaccine in the U.S.A. required a large number of rhesus and langurs for its preparation (between 1962 and 1964 the total imported was 528.421). Between July 1962 and July 1967, 3.510 chimpanzees, gorillas and baboons came in. And from July 1963 to June 1966, a total of 329.088 primates.

If we admit a loss of scarcely 30 % during the latter period, from the moment of capture to that of arrival at destination (some calculations indicate in certain cases as many as two individuals dead for each one who arrives living at the destination) we get a total of over 500.000 monkeys lost. And if we take into account that this half million of individuals belonged to less than about ten species, the seriousness of the problem is clearly demonstrated.

It was in the present decade that the importation of Callithricidae and Cebidae began to increase. Saimiri proved themselves more docile and tougher than Macaca, in addition to being cheaper - in some regions their price is less than that of a cat.

The interest in primates as popular pets also increased and advertisements in U.S.A. reviews offer specimens of Saimiri at price of U.S. dollars 16.95, including cage, collar, book of instructions and a toy for the animal.

In 1963 London airport recorded the transit of 42.000 primates. In England the control of importation of wild animals was established by the Animal (Restriction of Importation) Act, in 1964. Colonel C.L. Boyle had occasion to carry out an investigation on the traffic of animals in that country for IUCN and from his report are drawn the following data relating to neotropical species :

<u>SPECIES</u>	<u>1965</u>	<u>1966</u>
Alouatta	267	---
Aotus	157	115
Ateles	588	503
Brachyteles	24	---
Cebus	970	1229
Lagothrix	733	516
Pithecia	161	---
Saimiri	3544	2947
Callithrix	787	1550
Cebuella	64	102
Leontideus	6	6
Saguinus	650	454
Total	7951	7422
	=====	=====

In Germany approximately 500 neotropical monkeys were imported in the last five years. Dr. Starck keeps a small colony of Saimiri for etiological studies. In 1967 all importation was suspended because of a virosis introduced from Africa.

It is time that urgent and effective measures were taken with a view to increasing research on the real status of the Primatological fauna of the neotropical region.

Two Brazilian projects, integrated in the International Biological Programme, are being developed, having in view the evaluation of the species protected by law in Brasil (Brachyteles arachnoides and Leontideus rosalia), and the possibilities of ensuring their survival.

#### Neotropical species protected in South America

Recently laboratories and research institutions in the U.S.A. imported some examples of Leontideus rosalia. In 1964, in response to consultations about the possibility of their use as a laboratory animal, I initiated a campaign to throw light on the real situation of the remaining populations of this species in

the wild. The Brazilian firms engaged in trading in animals (for instance, Brasilfauna of R. H. Gerwin, Petropolis, Rio de Janeiro) themselves informed us of their rarity, for less than 100 couples were exported annually. In 1967, one of their advertisements offered (illegally, as a result of which immediate measures were taken), 4 specimens at the price of US dollars 75.00 per specimen, which confirms their rarity.

Two species are found, at the moment, with legal protection : Brachyteles arachnoides (Geoffrey 1806) and Leontideus rosalia (Linnaeus, 1766). Not merely the convention of the South American countries (1940) but the specific legislation of Brasil include them among the species threatened with extinction.

In Brasil a recent law (the Fauna Protection Law) placed all wild life species under the protection of the State and, in various countries of South America (especially in Argentina, Venezuela and Colombia) a movement is taking place to renew or strengthen legislation on the preservation of flora and fauna.

In England and the U.S. special legislation prohibits the import of species protected in the countries of origin.

In addition to this, the American Association of Zoological Parks and Aquariums (Dr. Clyde A. Hill is the Chairman of the subcommittee of Primates) publishes periodically a list of species which the institutions affiliated to it concur in not importing.

It should be noted that protected Brazilian species are being exported from Letitia in Colombia.

#### Summary and Recommendations

The I.U.C.N. should promote and encourage research on the problems of adaptation of primates to conditions of captivity or of semi-liberty. We are faced with the inexorable destruction of the natural habitats and progressive expansion of human communities (Latin-America presents a rate of population increase of 3.4 % per annum), reducing the extensive tropical and equatorial forests to woods whose discontinuous distribution does not permit the existence of species which demand large territories. In the very near future the annual capture of the thousands of animals necessary for the pharmaceutical industry and research laboratories will be impossible. Thus, the projects which aim at the study of behaviour, feeding and adaptability of primates to captive conditions, like that which is developed by the Zoological Society of San Diego, California, ought to be extended and encouraged. The American Zoological and Aquarium Society (A.A.Z. P.A.) has a committee (Wild Animal Propagation Trust) to attend to problems of propagation of species in danger of extinction. We think that other associations could do the same.

Some areas ought to be preserved as Exclusive Reserves to protect the species threatened with extinction. For instance :

- a) Reserve of Maranon : including the adjacent regions of Brasil, Colombia and Peru. Its creation should be considered. Perhaps the Reserve of la Macarena in Colombia could be used.
- b) Ducke Reserve : in Manaus, Brasil. Maintained by the Instituto Nacional de Pesquisas del Amazonas.
- c) National Park of Caparao, Brasil. Belongs to the network of Brazilian parks; the monkey Brachyteles arachnoides is found there.
- d) Reserve of Sooretama, Brasil. A federal reserve, in which remnants of the Leontideus rosalia can still be found as well as other Callithricidae.
- e) Reserve of Brigadeiro, Brasil. Its creation for the protection of the Brachyteles and of other animal species (and also plant species) of the region, should be considered.
- f) Reserves in Ecuador and Bolivia, as in the Brazilian Amazon region, for the protection of particular endemic species.

The following species can be used in research and experiments, since they are adequate and abundant : Callithrix jacchus, Callithrix penicillata, Saguinus tamarin, Saguinus midas, Cebus spp. Alouatta spp. Saimiri spp. Callicebus spp.

A strict control should be established in the ports of Latin-America over the species and number of primates exported.

The health authorities of the Latin-American countries should work out standards of operation for the capture, transport and commerce of primates and see that they are carried out.

#### Points to be noted

1. I suggest, as a special point, that this Conference recommends to the agencies which maintain or finance scientific and technological, national and international research, that they consider, in all projects which require the use of primates for laboratory research, or for tests and production of vaccines, serum, medicines :

- a) the reason for choice of the species to be used;
- b) the sources from which these animals can be obtained;
- c) the exact origin of the animals obtained, to make certain that they do not come from areas or countries where their capture is forbidden;

- d) the care taken ensure uniformity of consignments;
- e) the number of animals to be used.

Completion of a questionnaire on these lines should be demanded of all Zoological Gardens and the commercial firms who are concerned with to the commerce and traffic in wild animals.

2. Considering that some countries have laws which prohibit the importation of protected species in the regions of origin and that Customs control is unsatisfactory in regard to the precise identification of the species imported and in regard to the number of individuals imported, I propose that this Conference and the IUCN recommend to the Governments that they establish specific measures, standards and regulations destined to allow a strict control of the animal species imported and of their exact and true origin, and that they maintain a service designed to record the statistical data indispensable to the evaluation of the international trade in animals.

7. 2. "Conservation of Primates in Latin-America"  
by Carl B. Koford

Summary

As for other species, the conservation of primates demands protection of the animals and their habitats, based on sound ecological knowledge. But some primates have high economic, medicinal and scientific research value that can be fully realized only through the capture or killing of considerable numbers. As export demands for quantity and kinds of Neotropical primates increases, it become more imperative to determine their abundance, range, and ecologic requirements, to develop efficient methods of capturing, handling, and transporting them, and to regulate their utilisation without inhibiting scientific and medical progress.

Introduction

During the past dozen years, the conservation of primates has greatly increased in importance, in large part because of the growing demands of medical research and the pharmaceutical industry. This trend resulted in a conference on the Availability and Long Term Supply of Primates for Medical Research, held in May 1965 and sponsored by the IUCN and the New York Zoological Society. Many aspects of the conference results, summarized in the IUCN Bulletin (January - March, 1966) are pertinent to Latin-American problems.

A decade ago the principal medical demand was for Indian macaques to use in poliomyelitis vaccine manufacture. Although this use has decreased, there has been considerable increase in the demand for other species including Neotropical forms such

as squirrel monkeys and marmosets. Reportedly, in 1966 more than 14,000 South American monkeys reached Great Britain alone, and this traffic will doubtless increase. The U.S.A. imports well over 100,000 monkeys a year, mostly for medical use but also for zoological gardens and pets. Thus, primate populations are an increasingly important natural resource of most Latin-American countries, especially of Colombia, Peru and Brasil. These countries have an opportunity to utilize the resource for economic gain, but they also have the responsibility to conserve it for esthetic, medical and scientific benefit to the world.

### Considerations

A conservation programme for primates must be flexible to allow for changes in demands, environmental conditions, and ecological knowledge. The numbers of animals required may change greatly from year to year depending largely upon pharmaceutical needs. And the demand for certain species may change rapidly depending upon current research emphasis. For example, the discovery of spontaneous atherosclerosis in howlers (Alouatta) and squirrel monkeys (Saimiri) has probably increased the demand for these species. The programme must also be broad, to allow for differences among species in abundance, productivity and sensitivity to disturbance. Of more than 100 species and subspecies of Neotropical monkeys, few have been studied in the field, and of these, studies have usually been limited to short periods at a single locality, such as Barro Colorado Island.

The maintenance and utilisation of the primate resource must be primarily through protection and management in the wild. Because of their low fertility and slow maturation, as compared with rabbits and other laboratory animals, production in captivity is expensive even where the costs of labor and animal food are low. There is some promise in the "farming" of single desirable species on islands, such as has been done with rhesus monkeys in Puerto Rico. But as the animals produced under this system cost much more than those from the wild, the method is profitable only when special characteristics, such as lack of specific immunities or knowledge of kinship relations, are highly desired. In addition, rare species whose habitat is endangered might be preserved by transfer to suitable islands, as is being done with the aye-aye in Madagascar. Forested islets of the coast and rivers, such as are found in Brasil, may prove suitable for managed island colonies of the future.

To conserve animals we must obviously reduce losses where feasible. Death from old age, injury and disease are normal and generally balanced by reproduction, though occasional epidemics such as jungle yellow fever can seriously deplete the monkey population over vast areas. Hunting by local residents for food has reduced or eliminated some species, but usually only the large conspicuous forms, such as spider monkeys (Ateles), in

the vicinity of roads and human settlements, where the animals also sometimes raid crops. Hunting by museum collectors probably has minor effect, because they take few of each species, selectively (and collections are needed for accurate taxonomy). Medical research by necropsy, however, may use more than 200 animals from a single locality in order to determine the types and incidence of various diseases. Such studies have been made recently in Argentina (howlers) and Colombia (squirrel monkeys) with important medical results. Lastly, numbers are lost through capture by local collectors for holding, sale, and export.

It is primarily in this last category that losses can be reduced, in large part by improving methods of capture and holding, and by regulation of the kind, numbers, location, and season of taking animals. Among the worst practices is shooting the mother in order to capture her infant. Judged by experience in India and Africa, there is high loss in newly captured monkeys through ignorance of the animals' needs, neglectful care, and exposure to the diseases and parasites of each other as well as to communicable diseases of man. Each animal reaching its export destination may represent a loss of several during capture, holding, and transport.

In addition to reducing losses, it is necessary to maintain numbers of breeders and to insure adequate reproduction. In large part, these measures can be accomplished through preservation of suitable habitats. Some forms thrive in the closed crowns of deep rain forest, while others prefer second growth, the edge of clearings or savannahs. Thus, forest clearing reduces dense forest species, such as howlers, and increases second growth species, such as certain marmosets. Food requirements also differ among species, some utilising many foods including insects and even lizards, while others rely on a few kinds of trees. Many small forms have restricted home ranges (e.g. Callicebus) and can live in "islands" of forest, while others range widely. Annual reproductive rate also varies greatly among species, from perhaps two litters of two each year in some marmosets, to one young every two years in howlers. These differences, of course, affect the potential harvest. Lastly, some species are territorial or have a tightly structured social organizations, so that removal of key individuals may reduce the productivity of many others or increase mortality through fighting.

### Recommendations

To conserve the primate resource while allowing efficient utilisation and renewal, the following measures are suggested :

- 1) Periodic census to determine approximate numbers by species, geographic range, and habitat. This continuous "framework" programme could be conducted within each country by its own wildlife personnel, but should incorporate the findings

of visiting investigators and others. Current summaries of population status are needed to formulate efficient regulations and to orient field studies.

- 2) Ecological studies to discover for each important species its requirements for food, vegetational structure, and other environmental characteristics, as well as its social structure and population dynamics. Such studies will indicate safe degrees of utilisation and the measures needed for habitat conservation.
- 3) Regulation of hunting, capture, holding, transport, and export. This system is highly developed in India, where about 200,000 monkeys have been exported in some years, from the requirement of a "certificate of need" from the government of alien purchasers and the prohibition of internal transport without permit, to establishment of minimum monkey weight limits and cagespace allowances for animals in overseas shipments. Veterinary inspections are needed to decrease the spread of disease among animals and to man. Research and education are needed to insure efficient methods of selective capture and safe handling. Regulations must be uniform in neighboring countries so as to discourage illicit traffic across borders. Cooperation of governments, especially of the major importing countries, to ban import of rare species, such as the golden marmoset of Brasil (Leontideus rosalia), may also be effective. It is important, however, that regulations do not inhibit the legitimate export of animals, which is economically valuable to the country of origin, nor restrain bonafide research, which often demands collection, capture, or holding of animals. Qualified investigators from other countries should be welcomed and given maximum cooperation.
- 4) Increase basic information concerning Neotropical primates through international exchange of ecological and methodological reports, and of personnel. An informal mimeographed journal, similar to the Laboratory Primate Newsletter (edited by A. Shrier, Psychology Dept., Brown Univ., Providence, R.I., U.S.A.) could serve as an international organ for disseminating current information.

7. 3. "Problems of primates"  
by Arthur J. Riopelle

It is an honor and privilege for me to join you in a discussion about a topic which gives us both joy and concern. We enjoy our natural endowment and we are concerned for its future. Because of the importance of the subject which brings you together and the common interest we share in it, I was emboldened to accept the invitation to meet with you. I speak with a soft and humble voice, as one who is a sample from a larger universe of scientists concerned about the future of New World primates. Whatever validity and representativeness my views may have, must reflect those of many of my scientific colleagues, as I have listened often and intently as they reviewed their concerns for the preservation of primates.

If my remarks this morning can be accepted as reflecting the attitudes, plans and thoughts of some of my scientific cohorts who use primates in their research, they may prove useful in your deliberations regarding the most effective utilisation and preservation of all our natural resources and particularly the primates. We share your concern for the future and we, like you, feel deeply about primates and their use for scientific purposes, and what a great loss it would be to mankind if they were not available to scientists.

There is one other valid basis for coming before you. During the past twenty years, research with primates has mushroomed at an unbelievable rate. The growing importance of primates for biomedical research is being recognized and, generally, the funds available for their study are increasing. Therefore, a need exists for further information about primates in the laboratory and in the field if we are to utilise these research opportunities effectively and humanely.

One step has been taken in the direction of accumulating information about primates. Within the past several years the United States National Institutes of Health gave grants to seven universities for the establishment of regional primate centres. These centres, geographically spaced around the nation, exist mainly for the study of human problems through research with primates but they also conduct investigations on the natural life and the maintenance of primates. One, the National Centre for Primate Biology at the University of California, Davis, specializes in studies on the adaptation of wild primates to the laboratory. Although they do not conduct all the primate research in the United States, they do represent a significant concentration of that effort. Much information is being gathered in these centres about New and Old World primates and the centres will gladly share it upon request. This represents an exciting new scientific trend that will have special import for the use of

South American primates and for scientific laboratories. If there is any way that I, as an individual professionally concerned about primates in laboratories or as a director of a primate laboratory, can encourage or assist you to become actively involved in the utilisation of primates for scientific studies, or to aid in providing you with additional information about opportunities for research or study with primates in our centres, or from the massive primate data accumulating in them, I am at your service.

Each of us probably would acknowledge the importance of lower animals in research on problems of human and animal health. Not only do monkeys serve admirably in place of their human counterparts as subjects in experimental investigations, wild and laboratory-born animals too, carry numerous diseases, many of which are transmissible to man. Fiennes' recent book on the Zoonoses of primates, shows full well the close interplay of primates, disease and man. The importance of the howler monkey as a reservoir of yellow fever is well known, and the rise and fall of the howler monkey population is correlated with the spread of that dread disease.

The usefulness of primates as experimental models for disease studies has long been recognized. Poliomyelitis, tuberculosis, and yellow fever have lost much or almost all of their threat because of successful research with primates. The finding that New World monkeys harbor many human bacteria, parasites and viruses suggests the usefulness of these animals as experimental models for the study of those infections. The potential usefulness of Aotes, the night monkey, for studies of drug resistant malaria, Plasmodium falciparum is enormous, especially if we can solve the problem of its mortal susceptibility to virus infections.

Laboratory studies have also revealed that many diseases spread from one species to another, even within the primate order and usually within a single family. Infections with herpes virus in the squirrel monkey, Saimiri sciurea are benign events but should we place infected squirrel monkeys next to marmosets in the laboratory, we would have a fatal infection capable of wiping out the whole marmoset colony, as indeed has occurred in some unfortunate accidents. Thus the contact between monkey and man and between one species of monkey and another brings with it the possibility of disease transmission that may be fatal.

Much has been learned, but more needs to be done. The current research is leading us in the right direction for more effective use of primates in the future than in the past.

In one respect, the beginning point of a conservation programme is an assessment of the demand for monkeys. The precise numbers of New World primates brought into the United States is not

known. A recent survey by the Institute Laboratory Animal Resources, which is a permanent investigating body of the National Academy of Sciences-National Research Council, of which your President is a distinguished member, reported that approximately 11,000 New World monkeys were imported to the United States last year. This is an underestimate in my opinion.

Indeed a recent communication from Mr. William Conway, Director of the New York Zoological Society, under whose auspices I am here today, has provided me with additional data which shows just how much an underestimate that is. Data from official Peruvian records, supplied by Ian Grimwood, showed that 39,552 live animals were exported from Peru in 1964. Of these, 32,551 were primates including squirrel monkeys and 6,325 other small monkeys. And Peru is not the sole exporter. A conservative estimate of the proportion of squirrel monkeys exported is 75 per cent. Not all of these monkeys were used for research; many went to the pet trade. But, of course, it makes no difference from the standpoint of conservation whether the destination of the newly captured monkey is a laboratory or a private home. The important thing is that one demand adds to the other. It is inescapable that the total drain from South America is considerably higher than that from the single country, Peru.

This number contrasts with the larger number of Old World monkeys that are imported annually. The difference is doubtless attributable to the fact that kidneys and other organs from Old World monkeys are used in tissue cultures for the production and testing of vaccines. The number used for research, as separate from vaccine production, is much smaller, probably in the neighborhood of that for the importation of New World monkeys.

The possibility exists, of course, that at some time in the future, a pharmaceutically important requirement for a particular New World species may arise, and this would create a sudden increase in the demand. This event, if occurs, should not be regretted, for it would mean that a significant new advance has taken place in human health. However, it would have obvious implications for supplies of New World monkeys.

Experience with Old World primates has been documented by Conway in his 1966 report in the International Zoo Yearbook. He was able to obtain data from the United States Customs, supplied through the Department of Health, Education and Welfare. He reported that in 1952 before the polio vaccine emergence, 32,000 primates were imported into the United States. In 1955 this number had jumped to 152,000 and by 1958 had risen to 223,000. Such is the power of vaccine production and testing ! No one would deny that the benefits of the scientific studies based on primates were not worth the toll if the population of macaques was not eradicated. On the contrary, should a similar

pharmaceutical use be found for a catarrhine primate, the rise in the demand for it will be just as meteoric as it was for the Old World monkeys. Prudence dictates that we plan for the possibility of its occurrence. The rhesus macaque was able to withstand the harvesting pressure because the resident population in India, Pakistan and other southeast Asian countries was large, the animals had adapted to numerous ecological niches and was not eliminated by invasion of its territory by humans. Instead a systematic relation had developed which spread the animals widely over the country. No such happy circumstance exists in South America. The monkeys are shy and they shun populated areas. Invasion of their territory would mean extremely slow replenishment by natural forces.

It is difficult, if not impossible, to obtain a true picture of the exportation of monkeys. Some data are available from individual countries of exportation as were those from Ian Grimwood in Peru. Other data are based on importations into the recipient country, and at best, some of these are estimates. But the harvesting pressure on animals concerns particular species in specific countries in designated areas. It is essential that precise data be obtained on capture rates for different species in all localities associated with export. Such information, if it were collected, would make it possible to tailor a conservation programme to the specific requirements. Furthermore, the data would be of importance for the general scientific world.

A couple of other factors will tend to increase even further the demand for New World monkeys in the United States and probably in other countries as well. One is that new animal welfare laws are being enacted by our legislatures and because they are domestic in their application, they will have greatest effect for the domestic animals. This means that it will be more difficult to obtain stray cats and dogs as experimental subjects and they and their use will be subject to closer scrutiny by welfare investigators. One consequence will be to cause an increase in the price of cats and dogs at the laboratory because of the extra effort and work that will be required of the vendor. Many vendors will have to upgrade their care of these animals and this in turn will mean an increase in the costs. It is already a strange fact that in many cities today it is cheaper to purchase a South American monkey than it is to buy a stray cat or dog. And I do not mean purebred dogs either; mongrels are also very expensive. It is not unlikely that because of the increased costs, many investigators will switch to cheaper monkeys as their experimental subjects.

Another factor, probably more important in the long-range future of primates is the destruction and alteration of habitat due to technological advance and the encroachment of civilization.

The experience in Africa and Asia shows that the habitats of many species are destroyed by lumbering operations, cutting roads, building dams, and flooding valleys. This is unquestionably the single most important factor in the future of all wildlife, and it is the special province where the IUCN is most effective and can have the profoundest influence.

Another factor affecting the number of primates in the wild is the intensive extraction of monkeys from restricted areas. As has been pointed out numerous times, most of the animals exported are shipped from a few locations, so that the drain must be very heavy in the affected areas. For example, Leticia and Barranquilla, Colombia, and Iquitos, Peru, are points of exportation of thousands of primates.

Monkeys are not collected in a systematic or scientific fashion by organized teams trained to give the best care to the animals. Instead, residents along the rivers bring them to a collecting point for sale to dealers after waiting for several days to collect enough specimens to make the trip worthwhile. The dealers, meanwhile, buy every animal on sight, for they know that the only way of economic survival is through mass production, since no special premium is paid for healthy vigorous animals.

Finally, the monkeys and other animals are sent to an American port, often Miami, Florida. From there they are sent to another dealer who either conditions them or ships them out as fast as he can to laboratories, zoos and pet dealers.

We can see that possibilities exist for saving animals, so that fewer need be trapped. First, scientists can be encouraged to diversify their species so that the greatest portion of the burden does not fall on one particular locality. If many species are used, the drain on a particular species is lessened and a great geographic area is involved. Second, encouragement can be given to the diversification of sources of supply. It is not likely that entirely uninhabited areas will suddenly become important for the exportation of monkeys, for that would be commercially unfeasible, but it is possible that coordination of local transportation will make it feasible to diversify the area from which monkeys are trapped.

Additional study is being given to primate diseases and to their transfer between species. Many New World species have not been used because we do not know enough about their diseases to prevent high mortality. With the exception of the Cebus, the spider monkey, the squirrel monkey, and a few marmosets, little is known about other species in the laboratories. The howler monkey, the Callicebus and the owl monkey are thought to be impossible, or at least extremely difficult to maintain in large numbers. We have learned already that South American monkeys need

Vitamin D-3 rather than D-2 in their diets if bone disorders are to be avoided. I have mentioned the problems of the herpes virus. Other problems also exist. Any new information collected will have a direct, beneficial effect on the survivability chances of New World monkeys in the laboratory.

Related to this is the study of the nutrition, ecology, and pathology of animals prior to exportation, so that rational prophylactic and therapeutic regimens can be installed before the animals are subjected to the further rigors of exportation. Much of this study can be done in South American laboratories, because the diseases of animals in the wild and those that they contract when they come in contact with humans are of great public health significance for human populations living in the areas of monkeys.

We can also collect information on the nutrition, ecology, behavior and distribution of South American monkeys and publish it in handbook form so that it can be made available to anyone who has access to South American monkeys. The more information that everyone has, from trapper to user, the greater will be the efficiency with which the monkeys are used. Training programmes specifically designed for scientific handling and treating animals can be assembled and in some way made available to those handlers closest to the source of the animals.

Some of this information is already available and is contained in a document soon to be published by the Institute of Laboratory Animals of the National Academy of Sciences-National Research Council in Washington. For a number of years there has existed a book on the guidelines for the care and management of the common Macaca mulatta. Recently it was my privilege to work, as a member of a subcommittee on the development of standards and guidelines for other species as well. These guidelines, when published, will be available in most, if not all, of the laboratories, and if the suggested practices are adopted, mortality will be lowered.

Breeding areas and colonies should be established within the United States and other user countries including Latin-America, of course, so that healthy animals can be sent to the research laboratories. One reason that this is especially important is that the use of these animals in studies of diseases for which antibodies are formed implies that the animals have not contracted the illness to be studied prior to their arrival at the laboratory. The most effective way of solving this problem is to have animals born under known conditions without the possibility of contact with the disease. There is reason to believe that such a venture would be commercially feasible on a limited scale for special animals of known parentage and history.

There is an interesting way in which the International Union, working with governments, can give some guidance to the scientists for the selection of species with which to work. We hear from time to time that some governments have actually embarked on primate destruction programmes, especially if the animals are considered as agricultural pests. Mr. Conway recently wrote that nearly 25,000 guenons were destroyed in Sierra Leone a few years ago. As he rightly suggests, "Where governments are likely to be involved in monkey control, the primate research worker should be obliged to keep himself informed and if possible to obtain the offending animals for use or colonization elsewhere". I would like to emphasize this particular point so that if your great organization learns that such programmes are to be undertaken, it should make this information available to the scientists of the world so that the animals that would be destroyed anyway can be used for research and in this way prevent the possibility that the scientific requirements are depleting another location at the time when the residents of an area are exterminating the animals in their own domain. Now there has not come to my attention the existence of any such programme involving Central or South American monkeys but it is not surprising that had such occurred, I might not have known of it for it would have to be of gigantic proportions and become an international scandal before most scientists would be apprised of the fact, but it may turn out that such programmes do indeed occur on a microscopic scale where a particular forest or a particular island or a particular district may engage in such endeavors. If it has happened before, it can happen again.

I have mentioned that the availability of domestic cats and dogs as experimental subjects is declining while the cost is rising so that the monkey has become a cheaper substitute. I have also mentioned that additional study is needed on the ecology, nutrition and diseases of New World monkeys so that the exportation efficiency can be increased. Considering the importance of catarrhine monkeys for future biomedical research and the possibility of an accelerated demand for the monkeys due to their favorable price in comparison with that for cats and dogs, it seems not at all bizarre or unfeasible to suggest that the scientific studies proposed can be established now in a modest way, and that at least a portion of the costs for the operation of these laboratories could be recoverable through the sale of the monkeys themselves, if a percentage of the cost is collected by the respective governments and set aside for research or more effective conservation of primates and the application of the research results. This extra cost would not have a significant effect on the decision by a laboratory to purchase a monkey since the costs for the competing animals are also rising.

Right now the main price differential between species is due more to the differential mortality rate than it is to the actual cost of getting a trapped monkey transported from South America to a laboratory. If the results of the research are significant and the management of the exportation improves, the price of the monkey to the laboratory will be reduced at the same time that the number of monkeys captured will decrease.

I have stressed the importance of the scientific studies of the diseases and management of primate farms and colonies rather than the establishment of parks, farms and breeding areas. I refrained from the latter because Dr. Koford has referred to it admirably and because I believe that is a specialized study in which you are already very expert. I am happy to state that the scientific centres concerned with long term availability, are now beginning to establish breeding colonies for their own use and the use of others. One can hope and predict that this trend will grow so that the dependence on natural stocks will be eventually reduced. The information gained in these experiences will prove useful for field management as well as for laboratory control. We in the laboratory look with great interest on your efforts in preserving the wild population.

Finally, standards can and should be adopted for the human care and healthful shipping of animals so that the percentage arriving in good condition at the user's laboratory is higher than it is now. Internationally accepted standards, when adopted, will serve as an instructional aid to the uninformed and as a regulator to the shipper not inclined to do his best.

Let me close on a note of hope. The scientific community has an enlightened self-interest in the preservation of primates for research. Primate scientists are acquiring certain skills and information about their experimental subjects. Any invitation to participate with and to serve the International Union for the Conservation of Nature and Natural Resources will be gladly received and actively supported. They look to your guidance on the international scene and they are gratified for your efforts on behalf of all humanity. We cannot be complacent and we should remember that through joint effort much can be done ... and we should ... must ... do it.

### Summary

Growing recognition of the importance of primates as experimental animals for medical research, as might be expected, is creating a need for further information about primates in the laboratory and in the field.

Last year, it was estimated that 11.000 New World monkeys and about 170.000 Old World monkeys were imported into the U.S.A.

The difference is attributable to the fact that kidneys and other organs of Old World monkeys are used in tissue cultures for producing and testing of vaccines.

We can be sure, however, that the number taken from the forest is much higher than the number used in research, because the mortality in shipment is enormous. As bad as this is, another more important problem is the destruction and alteration of their habitats, due to technological advancements and encroachments. Lumbering, cutting of roads, building of dams, and flooding of valleys in Asia and Africa have cut drastically into the survival chances of primates.

There are possibilities for saving many animals so that fewer need be trapped. Scientists can diversify so that the heaviest burden does not fall on a particular locality or species. Additional study is necessary to disease transfer interrelations between species. Many New World species have not been used because we do not know enough about their disease to prevent high mortalities. We need to know more about the nutritional requirements, ecology, and pathology of the animals so that rational prophylactic and therapeutic regimens can be instituted before they are subjected to the rigors of shipment. Much of this study can and should be done in South American laboratories because diseases in the wild and of those they contract when they come in contact with humans is of great public health significance for populations in contact with these monkeys.

We can also collect information on the nutrition, ecology, behavior and distribution of South American monkeys and publish it in handbook form so that it can be available to everyone, from trapper to user.

Two closing points I should like to emphasize : one, breeding areas should be established in the United States and other user countries and in Latin-America so that healthy animals can be sent to the research laboratories. Second, standards should be adopted for the human care and healthful handling and shipping of animals so that a higher percentage will arrive at the user's laboratory in good condition. Internationally accepted standards, when adopted will serve as an instructional aid to the uninformed and as a regulator to the shipper not inclined to do his best.

By improvement in handling, shipping and care in selection, dealers will become aware of the acute need to import healthier animals, which in turn will be reflected to the natives who collect in the forest. And, breeding programmes, will reduce the stress and demand for heavy extraction of animals from forests readily accessible to the few ports of embarkation.

SURVIVAL SERVICE COMMISSION

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Thursday 28 March, 1968 : Afternoon Session

In his introductory remarks, the Chairman, Mr. Peter Scott, referred to the four subjects listed on the agenda, migratory birds, the vicuna, marine turtles and orchids, but expressed the hope that time would permit a discussion of other endangered species in Latin-America, particularly the whales.

8. Migratory Birds:

Two papers were presented:

8. 1. "Migratory Birds in South America with special reference to Conservation" by C.C. Olrog.

In the absence of the author, the Chairman read the summary of the paper which is reproduced here.

8. 2. "Bird Migrations" by H. Sick.

The author read the summary of his paper as published in these Proceedings.

DISCUSSION

Carvalho (Brazil) : The Brazilian Foundation for the Conservation of Nature was undertaking a survey of the nesting sites of Zenaidura auriculata, so that arrangements could be made for their protection. Brazil was preparing a list of all endangered species, a copy of which would be sent to IUCN.

9. Vicuna

9. 1. "The Vicuna, a Camelid in Danger of Extinction" by J.C. Godoy.

The author discussed his paper, a summary of which is reproduced here.

9. 2. "The possibility of managing Vicuna for the economic and social development of the Andean High Plateau" by P.V. Pierret.

The author summarised his paper.

Benavides (Peru) : gave an address on the vicuna. He referred to the pioneer studies on its domestication and its cross-breeding with alpaca at the Cala-Cala Ranch. The price for vicuna wool was very high and the incentive to kill the vicuna and smuggle the wool out of Latin-America was great. A ban on the import of this wool by the developed countries of North America, Europe and the Far East, until the population of the vicuna had recuperated, would be a most effective means of increasing the protection of the vicuna.

#### DISCUSSION

Delegates from the Argentine, Chile, Bolivia and Ecuador supported Mr. Benavides' proposals for better conservation of the vicuna and a temporary international ban on traffic in vicuna wool. The Governments of Argentina, Bolivia, Chile, and Peru hoped to co-ordinate legislation on vicuna wool trade very soon. The delegate from Ecuador wondered to what extent the low natality and high infant mortality was related to habitat degradation. The Bolivian delegate was also concerned about the vicuna's low reproductive rate. It had been shown possible to increase the reproductive rate of llamas artificially and Bolivia was studying both reproduction and nutrition in the vicuna.

Barreda (Peru) : praised the late Francisco Paredes for his pioneer studies on the domestication of the vicuna, on the Cala-Cala Ranch. He hoped that the Peruvian Government would find it possible to purchase the Ranch and to expand this work.

Riney (FAO) : stressed the importance of determining the ecological requirement of the vicuna. FAO would be willing to advise on the co-ordination of legislation for this animal.

Guildbride (Peru) : considered that if the vicuna could be shown to have economic potential, either for itself or for its use in crossing with alpaca, the case for conservation would be greatly strengthened. Techniques for increasing reproduction, by ovum implantation or artificial insemination, required further study.

Villa-Ramirez (Mexico) : expressed the hope that, later in the session, the conference might discuss the plight of Ovis canadensis and Antilocapra americana in north Mexico. Their numbers were dwindling in spite of the Mexican Government's protective measures.

The Chairman : in his summary, considered that the vicuna exemplified many other species in Latin-America. Courses of action had been discussed and it was essential that delegates made the conference's recommendations known to their Governments.

10. Marine Turtles

There were two papers in this Section.

10. 1. "Sea Turtles : a vanishing asset" by Prof. Archie Carr.

The author discussed his paper which is published in full.

10. 2. "Sea Turtles in Mexico" by Antonio E. Montoya Carbajal.

A summary of this paper by the author is included in these Proceedings.

DISCUSSION

Carvalho (Brazil) : and the Venezuelan delegate, drew attention to endangered freshwater turtles in the Amazon and Orinoco Basins. Dr. Carvalho referred to papers on this subject in the proceedings of a recent symposium on the conservation of the Amazon Basin, organized by the National Research Council of Brazil. The status of Podocnemis expansa gave the greatest cause for anxiety, but its nesting sites were now afforded some protection. His Foundation hoped to organize an investigation into the biology and protection of Kinosternon scorpioides.

Buchinger (CLAPN) : drew attention to the work of the Charles Darwin Foundation for the Galapagos Islands on reptiles, and other threatened species.

Munoz Pizarro (Chile) : referred to the publication on Chilean reptiles, produced in 1967 by the University of Chile.

Chairman : stressed the need for comprehensive resolutions to save species which constituted valuable marine and freshwater resources.

11. Orchids in danger of extinction

Two papers were available for discussion.

11. 1. "The disappearance of valuable native orchids in Latin-America" by M. Ospina Hernandez.

11. 2. "Conservation of Orchids" by Calaway H. Dodson.

In the absence of the author, Dr. Buchinger read the summaries of the papers, copies of which are given here.

## DISCUSSION

Magnanini (Brazil) : the Brazilian lists of endangered animals and plants, at present in the course of preparation, included seven species of orchids.

Chairman : expressed the hope that all Latin-American countries would prepare national lists of endangered species and that they would send copies to the Survival Service Commission. He suggested that botanical gardens might play a much greater role in the conservation of rare orchid species in the future. Orchid production had often proved difficult, but meristem culture techniques now provided a method of propagating orchids on a large scale.

### Other species

The Chairman requested Maj. I.R. Grimwood to make a statement on the conservation of whales in Latin-American waters. The Argentine delegate objected to this proposal, however, on the grounds that this subject was not included in the agenda and as a result there were no Latin-American specialists on whales present. His objection was supported by the delegates from Brazil and Chile.

The Chairman said he was disappointed that the opportunity could not be taken to discuss this urgent matter; however he had no alternative but to accede to the delegates' wishes.

Before the close of the session, the delegate from Chile suggested that, as an aid to the elimination of illegal traffic in endangered species, the Latin-American Governments, in consultation with national and international conservation organizations, should prepare lists of animals and plants in which trade was permissible. The lists should be published annually and distributed to every country in Latin-America and other parts of the world.

8. 1. "Migratory Birds in South America with special reference to Conservation".  
by C.C. Olrog.

The introduction mentions the general views taken regarding migrations, some historical references and opinions, and also some modern methods for the studies of bird migration.

With reference to South America the author points out some reasons why so little has been done in this, popularly called, "Bird Continent"; for example: the lack of ornithologists (who generally prefer to work on systematics), the lack of books for

identification, and the lack of ornithological magazines in which observations could be published.

Included is a general report on a bird-banding programme in Argentina, carried out by the Miguel Lillo Institute in Tucuman, and sponsored by I.N.T.A. (the National Institute for Agricultural Technology).

The author reviews our knowledge of bird migrations in South America before this programme started as well as some previous observations of migrations of Argentine birds in Paraguay and Bolivia. Regarding migratory species appearing in Argentina the author presents a division or grouping of the different migratory routes or fly-ways, pointing out the latitudes between which these migrations are performed.

Attention is called to the migratory movements newly discovered in Argentina and to the general experiences of this study, which show that it would be worthwhile to start bird-banding on a large scale in South-America.

Finally it is pointed out that one of the most serious problems for any ornithological study in South America is the lack of illustrated books, which permit a rapid and secure identification of the different species, their habitats and ecology. Such books are also useful in convincing government authorities to recommend the preservation of species and zones.

The paper ends with the remark that it is still possible to study birds' migration in South America, but that the swift destruction of biota, every day more complete and irreparable, points to a tragic perspective and a sad future for the "Bird Continent".

## 8. 2. "Bird Migrations".

by H. Sick.

Among the migrations of birds in Latin-America there are some cases concerning conservation which are of special interest to the IUCN Conference.

Ducks and their allies which are among the most numerous migrating birds, become flightless during the molt and are driven and killed mercilessly in Amapa (Brazil) and in the Llanos (Venezuela).

Migrations of the Curassow Pipile jacutinga, quite impressive still at the end of the last century in Rio Grande do Sul, Brazil, ceased because the species was practically extinct. The same is true for the Eskimo Curlew, Numenius borealis, and the Parrot Amazona pretrei.

Many passerines and some other birds arrive in northern Venezuela exhausted after crossing the Caribbean Sea. They need protection - as do those birds, also, which are attracted by strong lights.

Some migrating birds are useful, as the Swainson Hawk, Buteo swainsoni, a Northamerican migrant, which in Argentina was called "Aguila langostera" - grasshopper-eater. Need for protection is evident, and must be extended to other Hawks too, such as the Peregrine, Falco peregrinus, coming also from Northamerica during migration.

The migrations of the Eared Dove, Zenaidura auriculata, and the Purple Gallinule, Porphyryula martinica, among the strongest migrations known in South America, are limited to N.E. Brazil and need urgent attention from conservationists.

The "Fundação Brasileira para a Conservação da Natureza" are planning to conduct special research into these problems.

9. 1. "The Vicuna - a Camelid in Danger of Extinction".  
by Juan Carlos Godoy.

The author presents the painful call in favour of the protection and conservation of the vicuna (Vicugna vicugna) (Molina) that has become an endangered species. The precedents in former panamerican conferences are cited briefly.

Few american mammals possess such an interesting and suggestive history as this small Camelid, endemic of the Central Andes of South America. The cultural, scientific, sporting, esthetic and economic values of this animal are discussed. The author also gives a brief review of the intimate relations of the whole group of the Andean Camelidae with the pre-Incasic and Inca civilizations, recalling their ability to domesticate the llama and alpaca that occurred between 200 - 1000 B.C.; the Incas organized on conservative lines the management of wild vicuna, hunting them only every four years (Chaco) under strict rules, killing only the males to shear the fleece and obtain the fine wool (for which the species is world famous since the Conquest) - for manufacturing delicate apparel for the exclusive use of the nobility.

The author reviews important opinions of naturalists on the matter of the destruction of vicuna through the last centuries up to the present time and the conflicting population estimates (Cardozo 1954, Koford 1957) that seem too optimistic. The general opinion in the four countries of its range, Argentina (N.W.), Bolivia (E.), Chile (N.) and Peru (Center and S.), that is that the vicuna is in a serious and endangered situation and in need of drastic measures for protection and conservation.

In general there is still a great lack of information on vicuna, there being no accounts of censuses or complete ecological studies, therefore research should be encouraged.

The paper also touches on the importance of continuing efforts towards the domestication of vicuna on a larger scale, since it is quite possible although a slow and costly process that calls for official support. Evidence for this is provided by the famous Cala-Cala (Puno, Peru) establishment.

The author is happy to report the establishment in Peru of the first Vicuna Refuge in the Galeras plains (Pampa de Galeras, Ayacucho), consisting of 6,500 hectares (approx. 16,250 acres) over 12,000 ft. high and with a population of 1000 vicunas. Also Argentina's project of establishing a large National Park in the Andes range of the province of Catamarca, where vicuna exist. The full importance of these reserves in the field of wildlife protection is duly emphasized.

Finally, the author recommends: I. International agreements between the countries concerned to forward urgent and co-ordinated action for the protection of the vicuna. Such a programme should involve: a) legislation and enforcement; b) vigilance in the vicuna ranges; c) wide research; d) promotion of domestication; and e) education of the people on natural renewable resources. - II. Establishment of National Parks, Reserves or Refuges for vicuna. - III. Invitation to interested national and international institutions for technical and financial support.

9. 2. "The possibility of managing Vicuna for the economic and social development of the Andean High Plateau".

by Paul Victor Pierret.

Wildlife management very often views an improvement of the living conditions of human beings. Certainly one of the most important objectives of the vicuna management, apart from the scientific one, is directed towards creation of an improved income for the high plateau population.

In the great majority of developing countries the socio-economic methods of wildlife management are the best justification for the policy to be applied, and will secure support from all parts of the population.

If in the past the vicuna was subject to a wise management by the "Incas"; the modern life has provoked an intense hunting of this valuable animal, which is reaching the limits of survival.

In 1964 the Peruvian government took certain measures to ensure the conservation of the vicuna and created the National

Reserve of Pampa de Galeras. Since then, through the action of the Peruvian Forest Service and the Faculty of Forest Sciences of the Agrarian University of La Molina, an area of some 60,000 has been protected and several censuses proved the increase of vicuna population. Due to lack of means it was not possible to carry out further specific studies, but in the near future a center will be built to provide all of the necessary facilities for the realization of research on a very wide scope: behaviour, management, veterinary, pastures, tourism, sociology. The center will be in Pampa de Galeras and will be built through the financial contribution of the Kingdom of Belgium.

10. 1. "Sea Turtles: a vanishing asset"

by Archie Carr.

There was a time when marine turtles held high rank among the resources of the sea. Today, with mankind growing steadily in abundance and looking increasingly to the ocean to feed his numbers, sea turtle populations have dwindled dismally. The problem now is less how to manage an asset than how to save the species from extinction.

The sea turtles of the world belong to five different genera, as follows: Lepidochelys, the ridleys; Caretta, the loggerheads; Eretmochelys, the hawksbills; Chelonia, the green turtles; and Dermochelys, the leatherbacks. The group is essentially tropical, although Caretta nests as far north as Virginia on the coast of the United States, and the post-nesting travel of the leatherbacks takes them northward into Canadian waters and the Sea of Japan, and far down along the southern shores of Chile. By far the greater part of the nesting ranges of the various forms, however, lie within the tropics.

The taxonomic classification of the sea turtles is in a rudimentary state. Nobody really knows how many species exist. The confusion that this has brought, combined with the faulty understanding of the ecologic geography of all the genera, has been an important factor in the neglect of the group by the conservation and fisheries officials of most of the tropical maritime countries.

The survival outlook for all the marine turtles is an unhappy one. The green turtle, for example was once represented by numerous feeding and nesting colonies spread throughout the tropical world. Now it has been eliminated from much of its original range, and the problem of saving the few remaining mass assemblages is a challenge to both biology and international co-operation.

Originally sea turtles were hunted mainly for their meat and eggs. A fundamental factor in their present predicament is that they group to nest on limited sections of shore, where they are pitifully susceptible to overexploitation. It was mainly the taking of sea turtles on the nesting beaches that brought the populations to their present precarious state of depletion; and the continued harvesting of eggs at the remaining rookeries is still an important obstacle to restoration efforts. In some parts of the world the eggs are one of few sources of animal protein for seaside peoples. In other regions, notably in Latin-America, the eggs are sought as a source of sexual vigor. All over the world turtle eggs are eagerly dug up wherever they are found unprotected by stong-willed wardens. This drain will clearly have to be stopped if the species are to be saved and the industry revitalised.

So long as human populations of tropical coasts were small and scattered, the effects of exploitation were not catastrophic. Now, people and their works are rapidly spreading on the shores and islands of all the warm seas of the world, and the turtle rookeries are vanishing before them. At the same time that this local demand is rising, new inland markets are opening, new ways of using turtles are spreading through the world, and an altogether insupportable demand is coming from the export trade. Wherever well-organized exporters are able to provide a steady outlet for frozen meat, calipee, skins, and oil, turtling becomes feverish, and the drain becomes intolerable.

The most insidious traffic is that in calipee, the cartilaginous material that is cut from among the bones of the belly-shell. This is the one irreplaceable part of the turtle that goes into the making of clear green turtle soup, giving it the gummy consistency considered essential by epicures. The menace of calipee is its lightness, durability and relatively high price. Not long ago a turtle hunter had to move 350-pound turtles to market. Today, if transportation is difficult he simply removes the belly-shell, extracts and cures the cartilage, and takes the resulting three or four pounds of calipee to market in a back-pack or dugout canoe. The temptation that calipee presents to the poor man in a far-off place is a sore one. All too often he will slice off the belly-shell and leave the rest of a turtle for the vultures, sometimes so hurriedly that he leaves her alive with her entrails bare to the sun. Although calipee is the sine qua non for clear green turtle soup, it does not have to have come from a green turtle. Even the most sophisticated chefs are not able to tell sea turtles apart by their calipee. So the burgeoning trade in the stuff brings trouble for all the genera of sea turtles, except for the shell-less leatherback.

Just as the calipee trade was being organized on a world-wide basis, two new turtle products came into prominence. One was turtle leather, the other turtle oil. The leather is used for expensive shoes and ladies' handbags. Only the skin of the neck and upper fore quarters is taken. The demand is, on the word of an official of Saks Fifth Avenue, far in advance of the supply. It is so great in fact that on a recent trip along the Pacific coast my son saw stacks of hundreds of dead ridley turtles that had been killed for their skins alone.

The recent resurgence of turtle oil in the cosmetic trade has been formented mainly by Miss Polly Bergen. In parts of Central America the power of turtle oil to make women beautiful has been believed in for centuries. The idea could have come from either the Indians or Europe. For millenniums mystical influences have been attributed to sea turtle oil, meat and blood. Turtles loomed large in the pharmacopoeias of the ancient Chinese, and before Columbus reached America shiploads of lepers were voyaging regularly to the Cape Verde Island to cure their disease by eating turtle. In Alexandria, Egypt, women still go twice a week to a dockside turtle butchery and drink fresh turtle blood, which they believe will restore lost youth. All about the tropical world seaside folk are superstitious about the properties of turtle oil. In some places it is considered an elixir, in others a sure cause of syphilis. What the real effect of smearing turtle oil on female skin is has not been objectively tested. Maybe it does make girls pretty. Certainly Miss Bergen is pretty, and I suppose she uses it. But I think she got her looks long before she ever heard of turtle oil. I doubt that it made her a bit more beautiful. Only a whole lot richer.

No kind of sea turtle better illustrates the devastating effect of the recent convergence of demand for turtle products than the hawksbill, from which tortoise shell has been taken since ancient times. Hawksbills are reef turtles, carnivores that live singly or in small bands and forage about coral walls and heads. They nest ungregariously, coming ashore singly on any small piece of beach in most of the warm seas of the world. In the old days the shell of the hawksbill was much sought after for such articles as Japanese hairpins, Spanish ladies' combs and Nero's bathtub. Three decades ago plastic imitations of tortoise-shell began to appear, and the industry, believing it saw a straw in the wind, withered in most places. In the 1940's and early 1950's there was literally no export market for tortoise shell anywhere in the Caribbean. The hawksbill was left unmolested there, except about few islands where it is avidly eaten.

Now, however, there has been rebellion against plastic tortoise-shell. Because at the same time calipee and turtle skins have become semi-precious products, it is possible for a

fisherman to realise, say, 15 dollars for a full grown hawksbill. In the remote places where hawksbills can still be taken, this may represent somewhat more than a fortnight's wages. So, understandably, pressure on the hawksbill has increased to dangerous levels.

I won't go on cataloguing details of the plight of sea turtles. I shall only say that, beginning with the precarious status of the Mexican ridley, whose vast nesting assemblages have been reduced from 40 thousand females that once came ashore on one mile in a single day, to a few hundred - with eggs still being hauled away in oxcarts and trucks - and looking from there down through the entire world roster of sea turtle species, there seems no single ray of hope, as things are going now.

This does not mean that the trend of things could not be changed. It could be. All the sea turtles could be saved and most of the breeding colonies could be restored; and it would not take heroic measures to bring this about. It would surely be possible to devise techniques of management and culture that would take the blessings to be got from sea turtles and at the same time insure the continued existence of all the kinds. Some of the moves that seem to me most urgently needed to accomplish this are outlined below.

(1) Range Reconnaissance. Although in recent years much has been learned of the ecological geography of the sea turtles, serious gaps remain. To fill these, and thus provide a basis for intelligent conservation, worldwide surveys of sites of group nesting and of individual nesting emergence of all the five genera should be made, and areas of concentration on year-round and seasonal feeding grounds should be plotted.

From the standpoint of sea turtle geography much of the coastline of the American tropics is still unexplored. Only last year Biologo Antonio Montoya of the Mexican Fisheries Department discovered a big arribada of the Pacific ridley on the coast of Northern Guerrero. The recent explorations of Dr. Joop Schulz of the Surinam Forestry Department, and of Peter CH. Pritchard, of the University of Florida, in Guyana, Surinam and French Guiana, revealed important nesting grounds of all the sea turtles except Caretta. Almost nothing has been published on the nesting of sea turtles on the Pacific coast of South America. The whole coast of Brazil should be carefully surveyed and nesting localities of all five genera should be carefully searched for on both coasts and on all the South American islands.

(2) Exploitation Surveys. In order to understand the character and magnitude of the obstacles to be overcome, to design effective laws, and to assess the potential value of the

resource that effective management might build up, a careful analysis of the relations of sea turtles and man throughout the tropical world is needed. This should involve a study of all the kinds and uses of sea turtle products and a systematic plotting of the regional distribution of turtle fishing, with details of the methods used. Data on illegal as well as legal exploitation are required, because in some areas poaching by far outweighs legitimate harvesting as a degrading factor.

In much of tropical America, to provide legislation that effectively protects the marine turtle resource, it will be necessary to learn a great deal more about the processes of illegal exploitation than now is known. Much of the coastline is remote from centers of population, and policing critical sections of such shore against illegal depredations is a demanding job. The job is not being done. Good turtle laws, and vigilant wardenship, would be an important factor in the resurgence of sea turtle populations of the tropical American littoral and of the world at large.

(3) Migration and Population Studies. Support should be furnished for the establishing of tagging stations at all major nesting grounds, and for maintenance of existing stations. To determine the location and extent of the areas to which female turtles return after nesting at a particular place, it is necessary to mark them with a tag offering a reward to the recoverer. Besides information on migratory routes and seasons, and on reproductive cycles and behaviour, tagging projects will furnish a basis for the year-to-year appraisal of population levels.

For any long-time management programme a solid grounding of research is required. Such migration and population studies as are now in progress in Mexico, Costa Rica, and Surinam are indispensable to the intelligent designing of programmes of international control and protection. Tagging camps should be set up at every locality on the coasts of South and Central America where reconnaissance locates sites of heavy breeding. Their presence there would have the important side effect of increasing the efficiency of wardenship in the localities involved. In the remote places in which most sea turtles nest, the mere presence of scientific personnel is likely to make an impression on the local population and to make it easier for wardens to enforce regulations.

(4) Efforts to Achieve International Regulation and Protection. Negotiations for the creation of breeding and feeding sanctuaries, and for the international control of all trade in sea turtles should be made, and these should be reinforced by propaganda campaigns to diminish the current fads for turtle products. The present excitement over turtle leather

and oil is ephemeral vogue. The use of turtles as human food, however, and as an instrument for raising the food production of the oceans, is a legitimate and worthy aim that simply cannot be realised because over-use has grievously damaged the resource. For the time being, thus, there appears to be no recourse other than to curtail all commerce in products derived from marine turtles. Even with such limitation of exploitation, deprecations are bound to continue in the sequestered places where the local people are traditionally dependant on turtle eggs as source of protein. Wherever this dependence is heavy, some system of compensation for the cutting off of the food resource should accompany the new regulations. A method used recently by the World Wildlife Fund in several localities in tropical America has been to purchase and rebury eggs taken by local inhabitants of the shore. This was a stop-gap move however, which obviously will have to be replaced by some more viable scheme of management.

(5) Pilot Culture Projects. Experimentation in the rearing of green turtles in enclosures should be energetically supported. If there is any promise in the sea turtle industry it will probably only be realised through turtle farms. A first step toward developing these would be a pan-tropical search for localities with (a) good sites for hatchling crawls, with warm, clear constantly renewed water of high salinity, (b) a constant supply of cheap animal food for the first-year turtles, (c) extensive areas of submarine spermatophyte vegetation for pasturage or cut feed for the maturing stock, and (d) freedom from typhoons, hurricanes, and drastic changes in water level. To insure a steady supply of hatchlings for such projects the problem of inducing the migratory green turtle to mate and nest in captivity should be studied. The most promising places for green turtle farms are coasts and islands where coral reefs protect broad expanses of shallow sea from heavy wave action. Such territory is widespread in the Caribbean and occurs at many points along both coasts of tropical America. Wherever proper conditions prevail, government support should be made available for small scale pilot culture projects.

If these conditions could be met there seems no inherent reason why *Chelonia* should not become a semidomesticated meat animal of great value, supported by aquatic pasturage as cattle are supported by terrestrial grass. Successful evolution of this culture would not only extend the means of taking food from the sea but would quickly take the pressure off of wild populations and in this way help save the natural species for the distant future.

It seems clear, thus, that the marine turtles of the world demand attention for two reasons: because their existence as natural species is endangered; and because if intelligently treated they could bring great benefit to man. So far, these

two considerations have been of concern to two different sets of people- to some who seek to prevent the loss of living species, and to others who would increase food-harvests from a single campaign such as I have outlined here, there seems little cheer in the outlook for either the industry or the turtles themselves. Some of the existing kinds are sure to disappear, and none will make its potential contribution to human welfare.

10. 2. "Sea Turtles in Mexico"

by Antonio E. Montoya Carbajal.

The exploitation, utility and protection of the turtles captured along Mexico's coast line are here described in order to give a panoramic view of this fishing activity.

At the same time the paper mentions studies on sea turtles published by different Mexican scientists; it also gives a classification of the species and subspecies with their common names, the geographic location of the important nesting areas, as well as the work that is being done in these areas by specialists and technologists as a result of the national research programme prepared by the Direccion General de Pesca e Industrias Conexas and the Instituto Nacional de Investigaciones Biologico Pesqueras.

The data about artificial culture of the immature and mature eggs and the first results obtained, are reported. The significance of these data with reference to the rational exploitation of this valuable resource in Mexican waters, is stated.

11. 1. "The disappearance of valuable native orchids in Latin-America"

by M. Ospina Hernandez.

(1) Orchids as a Natural Resource. Advanced countries have established wise regulations for the use and preservation of their natural resources. It may be said that the degree of under-development of a nation runs parallel with the destruction and misuse of its own natural resources.

Native orchids must be considered as a natural resource in two ways: first, the areas in themselves valuable for their aesthetic and scientific characteristics. In this respect they may be treated as a "renewable" natural resource which can be exploited and multiplied almost endlessly. On the other hand, orchids must be considered also as a most precious companion of ecological structures which, if once destroyed or damaged, are hardly ever replaceable. In this light orchids must be treated and protected as part of "non-renewable" natural areas.

There are already well known methods for the multiplication and handling of orchids as an item of exploitation and legitimate commerce. These methods, however, are not well known in most Latin-American countries and the result is a careless and destructive extraction of wild orchids from their natural habitats to supply the demands of near-sighted export and import firms.

(2) The process of destruction. An examination of historical records shows that there are basically two main forces contributing towards the extinction of native orchids in our countries: first, the uncontrolled destruction of natural forests (and other orchid habitats) for the purpose of opening new land to an "extensive" type of agriculture and husbandry. Secondly, there is the unchecked ambition of orchid merchants and collectors who consider wild orchids as their legitimate prey without concern for other interests, such as the cultural and recreational needs of the present and future generations.

True, many fine species have been grown and preserved by European and U.S. commercial establishments but, on the other hand, the thousands upon thousands of plants lost in past decades due to mishandling, accidents in transport and unskilled cultivation, weigh very heavily on the negative side of these commercial operators.

(3) Some suggestions. Given the facts about the two main forces that threaten the extinction of native orchids, it seems possible to point to some policies and measures, which may stop or reduce these destructive forces.

In the first place it will be necessary to locate the rapidly disappearing areas where orchids are still to be found in natural settings, and then establish the necessary "sanctuary" or "reservation" provisions to save such areas. This process will be somewhat difficult and slow, and it is necessary to devise ways to prevent this very work of investigation into such locations from providing new information for the exploiters before effective measures of protection can be established.

In general it seems possible to start building up the necessary defenses for this vanishing resource in a way which allows both the legitimate commercial activities of orchid growers and the preservation (and perhaps re-establishment) of natural orchid areas. A proposal of this type is included.

No effort should be spared in this direction since we firmly believe that there are few (if any) natural sights which can compete, either as aesthetic or scientific attractions, with those described by orchid collectors of the past, but rarely seen in our days.

11. 2. "Conservation of Orchids"

by Calaway H. Dodson.

Unscrupulous professional orchid collectors have damaged orchid populations in the past, and to a much lesser extent still do. However, the market for orchid species has changed fundamentally with the introduction in the 1920's of the artificial seed culture techniques for orchids. Since that time the production of hybrid orchids has become an enormous business and the composition of orchid collections has swung in the direction of hybrids to a nearly overwhelming degree. The minimal quantity of species orchids in most collections has depressed the market for wild collected orchids and no longer does the rape of the tropical countries for their fine orchid species threaten their existence. Rather, the destruction of natural habitats of the orchids on a wholesale scale is now the major threat.

The question of the extinction of species of orchids in tropical and subtropical countries is inseparable from the general problem of conservation of natural forest and other habitats in those regions. Without their natural habitats the orchids cannot exist, except in botanical gardens and private collections. It has been frequently suggested that the orchids can be preserved by not permitting them to be exported from their native countries. This I believe to be "ostrich reasoning". The source of the problem is the elimination of their natural habitats by the needs of expanding human populations in tropical regions. This dictates the necessity of utilization of much of the available undeveloped land. Unfortunately adequate preserves are not provided or are not properly protected and in some cases they are first to be destroyed.

## COMMISSION ON LANDSCAPE PLANNING

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Friday 29 March 1968 : Morning Session

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Dr. F. Fraser Darling opened the Session by pointing out that the subject of Landscape Planning had come into the field of conservation within the last 10 years. It was symptomatic of the changing attitudes in the world that conservation now includes not only the natural world, which we first set out to protect, but also the whole environment in which we ourselves are protected. The world was finding how the human environment can produce or subdue ills in our personalities, which may have either mental or physical expressions. These illnesses, which are known as psychosomatic, illnesses may occur in many different forms, and all the medicine in the world cannot kill them unless the environment was also helping in the cure. He pointed out that this Commission was the most recent of IUCN's Commissions and handed over the Proceedings to the Chairman Mr. R.J. Benthem. Mr. Benthem said that IUCN's approach to Landscape Planning was essentially an integrated one, in which teams of scientists were involved. It might be termed "creative conservation". It must not be considered, however, that landscape planning was confined to the developed countries with high populations. The new discipline must also be used in the youngest of states.

### 12. Use and development of recreation areas

12. 1. One paper, "Recreation as a type of the wise use of the natural resources in the United States", by Lawrence N. Stevens (U.S.A.)

As the author of the Paper was unable to be present, his colleague, P. Swem, summarized the Paper which is published in these Proceedings.

### DISCUSSION

Chairman : Excellent work was being done in the United States of America and the assistance given by the Army Corps of Engineers should be noted.

Cain (U.S.A.) : The most significant development in land-use planning in the United States was well illustrated by the Paper on outdoor recreation. He referred to the fact that there were new administrations and statutory arrangements among federal and

state agencies for communitating, cooperating and coordinating the projects and programmes of their organizations. Although there remain some single purpose projects programmes, more and more were now planned jointly by several agencies. This was well illustrated by the exploding interest in outdoor recreation. If this were not coordinated with the National Parks Service, the Fish and Wildlife Service and the Forest Service, there would be penetrations and impositions in national parks and other natural areas that would be destructive of nature and contrary to interest in nature protection. As it is now developing, neither interest, recreation nor preservation will prevail everywhere, but each will find its own appropriate place.

Chairman : This illustrated the need for multiple use of land as against single use.

### 13. Natural areas in Landscape Planning

Two papers were presented, as a basis for discussion.

13. 1. "Natural areas in Regional Planning", by Rowland J. Darnell and Rezneat M. Darnell (U.S.A.)

As the Darnells were unfortunately unable to be present at the Conference, a summary was read by T. Pritchard. The complete text is published in these Proceedings.

13. 2. "Parks and natural areas in the natural landscape", by Joseph L. Fisher, (U.S.A.)

The author discussed his Paper, which is published in these Proceedings.

### DISCUSSION

Chairman : He agreed with Mr. Fisher's contention that although each country must plan and develop its parks and natural areas, systematically and comprehensively, the time had come for thinking on a hemispheric scale, and that we should plan for the year 2000, when there would be more than a billion people in the Western World.

M. Martinic Beros of the Chilean delegation presented three draft Resolutions, which after some discussions and with the addition of amendments were approved for submission to the Resolutions Committee.

T. Riney (F.A.O.) : Supported Fisher's hemispheric approach to bring the entire western world into perspective and that even-

tually a global approach would be required. He pointed out that at the World Forestry Conference, held in Madrid in June 1966, a Canadian delegate stated that some of the most productive and best managed areas were being lost to forestry because they were more profitable as recreation areas than as timber forests. He suggested that some effort should be made to identify overpopulated areas as well as underused potential parks areas. This information should permit the formation of cooperative plans between countries, whereby countries or areas oversaturated with tourists could divert the excess to other areas or countries which in their present stage of development wish to encourage tourism through their national parks and recreational area systems.

R. Alvarenga, (Brazil) : Natural parks and national parks were not synonymus. In Germany, areas of scenic landscape, including private properties and agricultural land were identified as natural parks, without elevation to the status of national parks. This system might well be used in Latin-America to obtain parks for recreational purposes, but with less expense than the creation of natural parks of a conventional type.

M. Buchinger (CLAPN) : In the Western hemisphere national parks may have exotic species, whereas nature parks are equivalent to wilderness.

A. Mendonça Paz (Argentina) : considered that the nomenclature and definitions of parks and reserves was causing constant trouble and suggested that a special meeting should be held to decide specifications once and for all.

J.-P. Harroy (IUCN) : When he was the first Secretary-General of IUCN in 1948, the first work of the National Parks Commission was to define and classify national parks and equivalent reserves; this, however, proved impossible, and the work was stopped in 1958. There were some legal definitions, as for example in the London Convention for Africa, drawn up in 1933, in the Washington Convention for the New World in 1942, and in 1949 United Kingdom had brought in a set of new definitions. Nomenclature was important, but definitions of more value. He urged that new areas should be gazetted, as National Parks, where land was cheap and pressure on it not too great. It was not necessary to follow a logical plan, but rather to go for areas where there is the least resistance to promotion of national parks.

Chairman : This discussion showed how the work of one Commission was correlated to the work of others, and although the discussion on the interrelationships of landscape planning and national parks could be profitably continued, he must call a halt to it, in order to continue with other papers.

14. Landscape Planning with reference to urban areas

Two papers were presented on this subject.

14. 1. "An approach to regional planning in relation to urban areas", by Carl Carlozzi, U.S.A.

The author discussed his paper, which is published in full in the Proceedings.

14. 2. "Landscape Planning with reference to urban areas - the position in South America", by Jorge E. Hardoy, Argentina.

The author discussed his paper, a summary of which is published in the Proceedings.

DISCUSSION

The main points raised were as follows :

Chairman : It was unfortunate that this session was running behind time, because there was here clearly a need for profitable discussion. He urged speakers to be brief.

A. Eichler (Venezuela) : In landscape planning of renewable natural resources in general, the "rational" use of the soil was frequently questioned. This problem was of immense importance in the present state of the development of the Latin-American countries. He asked Dr. Fisher how in the United States proposals for national parks and similar reserves were justified to the authorities, both with regard to other competitive uses of the land and with the obtaining of the necessary funds.

J. Fisher, (U.S.A.) : The government would acquire land if public demand was sufficient. In practice, it depended on how many people wish to use such areas and on the scenic qualities of the area. Enough people must realise that such habitats must not be developed so that they are destroyed and lost for ever. In addition to such justification, acquisition should be included in all long-term planning.

S.A. Cain (U.S.A.) : An additional justification in the U.S.A. to the two named by Dr. Fisher is that the present generation must not limit the options opened to future generations, although this point is sometimes not made explicit. This is not as Dr. Fisher's stated judgement that the public demands for parks and related areas is great and growing.

G. Budowski, (UNESCO) : The increase in recreational use of the magnificent system of national parks and recreation areas in the United States of America had been stated to be due to population growth, family income increase and the increase in mobility and leisure time. It was also considered that in other countries the same demand factors will be found. He questioned whether this would really be the case in Latin-America, in spite of the fact that population density in several zones was high. Although the overall density is very low, even the so called "relatively low cost of creating new national parks" was low in comparison with the absolute cost of an equivalent action in the United States, but in reality the cost were excessively high in relation to the monetary position of the countries concerned. Priority for providing funds towards creation and administration of new national parks must be low in comparison to programmes for health and industrial and communication development. If the population of Latin-America were asked in what area of public spending funds should be used, the result would certainly be discouraging for those at this conference. As opposed to the position in the United States, in Latin-America new parks were created not because of influence by the people, but because of the dedication and efforts of a small group of realistic conservationists. This small group of people should receive emphatic support from international organizations if landscape planning was to be developed in the required way. If we wait for the social changes, which motivated action in the United States, we would loose the race against time, because the greater destruction is too violent.

K.R. Miller (IICA) : Programmes for the management and development of national parks are under way in various Latin-American countries. Specifically in Columbia, where he had worked as a Consultant. The decision had been taken to concentrate on a few parks with good management. A permanent Committee had been established with the Universities and the department of national planning, in order to accomplish regional plans to supply the country with the products and services necessary to protect and manage the wild places and a planning policy which deals with ecology as much as economy has been established.

F. Barrientos, (FAO) : Dr. Fisher's idea of establishing a hemispheric national park system could be done by distributing the load that exists for countries which have not yet established the reserves and in which, for a long time, there will be no demand for recreation or tourism. Countries in the hemisphere should jointly study the subject to obtain necessary action.

F. Fisher (U.S.A.) : The plan for national parks of the whole of the hemisphere was an ambitious one but changes were so great and so rapid that plans must be ambitious, especially as the areas were necessary for use by many people. Plan should

not be confined to the traditional type of national parks, but for the use of the great masses of people living in the cities; areas, such as those used for recreation in the United Kingdom's idea of national parks must be used.

Chairman : Time was getting very late and it was necessary to close the proceedings. Sufficient material and ideas had been collected for satisfactory resolutions to be prepared.

12. 1. "Recreation as a type of the wise use of the natural resources in the United States"

by Lawrence N. Stevens (U.S.A.)

Outdoor recreation in the United States is a major use of our lands and waters. It involves over half a billion acres of public land and perhaps equally as much private land. Ninety percent of the people participate in some form of outdoor recreation. It is a \$64 billion business and has a major impact on the economy.

We define outdoor recreation in terms of what people do in their leisure time outdoors. This encompasses a broad range of activities from simple pleasures like walking to pursuits which require some skill such as mountain climbing. The resources necessary to these activities range from the urban playground to wilderness. Regardless of the specific pursuit, outdoor recreation has become an important part of the kind of life our citizens find rewarding and worthwhile.

The relatively recent recognition of outdoor recreation as a significant and beneficial use of our lands and water illustrates an evolution in public values and a corresponding evolution in public policy.

This evolution involves an increasing concern with the qualitative aspects of living - including the opportunity for outdoor recreation - and has come about as our basic material needs are satisfied and we find ourselves with sufficient income, free time, and the mobility to enjoy the outdoors. There is a certain irony in the fact that the same economic growth which allows us to enjoy the outdoors, simultaneously threatens the resource base necessary for outdoor recreation. Thus, while more people seek the outdoors, we also must devote more and more land resources to housing, highways, industrial sites and other growth needs, thereby reducing the amount of land available for outdoor recreation. Furthermore, though recreation is often compatible with other land uses, there is competition in some areas between recreation and consumptive

uses such as mining, grazing and lumbering.

In addition to the competition between outdoor recreation and other uses of our land and water resources, much of the strongest controversy, again ironically, occurs between competing kinds of outdoor recreation use. In general, this is the conflict between preservation of an area in its natural state for limited public use and development to accomodate intensive use.

Whether for extensive or intensive use, however, more and more people are demanding that more of our land and water resources be maintained for outdoor recreation. Our problem is to insure that these growing needs for recreation are met within the context of our overall resources planning.

There are two distinct, though related, aspects of outdoor recreation in the United States, both of national significance - the social and the economic. From the social point of view it is considered an essential component of a satisfactory standard of living, and all three levels of government - Federal, State, and local - have assumed substantial responsibilities for providing recreation opportunities to their citizens. This means that to a large extent it has been accepted as a welfare function in the broad sense of the term, similar to education.

From the economic point of view, outdoor recreation has come of age in another sense. By whatever economic measure employed, whether wage earners, wages paid, dollars spent, or value of product, recreation is one of the major and most rapidly growing economic activities of the Nation. In 1965, our Gross National Product totaled \$681 billion. Of this, \$79 billion or 11,6 % is attributed to recreation. Outdoor recreation and recreational travel accounted for \$63.6 billion or 9,3 %. The American Automobile Association estimates that we spend more than \$30 billion on domestic vacations and pleasure travel.

It is important also to point out that public expenditures for outdoor recreation stimulate the local economy and increase the value of real property. Our annual investment of \$2 billion in land and water acquisition for outdoor recreation provides the magnet that attracts tourist dollars.

Creation of the Bureau of Outdoor Recreation in 1962, to serve as the focal point and provide leadership in the field of outdoor recreation, gave tangible, full-fledged partner status to outdoor recreation as a necessary, beneficial, and co-equal use of our land and water resources as national policy.

We have, of course, to a limited degree recognized outdoor recreation as a legitimate use of our resources for many years. At the Federal level, however, outdoor recreation has for the

most part been a byproduct of public programmes to conserve the Nation's timber, water, mineral and land resources.

Establishment of our first national park - Yellowstone - in 1872 may be seen as the beginning of a Federal recreation policy. In the early 1900's the National Forest System was established - primarily for timber and watershed management. By 1940, however, there were some 19 specific Acts applicable to that System affecting administration of its recreation resources. In 1916, we established the National Park Service. During the 1930's, the Federal Government took a major step in outdoor recreation policy with the enactment of the Pittman-Robertson Act which provides grants-in-aid to the States for wildlife preservation.

During the administration of President Franklin Roosevelt, substantial recreation development occurred utilizing the Civilian Conservation Corps.

During World War II, outdoor recreation, along with other domestic programmes, lost impetus. However, a major advance in public outdoor recreation policy came in 1944 when outdoor recreation became a stated purpose of U.S. Army Corps of Engineers projects under the Flood Control Act of 1944.

Following World War II, the increase in outdoor recreation assumed dramatic proportions. This was reflected in overcrowded conditions at parks, forests, and other recreation areas in all parts of the Nation.

During the 1950's, the United States Congress increasingly recognized that, in making choices among the numerous demands on our resources, it must heed the growing public demand for outdoor recreation. This led in 1958 to the establishment by the Congress of the Outdoor Recreation Resources Review Commission to undertake an intensive nationwide study of the Nation's outdoor recreation needs and resources. The Commission was so-called "mixed Commission" consisting of four Senators and four Representatives equally divided between the two parties, plus seven private citizens chosen by the President. In the authorizing Act, the Congress assigned the Commission a three-fold mission :

1. To determine the outdoor recreation wants and needs of the people then and what they would be in the years 1976 and 2000.
2. To determine the recreation resources of the Nation available to satisfy those needs then and in the years 1976 and 2000.

3. To determine what policies and programmes should be recommended to ensure that the needs of the present and future are adequately and efficiently met.

President Eisenhower appointed Mr. Laurance S. Rockefeller as Chairman of the Commission. The Commission recruited a staff and launched an extensive study programme covering many aspects of outdoor recreation in the United States.

Separate studies were made under contract by universities, government agencies, and other research institutions on special facets of outdoor recreation such as wilderness, seashore, hunting and fishing. The Commission made the first comprehensive inventory of non-urban public recreation areas, as well as the first nationwide survey of the outdoor activity of the United States population. After three years of study and many days of deliberation, the Commission submitted its report entitled, "Outdoor Recreation for America" to the President and the Congress in January 1962. (The report is commonly known as the ORRRC Report, based on the acronym of the Commission's full name).

As a result of its review of the outdoor recreation picture, the Commission made some 50 recommendations. Among these - and one of the most basic - was its recommendation that a Bureau of Outdoor Recreation be established in the Department of the Interior. The reasoning behind this proposal is expressed by the Commission in these words :

"Providing adequate outdoor recreation opportunities for our people over the next 40 years is a major challenge that will require investment of money, resources, and work. Leadership, vision, and judgement will be needed to guide this investment into the most efficient channels. The present uncoordinated efforts cannot do the job. There must be a new agency of government at the Federal level to provide guidance and assistance to the other levels of government and to the private sector, as well as within the Federal Government itself".

Unlike the reports of some Commissions, the ORRRC Report resulted in almost immediate action. Only a month after receiving the report, President Kennedy, in a Message to Congress, endorsed several of its basic recommendations including the establishment of the Bureau of Outdoor Recreation and the Recreation Advisory Council. Secretary Udall created the Bureau on April 2, 1962, and later that month the President established the Council. The Council consisted of the Secretaries of the Interior, Agriculture, Defense, Commerce, and Health, Education and Welfare, and the Administrator of the Housing and Home Finance Agency (now the Department of Housing and Urban Develop-

ment). Its purpose was to provide broad policy advice and facilitate coordinated efforts among the various Federal agencies. The Bureau of Outdoor Recreation served as staff to the Council. In 1966, the Council was given broader authority, its membership was expanded, and it was renamed the President's Council on Recreation and Natural Beauty.

In May 1963, the Congress passed Public Law 88-29 which the Bureau's Organic Act. In passing this Act, Congress made a fundamental statement of policy :

"That the Congress finds and declares it is desirable that all American people of present and future generations be assured adequate outdoor recreation resources, and that it is desirable for all levels of government and private interests to take prompt and coordinated action to the extent practical without diminishing or affecting their respective powers and functions to conserve, develop, and utilize such resources for the benefit and enjoyment of the American people."

The Organic Act authorizes the following Bureau functions :

- a) Preparation and maintenance of a continuing inventory of the outdoor recreation needs and resources of the United States.
- b) Preparation of a system for classifying outdoor recreation resources.
- c) Formulation and maintenance of a nationwide outdoor recreation plan.
- d) Provision of technical assistance to and cooperation with the States, their political subdivisions, and private interests.
- e) Encouragement of interstate and regional cooperation in outdoor recreation planning, acquisition, and development.
- f) Encouraging interdepartmental cooperation and promotion of coordination of Federal plans and activities generally relating to outdoor recreation.

The Act also requires the heads of Federal agencies with outdoor recreation responsibilities to consult with and be consulted by the Secretary of the Interior with respect to their respective responsibilities and to carry out such responsibilities in general conformance with the Nationwide Plan authorized by the Act.

The authorities are designed to enable the Bureau to stimulate increased activity in outdoor recreation at Federal, State,

and local levels of government and by the private sector.

One of this Bureau's major responsibilities is to prepare a comprehensive Nationwide Plan at five-year intervals to guide the Nation's outdoor recreation development. The first Plan, to be published later this year, will define our present and future outdoor recreation needs, identify problems, and propose solutions. It will include information on public demand for outdoor recreation which will provide a systematic approach to this new dimension in our society and economy. It will take into consideration the programmes of the Federal, State, and local governments and of the private sector. The ORRRC studies revealed that existing recreation opportunities fall short of meeting current needs and that, while the 1960 population would double by the year 2000, demands for outdoor recreation were expected at least to triple.

The ORRRC projections have already been proved conservative. A nationwide survey conducted by the Bureau of Outdoor Recreation in 1965 showed that public participation in outdoor recreation activities had increased 51 percent since 1960. Based on that survey, we now estimate a four-fold increase in recreation participation between 1960 and the year 2000. The survey shows that walking for pleasure has become our most popular form of outdoor recreation. Swimming is second in the ranking of public recreation activity and will move up to first by the year 2000 if present trends continue. Driving for pleasure which was first in 1960, has fallen to third place. Following in order come playing outdoor games or sports, up 96 percent since 1960; bicycling, up 105 percent; sightseeing, picnicking, fishing, attending outdoor sports events, boating, nature walks, camping, horseback riding, and water skiing.

The Nationwide Plan will recommend the kinds of action needed to make certain that these burgeoning needs are effectively and efficiently met.

Another major responsibility of the Bureau is promoting Federal coordination in outdoor recreation. The need for such coordination was clearly recognized by the ORRRC Commission. As their report pointed out, "There are now more than 20 Federal agencies with programmes involving some aspect of outdoor recreation. While the programmes of these agencies are generally well planned in themselves, little thought is given in any of them to the overall development of outdoor recreation throughout the Nation. Thus a complicated and difficult pattern of intergovernmental relations is created, as numerous Federal organizations seek to work individually and separately with a wide variety of State and local agencies. There is at present no focal point for coordination of recreation policy, planning, programmes, or

management. Overall responsibility for initiating and guiding a national effort in outdoor recreation has never been explicitly assigned".

The Bureau was established primarily as a planning and coordinating agency. Our major planning objective is to assure that resources will be available to meet the variety and diversity of outdoor recreation needs and that these resources will be accessible to all citizens. Our objective in promoting coordination is to assure that all Federal programmes are directed toward meeting needs in terms of their priorities and in the most efficient manner possible.

It is important to note that the Bureau does not administer any lands or water. This function is capably handled by the longestablished agencies such as the National Park Service, Forest Service, and Corps of Engineers. It is appropriate that the Bureau not have any resource management responsibilities, since this would place it in "competition" with the management agencies and compromise its coordinating role.

Another Bureau function is the conduct of studies of particular geographic areas to determine their suitability and potential for meeting outdoor recreation needs. We are presently surveying our coastal and inland islands for their recreation potential. Some of these islands represent a last opportunity to preserve undeveloped land for outdoor recreation. An earlier Bureau study of some of the country's free-flowing rivers resulted in legislation now before the Congress that would establish a national system of wild or scenic rivers. Passage of this legislation would establish as major national policy that on certain of our rivers, the natural, scenic, and recreation benefits outweigh the benefits of water development and control purposes.

Another of the Bureau's special area studies has resulted in proposed legislation to establish a Redwood National Park in the State of California. Approval by the Congress of the Redwood proposal would signify recognition of and action to meet an important social need - to preserve the magnificent redwood for the permanent enjoyment of present and future generations. While meeting this social need is a justifiable end in itself, a Redwood National Park would also have economic benefits. For our studies show that in a relatively few years, the economic return to the affected area in northern California from a National Park would outweigh the return from harvesting the redwood trees for timber production.

While the Bureau's programme concern encompasses the traditional National Park Service objectives with respect to

preservation of unique or outstanding natural resources, creation of the Bureau signalled a new thrust and a new emphasis in resource use. Increasingly, in the last few years, the emphasis has shifted from preservation of the resource where it is, to provision of outdoor recreation opportunity where the people are. The focus has become people and their leisure needs. The new system of National Recreation Areas reflects this shift. These areas, while well above the ordinary in quality and recreation appeal, are established primarily to meet recreation need where it exists. They are generally more highly developed than traditional National Parks. Within the National Recreation Areas, outdoor recreation is recognized as the primary resource management purpose. Notable examples include Fire Island National Seashore within 40 miles of New York City, Assateague Island National Seashore off the Maryland - Virginia coast, near Baltimore and Washington D.C., and Delaware Water Gap National Recreation Area which is convenient to many millions of people in Pennsylvania, New Jersey, and New York.

Another major policy milestone in the field of outdoor recreation was enactment by the Congress in 1964 of the Land and Water Conservation Fund Act, which reflects both the general growth of interest in outdoor recreation and the shifting emphasis to people and their leisure needs. The Fund, administered by the Bureau of Outdoor Recreation, provides financial assistance to the States on a 50-50 matching basis for planning, acquisition, and development of outdoor recreation areas and facilities.

The Fund is also the source of money for the Federal outdoor recreation land acquisition programmes of the National Park Service, the Forest Service, and the Bureau of Sport Fisheries and Wildlife. Administration of the Fund is a key tool in coordinating the outdoor recreation land acquisition programmes of the three receiving agencies, National Park Service, Forest Service and Bureau of Sport Fisheries and Wildlife, to assure that priority needs are met.

The Act provides for a continuing source of revenue for both Federal and State outdoor recreation programmes. For a 25-year period, the Fund will receive revenues from the sale of surplus Federal property, from the Federal motorboat fuel tax, and from entrance and user fees at Federal recreation areas. Expenditures from the Fund currently amount to about \$100 million per year. It has proved to be inadequate to meet pressing needs, however, and the Congress is now considering legislation that would double its size.

A guiding principal of the Funds and of the Bureau is that the States play a pivotal role in providing outdoor recreation opportunity. In order to assure that the States are meeting

their priority outdoor recreation needs, a Statewide outdoor recreation plan is required to receive Fund assistance. These plans assess recreation supply and demand within the State and establish programmes for meeting State needs. Local governments participate in the programme through the States. Because the greatest needs are in our cities, the States are encouraged to share the Federal assistance with local governments. Federal financial assistance for urban parks and playgrounds dramatically illustrates the shift in public policy which has occurred.

The new recognition of recreation as an essential use of our resources did not end with enactment of the Land and Water Conservation Fund Act. In 1965, the Congress passed the Federal Water Project Recreation Act which provides that recreation shall be given equal consideration, along with irrigation, flood control, hydroelectric power, water supply, and other long-established purposes, in the formulation of multiple-purpose water resource projects by the Corps of Engineers and Bureau of Reclamation. Under this Act, the Bureau of Outdoor Recreation has a major responsibility for insuring that the tremendous recreation potential of the reservoirs constructed by these agencies in all parts of the country is fully realized. The funds invested in these projects constitute a substantial segment of the total Federal dollars expended on recreation each year. And the recreation visitors to the reservoirs outnumber those going to either the National Parks or National Forests.

A year later in 1966, in the Act establishing the new Department of Transportation, the Congress included the following language applying to all transportation programmes :

"It is hereby declared to be the national policy that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and water fowl refuges, and historic sites."

The Act also requires the Secretary of Transportation to consult with the Secretaries of Interior, Housing and Urban Development, and Agriculture, and with the States in developing transportation plans and programmes that include measures to maintain or enhance the natural beauty of the lands traversed, and to avoid or minimize damage to public parks, recreation areas, wildlife and waterfowl refuges, or historic sites. The Secretary of the Interior has delegated authority under this Act to the Bureau of Outdoor Recreation. During the brief time since this legislation was enacted, we have already found it effective in helping to avoid conflict between two major programmes each designed to meet essential and fast-growing needs - the need for efficient transportation and the need to protect the quality of our environment. This legislation is truly a reflection of the change in values taking place in the public

mind. Until very recently, the construction of a highway or an airport would definitely have had priority over a park, a wildlife refuge, or a scenic view.

These new conservation concerns were most clearly enunciated by President Johnson in a Message to the Congress in 1965 in which he said, "To deal with these new problems will require a new conservation. We must not only protect the countryside and save it from destruction, we must restore what has been destroyed and salvage the beauty and charm of our cities. Our conservation must be not just the classic conservation or protection and development, but a creative conservation of restoration and innovation. Its concern is not with nature alone, but with the total relationship between man and the world around him. Its object is not just man's welfare, but the dignity of man's spirit.

"In this conservation the protection and enhancement of man's opportunity to be in contact with beauty must play a major role. This means that beauty must not be just a holiday treat, but a part of our daily life. It means not just easy physical access, but equal social access for rich and poor, Negro and white, city dweller and farmer".

In the United States today, outdoor recreation is a major use of natural resources. But it is much more than that. It encompasses the creative use of leisure time and the growing appreciation of our natural environment. It is a reflection of the changes in our values as we seek to improve the quality of our lives.

### 13. 1. "Natural areas in Regional Planning"

by Rezneat M. Darnell, Professor, Department of Biology, Marquette University, Milwaukee, Wisconsin, U.S.A.  
(Chairman, Scientific Areas Preservation Council, State of Wisconsin) and

by Rowland J. Darnell, Principal Planner, Marin County Planning Commission, San Rafael, California, U.S.A.

### Summary

Through most of his evolutionary history the human animal has been a creature of nature, attuned to the moods of the seasons, and adapted to the sights, smells and sounds of the natural world. Although now surrounded by an artificial environment, through his hereditary make-up man is still functionally bound to the natural environment. For food, clean air to breathe, pure water, and psychological uplift man is still very much

dependent upon nature. Agriculture, industry, and medicine depend upon many products derived from natural plant and animal communities, and future generations can not be denied the opportunity of deriving further benefits from nature and of correcting the mistakes of our generation. Natural communities, as treasure houses of wild species diversity, must be regarded as a resource essential to the comfort and survival of the human species.

The regional planner works to insure that the future of man develops by design rather than by accident. His attention has traditionally been directed to problems of urban areas, and efforts toward regional preservation of natural areas for resource conservation have, so far, been pitifully small. As the planner continues to witness complete regional exploitation and the destruction of land and nature, he must join hands with the ecologist to preserve remnants of such natural communities as still exist. Effective long-range preservation activities must be carried out by ecological advisory boards which can locate, designate, and plan management policies for natural areas. The planner can aid in the location of potential natural areas and in establishment of the legal framework for the preservation activities. Both the ecologist and the planner, must work to gain public support for preservation projects. In his relationships with nature, man stands on the threshold of a great moral crisis, and upon his immediate decisions may hang his own future survival.

### Man and Nature

The Human species : Who is man that Thou art mindful of him ? What is the nature of this self-indulgent creature of animal origin which procreates without continence and which despoils the land for immediate personal gain ? Is not man's nature bound up in his past evolutionary history ? Can one really plan for man's future needs without understanding his origins and past relations with the environmental resources ?

Only a short while ago, geologically speaking, the ancestors of modern man roamed the field and forest. Their food was the fruit of the hunt and the harvest of the native trees and grasses. Home was a cave or a pile of sticks or the open field where one happened to find himself when the sun began to set. Man's tools were the native stone, bone, and wood. Although physically weak and possessing senses only moderately acute, man was able to survive by living in groups which roamed the landscape, hunting here, harvesting there. Place meant little, time meant nothing.

To the sights, sounds, and smells of nature man became attuned. The greenness of leaves, the brownness of soil; irregular shapes and patterns of plants and hills; the open arch of the sky and the far gaze of the distant horizon. The songs of birds and insects by day and the whispers and murmurs of the night. Random splashing of the brook and calls of animals on the chase. The heat of the sun, the wetness of rain. Organic odors of wet soil and a thousand plants. This was a world of endless variety of sensory detail superimposed upon the regular rhythmic patterns of the cosmos, the cycle of day-night and of season. Such was the environment in which mankind passed over ninety-five percent of his existence on earth, and such were the stimuli to which he, through evolutionary adaptation, became attuned. Greenness, irregularity, diversity, openness, soft sounds, gentle odors - a constant input of rather pleasant and seldom monotonous sensory stimuli. Acute dangers there were, but these were generally of brief duration and separated by long periods of relaxed vigilance. Within such surroundings man became a flexible creature, capable of coping, on the one hand, with external environmental conditions and with the internal organization of the social group, on the other. Being a generalized rather than a specialized creature, man was able to invade and survive in a remarkable variety of physical and biological environments.

During the recent and very brief period of his history wherein man has become "civilized" he has surrounded himself with an artificial environment of clothes, buildings, and cities. With increasing urbanization of the human society, man is experiencing less and less contact with the natural environment of his past, and the world of nature is being neglected and destroyed as though it were no longer essential to the existence of the human species. Upon close inspection, however, it is clear that, through his hereditary make-up, man is himself first and foremost a biological creature which, in spite of a certain amount of insulation, is still bound to the natural environment. His functional make-up is biological, and his nature is of the field and forest. Man's diet must include adequate quantities of carbohydrates, proteins (involving certain essential amino acids), fats, vitamins, minerals, and water. For respiration he requires a continuous supply of gaseous oxygen. Like other animals man returns to the environment gaseous carbon dioxide and liquid and semi-solid organic wastes. Man's body is attuned to the rhythms of nature, and he responds through hormonal and activity cycles. In the face of stress situations he reacts with hormonal mobilization of the body's defenses, and when subjected to prolonged stress he suffers hormonal depletion resulting in arthritis, nervous disorders, and a spectrum of related ailments. From the drab, monotonous screeching, reeking jungle of the urban environment man seeks escape. He must have surcease from the deadening stimuli and

routine of the factory, the office, and the city street. The world of nature is an inescapable part of man's past, present, and future, and doctors the world around recognize the restorative values of renewed contact with natural surroundings. Although science has not yet documented the case in detail, it seems likely that greenness, irregularity of pattern, the far view, the absence of time pressure, the muted smell and sound are all involved in the restorative process. This then is man, derived of nature and, of necessity, bound to periodic communion with its elements.

The natural community : But what is nature ? Plants, animals and microbes of a region live together in a state of balanced harmony which is called the natural community. Every natural community contains hundreds of species, each of which is governed by a particular spectrum of hereditary characters perfected through thousands of years of natural selection experiments. This process of elimination of the genetically unfit is referred to as adaptation. In this way individual species and whole communities have become adapted to the local set of soil and climatic factors of the region. The factors which shape adaptation are not the same from one place to another, hence the hereditary spectrum of a given species and the make-up of the total community varies from one locality to another. A forest of oak or pine is not the same from one area to the next, and the difference is clearly worth nothing on both biological and economic grounds.

Within each natural community the many species are integrated through functional relationships which impart to the system as a whole an inherent stability often referred to as the "balance of nature". Thus, the size of the populations of the individual species and of the entire community are subject to internal regulation.

Each natural community exists within the context of a non-living environment which it influences and by which it is partially controlled. Chemical materials and energy are cycled through the community and exchanged with the environment, and there is evidence that the rates of cycling are likewise controlled. A forest community, for example, regulates the soil moisture content, rate of water run-off, atmospheric oxygen and carbon dioxide levels, humidity, rainfall, and temperature.

Each natural community is a storehouse of genetic variability specifically adapted to the particular region. The diverse species are bound together in a self-balances system. In sum, the natural community contributes to the overall balance of water, weather, and atmospheric gases of a region. It stabilizes the environmental factors at levels which are favorable to the existence and comfort of the human species.

Man and nature : What is the importance of nature to man ? The case for saving remnants of nature may now be documented in some detail. Scientific evidence presently available points to the fact that the control of the natural atmospheric cycles of water, oxygen, carbon dioxide, etc. is being carried out effectively by the natural communities and that they will continue doing so if human society does not contaminate the atmosphere too much and if sufficient natural areas are left intact around the world. We know also that each natural community is a veritable storehouse of unique genetic material which we are already using to improve the strains of crop plants and livestock. The practice of medicine has been revolutionized by the discovery that soil microbes naturally produce antibiotics which can provide humans with miraculous protection against infectious agents. We know that man, himself, is mentally and emotionally refreshed by periodic contact with natural environments. We are sure that sciences has only begun to scratch the surface in its attempts to understand how the natural community regulates the cycling of materials, knowledge which will eventually aid in our understanding of the animal called man. Finally, we are certain that if we preserve remnants of each type of natural community our children will find many new uses for the species which we save, and some of the uses may be critical to their survival. The plants and animals of each region constitute a major natural resource, a national and regional treasure which must be guarded. Natural area protection is a matter of national concern. It can not be left to chance.

### Planning for Man's Future

Perspective of the regional planner : It is the responsibility of the regional planner to insure that the future environment of man develops by design rather than by accident. He must be aware of human needs and values, on the one hand, and the resource potentials and environmental limitations, on the other. He must plan, not only for immediate objectives, but for long-range future goals. Since the regional planner is neither all-knowing nor all-powerful, he must seek to bring together the resource scientist, sociologist, environmental engineer, legislator and administrator so that the best available information may be translated into objectives and these, in turn, into action programmes. His concern is with the needs of the total population rather than with the desires of the powerful minority or the individual with special vested interest.

Traditionally, the planner has directed his attention to problems, policies, and controls related to commercial, industrial, and residential land use, as well as to public facilities such as transportation. Planning on a regional scale, while it has been practiced in the United States (witness the thirty-year

old programme carried out under the Tennessee Valley Authority), has been spotty and, for the most part, concerned with urban expansion and the related problems of air and water pollution. Efforts to preserve prime agricultural land and natural areas for resource conservation have been pitifully few and far between. In most cases they have received massive public support only under the threat of easily recognized public disaster. For example, the new state of Hawaii, threatened with the loss of a significant share of its agricultural and scenic resources to the malignancy of urban sprawl, has followed its own century-old policy (water and forest preserves were set up under the Monarchy) in the establishment of state-wide zoning controls for permanent protection of the resources upon which the growth, and possibly survival, of the islands depends. In this case the tragedy of land disappearance was rapidly becoming obvious to all. In most cases, however, urban expansion and the development of extensive recreational facilities which entail destruction of the "close-in" environment are seldom recognized as causing a real loss if the areas are converted to some intensive human use. It is easy for everyone involved to assume that anything destroyed is duplicated somewhere else many times over.

As he witnesses the dramatic in the human population, its gravitation towards the benumbing environment of urban complexes, and the resulting regional sprawl, perhaps the planner, more than any other public servant, is becoming aware of the disappearance of the natural resource base. As this pattern of complete regional exploitation is multiplied on a global scale he desperately seeks to know if something of critical value is being overlooked and lost. To this the ecologist replies that whatever is being overlooked is bound up in the natural landscape, the soils and the plant and animal communities. Long-range planning must provide for the preservation of regional representatives of the native communities if the future environment is to reflect that elemental balance upon which the human species unconsciously depends.

Accomplishment of natural area preservation : The word "conservation" has come to be synonymous with the word "recreation" in the minds of many people in public office. At the outset the planner must recognize the concept of resource preservation and the role which he may play in saving the natural environment. Further, the planner must not embrace the concept of "multiple use" of natural areas if secondary uses by the public at large will in any way interfere with the primary purpose of preservation.

Even if the planner understands the need for natural area preserves, however, he is in no position whatever to determine which specific tracts of land are the most valuable. This is a decision which can only be made within the community of environ-

mental scientists, specifically the ecologists and taxonomists, who know the native fauna and flora and who alone can recognize a disturbed area from an undisturbed one. The necessity for a working dialogue between the planner and the ecologist is clear, but in actual practice the individual ecologist is seldom in a position to provide immediate clear-cut information regarding all the areas of a region which merit preservation. Furthermore, once areas are protected, management and use policies must be developed, carried out, and periodically modified. Land inspection and scientific and educational use are continuing activities.

The most effective arrangement for the preservation of natural areas of a region involves the establishment of an ecological advisory board which maintains periodic contact with the regional planner and whose functions include the location and designation of natural area preserves as well as the administration, management, and scientific and educational use of the preserves. The planner can generally point out the directions in which urban development is moving at any given time. The scientist must be willing to inspect portions of the region which do not lie in the immediate path of the bulldozer, to identify what is worth saving and what must be saved, and to support his case with appropriate maps, text, and illustration. Armed with this kind of evidence the thinking and principled planner is likely to lend his support in the establishment of the legal framework within which preservation and management may be accomplished. Outright purchase, purchase of development rights and easements, offering of tax benefits and application of police power (zoning) have all been used at the local, regional, state and national levels within the United States to effectuate the public interest in regulating or otherwise securing the proper uses of land. In extreme cases, where a highly important area is about to disappear, emergency legislation or exercise of the right of eminent domain may be justified to prevent the destruction of the resource, and such action may prove financially expensive.

Success in the business of natural area preservation resides not only with socially active ecologists and enlightened planners. The public is also involved, and successful preservation programmes recognize the importance of public support. Whereas, certain of the preserves will be small or very sensitive to human disturbance, others will not. Wherever possible appropriate public uses should be allowed, perhaps through well-marked nature trails along which are given guided tours. In his search for the best potential natural areas the ecologist will encounter some which, although disturbed and not quite as valuable for scientific study, are nevertheless nearly natural

and of some value as preserves. Such areas might be acquired and developed as nature study areas which would be more freely available for public education and general use. The value of public support for preservation projects can not be overemphasized and public support begins with public understanding. The scientist and the planner must work together to educate the public at large as well as the legislator and administrator. Natural areas must be protected from development, vandalism, and political whim. Regardless of the party in power at any given time the national treasures are not to be touched.

Moral aspects of natural area preservation : We have seen that man evolved as a beast of the field and that he carries deep within his biological make-up, even yet, the shadow of his past. Has man progressed beyond the animal ? Does our planning only postpone the inexorable operation of ecological laws that will eventually destroy the wretched species which glimpsed a vision of eternal harmony but which failed to achieve it because of an uncontrollable reproductive drive ? In historical perspective the measure of man will be how he controlled himself and his recognition of responsibility to future generations as well as to the other species of this planet. Man can not be viewed as a phase of life in separation from all others, as if his origins and destiny were separable from the rest of the cosmic spectrum. We who plan for the future welfare of humanity are profoundly convinced that man is on the threshold of his greatest moral crisis and that the decisions made now will influence not only our immediate practical actions but the long-range survival of the human species.

### 13. 2. "Parks and natural areas in the natural landscape"

by Joseph L. Fisher

About a year ago I had the opportunity of visiting the great national park here in Bariloche in connection with a conference on natural resources sponsored by the Direccion General de Parques Nacionales and the Fundacion Bariloche. One night I walked by myself down to the shore of Nahuel Huapi Lake. The moon was bright enough for me to trace the silhouette of the mountains across and back of the lake. The wind stirred the water gently making a rough path of moonlight across the surface of the lake to the far shore. It was, I was told later, one of the coldest nights; in Buenos Aires that night the temperature went below freezing. I picked up a stone and threw it far out into the lake, and thought I could hear it strike the water. Nothing was visible except the outlines of land, water, and trees, but I could fill in the detail, as much or as little as I wished, from the fresh memory of having been on this spot early that afternoon. The experience was transcendent; one

of those occasions in a lifetime when one is lifted from the ordinary plane of living and finds himself a part of the whole design.

Nearly thirty years ago I had a similar experience near the northern end of the new world, this time at McKinley National Park in Alaska. That night was a cold one also, minus 55 degrees centigrade which is about as cold as it ever gets at McKinley Park. I walked away from the lodge about fifty yards. The cold penetrated almost immediately through my overcoat, but I stayed out long enough to look up at the great bulk of Mt. McKinley, the highest mountain in North America though falling short of Aconcagua by nearly a thousand meters. The moon was bright, or would have been except for the more spectacular play of the northern lights across the sky and across the mass of the mountain. The great shafts of red, yellow, orange, and purple lights moved rhythmically across the snow. Again the experience was a transcendent one that I shall never forget; for a few frozen moments I was unmistakably a part of the whole design.

In between Nahuel Huapi and McKinley are fourteen thousand kilometers, twenty five countries, and more than 400 million people. At present rates of population increase the year 2000 will see more than one billion people living in the Americas. This vast expanse of land and water, this western world, which must have seemed limitless to its European discoverers a few centuries ago, is being drawn together ever more rapidly by transportation and communications, economic and cultural exchange, and the entire logic of our modern situation. I examined the airline schedules recently and found that the ordinary traveler could go from McKinley Park in Alaska to San Carlos de Bariloche in Patagonia between the morning of one day and noon of the next. We have come a long way in the few centuries since Columbus, Magellan, Orellana, Drake, De Soto, Coronado, and Bering. And we are only beginning.

One of the most startling things about the evolution of the new world is the rapidity with which we are moving from a situation in which wilderness and natural areas were everywhere to one in which the bulk of the population is concentrated in cities far removed from wilderness and natural areas. From an abundance of nature we are forced to make a rapid transition to a scarcity of nature, at least from the viewpoint of most people. In sharp distinction from the past, in the future we shall have to plan for parks and natural areas, protect them, invest in them, and manage them; otherwise presently there will be none. Or, if not none in the absolute sense, then very few in relation to the needs of people for them.

My plea here is not for a particular park or natural areas in this or that country. It is for something much more difficult,

namely a new way of looking at parks and natural areas. My plea is for looking at parks and natural areas as a necessary element in the national landscape of each country. Just as land areas are needed for cities, farms, highways, forests, reservoirs, and the grazing of livestock, so land areas, and water also, are needed for parks and natural areas. Parks and natural areas should not be the remnants, the left-overs, the very remote and largely unusable areas. They should be selected deliberately to meet the needs of people and to provide the opportunities, services, and satisfactions people want. A natural area that is not needed for people or wanted by them is probably not worth having. Of course I include among the areas that people need those containing magnificent scenery, unusual and interesting species of flora and fauna, and unique scientific reserves which frequently embrace whole ecosystems, as well as those areas of direct and immediate recreational use for outdoor recreation such as camping, hiking, boating, swimming, hunting, fishing, painting, and photographing.

The diversity of possible uses leads to the need for a variety of areas from the remote mountain or lake of superb beauty to the more ordinary beach or forest. In some areas more than one kind of use can be satisfied; others will be single-purpose in character. Fortunately the countries of North and South America among them offer many types of parks and protected natural areas. Between the Arctic and the Antarctic extremities lie great mountain ranges, deserts, tropical jungles, high plains and low plains, lakes and immense rivers, and much beautiful seacoast and island scenery. The plant and animal life is equally rich and diversified. The larger countries such as Brasil and Argentina, The United States and Canada, have within their own boundaries great variety of natural areas. The more numerous smaller countries have a narrower range, but still each of them has a number of significant and interesting possibilities.

There is much to be said for viewing parks and natural areas, not alone as part of particular national landscapes but also as parts of the continental landscape. In this way my country, the United States, can feel a sense of relationship to Brasil and other Latin-American countries which have tropical rain forests, while some of the Central-American countries which have no deserts can similarly feel a relationship with Chile, Peru, the United States, and Mexico which have an abundance of desert land.

One of the mistakes sometimes made by park planners is to think solely in terms of the geographic areas and their physiographic and related characteristics. Of greater importance are the people who may use the areas. How many users are there and

how many may there be in the future ? What do we know about their interests in parks and natural areas, and how may existing interests be satisfied and new ones aroused ? How much money do people have to spend for visiting parks and natural areas ? How much money will governments devote to the acquisition, improvement, and management of such areas ? How far will people travel to visit parks and what kind of vehicles will they use ? In short, how may the demand for the use of parks and natural areas be more completely understood ?

The demand side of the equation has not been studied in a comprehensive and systematic way. Only recently have the various countries begun to gather the statistical information, define the concepts and tools for measurement, without which park planners will have to work in semi-darkness. In my own country analysis of the demand side in the last few years has progressed rapidly. This work has involved statisticians and economists, sociologists and psychologists, political scientists and public administrators, and of course land and water planners. Measured in terms of visits, the use of parks and natural areas in the United States for many years has been increasing by nearly 10 % annually. This places outdoor recreation among the rapid growth industries of the country along with electronics, plastics, and others. The principal reasons for this increase are not hard to find : they include the growing population, rising family incomes, increased mobility, more leisure time with a somewhat shorter work week and longer annual vacations, and finally an increased desire on the part of nearly everyone to escape from dull and sedentary work by going into natural areas. Most of these factors will continue to work for many years into the future so that realistically one must expect the demand for parks, natural areas, and outdoor recreation to continue to grow. Reinforcing these trends will be an increasing need to set aside natural areas for scientific purposes as storehouses for genetic materials that would otherwise be lost, and for the preservation of undamaged ecological systems.

A special and most interesting case is the possible need for preserving areas not for any particular use but simply to preserve them against the erosion of time and development. In my own country, for example, there is much sentiment for preserving a certain amount of wilderness which will be very lightly used, if at all. Apparently many people find value simply in the idea that there is protected wilderness somewhere in the country even though they will probably never visit such an area except in fancy.

These same forces on the demand side are to be found in other countries, although perhaps they are most keenly felt in the higher income, industrialized countries. Certainly I have

the impression that the national parks and magnificent natural areas in Argentina and other Latin-American countries are quite well known and that large numbers of people want to visit them. As an indicator of the recreation demand that may well flood over the Latin-American countries in the future, recent projections of the number of individual visits annually to national parks and forests in the United States point to more than 1.000 million by 1980 and nearly 9.000 million by 2000, based on postwar trends. This will mean about 27 visits on the average of each of over 300 million Americans in the year 2000. In addition is a very large projected use of other outdoor recreation areas such as other federal recreation areas, state parks and forests, and city parks, not to mention privately owned areas. In the United States during recent years a doubling of per capita income has been associated with about a five-fold increase in per capita visits to national parks. By the time per capita incomes in Latin-America taken as a whole reach the 1967 United States level, the population of the countries from Mexico south to Argentina and Chile may be twice or three times that of the United States population now. These factors taken together represent a potential increase in demand for national parks and similar areas so high as to be almost unbelievable.

Fortunately potentialities are numerous for parks and natural areas in most, if not all, of the Latin-American countries. Population density in most places is still relatively low and there are vast extents of land and water which can still be brought into a parks and natural area system at reasonably low cost. The International Union for the Conservation of Nature and Natural Resources, and especially its Latin-American members, are to be complimented for perceiving the trend of demand and the need for setting aside additional areas now and in the immediate future rather than waiting until the supply has diminished and the cost has become high.

Progress in this field would be hastened in most countries by thinking in terms of developing whole park and natural area systems. By a park system I mean an interrelated set of areas selected and managed to meet a range of human needs. The needs include outdoor recreation, scientific experimentation, scenic and wildlife preservation, among others. The types of areas will include remote and large areas of superb scenic beauty such as this one we are now in, intermediate areas of slightly less scenic attraction and uniqueness but more numerous and closer to the cities, and finally close-in areas of easy access to large numbers of people. In addition will be the scientific areas necessary for ecological, genetic, zoological, botanical, and other purposes. By a park system I mean to convey the importance of linking in a comprehensive and logical way the range of demands that people have, or may have in the future,

with the kinds of areas that are available, or may be made available.

It seems to me that only when parks and natural areas are placed in a systems framework will the full potential for them be realized. By orienting the system as much or more to people and their needs than to the geographical areas and their physical features, I believe the whole subject can more readily gain popular understanding and support. Furthermore I believe the national and regional planners and developers can more readily see the importance of parks to national and regional economies if a systematic approach of this kind is taken. Until park development becomes as respected a part of national planning as electric power, agriculture, and basic industry, progress will be slow and halting. Parks and natural areas are too important to be left entirely in the hands of amateurs and sentimentalists; they must be made appealing to budget makers and politicians. I think the systems approach I have outlined, based solidly on demand trends and supply possibilities, is the way forward.

Of key importance in any accelerated planning and development of parks and natural areas will be the selection of the areas and the establishment of criteria or standards for their use. These standards will vary from area to area, depending upon the wishes of the people and the ecological constraints against overuse. A park systems planning council might be established advantageously in each country to undertake the job of advising on the selection of areas to be included in the system and establishing the standards of use for each type of area. In many instances national or regional park services already exist to do this work. Clearly this kind of planning needs to be placed on a long range basis and needs to be reviewed from time to time. The whole exercise should be geared in with the established procedures for national and regional planning in general, and not be done in an airtight compartment without direct reference to planning in other sectors.

Fortunately in most countries there is considerable flexibility in the development of parks and natural areas depending upon the level of investment and management that can be applied. Thus, in many parks the number of users can be doubled or tripled if enough funds are invested in roads, trails, shelters, maintenance, and management generally. In some instances the substitution of intensive management for sheer open and unmanaged space can increase the enjoyment that people have in visiting the area without any sacrifice of protection from ecological damage.

There will have to be feedback between the selection of areas and the establishment of standards of use. Use standards will to some extent determine the number, location, and types of areas needed; while the kinds of areas potentially available will, to some extent, govern the standards that are possible. The day is passing when natural areas can be left entirely to themselves; we are entering the era in which all land and water areas that conceivably could be placed in a park and natural area system will have to be managed as integral parts of the landscape in each country. The only question is how.

But I want to go a step beyond a national approach; I want to urge a hemispheric approach which will bring the entire western world into its perspective. A month ago my country unveiled a new transport airplane which, properly fitted out, could carry comfortably nearly a thousand passengers at nearly a thousand kilometers an hour. Another decade could easily see thousands of North Americans wanting to spend a two weeks holiday in parks in South America, such as this one at Bariloche, and equal numbers of South Americans wanting to go north to the Yellowstone or McKinley parks. To go from Buenos Aires to Rio de Janeiro will soon be no more unusual than a trip from Buenos Aires to Rio de Janeiro was only a few years ago. We must respond to new technological events and social forces with scope and imagination. For park planners, it seems to me, this has to be in terms of a system of parks and natural areas conceived as a hemispheric system and developed accordingly. I hope this conference will provide both the inspiration and the basis for such a step forward.

To conclude, let me summarize the main points I have tried to make. The demand for parks and other natural areas will continue to grow rapidly everywhere in the Americas as population increases, incomes rise, and people become more mobile and have more free time. Levels of recreational use already experienced in the United States and Canada may be expected in the Latin-American countries in a relatively few years. So as not to be overwhelmed, each country will need more parks and natural areas and a higher level of investment in land acquisition, protection, and management.

My central proposal is that each country plan and develop its parks and natural areas systematically and comprehensively by relating the various types of areas to the different ways that people wish to use the areas. The spectrum of uses ranges from pure science to ordinary outdoor recreation for the millions of city dwellers. The spectrum of natural areas ranges from the mountains to the coast, from deserts to rain forests, from remote and superbly beautiful scenery to recreation areas close to the cities. Such parks and natural area systems can be developed more soundly and rapidly if they are integrated with

national plans and programmes that cover other land and water uses, and the economy generally. Park planning must become the business of national investment planners and budget makers.

Furthermore, I believe the time has come for thinking of parks and natural areas on a hemispheric scale in view of technological advances in transportation and the prospect for more than a billion people in the western world by the year 2000. In such an approach the needs and desires of people in all of our countries could be brought together with the full extent and variety of our existing and potential parks and natural areas, from Bariloche to Alaska. The Porteno and the New Yorker alike would then have the exciting prospect of being able one day, not too far off, to visit any park anywhere in the hemispheric system. They would be assured of a planned and well-managed area which would be a credit to their countries and a testimonial to the foresight of us here today who are trying to understand the possibilities for improving the future landscape of our two continents.

#### 14. 1. "An approach to regional planning in relation to urban areas"

by Carl A. Carlozzi (U.S.A.)

The title of my paper implies a relationship between the urban area and the region. What I will stress in this paper is that a general relationship between urban areas and their regions is very hard to define, especially in the mid 1960's. Rather I propose that several types of relationships exist in varying degrees of strength. These are ecological, economic and cultural. With the exception of the most primitive gathering societies or perhaps simple agrarian societies, it is unlikely that all types of relationships can be drawn in equal strength between a center of population and its region.

When Lewis Mumford put forth the concept of "urban implosion" to describe the earliest formation of cities, it became easy to imagine that the city was bound to the countryside by compelling ties of ecological, economic and cultural forces. The thrust of human energy and the weight of economic production resulted from action related to the land. Cities were centres of religion, government, mutual defense and storage of surplus product, but the sustenance of the population and most of its material well-being were derived from the soil, water and forests of the region. The early cities functioned as service centres and provided social order for populations that lived outside their walls.

Such a simple relationship was not destined to last. As Mumford points out, human minds latent with inventiveness and creativity were stimulated by the interactions of the urban environment. All forms of artistic, technical and cultural skills bloomed, and with them the majority of social activities shifted to the urban arena. This shift of emphasis in human effort and activity was mostly economic and cultural rather than ecological. The city still depended on its immediate region for raw materials and food. In ecologists' terms, its energy and matter cycles were site-bound; the total system was closed.

Where the fundamental ecological lines of dependence were clearly drawn, civilizations could persist successfully if they exploited the land within the framework of nature and her processes. The fact that numerous civilizations did not live within that framework is recorded in the historical lists of national and cultural collapses.

In part we may assign some of those failures to the ecological ignorance of our predecessors. They had just enough power at their command to physically alter their environment but insufficient knowledge to project long run ecological problems and create social constraints to avoid them. We also know that wars upset otherwise functional adaptations to the landscape such as irrigation systems, agricultural regimen and transportation routes. Many early cultures never reconvered from that kind of destruction, and both man and land suffered.

But this is the 20th century, and while we have surely not resolved the issues of war, we do have some capability to illumine the ecological processes by which our living world operates and upon which we are dependent. In this respect we are faced with a very basic question of how our knowledge of those processes relates to the ordering of our social and physical growth and change that seem directed today by the irrevocable forces of world-wide economic-technic urbanization. The idea of planning the region in relation to urban areas admits of those forces and its language admits of a hierarchy of planning priorities. It is the countryside which will be developed or not developed as factors and forces in the cities demand.

As an ecologist, I wish I could say with conviction that urban areas might be in their construct and function subservient to the ecological processes of their surrounding region. I can not, however, because the direct lines of ecological dependence between the 20th century urban centre and its adjacent region are only partially drawn or vaguely operative. Indeed many of the major urban areas of this hemisphere and Europe appear to have very little material dependence on their immediate region.

The energy powering the workings of the city, the raw materials supplying its industries, and much of the food feeding its people may originate from regions far removed. Today our major cities are not "site bound", unless we are willing to extend the concept of "site" to encompass a geography that in its least scope is usually national and in its greatest scope is almost global. Since ecology is the mother of economics, anything said about urban-region relationships in the ecological sense is essentially true in the economic sense. Because we are preoccupied with economics rather than ecology, we tend to view the problems of our urban societies as mainly economic problems and seek solutions to those problems through economic means. If unemployment in the cities is a problem, we plan factories to take up the unemployed. If we must import materials to supply our new factories, then the balance-of-payments problem resulting is treated by finding export markets for our industrial product. With each increment of economic problem solving there is a further separation of the urban-industrial centre from its region. Reciprocating effects are felt less and less between city and surrounding countryside and more and more between the city and some market or economic entity across the sea or on the other side of the continent. This modern mercantilism is not entirely undesirable. It is mainly by these means that much of the small improvement in the material quality of life for millions of the world's people has been possible. Without a global economics, resource poor regions or nations would remain economically poor. It appears almost axiomatic that societies that are ecologically and economically site-bound are in the 20th century terms, "backward".

I conclude then, that it is not wise to avoid or reverse the trend toward continued expansion of inter-regional and inter-national economic interdependence. I say this not because we have managed to resolve the social or political difficulties of a global economy, or that we have found a way to adjust to nature's uneven distribution of naturally produced wealth without doing long-run ecological damage, but because I believe those problems are susceptible to human will and ingenuity.

The issues that emerge when we wish to plan the use of the region's resources are, however, confused by the absence of clear-cut relationships to the urban centres. We detect this confusion in our failure to construct an acceptable social-psychological image of what our environment should be and how we relate to it. Having lost an explicit ecological framework within which to judge the Tightness or wrongness of our actions on the land, we have found no effective substitute in the economic-technic structures that today form most of our lives. To speak of an explicit relationship between the contemporary metropolitan area and its region is often to speak of exploi-

tation in its most undesirable sense - urban sprawl, pollution, soil erosion, and ruined hydrology. These problems are the opportunity costs incurred by the economic activities that make up most of what we in faith and hope call progress. They degrade that very progress, however, and their cost is high in both the long and short run.

It is possible to reconstruct the man-environment relationships along other lines. If we cannot recognize a material or commodity relationship, there is every likelihood that we can recognize a service and amenity relationship. We can create a closed system between the urban area and its region with respect to environmental quality rather than resource quantity. In the philosophical and aesthetic sense this, it seems to me, is what progress is all about - to achieve a more human and humane life with an equitable arrangement between man and the living land.

Where the root causes of the breakdown of man-land or urban-region relations are not understood then there is a tendency to treat only the symptoms of the problems. We apply cosmetics to restore landscape beauty and perform physical therapy to restore landscape functions. Truly effective regional planning goes beyond cleaning up today's mess in order to allow us greater efficiency in making tomorrow's mess. For example, regional flood control plans should not be seen as a means for creating greater economic inputs in the flood plain.

The approach to identifying the root causes of urban-region problems that I am suggesting is one that uses the relative openness of ecological-economic systems as its framework for analysis. The need for planning, the purposes of planning, the policies and priorities for which planning is conducted, and the technical-institutional means for implementing plans may each be drawn from analysis of the degree of openness.

It is apparent as one looks at various ecological and economic situations that four basic types of systems can be delineated. In the static sense they can be seen as points along a continuum from fully closed to fully open. In the dynamic sense they can be seen as progressions through time leading from the closed primitive system to the open metropolitan-industrial system.

#### The Internal Supply and Internal Market System (Type I)

In the classic condition this system is fully closed. It is primitive in its general structure, having very few resources processes and social institutions. The system is usually based on gathering, agriculture, or pastoralism. Its economy is automatic and maintains a state of equilibrium between the

population and resource use. Population densities are low and stable or very slowly growing. Growth is a simple extension of existing conditions to a larger regional base. Materials tend to cycle through the system in much the same way as they do in natural organic systems. As long as the essentials of the system remain the same, there is no need for planning. Tomorrow will be the same as today.

#### The Internal Supply-External Market System (Type II)

The major economic activities of this system depend on a regional resource base and an external market. Resources processes tend to be extractive such as mining, forestry, cash crop agriculture, and grazing. Economic functions are relatively few and continuous through time. Urban centres are evident in regions supporting this type of system. Cities typically are points of trans-shipment of regionally derived materials and may contain industries which partially refine or elaborate raw materials. The rate of flow of materials is sensitive to the demand in the market over which the region has little control. Growth of the economy is related to market growth. When the supply region enjoys the existence of a resource that is scarce in the nation or world it may rapidly deplete its resource base in an effort to maintain market advantage and gain the benefit of a current high selling price. When the region supplies materials or crops that are plentiful elsewhere, it may suffer periodic advancements and declines in its economy.

#### The External Supply-Internal Market System (Type III)

Regions evidencing this system are dependent on other regions for their materials and energy. Their economies are complex, with industrial activities predominating but with commercial and service activities highly operative within the local region. The basic functions of this system are to elaborate materials into finished products for an internal market. Populations are usually high and growing and there is a tendency to increase the kind and number of functions carried on in the urban areas in order to provide employment and expand the market for products. It is expected that the sources of supply should respond to such increases automatically, and so the urban area will attempt to exert some control over the supply regions to insure a steady flow of materials. This is often done through the control of capital and credit to the supply regions. The pull generated on distant resources tends to be depletive in character because the market region is ingrown in its concerns and will see supply regions as important so long as they are capable of maintaining a flow of materials. This system may seem to describe the relationship between a metropolitan country and its colonies, but it is also true of metropolitan centres in relation to supply regions within a nation.

## The External Supply-External Market System (Type IV)

This system approaches openness. It is characteristic of the larger metropolitan areas in the world. Geographically such systems occupy positions where all forms of transportation are joined. Their economies are highly commercial through industrial activity may also be present in significant degree. The system relies on external sources for energy and material and on external markets to buy its products. Very often the external supply and markets are international which may make this system the worst of all possible worlds - to have to buy what you need from someone else to produce what you must sell to someone else and hope the difference between buying and selling results in profit.

When supply regions are naturally internal and markets are beyond National control, then the whole system may become resource depletive. I believe this is part of what is called neo-colonialism.

I would now like to discuss the dynamics of the four types of supply-market systems to outline how planning goals and policies may be suggested.

It has always been intriguing to read Utopian novels because they consistently present social-economic systems that are ecologically ideal which is to say they are closed systems operating in a state of equilibrium. I believe the universal fascination and nostalgia over primitive societies can also be understood on the same ecological terms. There is a kind of appreciation for the balanced state of affairs whether in relation to man to man or man to nature. Brenton Mackage wrote in 1928 about regional planning and set forth the concept of the "indigenous region". He didn't call it a closed system, but that is what he was describing.

What I am suggesting is that regional planning should strive to close systems that are open or are about to become more open. Utopian authors recognize that all open systems are inclined towards a bad use of the human being and are depletive of environment and resources. Planners should be aware of that also. It is significant that as we study the closed systems in the world today we describe them as backward, undeveloped, or underdeveloped. We do not, however, describe the societies as unhappy, poorly adjusted or as a scourge on the landscape. It is only when we change one or several elements in the closed system, such as cultural values, death rates or resources processes that the primitive society is degraded and its equilibrium is upset. This kind of change typifies the first step in economic development shifting the closed Type I system to a Type II system. It is historically obvious that such opening

of closed systems has occurred or we would all still be very primitive. But it is equally obvious that the opening of primitive systems has caused a considerable amount of long-lasting damage to man and nature. That we should continue today to develop underdeveloped regions without understanding the problems ecologically inherent in that activity is to perform with 20th century technology what our for-bearers did out of ignorance.

Planning the development of regions with closed systems should immediately recognize the basic problems that are inevitably attendant. These are :

- a) Exploitation of renewable resources at rates faster than natural cycles can accommodate.
- b) Use of mechanized modern equipment to increase resources processes but still follow older traditional resources use patterns.
- c) Migration of the region's population to urban areas following improvement of transportation and communication and the substitution of capital for labor.

Several factors may stimulate the opening of systems, such as : the discovery of fossil fuels and minerals; an improvement in technology or social institutions that make a non-economic substance a resource; or a change in market demand that brings slightly used resources in to vogue. Whatever the factors, the development of the regions usually depends on one or only a few resources. This leads to depletion because the market for the resources is not directly involved in the process of supply. Urban centres arising within the developing region might bring use rates into balance in the case of renewable resources or reduce the likelihood of environmental damage from the extraction and initial processing of non-renewable resources, if the source of control resided in the region. Almost always it does not. Capital and credit for resources use and often the means of transportation reside in the market. It is in the Type III or IV regional systems that pull is exerted on the supply and real control is affected on resource use rates.

Several planning policies are called for in order to close the system and bring about a means for creating equilibrium. First is the recognition that the region being planned must include both the supply and market areas. Assuming that both areas are within one country then the geographical extent of the planning region can be institutionalized.

Second, the plan should include a means for allocating resources to potential users in a way that guarantees the rate

of use will not exceed the natural production cycles under the existing state of possible management or create exclusivity of ownership that could lead to a false scarcity or surplus of resources through single control of the supply. This is what I call conservation policy. That is, the imposition of the public's interest in the long run ecological health of the environment as determined by science and economics between the resource and the first resource user. This may be done by public resource ownership, laws, tax and subsidy inducements and technical assistance.

Because there is an universal and intensifying wish by all societies to improve their material existence, it is difficult to keep a supply-market system closed. All regions or nations do not contain all the resources and energy to accomplish a truly closed system and improve living conditions even on the National level. As economic power increases through resources use and social organization there will be a need to look beyond the existing system for resources, energy or technical processes if further advances are to be made. The system must be enlarged again. Utopia only can exist where the closed system contains all the resources that it needs or if human aspirations are limited.

History has recorded an ever unfolding of larger and larger supply-market systems as technology and institutions have progressed. Our present capacity to continue this expansion is seemingly boundless. Our present attempts to close the enlarged systems are pitifully inadequate, though some efforts are made through national planning and certain types of international agreements. These are not likely to succeed as they are now carried on because they are not ecological in conception. Although the nation is a supply-market system that can be closed, it is rarely the system that should be closed; and we tend to treat only with the Market part of the system when we do act at the international level.

We achieve only a little bit on the supply end through international means. We can do this when the resources in question occupy a space which is common to all nations such as air - the treaties protecting migratory birds - or oceans - international fisheries conservation. There is the beginning of progress in preserving special or unique resources through the creation of international parks. These actions are but tokens of what is still to be done in establishing a conservation policy for the supply-market systems under which we now operate.

If planners can begin to conceive of the relationships of urban areas and regions in the fullest extent of their function and if planning can be carried out within the ecological frame-

work of what whole systems are, then there is every possibility that an equitable arrangement between man and resource is possible. This will require a much broader interpretation of ecology by the ecologists and a more effective means for bringing ecologists into planning at all levels of decision making.

There is no reason to believe that the theories of a common supply cannot be at least as well worked out as those of a common market. They will have to be if we ever hope to plan effectively. This may be asking for a great and difficult advance in science and planning institutions. But, if we are to continue the process of world-wide metropolitan growth, then developing a closed system planning approach is the only basis I know for making this the best of all possible worlds.

#### 14. 2. "Landscape Planning with reference to urban areas - the position in South America"

by Jorge E. Hardoy, Argentina

#### Economically developed cities and economically developing cities

In an article published a few months ago, one of the wisest observers, who at the same time did excellent research into the urban problems of the United States, pointed out the serious problems that faced the cities of his country. "Water and air will be dangerously contaminated. An increase in contamination to levels at present characteristic of our largest cities will make relatively pure air and water one of our scarcest and most costly natural resources. Traffic congestion in our cities and in the air space above them will be unbearable. Open spaces near to built-up areas will be so scarce that the use of parks and other open recreation areas will have to be promoted". He then expressed his concern for the difficulties which the governing bodies of the cities will raise, and the decline of local authorities owing to the persistence of cliques, and that the greater part of construction would be extensions of present-day suburbs.

The physical and environmental problems of urbanization in an industrialized society based on a highly developed and specialized economy, are there clearly drawn out. My impression is that the urban problems of this society have, in principle, a solution, if the society that faces them decides to choose massive systems of speedy transport, as an alternative to the car, as a matter of policy, which allows the state to control the unnecessary subdivisions and bad usage of urban and suburban land. To impose a control on the disposal of industrial waste, and to subsidize highly the areas with low incomes so as to enable them to improve with better education and health pro-

grammes, and to evict tenants, and to face other solutions as far as their incomes will allow. The developed countries have the technical resources to analyse the problems and to carry out solutions, and financial resources can either be created, or exist already although diverted to other debatable objectives. Basically, it is a question of incorporating into the necessary economic and social programmes, an urban policy at national level and urban policies at city and metropolitan levels, which consciously place the interests of the community above those of specific groups, and to give them preference over other decisions, not so clearly definable, of national and international policy.

The United States, like all countries with a developed economy, has a relatively low urban potential in comparison with countries with a developing economy; especially is this the case if we take into account that countries with developed economies are generally highly urbanized, and that their increase of rate of birth and of growth of rural population are also comparatively low. In the countries with developing economies the situation is very different. Generally they are scantily industrialized nations, with a high percentage of their population working in agriculture, with livestock or in mines. For the most part they are also little urbanised and have a high birthrate, with an increasing rural population. In other words they possess a high urban potential, and are therefore urbanly very unstable.

The physical and environmental problems that face the countries that have not reached a very pronounced state of urbanisation are completely different, and are aggravated by the limited technical and investment resources that can be allocated to the necessary solutions. In other words, they face a state of urbanization without the adequate human resources to analyse the problems and to carry out the solutions, and without the financial resources indispensable to maintaining minimum standards of living and working conditions.

The physical and environmental problems of urbanization in the United States are also present in the economically developing cities, although not with the same intensity and on a lesser scale. On the other hand, in cities with a developing economy, other problems appear, which do not have the same importance in economically developed cities, or are comparatively less visible, as they have been faced in their time with the necessary investment and technical resources. These problems are :

- a) A population without a fixed legal address, subject to periodic threats of eviction, which lives in districts deprived of indispensable services and living quarters, or on land that is subject to frequent floods or

shifting, which are generically termed "shanty towns", and which frequently comprises a very high percentage of the total population of a metropolitan or urban area.

- b) A population which is not incorporated into society and the economy, which is partially segregated, and which has not yet been finally incorporated into the institutions and systems characteristic of urban and industrial society.
- c) A percentage of the population which has not been incorporated into the employment structure, owing to lack of opportunity, to lack of the necessary training, or to lack of physical fitness and state of health to adjust to the different requirements and standards, and which then ends up by swelling the already exaggeratedly wide third sector, or the already too large group with disguised jobs, or the unemployed.
- d) A system of urban communication and transport so deficient in most cases, that it minimizes the social and economic advantages derived from the scale of large conglomerations.

It is a fact that, as with the cities of the United States, the traveller who approaches Buenos Aires by sea sees the city under a roof of industrial smoke; and that at certain hours in the centre of Lima or Caracas it is easier to move on foot than in a car; and that in nearly all cities the most practical expedient to solve the problem of industrial waste, which is thrown into a city stream, is to encase the stream; and that the only choice many inhabitants of La Paz, or of Rosario, or of Bogota, have on a their day off is to throw themselves under a tree at the side of an access route to the centre of the city. Some of the already mentioned problems of the economically developed cities are therefore partially present. But the cities with developing economies generally do not have the same scale, or their industrialization is less and not so concentrated : far fewer cars travel along their streets, and a large proportion of the population simply does not have the income to pay for a telephone service or to waste it on taking a family to a park, or hill, or beach which is too far from their place of residence. In such circumstances the physical and environmental problems of future urbanization in countries with developing economies acquire a fundamental social importance, because the natural environment, irrespective of its degree of deterioration, is for some the only possibility of recreation.

This study is based on five suppositions :

- 1) That given the political and power structure that exists, for example, in the South American countries, it is unlikely that they can bring about the real incorporation

of the great rural and urban masses into the national economic effort and its political life.

- 2) That if the previous supposition is accepted, urbanization is an inevitable fact, regionally uncontrollable, and quantitatively of a size never known until the present; its impact is aggravated by a tendency to spontaneous concentration in a few dynamic urban centres chosen from the largest in each country.
- 3) That no South American city is at present technically, financially and administratively ready to absorb the new urban population, and to establish standards of services, equipment and essential living conditions, and at the same time to supply employment; therefore, until they earn a better level of general income, or have lower service costs, the only alternative for a growing proportion of the urban population is not to endow it with services, but only to subsidize services.
- 4) That the real cost of lodging the new urban population in acceptable living conditions, added to the cost of absorbing the existing deficiency of housing, services and the cost represented by the annual quota of rehabilitation exceed the real possibilities of investment in the South American countries, given the present situation of the economics of the governments of the area; in all the countries the deficit grows quickly.
- 5) That socially and politically urbanization constitutes a positive process, and a reflection of the spontaneous, and usually silent rebellion of those who find no alternative for work, education and survival but to move to the cities.

If we examine the process of urbanization that is operating in any of the South American countries, we will find that the five enunciated suppositions are very evident realities, although they differ in size and characteristics for every country, in spite of the fact they have not been carefully analysed and quantified. The problem that faces Brasil, which has to absorb by 1980, that is in the next thirteen years, an increased population of about 27.655.000 people, is of a very different size from that of Uruguay, an urbanly stable country which is endowed with a higher and better distributed income per capita, and with an already ancient tradition of housing, education and health service programmes.

In the same way Argentina, a country which can be considered urbanly moderately stable, does not have at its disposal the same technical and investment resources as Bolivia, as implied in its recent process of urbanization, though basically a rural

and agricultural country. However, in spite of the different extents of urbanization and different available resources, one can see a similar phenomenon in both countries : gradually man has been losing control of his environment, which has become always less propitious for life in society and for the efficient function of operations inherent in a city.

We are aware that irrespective of what we do, urban environment in the future cannot be the same as at present, not even a scheme a hundred or five hundred times larger than was carried out during the colonial period, or during the republican period, or during the first phase of industrialization. One mistakenly tends to accept the fact that the city of the future has to be an enlarged version of the city of the past.

We must, above all, recognize that it is very difficult to predict the future of our cities, just as it is difficult to predict the future of our society or economy. The present-day city is a complex organism whose internal structure is constantly affected by modern technology. This is one of the great differences between cities with developing and with developed economies. In cities with developed economies the incorporation first of all of the car, then of the new means of commercialization and communication, and the changing attitudes with respect to the desirable forms of life in society, have determined a significant redistribution of economic activities on a scale which in the twentieth century has lost its urban quality to the metropolitan wave of urban-area. The age-old compactness of the preindustrial city was destroyed. The decentralization came about spontaneously, without its effects on the urban environment, and on the social-cultural ties of this new type of society being foreseen.

But the availability of technical and financial resources does not constitute, in itself, a guarantee that the countries that can count on them are capable of securing an adequate urban landscape. In some developed economies of today, such as, for example, in Sweden, Holland and Denmark, a wise and visionary policy of constant acquisition of land has made possible the control and guidance of urban and metropolitan development, the advanced foresight of the uses and densities of land, the conservation, and even the realization, with the work of man, of the most important values of urban landscape. The attitude in other countries was different. An American author says, referring to the United States, that "no nation has inherited a more naturally endowed country than ours", and then he adds, "the only drawback is that we are about to transform this beautiful heritage into the largest tenement building on the face of the earth". However, in the United States there exists a reaction to the decay of the city and the racial

conflict and social tensions that erupt from time to time. In the United States there is a greater general enthusiasm for the city and its problems, and a renewed interest in urban life. This is reflected in the formation of civic groups which seek the revitalisation of the central cities in metropolitan areas, the conservation of urban open spaces and of the most significant architectural groups, and which extend their interest to sub-urban and rural landscape. It is significant that the United States government has created a Ministry of Housing and Urban Development, and that the Senate has passed important, although insufficient grants for the modernisation of cities. Faced with the growing shortage of housing and civic services in the developing economies, their solutions have to be different from those countries with developed economies. Nevertheless in these countries they insist on repeating the monotonous ugliness of the enormous Los Angeles suburbs, on allowing allotments to sell useless products, on financing expensive housing and on maintaining a disorganised and uninventive bureaucracy. It is even more necessary to foresee and anticipate the future of cities with developing economies than that of economically developed cities; partly because in the majority of the former, urbanization is in its initial stages; also because every decision and investment acquires a relatively greater importance, owing to the scarcity of resources that can be made available, at least for long term, for the solution of the principal urban problems. For example, the foresight of the effects that any new technology will produce on them, will acquire a greater urgency because its replacement or substitution constitutes a financially difficult expense. For this reason, in countries with high urban potential, that is with very unstable urbanization, it can be important to take into account that the plans for a new city or the expanding of an old one is simpler and generally cheaper than the redesigning of an existing city.

I do not doubt that economically developed cities are in a state of crisis, and that their inefficiency in satisfying human necessities increases in spite of the growing cost of construction and building. But in developing economies I anticipate cities that constitute, by their size and poverty, an immediate challenge. The two hundred and seventy million new urban inhabitants who will flood into the cities of Latin-America in the next generation will not live in past or present cities, but the great majority will live in a type of city that is rising nowadays, which differs in structure, form and landscape from what up to now we have known.

Evolution of the form of the cities of South America - the classical colonial model, the republican model, the first industrial phase model and the industrial model

In the last decades, numerous theories about the future of cities have been enunciated and published, and many of them have received general attention. On the other hand, a real situation, like the accelerated process of contemporary urbanization in which the economically developing countries live, and which are realized without the minimal indispensable investments, have not received the same interest and publicity in so far as its influence over the urban forms of the future. The most frequent defect in the theories about the cities of the future lies in their lack of calculations about investment and finance, which, in the first place, by not worrying about this theme, can make one think that the urban society of the future will not be very different from present-day urban society. If this is quite possible, though improbable, in economically developed countries, then on the other hand it is possible to expect radical changes in the structure of future urban societies of developing countries. To make good the five suppositions enunciated in the first section of this work, we would find ourselves faced with an insoluble situation, which would mean maintaining internal structures which have not shown any real interest in the change. So one must ask oneself : what kind of urban society will an urbanization without investment and technical resources produce ? What urban forms will this urbanization produce ?

In the second part of this work I will synthesize four models which will show successively the evolution of the form of the cities of South America in relation to the most important social and economic processes.

The typical South American city is of colonial origin. The colonial origin evokes in most peoples minds the existence of a quadrangle placed rigidly on the land independent of the width and characteristics of the site. This image of the colonial city is correct for the majority of those founded during the conquest and Spanish colonization, except for some maritime ports, some mining centres and occasionally some regional centres, for reasons of topography, position and spontaneous origin. However in Brasil, conquered and colonized by the Portuguese, the model was entirely different.

Model 1 - The classical model of the Hispano-american colonial city

Sector 1 : The civic and commercial centre. This was organized around the main square. This square generally had the same square or rectangular form as the blocks of buildings. The

principal buildings were built around it : the cathedral or main church, the Town Hall, and depending on the importance of the city, the vicerojal palace or the Governor's residence. The houses of the principal citizens, the merchants, the most powerful mine- and land-owners and the principal members of the colonial administration, and the best business premises, were built around the other sides of the square, often under arcades or lining the streets that grew from the four corners of the square. In this sector the convents of the main religious Orders, which, with their Cloisters, walled gardens and outbuildings covered considerable areas, were built; as were the Schools, hospitals, the University buildings in the towns which had them, and the houses of the wealthy classes, which in the first colonial period generally had only one floor, to which was later added an upper floor, which were organized around one, two and sometimes even three regular shaped patios. Some streets in this sector were paved and had some lighting. The greatest concentration of public and private fountains was to be found in this sector.

Sector II : The residential sector. This was a truly transitional zone where the lesser employees of the administration, the small merchants, the free craftsmen, and, by and large, the white and mestizo families with middle or low incomes lived. The houses were on a smaller scale, and with simple doorways, almost devoid of ornament. There was a much lower number of churches and business premises. At the backs of some houses there still existed walled gardens. The streets were delineated by the simple whitewashed walls, and were seldom paved. Lighting was practically nonexistent.

Sector III : The suburbs of the Hispano-american colonial cities consisted of widespread buildings extending from the central diameter of the city. The expansion of the colonial cities was slow, even in the Sees of the Viceroys and the Audiencias, and in the main ports : in 1755 one third of the surface within the walls of Lima was not built upon, and only near the end of the colonial period did the construction outside the walls of Habana reach any state of density. The villas of the suburbs continued for several miles, and were used as summer residences for the wealthy classes, or supplied fruit and vegetables for the provisions of the cities. Urban services did not exist in this sector; there were occasionally a convent, chapel or hermitage or some shop at a crossroads.

Sector IV : Beyond the suburbs extended a zone of farms, which had differing characteristics according to type of exploitation peculiar to the region. Vineyards and orchards around Santiago de Chile, Mendoza or San Juan; dairies, olive groves and

intensive farming in the neighborhood of Lima; fruit trees especially peach trees, fields of corn and maize, and pasture fields around Buenos Aires. Only the bailiffs, wage earning peasants and slaves lived in this sector. The landowners lived in the city.

During the colonial period, only occasionally did a city exceed 100.000 inhabitants, and only a few exceeded 20.000. The original site could then absorb the gradual growth, without the physical surroundings suffering greater changes.

## Model 2 - The Republican Model

The classical model of the colonial city lasted well into the 19th Century. The independance of the old Spanish and Portuguese colonies provoked a greater development in foreign trade which became controlled, especially by England, the United States and France, but which was not sufficient to prompt an urban growth. Besides the natural growth of the population, nearly all the countries entered a period of civil strife during which personal ambitions were mixed with external interests. Towards 1855 Buenos Aires was not very different from the city in which the first independant Government was proclaimed almost half a century earlier; Santiago de Vicuna Mackenna was not essentially different from the place where the battle of Maipu was fought, nor was Caracas, in the first years of Guzman Blanco's government, different from the city in which Bolivar was born nearly a century earlier. The transformation of the urban landscape was slow, and in many cities it was almost imperceptible. Two storey houses were more usual in Sector I, although the lower floor was not altered. There appeared on the outsides elements which were sometimes imported, though usually they were modifications of ornaments used during the colonial period. But the limited investment resources did not allow the construction of new buildings to house the institutions that the new governments created, which had to be housed in already existing buildings. Neither the water and lighting services nor the street paving and railings, were very different from what existed during the colonial period. The streets and squares of the central sector of the republican Lima or "the large village" as Buenos Aires was then called, kept a simple image, defined by the vertical planes of the whitewashed houses, hardly interrupted by the protruding balconies and some iron lamp post on the corner, and the horizontal plane of the street.

The changes in sector II, III and IV were even less. Sector I expanded at the expense of Sector II, and so on successively, as a consequence of the general growth of the urban population, and the expansion of the exporting groups, and the bureaucracy which, depending on its means, resided in

either sector I or II. A public transport service did not exist in any city, which, on the other hand, was still unnecessary given the small area covered by the Latin-American city at the beginning of the second half of the XIX Century. The original site did not undergo any modifications; it was still in a position to absorb the slow growth operating during the first decades of government of the new republics.

### Model 3 - Model of the first industrial phase

The impact of immigration and of the first stage of industrialization directed at the substitution of imported products by those which could be manufactured locally and at the transformation of primary national production for a foreign market, were fundamental in the transformation of the urban landscape of the Latin-American cities. This transformation took place from 1860 to 1870, and with a growing intensity as the decades passed, for the cities of the Atlantic coast, of which Buenos Aires, Rosario, Montevideo, Rio de Janeiro, San Pablo and Porto Alegre were the most significant examples. In all these cities the expansion of an economy based on country produce - cattle, cereals or coffee, according to each particular case - in conjunction with public and private colonization, attracted several million European immigrants to the ports of Argentina, Uruguay and Brasil. The immigration contribution was decisive in the quantitative growth of the urban population and in the expansion of the economy, especially in local trade, in the building industry and in other industries orientated towards internal and especially local consumption. The impact of immigration made itself felt much later on and with less intensity in the countries of the Pacific and of the north of South America, which were more difficult to reach and had more backward communications.

Between 1870 and 1920 the above mentioned cities suffered transformations of such a kind, that they could really be called new cities. The population of Buenos Aires increased nearly twelve times between 1869 and 1914; as did Rosario in the same lapse of time; the growth of San Pablo was even more accelerated.

Immigration meant the contribution of a human group more predisposed to the changing of traditional craftsmanship in industries as well as the incorporation of capital, technical innovations and a different sense of enterprise directed towards a capitalist conception. It also meant the formation of a new urban social class, with interests that differed from the traditional, and as a consequence the incorporation of the countries of the area into international trade with dependent roles which were clearly established and difficult to change. All the institutional, economic and social change, which broke

the traditional cultural roots, and which produced profound political change, was reflected in the model of the city in the first industrial phase.

Sector I : The civic and commercial centre did not change its position. The old main square continued to be the physical centre of the city, and just as centuries earlier, the Public Administration building, the Church Cathedral and the Town Hall concentrated around it. But now trade expanded along the central streets and, with the expansion of a national market - for which the main cities acted as intermediares - and especially of a continually growing local market with the general increase in purchasing power of the new urban population. New institutions emerge in the centre : Banks, Insurance Companies, newspapers with national influence and distribution, hotels and clubs with imposing facades in French Neo-Classical, Italian Renaissance, English Tudor and Neo-Andalucian styles.

The nucleus of architects and engineers trained in Europe introduced new styles, and produced their most important works on the mansions of the landlords, mining magnates and coffee, sugar or cocoa merchants. Sector I was modernized; the streets were paved, water and drainage services were constructed, tramway lines were installed and the large railway stations appeared. The simple facades of the colonial and republican streets suddenly disappeared. Sector I lives through a constant and spontaneous redevelopment. The influence of its activities spreads out all over the city. It is still the place of residence for the wealthy classes and the most powerful of the middle class, but it is beginning to lose its social homogeneity. In consequence the land usage becomes more heterogeneous, and the centre loses its architectural unity. They build without any sense of the importance of the whole to arrive at a formal equilibrium. Land speculators come on to the scene. The past is rapidly replaced, and only the churches and their convents, a few very important large houses, and a few public buildings escape the work of transformation.

Sector II : Sector II of the previous two models has been almost completely absorbed by the expansion of sector I during this phase. So a new Sector II is formed on the old zone of villas, although its boundaries cut into and are diffusely mixed with those of the new Sector I. Sector II is almost exclusively residential with complementary services; district trade, churches, school and a few stores. Also repair shops and a few small industries appear. Not all of Sector I is provided with water, drainage and electricity, nor are its streets paved. The tramway service is produced along the principal routes, and under its influence, more intense and commercial employments are established along both sides of the streets. Sector II does

not have social uniformity. The greatest densification of immigrants occur in the employment of localized industries, of the port if it is a city with a port, of stores and in the progress of public works. In some district of Sector II, the real pockets of promiscuity, tenement buildings with two or three stories are built where the new wage-earning urban proletariat takes refuge. It is a new physical element in the urban landscape, and is in response to an also new social group, in this dynamic, forming society. But in Sector II the monotonous expansion, on a large scale, of the city based on the tireless repetition of the colonial pattern to which is incorporated houses with narrow frontage and useless depth, as a result of a factor which gradually would become fundamental to the shape of urban landscape land speculation rising to inexhaustible limits. The houses in Sector I are one storey high. Their facades lack the colonial simplicity and incorporate plaster adornments and ironwrought balconies in designs copied from abroad. The middle class which is being formed live in Sector II, those who work in the banks and in business, in the public and private offices built in Sector I.

Sector IIIa : Industrialization in the new countries was concentrated in a few cities, generally in the main national and regional centres, which used to be at the same time state capitals and exporting ports. Foreign investment was concentrated in them, as they preferred loans to governments, and investment in urban services and railways, in banks and insurance companies, and in industries which convert the national and regional primary products, such as refrigerators, flour and textile mills, coffee processing, etc. or in industries whose production is for the local market, such as breweries, and factories for toilet articles, wine blending and building materials, etc. Its position in the city is determined by the need for water, to make it easier to ship abroad, or for use in its industrial process, and the need for railway lines when there are any, or simply by the availability of land. Its position determines the concentration of workers' houses, or the formation of new mixed districts - factories and housing - in the suburbs. Neither smells, nor smoke, nor noise are taken into account. The new industries are sometimes located a few blocks away from the traditional centre and the presence of these and their adjacent warehouses causes in a short while the obsolescence of complete districts. Industrial discharge begins to dirty the streams and rivers. Its location is a decisive factor in the tendencies for cities to grow.

Sector IIIb : Some towns, considered as independent units in Model II, find themselves incorporated into the central city by tramways and the first suburban railways. Some of these towns were summer residences in Model II; in this phase others

grew up with this function. They constituted the physical introduction to the criteria of modern metropolitan space. The intermediary area between these towns and the central cities continued to be used for villas, or were hardly inhabited. In these areas are planned at this time what are nowadays some of the main metropolitan parks.

Sector IV : The suburbia of the city in the first industrial phase had few city, and many country characteristics. The only definite outline is that of the roads that leave the centre heading inland, or the few access roads to the farms and hamlets without any continuous building along them, with the only permanent residents being from the newly forming urban society and economy. It was not sense and did not have visual and institutional characteristics, nor a way of life peculiar to the city they could see in the distance. It was not like the suburbs of industrial cities of Europe and the United States at the same period. The suburban train and tramway had not yet provoked important subdivisions. Cultivated farms, brick furnaces and empty plots were mixed with a few improvised hamlets where the workers of a few small suburban industries lived.

Sector V : The farms retreated even further. Land acquired a new value in the expectation of the hoped for physical growth of the city. The farms supplied many of the products that were consumed daily by the city. The landscape had rural characteristics, but it showed the intensive cultivation which distinguished it from the agricultural and cattle raising zones. A group of trees would mark the position of a dairy, a vegetable farm, or the position of a storehouse, a social centre for the inhabitants of this transitory sector between the city and the country. Further away were the fields of extensive farming.

The main Argentinian and Uruguayan cities were close to this model. They were the first in South America to receive the impact of immigration and industrialization. Their transformation was quick and anticipated by twenty, thirty, or more years what Santiago and Bogota would undergo in the middle of the century, and which was belatedly felt by Lima and Caracas, and which only in the last few years has reached La Paz and Asuncion. The majority of the main cities in South America and in Latin-America in general, did not undergo this first industrial phase and the impact of European immigration. They jumped from the republican to the industrial model, with migration from the rural interior of each country coming at the same time as industrialization. Without a prior and preparatory phase there began an amazing and unprecedented growth.

The first industrial phase brought about complete modifications in the natural landscape. They were carried out without considering the near future; the extensions of each city reached

such a scale that the conservation of the natural elements became much rarer. The gorges were covered with buildings, the rivers and streams were contaminated, the trees of the former villas were destroyed and the hills were levelled out. No one thought or was interested in the fact that these elements should be preserved, so as to introduce some variation into the monotonous spectacle of concrete, bricks and asphalt. The creation of a few parks showed that some enlightened people were interested in retaining some preserved green. Soon they were insufficient, Buenos Aires and Rosario grew along the banks of two of the largest rivers; the banks of the Mapocho and the Rimac were not used for the inhabitants of Santiago and Lima. In Mar del Plata the rigid quadrangle was planned without taking into account the topography; summer resorts grew up without taking into account the natural beauty of the coast and woods. Only in Montevideo and Rio de Janeiro were projects on a grand scale carried out to transform the coast into residential and recreational places. The cities in the first industrial phase transcended the possibilities of their original sites. In spite of the fact that their population was fifteen or twenty times that of the colonial city, and the area covered was fifty or more times greater, there still existed the possibility of guiding the growth of controlling the form and of determining the use of the land and its lines of trade. Little or nothing was tried, and when, in the last years of the Second World War, urbanization reached its most advanced expression, there was no clear consciousness as to what was happening, and the unleashing of present-day urban chaos was witnessed with complete passivity and lack of vision.

#### Model 4 - The industrial city

Slowly the attraction of certain cities, in conjunction with the centralising nature of the Latin-American governments, brought about the pre-eminence of a centre on a national scale, and occasionally of two, three or more centres in their respective regions. The slight distinction of scale of the regional urban systems of the colonial and republican periods was gradually widened. While in the interior there remained many cities that were still adjusting to Models 1 and 2, and while the characteristics of Model 3 could scarcely be seen in some of the regional centres of the most economically developed countries, or countries with the most extensive surface areas, large metropolitan areas had developed with unprecedented speed. Their size and population are about to turn them into some of the quantitatively most important human conglomerations in the world. But urbanization came about without sufficient industrialization. Internal and external forces maintained power structures interested in preserving the agrarian and exporting economy. The foundations of the agrarian economy and society did not undergo substantial changes, and the low development of some regions

prompted increasing migrations. Internal migration replaced immigration, where the former was important, and it constituted in all countries the greatest factor in the accelerated urban growth which is operating in the area, greater even than the already considerable natural growth of the national and urban population of the country. So there evolved a city whose structure differed entirely from that of a highly developed country, a city with a high percentage of people unemployed or without fixed jobs, without indispensable housing and services, with a fragmented and unconnected urban structure, with signs of poverty and general decay clearly visible in the urban landscape.

Sector I : After several centuries the Main Square stopped being the commercial centre of the city, although it continued to be the civic centre. The most important public offices - the Ministries and Official Banks - existed or were built around or in the neighborhood of the Main Square. The Church Cathedral, The Curia and the new Seat of the Municipal Government kept their traditional positions. But the commercial centre expanded and branched out; when the banking and financial activities in general expanded with the development of the countries, they brought about an intense concentration of offices in the traditional centres. The centre stopped being the exclusive residential area of the wealthy classes; their houses were demolished to make way for commercial stores and businesses, banks, public and private offices, and the whole range of institutions connected with a society whose activities are always more diversified. The nucleus of this sector, which during the day is a boiling mass of humanity and traffic, at nightfall it becomes empty. Hotels, cinemas, theatres, restaurants, and confectionary give prestige to certain streets, to the extent of making them truly lineal centres, intensified and reduced in length at night. In spite of this some apartments blocks, built during the first industrial phase, were still inhabited, and the sector maintained a high permanent residence in some areas.

At first this sector expanded along the main avenues and what were traditionally reputable streets. Then, with its ascendance the neighbouring streets suffered a similar fate, until Sector I exceeded in extension the whole urban area of Model I and even a good part of Sector I and II of Model 2.

The illuminations, the advertisement posters, the noise of a continually moving human mass, show the attraction Sector I, in alternating districts, has for the whole population of the modern industrial metropolis, and even of its respective country.

Sector II : The extent and characteristics of Sector II depend on the size of the city. Generally it is devoted to residences and the commercial services and institutions that go with it;

but while in the large metropolitan areas it has a high density and very intense urban characteristics, in cities of less than half a million inhabitants, these characteristics rapidly decline. However, one can never call any sector homogeneous. Rather it is a question of areas or pockets with similar uses, but which, because of the differing purchasing power of its inhabitants, present a greater diversity of density, and a whole range of varied architectural expressions which stretch from the tenement buildings and alley ways of the first industrial phase to high class apartment blocks. The common denominator is the residential use for which it is destined. The quality and variety of institutions, the contrast between the limits of some avenues and the modest aesthetical small streets, are intimately bound to the social group which lives in each are. Within Sector II are areas of great prestige, which were being formed during the decades of Model 3, and which have become completed and consolidated over the years. Some of the areas with a significant housing plan, and general outline, do preserve a social homogeneity, others have begun a slow but progressive deterioration. Their land prices are the highest in Sector II, although they are generally lower than in Sector I.

Sector III : Further away from the traditional centre, and joined to predominantly residential Sector I, one can find an interruption in the gradient of uses which became less intense and varied the further from the centre and the nearer to the periphery. This gave way to a mosaic of uses, often homogeneous and confined to a relatively small area. Their position and pre-eminent uses depend on a series of factors that have an influence on the model, among which, the economic base of the city, the topography, the transport system and the class structure are essential. In this mosaic it is possible to distinguish some zones.

Zone IIIa : Industrial. Some industrial zones stay in the same original zones as in Model 3. Whilst the country industrializes and diversifies and specializes in its type of industry, the factors of positioning the new industries grow larger. So new industrial districts emerge in the suburbs looking for advantages of rapid access to primary materials from the interior, and a better distribution of manufactured products in the growing suburban market. The lorry has replaced the railway, as a means of transport, even in the countries with quite important railway grids. The electricity, water and drainage services have been enlarged. The options are therefore greater. The first phase industries directed towards a foreign market have been incorporated into the growing fold of the city; their positions are no longer on the boundaries. The new industries directed to the same purpose look for sites outside the metropolitan congestion, and are placed in cities with good internal and

external transport within a bigger radius of the region under the immediate influence of the metropolitan area.

Zone IIIb : Residential areas for high and middle incomes. The expansion of public transport services - buses and suburban railways - and the incorporation of the motor car induced the over-turning of the traditional model (Model 1, 2 and partly 3) in favour of a model with some points in common with what grew up in the United States in the 1920's and 1930's. The technology of each country can apply, and the purchasing power of the population has a decisive influence on the urban form that will emerge spontaneously. So with regard to the lines of transport, the avenues for access to Sectors I and II, and the routes of access to the metropolitan area, a chain of zones emerge, generally outside the administrative limits of the central city, which correspond to the mentioned factors. Building is less dense. Detached houses with gardens predominate in districts that throughout Models 1, 2 and 3 were isolated farms, then weekend villas for the wealthy class. Trees line the streets. It is usual that each family possesses a car. The communities are self-sufficient, and except for the place of work, which continues to be in Sector I or IIIa, they possess everything that is necessary for the education, the provisions and the recreation of the inhabitants. Zones alternate and succeed each other between the characteristics of higher or lower class, according to the incomes; the prestige classes settle down according to which direction this succession is orientated along this or that line of expansion of the city. The topography, the amenities of the place added to a sometimes age-old tradition demand prestige zones. But the city grows from the centre in all direction in the shape of a star, by dint of the lines of communication, the intermediary zones being filled by zones with mixed uses.

Zone IIIc : The migration from the country to the main cities constitutes a comparatively recent phenomenon. It gave rise to the shanty towns of Argentina, Brasil, Chile etc. They sped towards Buenos Aires from 1930, to Lima from 1945, to Caracas from 1950, and even more recently to la Paz. This constitutes a problem that is characteristic for all Latin-America, although with different degree of magnitude. It constituted an element that formerly had little importance in urban structure, but with its acceleration it influenced economic and social principles as well as political and psychological ones. Generally they were spontaneous invasions, though nowadays they are frequently organized. They live on waste land belonging to the State or to private individuals, and there exists an obvious and sure relation between the preferred sites and the main lines of movement of the city. These unoccupied spaces are often floodable, or are slopes, river banks or deserts, and circumstances that make these districts of precarious houses sometimes penetrate nearly into

the middle of the town, like in Lima, Rio de Janeiro and Caracas. The occupants are squatters. They build their houses with a variety of materials, though they are usually precarious. These districts have none of the most indispensable services, and usually no schools or other communal amenities. In spite of the fact that they constitute ten to forty percent of the population of some of the most important Latin-American metropolitan areas, and that they continue to grow in absolute and percentage values, no State has seriously faced in depth a solution to the housing education and sanitary problems, without calculating that the lack of jobs constitutes one of the roots of social and economic borderlines in which they find themselves. The shanty towns have stopped being a transitional zone, and has become the environment for a lifetime of a growing group of the population. They are a characteristic of the cities with developing economies, and they reflect the problems of economic and social development, and the growing though often intermittent political participation of the popular masses.

Sector IV : The edge of metropolitan areas in the process of industrialization are indefinable and with mixed and usually not complementary uses. Visually they lack unity. They do not alternate between solidly built districts, with low density, and cultivated land with trees, and empty in a near natural state, but are rather an always half urbanized, unattractive extension, and in continual expansion because of the successive uncontrolled and unguided industrialization. Its inhabitants usually have low incomes; they usually work in the industrial zones (IIIa), the secondary urban centres of the metropolitan area (V) and to a lesser degree in the centre (I). Services are generally rare and unsatisfactory; the community amenities are scattered and insufficient. Socially they seem to have the characteristics of a disintegrated society. The houses are detached; modest permanent constructions, one storey high, little houses or huts made of perishable materials. Public transport, which for the great majority is the only means of travel, is rare and congested.

Sector V : Various lesser conglomerations, some of which were really middling sized towns physically separated from the central town in Models 1 and 2 and sometimes in 3, have been incorporated into the extensive modern urban patch, when the public transport services were extended. They normally serve a residential function; some are cities for sleeping in, and light industries and workshops exist in others. Visually they are copies, on a small scale of Sector II, and socially they possess many of the facilities of these same districts.

Sector VI : The zone of villas and farms have moved to ten, fifteen, twenty or sometimes even more kilometres out from the centre of the city. Much land is left uncultivated in the hope that it will be urbanized. Its fragmentation, motivated by

speculative reasons, usually make its rational and economic exploitation impossible. The population lives very spread out; it mostly depends upon the exploitation of the land or it finds jobs in the brick furnaces or in not very remunerative jobs. Services are nonexistent.

In fifty, thirty or sometimes twenty years the urban landscape has undergone a complete transformation. Urbanization, in its development, changed the natural landscape beyond recognition, to such an extent that even in these countries unspoilt areas constitute an element that can scarcely be found.

People do not seem to give importance to what is happening. They are not worried by the destruction of the general environment where they live, or they think that they can do nothing to stop it, and they have very limited ideas about what values the particular environment should have which constitute the immediate surroundings of their work and living places. People indifferently accept without protest the bad taste and ugliness that constitutes the daily movement of the urban population; and they are ignorant of the natural elements that can be preserved by human hand and be realized for the construction of a more favourable environment. Without protesting people allow rivers and streams, trees and woods, lakes and ponds, air, grass, fauna and flora to be destroyed, to deteriorate or be modified beyond recognition. They allow micro-climates and micro-landscapes which constitute a few more different aspects of the environment of a metropolitan area, to be levelled by uniform criteria.

The importance of a natural landscape is realized when man begins to live permanently in it. The landscape of a national park, the simple formal beauty of a seaside beach, or the vital force of a chain of mountains, do not belong to the everyday or frequent experiences of city dwellers. They belong to annual experiences, or occasionally sensorially necessary ones, and therefore are biologically sought after; but every city dweller is conscious that it constitutes the exact opposite of his daily experience. Therefore it is important to discover the values of the immediate environment, to preserve them, to enhance and combine them, in order to introduce into the city dweller the sense of equilibrium which is necessary for our perception of urban space.

Basically urban space should be formed by natural space - which man finds when starting his settling, and the space created by man - by the alternation of solids and empty spaces which can define a city. But the limits of natural space and the space created by man within the urban space, are not clearly defined, nor has its interaction been satisfactorily produced. By explaining the successive models of the Latin-American city, I have tried to explain how gradually the space created by man,

with the growth and expansion of city territory, has begun by affecting, then by rendering useless, and finally by destroying this clear division - between what is natural and what is created by man - which was so clearly drawn out in the initial model. Lets see what can be done.

### Factors conditioning future urban form

It is difficult to predict the future urban forms of the countries of this area. The technology that may be used, the level of incomes and the investment policies of the public sector which may be decided, will all greatly influence them. In spite of the superficial and polemic character of this study, it would seem that these three factors will be decisive. Some facts are obvious. Whilst the models became more complex, it is evident that we cannot clearly distinguish the sector boundaries, and on the other hand, it is easier to talk of the degrees within each sector; in other words the changes in land usage and in the social structure of each sector are replaced by discrepant uses and considerable heterogeneity, to the extent that the model divided in to sectors and zones is questionable.

Moreover, present-day uncontrolled urbanization could be regionally directed, guided and controlled to the extent that some of its problems could be overcome and minimized, if new focal points are accepted.

- a) Uncontrolled urbanization is the result of pressures exercised on the cities as a consequence of regional disequilibrium and an unequal distribution of income. It reflects a state of socio-economic injustice. The groups which exercise the greatest pressure and constitute the most important percentage of the new urban population which will try to become established, lacks the incomes indispensable to comply with the contemporary minimum standards of living, services and amenities. The usual programmes emphasize high levels of earthworks and amenities to the detriment of inconclusive housing on a larger scale, or as a possible and preferable option, the acquisition of land for future urbanization and the provision of complementary services. This alternative has several advantages :
  - 1) it benefits a group several times larger by concentrating investment on what is indispensable;
  - 2) it controls the elements whose good or bad use is essential to the definition of land usage and to the treatment of urban landscape;
  - 3) it permits one to limit the population and to furnish it with a base from which to channel its own savings (from work or investment) into its own houses and community;

- 4) it makes use of public investment as a means of leveling out, by directing it into functions and uses, to which can be incorporated, even with their small incomes, a considerable larger percentage than could be able to comply with a housing programme with the usual standards.
- b) The need for urban and suburban land grows annually, and depends on the greater or lesser success of each country in incorporating into its cities the criteria for the densification of the population, and therefore for the use of the land. It is fundamental to understand that whilst the rhythm of urbanization increases and accelerates the percentage of urban and especially suburban land which is badly used or momentarily useless for adequate purposes considerably increases by not adapting planned criteria of investment and control. Depending on the criteria and policies that it adopts, between 1960 and 2000 Latin-America will have to incorporate between 135.000 square kilometres (20 people per hectare) and 18.000 square kilometres (150 people per hectare) of urban and suburban land. With the exception of Haiti, El Salvador, Costa Rica and other countries with small areas and deficient in sufficiently agricultural land, it is not the lack of land that these countries should be concerned with. Their concern should begin in the fact that the low density impedes the construction of public services and cheap and efficient community equipment, the integration of new urban groups and the plan of an urban landscape which visually and psychologically works out favourably.
- c) The cities that have achieved a successful urban environment have been, on the whole, those of Holland, Sweden, Denmark and Switzerland. An obvious reason is that they have learnt the lesson from those countries which experienced the impact of the first industrialization. But this reason alone would not be sufficient if they had not adopted with due anticipation a continuous policy of acquisition of urban and suburban land, foreseeing its future development. Laws and regulations exclusively could not achieve the same results, and the densely urban feeling that they possess has been achieved by the ability of their inhabitants in employing wisely the materials they had at their disposal. In all of them the natural site was fundamental to the shape and plan. The natural positions of Stockholm and Copenhagen are marvellous, but also are those of Quito, Caracas, Rio de Janeiro and Bogota. But while in the two European cities the quality of natural areas of different size and characteristics contrast with simple and compact expressions in

architecture and town-planning, while the variety of squares and streets, great and small, interconnect one with another providing an adequate frame to the buildings, in the cities of Latin-America the imposing natural landscapes have been destroyed and the cities grow without personality. In the already mentioned European cities the trees, plants, rocks, slopes, lakes and streams are protected with respect and the architecture allows the open spaces to be displayed and unfold, connecting with each other in extended and varied sequences, while the natural landscape in the Latin-American cities is being hidden by the disorderly proliferation of dwellings or destroyed by the bulldozer.

- d) Cities famous for their beauty, Paris, London, Florence, Rome and others, have grown slowly. Their history stretches back and many architectural and urban styles of different epochs are impressed upon their features. In this way each one of these cities has unique and unmistakable characteristics. On the other hand nothing comparable has been attained up to now in the new and great cities planned since the last century, in Chandigarh, Islamabad, Brasilia, Canberra and others. It is not easy precisely to determine what these cities lack. Perhaps that which springs most vividly to the notice is they lack the variety of districts with "lively urban life" which characterises the former cities. Because it is not only for their urban beauty that the former cities are attractive, but also for the continuity of a framework, often architecturally neutral, which encourages the people to go out into the streets; now, in Latin-America we face an urbanization of such proportions that the growth of the principal cities of the area cannot be slow. Moreover, in spite of the fact that the level of income and education of the urban population of the area is higher, and will be even more so in the future, very much higher than that of the middle of the century and of the last century, the resources that will be able to be canalized into the creation of urban districts of beauty will be reduced or nonexistent with the already existing necessity of finding practical solutions to concrete problems. More than ever then, it is necessary to incorporate into cities of perishable materials profoundly bare of aesthetic interest, elements that attract the people and encourage a "lively urban life", even in an incomplete and casual form. These urban elements and the best designs, like the institutions they create, must be carefully analyzed in relation to the necessities, motivations and expectations of a population not wholly integrated into our concept of urban life. These elements and areas of natural landscape, incorporated into the great extension of precarious dwellings, will constitute two fundamental aspects of the future urban concept as it is actually developing.

## Conclusions

The future metropolis of Latin-America will be much more extensive dynamic and complex than any of its predecessors. Its extension will be such that it will, with difficulty be contained by the natural limits of the site where it was implanted and even by its immediate geographical limits. The changes that will occur will be most frequently in the operation of better transport and communications, and better accessibility of sectors and zones today badly served. Thus we cannot speak of the shape of the future metropolis. The concept of property that may prevail in the future : governmental decision to act with greater energy in controlling land speculation and in co-ordinating investment : the incorporation of new technology, especially applicable to systems of transport, means of communication, methods of construction and industrial progress, and the levels of middle-class incomes will notoriously influence the form of the future metropolis. The metropolis should reflect the enormous diversity of the community and not favour an enlarged version of a worn-out pattern. For this it should seek flexible plans that permit the incorporation of better standards of supply and more varied prospects. This is reflected in the changing uses of the land at the moment of concretion of these standards and prospects and in continually renewed institutions.

If the future pattern will be, as until now seems to be on the way to being, an enlarged version of the sequence of analysed patterns, the prospect is very gloomy. It does not need much imagination to foresee an immense blot of hamlets, some with services and others without, alternating with waste-land. The centre will be larger and more congested, the intermediate housing sectors will be extended and new industrial districts will have appeared without a clear judgment of location. But the dominant sight will be of shanty towns, extending in all directions in great patches of poverty and filth. Some formulas can be tried :

- a) The technology which is incorporated in the solution of urban problems should be carefully analyzed and selected. No economically developing country can indulge in the luxury of incorporating techniques that will in a short time be obsolete, but neither is it in the position to adopt others which imply a financially unsuperable burden. For this, preventive measures, although they can at first cause opposition, must be clarified and implemented. This is valid in the design of avenues, in the collective transport systems, in the prohibition of the use of the automobile in certain hours and places, in the systems of commercialization, etc.

- b) The natural countryside, once destroyed, is irreplaceable. And anyway, its preservation and valuation can be achieved with very little cost. Essentially with vision and sensibility. In the enormous metropolis of the future the presence of natural landscape of different size and quality will be a necessity even more important than in the present industrial city. A careful analysis of the site could provide a register of the most important elements, those which could be declared of interest to the community and incorporated in the general design of the area.
- c) The miserable shanty towns will be, in the long run, an important element in the future urban image unless unexpected changes are produced in the social-economic policies of our countries. We cannot ignore them; that is to say, it is impossible that nothing should be done for them in the expectation of fundamental solutions. It is possible to accept them as a result of an unjust but modifiable situation, then to face their improvement by a rigorous typology.
- d) The control of urban expansion and the use of land by part of the State is the only viable solution in the face of the disaster of the private sector in the management of the land market, the chief cause of the lamentable deterioration suffered by the natural countryside in areas where it produced urbanization and urban landscape.

### References

Harvey Perloff; "Modernizing urban development"; Daedalus, summer of 1967; p. 789

Harvey Perloff; *ibid*; p. 789

Taking into account three indications which represent potential causes of urbanization and which are the percentage of rural population over the total, the measure of increase in urban population and the measure of increase in rural population, we have defined comparatively four grades or urban stability among the ten South American countries. Uruguay is stable, Argentina and Chile moderately stable, Venezuela unstable, and Colombia, Peru, Bolivia, Paraguay, Brasil and Ecuador, in this order, very unstable. See Jorge E. Hardoy, Raul Basaldua and Oscar Moreno; "Policies of the land and mechanism for its regulation in South America"; information prepared by the Centre of Housing and Town-planning of the United Nations, October 1967

Richard Meier says : "Cities develop above all to facilitate human communications"; and then adds "... the proliferation of the technique of communication is a fundamental feature of urbanization"; see R.L. Meier, "A communications theory

of urban growth"; Joint Centre for Urban Studies; Cambridge 1962

Peter Blake; "God's own junk yard"; p.8; Holt, Rinehart and Winston New York, 1964. Study attentively the excellent photographs.

This positive attitude has not always existed and the anti-urban tradition and literature is extensive. See Morton and Lucia White : "The intellectual against the city"; Ediciones Infinito, Buenos Aires, 1967

One of the most brilliant analyses of the changing urban landscape of the United States is that of Christopher Tunnard and Boris Pushkarev; "Man's made America"; Yale University Press; New Haven, 1962.

It is forecast that the urban population of Latin-America will pass 90 up to 360.000.000 persons between 1960 and 2000.

Jorge E. Hardoy; "Aspects of urbanization in Latin-America"; Cuadernos del CEUR, No.6, Buenos Aires, 1966.

## COMMISSION ON LEGISLATION

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Friday 29 March 1968 : Afternoon Session

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The Chairman of the Commission, Mr. W. Burhenne, introduced the three subjects to be discussed. As the first one on the agenda, 15. The Import and Export of Animals and Plants, was in his opinion the one that would raise most discussion, he proposed to deal with it last. This was approved.

### 16. International Coordination of Conservation Laws

16. 1. by Mr. Flavio Bazan, was presented for discussion. As Mr. Bazan was not present at the Conference, Dr. Augusto Penaloza (Peru) introduced the paper. He indicated that the author insisted that fauna and flora were at present insufficiently protected, because of lack of coordination in the preparation and implementation of the laws of neighbouring states. Dr. Penaloza presented a resolution asking countries to consult with IUCN's Commission on Legislation during the preparation of conservation legislation, and suggested that they should send draft legislation for examination by the Commission.

### DISCUSSION

Phelps (Venezuela) : spoke about the Latin-American Meeting of the International Council for Bird Preservation (ICBP), held the previous week in Caracas. He called the attention of the Conference to Resolution No. 5 of that Meeting, which recommended the encouragement of regional cooperation, treaties and conventions among various American countries sharing common problems.

Benavides (Peru) : Legal measures were essential, especially with regard to species included in the Red Book. Peru and Brasil, for example, both had adequate legislation, but national legislation was not enough, and international coordination was needed. For example, in the field of import and export of endangered species, it was essential to have a document accompanying the species, and to agree on a system involving certificate of origin. The draft Convention on the Import, Export and Transit of certain Species, prepared by IUCN, was a tool towards this object.

Carvalho (Brazil) : Thanked Mr. Benavides for pointing out that in Brazil the fauna had been declared to be property of the State. The Convention for the protection of the flora, of the fauna and the scenic beauties of the American States (1940) is the legal instrument of legislation in conservation for the American continent. The object should be to improve and modernize it, and not to encourage new Conventions.

Godoy (Argentina) : Independently from the Pan American Convention (1940), a new Convention on Protection and Conservation of Continental Flora, which is decreasing in number and on the verge of extinction, should be promoted. A project was already in existence, which had been brought to the attention of the Argentina Chancellery for consideration and for consultation with other States. This draft had been proposed in 1965, and merely needed to be brought up-to-date.

Benavides (Peru) : considered that IUCN could help in this.

Chairman : coordination of legal measures at the international level necessitated studies of what was already in existence; he informed the Meeting about the work done by the Commission of Legislation in that respect. He emphasized the value of the computerization of legal instruments, on which his Commission was already working. He also emphasized the necessity for collaboration with other Organizations working in the same field, and referred to a previous session of the Conference in which it was told that FAO was preparing a study of Latin-American legislation.

Budowski (UNESCO) : In the tasks which involve cooperation in legal matters for Latin-America, the work accomplished by the legal department of the Panamerican Union (Secretariat of the OAS), which had been and was still active in the field of conservation law in the American continent, had to be taken into consideration. Furthermore, attention should be paid to the work of regional and international organizations such as UNESCO and FAO.

Chairman : agreed with Dr. Budowski, and expressed the need for, and the wish of his Commission to cooperate with all organizations working in the field of conservation legislation.

Carvalho (Brazil) : The problem of conservation legislation should be considered at this Conference at three levels. Firstly, at the international level, all should collaborate with IUCN to achieve the necessary international agreements; secondly, at the continental level, where the proper instrument, The Convention of the American States (1940), should be improved and modernized as well as made better known to both the Govern-

ments and the people; thirdly, at the State level where efforts should be made by each country according to its constitution, to improve its legislation.

Godoy (Argentina) : Referring to the existing Pan American Convention, the Mar del Plata Conference had made specific recommendations for improving it, especially with regard to definition of protected areas. OAS was at present working on it.

Buchinger (CLAPN) : As Executive Secretary of the Latin-American Committee on National Parks, she had recently been contacted by the Secretariat of the OAS, concerning a proposed agreement to be reached between CLAPN and OAS. The Secretaries of States of the various countries in Latin-America were working on the proposals made at the Mar del Plata Meeting, even on those, which had not been unanimously approved, among which was the proposal referred to by Dr. Godoy. At the end of the Inter-American Specialized Conference, dealing with problems related with the conservation of renewable natural resources in the Western Hemisphere, she had sent to IUCN at Morges all the documents of that Conference, because the final report included only those recommendations which had been approved.

Benavides (Peru) : supported the position taken by Dr. Carvalho (Brazil).

17. Integration and coordination of national conservation laws with provincial and State laws.

The only paper under this item (17.1.) had been prepared by Mr. Sanchis Munoz, acting agricultural counsel or of the Argentina Embassy in Washington, who discussed his paper. He took the concrete example of the United States to demonstrate how law coordination, integration and actions at different levels could be achieved. The Federal Government, through the Parliament and Administrative organs, acted as representative of the Nation to protect permanently common conservation interests; in their turn, the States and local communities cooperated with the Federal authorities with a view to ensuring the protection of their respective specific interests, provided by the natural resources in their States.

Magnanini (Brazil) : then presented a paper which is given in these Proceedings as 17.2. He pointed out that the constitution in Brasil gave competence to the Federation with regard to conservation laws, and that the Federated States were competent only to enact supplementary measures to complete federal legislation. He gave examples of modern and simplified federal conservation legislation in force in Brasil.

## DISCUSSION

Chairman : Thanked the authors for their papers, and stressed the importance of coordinated legislation in Federal States. He stated with great satisfaction that his Commission had reached an agreement with the Brazilian delegation on exchange of legal material, and cooperation in the computer programme of the Commission with regard to Brazil.

Phelps (Venezuela) : In his capacity as President of the Venezuelan Section of ICBP, drew the attention of the Conference to resolution No. 14 of the recent ICBP Meeting, held in Caracas.

Carvalho (Brazil) : stressed the importance of the role of private institutions in the enforcement of conservation legislation, especially in Latin-America. These organizations which were free from political issues, and democratic procedure could request alert and suggest to governments, organizations and officials and draw their attention to the need for enforcing the law. He pointed out that this procedure was giving good results in Brazil.

Prego (Argentina) : Asked whether it was better for a Federal State to have national laws binding on everybody, or whether it was better to have provincial or State laws, coordinated by agreement between those States.

Chairman : The situation was different in every country, and depended on the constitution. His professional experience in the Federal Republic of Germany showed that coordination between the laws of the various Federated States and the Federation was necessary. If the various legislatures made an effort in this respect, for example by organizing common hearings, etc., such coordination could become a reality.

### 15. The Importation, Exportation and Transit of Animal and Plants

Three papers were presented for discussion.

15. 1. The Importation, Exportation and Transportation of Animals by the International Society for Protection of Animals (ISPA)
15. 2. The Importation, Exportation and Transit of Animals and Vegetables, by Mr. Fernando Hartwig, and
15. 3. The Importation, Exportation and Transit of Animal and Vegetable Species, by Mr. Richard Fitter.

Dr. Hartwig, Director of the National Parks in Chile, and Professor of Ecology at the Forestry Engineering School in San Diego, introduced his paper. He concluded by stressing that it would be desirable if this Conference not only made a declaration on conservation of renewable natural resources, but also proposed action at the Latin-American level to regulate and diversify the exportation and importation of animals and plants taking into account principles of dynamic conservation of renewable natural resources.

Mr. Trevor Scott, chief administrator of the ISPA, indicated that the main causes of animal loss in this field were the inadequacy and imperfections of means of transportation. He indicated measures of a general nature, and more specifically measures for inclusion in legislation to control movements and conditions in international transport of animals.

Mr. Richard Fitter, Honorary Secretary of the Fauna Preservation Society (London), introduced paper 15.3 which had been prepared with special reference to the British Animals (restriction importation) Act (1964). The Act had three main objectives, which were to help to preserve animals in danger of extinction, to set an example to other countries, and to support protective legislation in the countries of origin. The importation of the animals listed, which list excluded birds, was controlled by a licensing system under a Government Department, and enforced by the Board of Trade, technical advice being given to both Departments by an Advisory Committee. Details on the work and achievements of the Advisory Committee were given.

#### DISCUSSION

Chairman : Asked the Secretary of the Commission to report on the draft Convention on Import, Export and Transit of certain Species, which had been prepared by IUCN and sent in September 1967 to Governments as well as to FAO and UNESCO for comments.

Guilmin (IUCN) : briefly described the provisions of the draft Convention and pointed out that it was restricted to the conservation aspect of the problem of the import, export and transit of listed animals and plants.

Phelps (Venezuela) : Pointed out that resolution No 6 of the Latin-American Sections of the ICBP dealt with the subject under discussion.

Magnanini (Brazil) : Explained the particular situation of his country, where at last professional hunting and trading in animals and the by-products of fauna were now prohibited. The

actual legislation scarcely allowed the stocks of skins and other products obtained before 1966 to be sold. In a country such as Brazil, with more than 6000 Km of coasts and gigantic continental borders, it was difficult to enforce the law, but this was now being done with a view to utilizing rationally and protecting wild animals and plants against misuse and extinction.

Benavides (Peru) : Firstly supported the proposal of Mr. T. Scott to prohibit transportation of animals in aircraft, which deal not have pressurized cabins. Secondly, although the document presented by Fitter on the importation into Great Britain of animals threatened with extinction was interesting, the importation of skins and wool, for example Alpaga and especially Vicuna wool, had not been mentioned. A enquiry made in England indicated that one factory alone used in 1967 Vicuna wool smuggled out of Peru equivalent to the wool of 4'000 Vicunas. He recalled that the population of Vicuna had been estimated to be 10'000, and that it was essential that use on this scale had to be stopped.

Perry (U.S.A.) : The zoos of the United States of America and Canada which he represented, were deeply concerned with conservation and especially the conservation of endangered species. To this end, they had unanimously agreed to impose discipline upon themselves. Certain endangered species would not be acquired in the future, because the removal of even a single individual from its habitat would add to the danger of extinction. In other cases, zoos would buy only those animals which had documentary proof of legal origin. He was happy to hear the statement of Mr. Scott and would welcome his assistance. The position in the USA with respect to humane shipping standards was unusual. Legal authority had been given several years ago to the Secretary of the Treasury, who had recently asked zoos and others to submit a new set of regulations, which was now being drafted. He indicated that the USA and Canadian zoos had been studying the extensive world traffic in animals illegally obtained for several years. Difficulties of enforcing animal protection laws had to be faced everywhere. The trade must be attacked in the avenues of commerce, and each nation must have its own laws declaring which species are to be placed under protection. All possible enforcement was desirable, but enforcement would not be effective as long as rich commercial markets existed. The trade could be attacked at two points : in the principal countries of transshipments, where wild animals and their products were collected and marketed, and in the consuming countries. In the USA the Lacey Act had for some years prohibited the entry of any live bird or mammal removed illegally from its country of origin, but this law had proved difficult to enforce. A new Bill, the Dingell Bill, was now before the US Congress. This Bill would give the Secretary of the Interior the power to

declare the species of animal endangered and thereafter prohibit the importation of it into the USA. The exclusion would apply to hides, other animal products and trophies. Discretionary exceptions could be made for scientific and educational purposes. The law would also permit the Secretary of the Interior to limit the number of ports of entry and to ensure competent supervision at those ports. He finally pointed out that when hearings were held on that Dingell Bill, Congressmen expressed concern that its enactment might offend other countries and that it should be considered that each country has the responsibility of enforcing its own laws, needing no help from other countries. He therefore urged the adoption of a resolution addressed to all nations, especially to those which are transshipment points for animals and their products, and to those which are the importers and consumers. A declaration of this kind, requesting international assistance in suppressing illegal traffic, would have great importance. He also urged that communication between States be improved, as the full exchange of information about the nature of the States respective laws and regulations, including information about proper procedures and documentation, would greatly assist those who had responsibility for enforcing import regulations.

Godoy (Argentina) : Argentina, as a producer of meat and cereal was very conscious of sanitary problems, and therefore supported every effort for better control in the importation and exportation of wild animals. The problem was not only to integrate sanitary and conservation measures and to implement them, but also to create a world interest in controlling the trade in wild species. All suggestions made would be taken into account by Argentina in the course of the elaboration of the programme aimed at better administration of its natural resources, which was now being prepared.

Carlos Munoz (Chile) : It was necessary to deal in the Conference not only with trade in orchids, but also other plants species. An intensive trade had been built up between countries especially those which had deserts in Cactacea, Bromeliaceae and succulent plants in general, owing to their horticultural interest. To start with exportations were not excessive, but recently, their volume had grown alarmingly, and trade now included rare species. Damage had been caused to the habitat in many regions of Bolivia and Peru, where Cactacea, for example, were the only sign of life. IUCN should consider a resolution which would deal with the regulations not only for orchids, but also for Cactacea, Bromeliaceae and succulents in general.

Chairman : For establishing such control, it would be necessary to insist on export licences or permits.

Martinez (Chile) : Recalled that a recommendation on the matter under consideration had been made the day before, namely that each country should publish a list of the faunal and vegetal species that they protect.

Carvalho (Brazil) : Article IX of the Convention of the American States (1940), already dealt with export and import of fauna and flora. If that Convention is enforced by the states which has adopted it, better results could be achieved. Since a regional agreement for America states already exists, what is now required is international agreement on the subject, as it is essentially an international problem.

Buchinger (CLAPN) : Considered that two different propositions were under consideration; the first was to put into effect the Convention of the American States, requesting each country to revise annually its list of species threatened with extinction; the second that each State should publish annually a list of plants and animals which might be commercialized. She considered that the second proposal which was made during the Survival Service Commission Session was the concern of the Commission on Legislation Session.

Chairman : Doubted the possibility of establishing such lists, and their practical effect. Both proposals had the same aim, namely to avoid traffic in endangered species, but there were different approaches to the problem. The second proposal was also aimed at putting into effect the Pan American Convention (Article IX) but in a different way from that foreseen in the text. To establish such lists would not be a legislative measure, but purely an administrative one, and therefore fell outside the terms of reference of the Commission on Legislation Session.

Perry (U.S.A.) : A distinction must be made between threatened species and legally protected species.

Martinez (Chile) : It was the right of each individual country to decide which species were threatened, but as soon as a country had decided what might be exported, there should be international coordination. For that purpose, each country should establish lists of species and inform other countries accordingly.

Carvalho (Brazil) : emphasized once again that a Convention for America existed, and what was needed was a wider international agreement.

Eichler (Venezuela) : Asked the FAO representative what his organization was doing in their study on the legislation of Latin-America.

Riney (FAO) : FAO was starting to analyse the legislation on wild life, national parks and so on, in Latin-American countries. This was being done essentially for FAO's own purposes, although they work very closely with Unesco, because their aims were similar. The vast amount of work that had been done in almost all of the Latin-American countries in formulating their own regulations, not only recently, but over a period of years must be recognised. The main idea in sending experts into the field to analyse and advise on wildlife, National Parks, etc. was to enable the FAO to have an appropriate background for giving suitable information to the Latin-American countries concerning legislation. FAO also had a legal advice service, which was available to member governments, at no cost, and they had indeed recently helped the Government of Honduras at its request. The object of this service was not to try to made legislation for the various countries but only to offer help and advice upon request by the countries. The matter of the international conventions was a very different one, and one on which he was not able to commit his organization. FAO only became involved in such matter the request of an intergovernmental meeting. This ruling had to be rigidly adhered to by all the organizations in the United Nations family. Furthermore, this kind of work had to be integrated with all previous conventions and had to take into account all earlier documents. The drafts had to be passed through official, governmental and UN channels, referred back to the Governments and eventually they would become documents suitable for adoption by those Governments who had worked so carefully to bring them about.

Fitter (U.K.) : Great Britain would not be able to sign the draft international Convention until its legislation covered dead as well as living animals. When this had been achieved, it would be possible to comply with the request from Peru to stop the import of Vicuna wool. He emphasized that in Great Britain at least, contrary to what Prof. Bourlière had said in the first session, scientific research was still a more important consumer of monkeys than the pet trade.

Benavides (Peru) : was completely in agreement with the spirit of the draft convention on import, export and transit of certain species. It was now necessary to examine the form of the draft and adopt legislation to comply with it. Such an agreement was a basic requirement for the defense of threatened species and especially so in the case of the Vicuna.

Roth (FAO) : The problems associated with import, export and transit of animals had many different aspects, with very wide ramifications. Apart from the objectives to regulate traffic in rare animal species and their products, with view to ensuring their conservation, there were other legislative aspects involved

of greater economic importance. There was the need to control.. the international spread of animal diseases to livestock and there was also a need for improved legislation to protect human populations against zoonoses from animal traffic. Thirdly, international regulations were necessary to take care of the humanitarian aspects of animal transportation. This whole subject involved very important economic and trade considerations. As so many aspects were involved it was necessary for many government departments to be involved and this would make it very difficult to discuss the problems in a general way or even to try to arrive at an international agreement. Although it was possible for public health or veterinary legislation to support regulations concerning conservation, and vice versa, it was better to discuss and attempt international regulations in respect of each aspect separately. With regard to veterinary and public health regulations, several meetings on an international level had already been held in 1964, 1965 and 1966 by FAO in collaboration with other organizations, e.g. the International Office for Epizootics, the World Health Organization, and in consultation with the Economic Commission for Europe. These meetings resulted in definite efforts to establish international zoosanitary regulations which will of course necessarily include wild animals and their products. The Pan American Health Organization was very shortly calling a meeting in San Antonio (Texas) to discuss animal traffic. The humanitarian aspects had been dealt with at previous international meetings by organizations like the World Federation for Animal Protection and the International Animal Protection Society. One should not confuse the different aspects and their legislative objectives as to confuse them would most certainly harm the process of regulating internationally the traffic of rare species for the purpose of conservation. The quickest way to bring about this regulation would be to introduce national model legislation against the import of rare species in the main receiving countries in Europe and North America. This kind of legislation is soon to be brought into effect in the United States and already in force in Great Britain.

Budowski (UNESCO) : Recalled that earlier in discussion, Phelps (Venezuela) had read a resolution recently unanimously approved in Caracas which recommended that law should be simple and easy to understand by the general public. In the same vein, Magnanini (Brazil), had expressed very clearly that rational use was possibly the most effective way to attain the goals of conservation. He felt it was necessary to emphasize that in accordance with modern tendencies, the positive and constructive aspects of the law should be stressed. In forestry, for example, a review of the laws passed showed clearly a reduction in the number and length of restrictive articles on sanctions, but at the same time an increase of those articles aimed at building more understanding

of the problems which required punitive action. Specifically, he suggested that all possible efforts be made to include those articles that expressed clearly the interests and stimulants which investigation and research needed as well as those which expressed the necessity to create or reenforce the appropriate institutions, making sure that they were technically directed and properly equipped, so that natural resources could be correctly administered. Above all these articles should specifically refer to adequate financial sources for these activities and the respective institutions without forgetting their future growth.

Phelps (Venezuela) : As President of the Venezuelan section of the ICBP he called the attention of the Meeting to resolutions Nos 7, 8, 9 and 12 of the Caracas Meeting of the ICBP and summarized them, the full text being available to the Secretariat. He hoped that the resolutions of the Caracas Meeting would be supported by the Conference.

Chairman : expressed his appreciation to all those who had contributed to the session.

#### 15. 1. Importation, Exportation and Transportation of Animals

by the International society for the protection of animals (ISPA).

##### Introduction

This Submission is presented on behalf of the 122 member organizations of the International Society for the Protection of Animals representing animal welfare in 52 countries.

When ISPA was founded in 1959 it adopted a Charter of Principles that include the following :

That it is a moral obligation that all animals, whether domesticated or wild, be protected from cruelty on the part of Man.

That all domestic and captive animals must have humane conditions of life, work, housing and transport, including suitable food and rest.

That animals transported by road, rail, sea and air must always be handled humanely, and adequate space, food and water provided, and proper sanitary conditions observed.

That the claims and interests of science, sport, entertainment and the production of food, do not exempt men from the obligation to eliminate cruelty and avoid suffering.

These quoted Principles clearly declare ISPA's position at this Conference.

ISPA has had a unique opportunity during the past nine years to study the effects of transportation on animals of various species (the term "animal" used in ISPA's Statement of Principles is defined as any mammal, bird, reptile or fish).

It is pleasing to note that there is a growing awareness of the problems inherent in the subjects under discussion. Interested parties are getting together as evidenced by this Meeting in South America, by the Informal Conference on conditions of transport and importation of live birds held at the Zoological Society of London in 1967, and by the appointment of the Special Study Group for the conveyance of animals convened by the International Air Transport Association during 1967.

Generally speaking there are three main stages in the export of animals to another country. They are :

1. The journey and marketing in the country of origin.
2. The actual conveyance from one country to another.
3. The journey and possible remarketing in the country of destination.

The Directors of ISPA submit that under normal circumstances, each of these stages represents a distinct period during which the animals exported are at risk. It is not unusual for the mode of transport to vary at least once for each stage of the journey, thus animals can be exposed to additional hazards. Supervision is not an easy matter.

Stage one is not at all easy to check but it might be assumed that the animals from agricultural sources are reasonably fit at this point in the journey. However, in the case of captured wild animals, reports suggest that casualties are high at this stage. Stage two is relatively easy to check because some control is usually exercised at points of export and import. Agricultural animals certainly suffer most during Stage three of the journey, evidence suggests that some are re-exported without proper rest or feeding.

#### ISPA's Activities in the field of animal transportation

As a part of ISPA's day function through its offices in London and Boston, Massachusetts, all reports received alleging suffering to animals are followed up. These reports include a number relating to incidents caused by faults in transportation.

In addition to this routine work, ISPA has been particularly active in supporting member societies in their efforts to obtain national and regional standards, and our representatives have made contributions to the study of problems inherent in animal transportation at local, national and international levels. Notable among which have been ISPA's efforts in connection with the review of standards for animals conveyed by air and subsequent recommendations made to the International Air Transport Association (I.A.T.A.), and also the Chief Administrator's attendance at the study group of the British Standards Institute for the carriage of animals by air, and ISPA's work in conjunction with the R.S.P.C.A. of the United Kingdom, on proposed legislation to ensure standards for animals transported within the jurisdiction of the Council of Europe.

ISPA further participated in the specialized study of Conditions of Transport and Importation of Live Birds organized by the International Council for Bird Preservation in 1967 in London.

My Society's opportunity to study this problem is unique by virtue of ISPA's 122 member organizations in 52 countries. The study of the transport of animals has also been a major feature at ISPA International Conferences in Boston, U.S.A. (1959), Wiesbaden, Federal Republic of Germany, (1963), and London (1965, 1966 and 1967).

#### The problems and animal welfare

A close appraisal of the situation will show that the main cause of animal suffering in the field of IMPORTATION and EXPORTATION is caused by the need for TRANSPORTATION and the inadequacy and imperfections of the latter.

In the experience of ISPA there is evidence to support the contention that throughout the world, in any given period, more animals are probably caused to suffer by transportation than by any other single means. For this reason the transport of animals by land, sea and air claims a high priority with this Society.

It is common for animals involved in importation and exportation to be exposed to the faults and failings of all three modes of travel, i.e. land, sea and air. Overcrowding on lorries and trains, inadequate watering facilities and decks without reasonable cover by sea, excessive delays, and a poor standard of packing containers by air, to name just a few of the more obvious and general deficiencies. Some of which, overcrowding and inadequate watering facilities, for example, are common faults of all three media.

Bad packaging, inadequate labelling, loading ramps without side rails, and floors of ramps, vehicles, and vessels without good foothold for large animals, all contribute to the present unsatisfactory state of affairs.

Packaging and crating is a subject demanding detailed study in its own right. Experience has shown that livestock crates are often used more than once for the conveyance of different species, especially in the case of air freight.

There are many examples of suffering and death caused by shortcomings heretofore mentioned. Market Research has revealed that the U.S.A. has reported in recent years a surplus of 13 million unwanted calves annually. Arrangements were made to airfreight these animals to countries with a shortage e.g. Greece, Italy and Israel. In the case of the exports to Italy the calves were delivered with a 50 % casualty rate due in the main to lack of feeding facilities and bad packaging causing the calves to huddle together, allowing any disease present to spread rapidly. (Rose Miller 1967).

In 1966 a lioness being conveyed by air, turned in her crate between Amsterdam and London, blocked the only airvent with her hind-quarters, and suffocated.

A racehorse went berserk in an aircraft flying between New Zealand and California in 1965. There was no humane killer on board the aircraft and the horse was beaten to death with a rescue axe.

Reports reaching the ISPA offices show that large numbers of tortoises die annually during sea voyages between the Mediterranean and Northern Europe and, the Americas and Europe.

One hundred and forty-four Senegalese finches died out of a consignment of 2.000 between Senegal and the United Kingdom in April 1966. Seven hundred Java sparrows died between Indonesia and the United Kingdom in March of the same year in a consignment of 5.000.

The record shows that in Latin-America large numbers of wild birds are sent to the United States annually without any attempt being made to feed or water them from the moment of capture onwards, with very bad consequences. (Fitter 1967).

Cattle are unloaded at docksides in Africa, South America and Southern Europe, being hoisted by cranes shackled from the horns or legs depending on local custom.

One could quote many more instances, some of which would be repetitious in nature. However, it is the rapid growth in air transport coupled with the generally less well planned collecting, accepting and forwarding facilities that causes ISPA most concern at the present time. In many countries national standards for accepting and caring for animals protect animals subjected to national transportation. There are at present no international regulations universally enforceable that adequately protect animals and birds travelling between countries. It should be noted, however, that the International Air Transport Association (I.A.T.A.), the Council of Europe, the Food and Agriculture Organization and the British Standards Institute, have all considered aspects of the transport problem, and some work has been recorded by these different agencies.

### Recommendations

My Society submits that there is an urgent need for controls to regulate the international traffic in animals.

Such controls might be achieved by one of the following two basic approaches :

1. Through the medium of a mutually agreed supra national body.
- or 2. By mutually agreed, aligned and enforced national regulations between the countries concerned.

Effective controls would undoubtedly quickly give raise to more humane conditions for the animals involved, and in the long run would benefit the countries concerned from social and economic standpoints.

A study of conditions and proposed regional and national legislation prompts ISPA to recommend to this Latin-American Conference the following points to help control the conditions for the international transport of animals, on the grounds that the adoption of these would certainly raise the standard from its present appallingly low level. The ISPA view is that this would also eliminate much of the unnecessary suffering at present experienced.

Some of the points advocated by ISPA are of a general nature and others most certainly should claim the support of statutory authority if they are to be effective.

The recommendations are, therefore, listed under two headings 1. General Items and 2. Points for inclusion in legislation.

### Category 1 - General

1. Animals should not be loaded for international transport until they have been inspected by an authorized veterinary officer who should satisfy himself that they are fit for transportation.
2. In customs procedure priority should be given to consignments of animals.
3. Animals should be transported as fast as reasonably possible, and delays, particularly in transshipment, should be reduced to a minimum.
4. Animals conveyed by aircraft should be treated as specially designated cargo in a similar way to that applying to the carriage of explosives at present.
5. In circumstances where transport conveying animals is subject to delay the conveyer should make every effort to service (feed, water and clean) the animals carried and to advise the consignee. (Agreement for the establishment of animal hostels at transport Termini (airports, seaports and land staging posts) would help enormously in this regard).
6. ISPA recommends that urgent study be given to the establishment of universal acceptance and handling standards for all animals transported internationally by whatever means transport is effected.
7. There is, in ISPA's view, a case for the detailed study of the effects of temperature change on all animals and subsequently this Society would like to see minimum temperatures for the species carried marked on the containers. It is felt that this is particularly significant in respect of life animals carried by air.

### Category 2 - Points for Inclusion in Legislation

1. An authorized veterinary officer should issue a certificate which states the registration number of the means of transport, identifies the animals, and states that they are fit for transportation.
2. Before and after each journey animals should be allowed a period for rest during which they must be properly accommodated and offered water and appropriate food.
3. Whatever the method of transport employed, the animals should be provided with adequate space, sufficient head room, and, if necessary, room to lie down.

4. Ventilation has to be adequate at all times in relation to the circumstances of the transport.
5. Containers should be escape-proof and must be so constructed as to prevent the protrusion of any part of the body of the animals. They must be capable of being effectively cleaned, and they must also allow for feeding, watering, cleaning, and the inspection of the animals. They should be stowed in a way which does not interfere with ventilation. During transport, including loading and unloading, containers must always be kept upright and must not be exposed to severe jolts or shaking.
6. Any container or railway car in which animals are transported must be marked with a symbol for the living animal.
7. Any container in which animals are transported must be marked with a sign indicating the upright position.
8. During the transport animals should be offered water and appropriate food at suitable intervals having due regard to the means of transport and the species carried. Animals should not be left more than twenty-four hours without being fed and watered.
9. Bulls over eighteen months ought to be tied. They must be fitted with a nose-ring for control which should not be used for tying them.
10. When animals of various species travel in the same vehicle, vessel or aircraft, they should be segregated according to species.
11. Suitable equipment for loading and unloading of animals, such as bridges, ramps or gangways should be used. The flooring of this equipment should be constructed so as to prevent slipping, and the animals should be provided with lateral protection if necessary. Animals should not be lifted by the head, horns or legs during loading or unloading.
12. The floor of vehicles, vessels, aircraft or containers should be thick enough to bear the weight of the animals transported, close-boarded, and so constructed as to prevent slipping. The floor should be covered with an adequate amount of litter to absorb excrements.
13. Animals likely to give birth during carriage or having given birth during the preceding 48 hours should not be loaded.

14. Where animals are unaccompanied by an attendant the conveying agent should be made responsible for feeding, watering and caring for the animals.
15. Animals which become ill or injured during transport should receive veterinary attention as soon as possible, and if necessary be slaughtered in a way which avoids unnecessary suffering.
16. Animals should only be loaded into vehicles, vessels, aircraft, or containers which have been thoroughly cleaned. Dead animals, litter and excrements should be removed as soon as possible.
17. Fittings of transport vehicles and containers should be such that animals can be transported without injury and unnecessary suffering.
18. Animals conveyed should be afforded adequate protection against weather (particularly when conveyed by sea).
19. Appropriate mechanical means of humanely killing animals should be carried on lorries, trains, aircraft and ships used for the conveyance of animals.
20. Sick or injured animals should not be transported.
21. The conveying agent should be made responsible for ensuring the fitness for travel of all animals and containers before accepting them.
22. For carriage of small animals, universally understood and adequate labelling should be adopted to clearly establish -
  1. Species carried and
  2. Feeding and care requirementsduring journey.

15. 2. The Importation, Exportation and Transit of Animals and Vegetables

by Fernando Hartwig.

Summary

The subject "The Importation, Exportation and transit of animals and vegetables" in relation to the "Conservation of Renewable Natural Resources" includes many facets of human, plant and animals ecology; however, due to the short time available, it is possible to point out only a few of them.

Agriculture and animal husbandry were born independently in Asia and America giving base to the interchange of products

through all the world. With the introduction of genetic elements a dynamic change in the native landscapes that had remained static was initiated in some parts of the earth, favouring several human groups with the new cultivations. The adoption of new plants and animal species had in some places partly negative results, turning into plagues. In general it can be stated that the advances of genetics have allowed the diversification of many crops, contributing thus to the promotion of the exportation and importation of animals and plants.

In the future it is foreseen that the food deficit in the world will have to be solved through new cultivation methods and using non-traditional spaces to produce them. In this order silviculture will not be limited to produce timber, but also its production of foliage and seeds could contribute as raw material for food fabrication.

From the bio-economic-geographic point of view, close correlations are observed between the disponibility of plant and animal foods and the physical development of the peoples. An increase of stature is observed in population that have or abundance of food obtained from its production or importation, and a decrease is detected in countries whose inhabitants, in determined historical periods, did not have food importation or where the soil potential was eshausted.

There exists an evident need to put at the reach of all countries the natural resources coming from the earth, by means of a rational exploitation of the use of the edaphic potential and the access of its production to the markets through a communication system integrated above the national limits. The agility of the product interchange will have to be improved with a more adequate system of customs, sanitation, storage, loading and transport.

### 15. 3. Importation, Exportation and Transit of Animal and Vegetable Species

by Richard Fitter

At this time no country had an adequate law restricting the importation of rare animals, although the United States had the Lacey Act, which enables the authorities to stop the importation of animals whose export is prohibited in the country of origin.

For four years after the Warsaw Conference, Lt. Col. C.L. Boyle, who was then Chairman of the E.S.C. as well as Secretary of the Fauna Preservation Society set out to promote

such legislation in the United Kingdom. By 1963, with the aid of I.U.C.N., the International Council for Bird Preservation, the Zoological Society of London, the animal welfare societies and the government departments concerned, the Fauna Preservation Society was able to promote a parliamentary bill on the subject. After a smooth passage through both Houses of Parliament, this was finally passed into law as the Animals (Restriction of Importation) Act, on July 17th, 1964.

The Act has three main objectives : to help to preserve animals in danger of extinction, by controlling their importation into the United Kingdom; to set an example to other countries which do not regulate such imports; and to support protective legislation in the countries of origin by the removal of a market for animals that have been captured illegally and smuggled out. Birds are excluded from the purview of the Act because it was considered at the time that their importation could be adequately controlled under the Protection of Birds Act 1954. Although nothing has so far been done to make use of this Act to control the import of rare birds, it is hoped that such action will be taken shortly.

The importation of rare animals (in practice mammals and reptiles) is controlled by a licensing system. Attached to this Act is a schedule of families, via Marsupialis (four families), Primates (six families), Rhinocerotidae, Testudinidae and Iguanidae for the import of which a licence must be obtained. This system, adopted for legal rather than zoological reasons, inevitably involves the inclusion in the schedules of a good many species not in danger of extinction, in order to make certain of those, such as the orang-utan, the rhinoceroses, the giant tortoises and the Galapagos iguanas, judged to be in danger of extinction and so in need of protection.

The licensing of the animals covered by the schedule of the Act is controlled by a Government Department, the Board of Trade, and the enforcement of the Act itself in the province of the Customs and Excise. The technical advice needed by both departments is provided by an Advisory Committee appointed by the Secretary of State for Education and Science, which meets usually four times a year and advises which applications should be accepted and which rejected. In order to facilitate the smooth working of the Act, the Advisory Committee has divided the animals in the schedule into two lists. List 1 contains animals known to be in some danger of extinction, or in need of protection if they are not to become in such danger, and includes all animals whose export is known to be forbidden in the country of origin, as, for instance, all marsupials in Australia, and the monkeys Brachiteles arachnoides and Leontidens rosalia in Brazil. List 2 comprised those not in

immediate need of protection. Licences for list 2 animals are issued automatically, but those for list 1 animals can only be issued with the consent of the Committee.

In issuing licences the Advisory Committee has established a number of general principles :

1. The risk involved in the refusal of a licence to an individual animal, however, rare must be disregarded in deciding whether to issue a licence or not; otherwise the Act could be evaded by unscrupulous dealers despatching to Britain rare animals unasked and without obtaining a licence in advance.
2. Conditions must be attached to any licence specifying that it must only be used for the purpose for which its importation has been approved, e.g. an animal licenced has been approved, e.g. an animal licenced as a private pet must not be handed over to a zoo without official permission; otherwise this too could prove a loophole in the Act.
3. List 1 animals may only be imported for a specific purpose, and not, by way of trade, in the hope of finding a buyer.
4. List 1 animals should not normally be imported purely for exhibition in a zoo. The keeping of such animals in captivity can only be justified if a breeding colony is founded.

Some difficulty was experienced at first in determining which of the smaller zoos had adequate premises and technical knowledge to set up a satisfactory breeding unit. However, since the establishment of the Federation of Zoological Gardens of Great Britain and Ireland, which lays down standards for zoo management, this task has become easier.

One of the more useful by-products of the Committee's work is that for the first time detailed statistics of the importation of animals into the United Kingdom have become available. We now know, for instance, that during 1966, the last year for which figures are available, 23 marsupials, 28,488 primates, one rhinoceros, 320,573 tortoises and 4,255 iguanid lizards were imported into Britain. These represented in each case a slight decrease in the numbers imported in the previous year. Of the primates 21,066 were Old World monkeys (Cercopithecidae), 5,310 were New World monkeys (Cebidae), 2,112 marmosets and tamarins (Callithricidae), 52 apes and one lemur. The great bulk of the primates (22,306) were imported for scientific research purposes, and almost all the tortoises were imported for resale, presumably as pets. This is the first time we have had an inkling of the very substantial importations of these

two groups, and it inevitably raises the question of whether these numbers which must represent a serious drain on the wild stocks, are really necessary.

Statistics published by the Advisory Committee give a complete breakdown of the imports by species and country of origin. We find, for instance, that the largest number of Cebidae were imported from Colombia (1.101) followed by Guyana (870) and Brasil (829), the same three countries also providing the largest imports of Callithricidae. As regards individual species, the bulk of the Cebidae were Saimiri sciurus (2.927), followed by Cebus capucinus (893) and Lagorthrix lagothericha (505). Among the marmosets and tamarins, there were 1098 Callithrix jacchus, 239 Leontocebus oedipus and 212 each of C. aurita and L. nigricollis. The small tortoise trade from South America in 1965 (only 356) was not continued in 1966, but in the latter year 2.425 iguanid lizards came from Colombia, and 1.289 from unspecified parts of South America. The great bulk of the tortoise trade comes in fact from Morocco (102.000), the U.S.S.R. (80'000), Yugoslavia (35.000) and Tunisia (19.000). The principal suppliers of Old World monkeys were Malaysia (3.373), Kenya (3.094), India (2.518) and Nigeria (2.031).

The experience of the first three years working of the Act shows that legislation to restrict and control the importation of rare animals is perfectly feasible, and that IUCN is fully justified in pressing for other countries to institute such legislation even before the proposed International Convention of the Animal Trade comes into force. The United States Congress has before it a piece of legislation that is more comprehensive than the Lacey Act and more comprehensive than the British Act in that it includes all dead animals and parts of dead animals. This is the Bill sponsored by the Representative Dingell, and Dutch conservationists are also pressing their Government to pass a similar law.

#### 16. 1. International Coordination of the Conservationist Laws by Flavio Bazan

##### The problem

In many regions of America, and especially of Latin-America, important natural renewable resources, have been and still are utilized in a way that does not assure their conservation. It is sufficient to cite the extensive deforestation of the woods which occupy typical forestal terrain, unrestricted hunting of wild animals for alimentary, commercial and sportive purposes; the fishing and hunting of fish, reptiles and aquatic mammals, which due to their economic value are utilized above their reproductive capacity.

It is therefore imperative that the fauna and Ichthyological wealth of the sea and continental public waters be declared officially patrimony of the State, which should adopt indispensable conservationist measures.

All countries have abundant legislation consisting in laws and governmental dispositions, which refer to conservation, preservation or promotion of their natural resources.

With such legislation, one might assume that the natural resources of Latin-America are well protected; nevertheless, in many cases there is no adequate governmental organization to ensure the enforcement of the laws.

On the other hand, there are certain terrestrial and aquatic communities which occupy ecological zones in two or more neighbouring countries, therefore, the conservation-legislation, to be effective, has to be preferably co-ordinated between the countries involved. Thus, in the andean plateau which is the habitat of the vicuna *Vicugna-vicugna*, chinchilla *Chinchilla-lanigera*, guanaco *Lama guanicoe*, alpaca *Lama pacos*, suri *Pterocnema pennata*, condor *Vultur gryphus*, the laws which protect them in Bolivia and Peru did not turn out as effective as expected; the same can be said about lagarto negro *Melanosuchus niger*, lobo de rio *Pteronura Brasiliensis*, triguillo *Felis pardalis*, otorongo *Panthera onca*, nutria *Lutra incarum*, the monkey known as Farile *Saimiti sciurens*, manati *Trichechus inunguis*, charapa *Podocnemis expansa*, and many birds with outstanding plumage, which are on the verge of extinction at the brasilian amazonic plains, Peru, Colombia and Bolivia, the rubber *Hevea brasiliensis* raised in a few years the amazonian economy in various countries, to vanish later when in the East and Africa more profitable plantations were established; the same happened with the quina *linchona officinalis*, patrimony of Peru and Bolivia, which lost its economic importance, after having constituted a monopoly of an european country. The anchoveta *Engranlis ringers* in recent years gave a start to an important fish-flour industry in Peru and Chile; nevertheless we have to ask ourselves if this industry can increase without becoming a danger to the species.

It is well to mention the case of migratory birds, whose habitat sometimes is projected to far apart regions of countries. Therefore it is convenient for the conservation of the species, to legislate by joint accord in those countries.

The conservationist anxiety at an institutional level in America, has resulted in some cases in conferences, agreements, congresses, symposiums, etc, whose recommendations would be of

great utility if they were put forth by the governments. There is no doubt that some of these conclusions or agreements were very well utilized, but unfortunately the majority remain as documents. The official institutions in charge of formulating preliminary projects for laws, reglamentations authorizing dispositions, etc., when drawing up the considerative part, or of its fundamentation, should mention the recommendation in accord with the corresponding international citation.

#### The International Coordination Must Have and Ample Basis

There is no doubt that the conservationist attitude in Latin-America requires a close coordination between neighbouring countries with identical resources. To obtain the maximum use of financial and human resources, and even for a better understanding between countries, stations, centres, or Biological Institutions at a regional level should be established, as well as International National Parks to be developed by two or more countries and organize international courses for the training of the personnel in charge of the conservationist duties. We are aware, of course, that although desirable, the execution of these projects is not an easy task for technical, budgetary and even diplomatic reasons. Minor difficulties can be found no doubt trying to achieve the coordination of legislation, and this should an important step in the common movement in favor of the conservation of the natural renewable resources in Latin-America.

#### Coordination of the Conservationist Legislation

Knowing the problem and the necessity that two or more countries orientate or coordinate the conservationist legislation, in a certain field or for a certain resource, they should constitute a working team of a few professional specialists or very experienced persons in the field, to dedicate itself to define the importance of the problem, obtain the dictated legislation, evaluate the results, and possibly to acquire on the spot the biological, economical and social information which permits to formulate the documents which serve as a basis to the respective governments to dictate their governmental conservationist laws or dispositions.

Although it may appear obvious, it must be mentioned, that when the measures to be adopted have the character of permanent, laws will be dictated and when it is foreseen that they could be modified later on, through better knowledge obtained or for possible changes of the bio-socio-economic conditions, the legislation should be of a reglamentary character or of governmental dispositions.

## Conclusions

It is highly desirable that the Governments of the Republics of America declare officially patrimony of the State the wild fauna and the marine Ichthyological resources and continental public waters.

The Latin-American countries with natural renewable resources of economic importance, which occupy area without solution of continuity, should designate working teams to propose to their respective governments the bases for the formulation of laws or governmental dispositions which secure the conservation of the natural renewable resources.

Similar work-teams should be established in countries, although distant, which possess areas that constitute habitats of determined species of migratory birds.

It is advisable that the governments take as much advantage as possible of the conservationist Conferences, Congresses, etc. when formulating their legislation concerning protection, promotion and utilization of the natural renewable resources.

### 17. 1. Integration and Coordination of Legislation and National and Province or State Conservationist Action

by José R. Sanchis Munoz, Acting Agricultural Counselor  
Embassy of Argentina - Washington, D.C.

One of the most complex systems concerning the integration and coordination of conservationist legislation and measures, not only because of the vast number of its by-laws but also for the extent and depth of the systems and jurisdictions that encompasses, is undoubtedly that of the United States. Therefore, I shall attempt to analyze these systems as well as review some of their main characteristics.

The U.S. federal system is the frame within which the national, state and local powers interact at different levels, in the various aspects through which the conservationist action is carried out. Moreover, this action receives substantial help from the private sector.

In his recent Message to the Congress on conservation of natural resources ("To renew a Nation" - President Johnson's Message to Congress, March 8, 1968), President Johnson enumerated various fields of conservationist action of direct interest for the Federal government, which assert rather than exclude local action.

Such federal interests - inter alia - are :

1. Water pollution control in rivers, lakes and seacoasts.
2. Surveys on water standards.
3. Construction of water-purification plants, including the development of schemes on water taxation.
4. Adequate supply of safe drinking water.
5. Planning the rational use of water in cities and rural areas.
6. Oil-polluted waters.
7. Air pollution.
8. Excessive noise control.
9. Restrictions on soil-eroding mining practices.
10. Utilisation of solid wastes and agricultural residues.

As expected, in his Message to the Congress, the President of the United States also made reference to certain fields in which the conservationist work carried out by the Federal government has traditionally enjoyed wide recognition, namely : the national parks and recreation areas; the so called scenic trails and rivers and the wildlife systems. Moreover, the President emphasized the interest of the Federal government in adequately beautifying the national highway system and surrounding parks.

In the national order, the Department of the Interior is the agency mainly responsible for the management, conservation and development of water resources, wildlife, minerals, forests and parks in the United States, in cooperation with the Department of Agriculture and other Federal agencies.

The progress achieved in the various fields has often been varied, although the general trend of the problem-solving process has in the main consisted of a reinforcement of the coordination - and sometimes of the supremacy - of the federal order.

Within the specific subject of the coordination and integration of conservationist legislation, the case of commercial fisheries may be regarded as one of interest.

The primary responsibility of the states is the management of commercial fishing resources in both territorial and in-land waters. Conditions outside territorial waters usually related to international treaties are regulated by the Federal government through especial legislation. Thus, cases of overlapping

so far as functions and jurisdictions are concerned are almost non-existent.

However, some examples of coordination of the legislation or regulations on the subject matter can be cited.

For instance, the State Compacts which bring together several American states in cooperation with the Fish and Wildlife Service of the Department of the Interior to coordinate and standardize the regulations, is a case in point. Three State Compacts have been formed and they cover the Atlantic Ocean, the Pacific Ocean and the Gulf of Mexico.

Another example of coordination is the adoption, by the state of California, of Federal regulations on tuna fish, issued in accordance with the Tuna Conventions Act of 1950, Washington State adopted similar regulations regarding salmon and other varieties of fish.

The United States, Canada and all four states on the Pacific Ocean (California, Oregon, Washington and Alaska) have each issued complementary regulations, prohibiting net fishing for salmon, either within or outside territorial waters.

Alaska, Washington and Oregon have adopted some of the agreements suscribed by the United States, as state regulations on commercial fishing.

The Great Lakes Fishery Commission, created by Federal law, made several recommendations, which were adopted as local legislation by the various states where the lakes are located and by the Province of Ontario in Canada.

The local federal cooperation regarding commercial fisheries is further evidenced in the matter of establishing fund-raising programmes for research and development, where the proportion of Federal contributions is variable.

We shall now consider the matter of public lands. It should be noted that these lands have long been the cause of complex problems, especially so in the West. Large and small companies have depended upon the utilisation or development of said lands and over the years an intricate maze of federal and local laws, regulations and habits was created, to cope with the changing situations and to encourage - and sometimes discourage - the efforts of lumbermen, oilmen, miners, hunters, etc.

To put order in this matter, the Congress of the United States created in 1964 the Committee for the Review of Legislation on Public Lands. This Committee works in close cooperation

with governors, and acts as an advisory body to the state governors. It also acts as the agency through which ideas and recommendations are submitted to Congress.

With regard to the matter of water contamination, the obvious fact that most of the country's main rivers flow across more than one state means that the protectionist measures must be carried out not only by the state most affected but also by all the states concerned, so that the problem may be dealt with more efficiently. The Water Quality Act of 1965 provides the means and standards so that, in determining the degree of quality of the waters, all the states and communities may adequately apply a uniform yardstick. In compliance with the provisions of said Act, the states took inventory of the various degrees in quality of rivers and lakes and submitted their results and proposals of improvements to the Department of the Interior, in order for the Federal Government to coordinate and support future efforts.

The 1966 Clean Water Restoration Act complemented the above Act and in accordance with its provisions, the Federal Government can provide financial assistance (from 30 to 55 %) for the construction of water processing plants at community level. Over a billion dollars of Federal money has already been invested in such plants.

In National Parks, routes have been built to make use of their panoramic advantages offered by said parks. The states provide for the right of way and some auxiliary facilities and the Government builds and operates the roads and takes care of their upkeep.

A similar system has been planned for the scenic trails, such as that of the Appalachians. The states and local communities are encouraged to acquire the rights on the land adjacent to the trails. Only when they fail to do so, can the Federal authority acquire said land.

Moreover, the states shall develop a system of natural paths, auxiliary to the national trails, using mainly obsolete legal rights of way, which originally belonged to railroads, tram and canal-operating companies.

Another particular case of cooperation is that related to the establishment of National Shelters. Such would be, for example, those shelters established for breeding, feeding and also sheltering ducks and geese in the winter. No local or state Government funds are required in this case, the authorization of the Governor of the state concerned only being required. A similar case, so far as the need for a permit is concerned, is

that of animal control, although in this field federal funds cover only 40 % of the joint programme costs, other state programmes also presently being in force.

Furthermore there is a wide range of situations worth mentioning, where there exists what I would dare to describe as a sort of "solidarity contracts". In fact, after the completion of certain requirements by the states, the municipalities or local communities, or even private citizens, the Federal Government under special circumstances provides funds, assistance or other form of help going to programmes of a conservationist nature.

Such would be the case of funds granted to the States, or their communities for planning, acquiring and developing lands, for recreation areas, pursuant to the Land and Water Conservation Fund Act of 1965. Another example would be the sale or lease of Federal lands, in order for the states or local communities to establish in these lands, areas for recreation or for other public use. This is carried out within the framework of the 1954 Recreation and Public Purposes Act.

The National Park Service can contribute its experience by providing advisory services to the state or local governments or even to other federal agencies.

The Water Resources Research Act of 1964 (L.P. 88-379), provides for the granting of funds to all states to finance studies by centres for Research of Water Resources.

Finally, I would like to refer to two typical cases ("Soil Conservation" Magazine, published by the Soil Conservation Service of the U.S. Department of Agriculture - March 1968) which exemplify the coordination of regulations and organizations at different levels, in the matter of conservationist action.

In a hunting area near Lake Cumberland in the State of Kentucky, the U.S. Army Corps of Engineers, which is the proprietor of the lands adjacent to the lake, authorized the State's Department of Fish and Wildlife Resources to develop said area as a hunting zone. Some areas were placed in the care of farmers in order for them to grow especial crops as a protection from the excessive forest growth. The local county's Soil and Water Conservation service provided assistance to the farmers in their work.

In carrying out the Little Contentnea Creek Watershed Project in North Carolina, the Soil Conservation Service of the Department of the Interior, working together with the Wildlife

Resources Commission of North Carolina, applied federal legislation (Public Law 566) in order to preserve the watersheds located in the area, the Federal Government's Fish and Wildlife Service also cooperating in this joint effort. The main projects have been approved by the U.S. Congress and construction will begin probably in 1969.

Cases involving coordination and integration of legislation and conservationist action at different governmental levels in the United States evidently seem to point to a general philosophy or attitude with respect to the conservationist policy.

In governing through Congress and U.S. agencies, the Federal Government acts as a representative of the Nation and as such, it is the permanent custodian and overseer of the Nation's wealth (in the conservationist sector). The states and local communities in turn cooperate for the protection of that wealth within their respective frameworks. They also seek to benefit from the many-varied possibilities offered by natural resources for the well-being of the people of their territories, with a view to achieving more specific and practical objectives.

## COMMISSION ON EDUCATION

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Saturday 30th March 1968 : Morning Session

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The Session was opened by Dr. L.K. Shaposhnikov, Chairman of the Commission on Education, who apologized that he had not been able to attend the previous sessions. He invited Prof. A. Eichler of Venezuela and Prof. Magnanini of Brasil to be Honorary Presidents of the Meeting and Mr. J. Goudswaard, the Secretary of the Commission, to be Rapporteur. He emphasized the importance of nature conservation in all countries and on all continents and stressed that rapid progress in conservation education was essential. He then invited Dr. T. Pritchard, the Vice-Chairman of the Commission on Education, to be the Chairman of the Meeting.

Dr. Pritchard then gave a summary of Dr. Shaposhnikov's speech, which is given in full under item 20. The international movement for the conservation of nature was becoming stronger and its development more closely connected with the United Nations Organization and its Specialized Agencies; at the same time, IUCN was becoming the universally recognized center of a scientific and consultative character in international activities. The Commission on Education was striving to establish Regional Committees in general, similar to those in Europe. In such a structure for the Commission, it was necessary to strengthen activities in the field of conservation education, especially in Africa, Asia and Latin-America, where natural resources were under severe threat. In considering the future work of the Education Commission and its Regional Committees, besides studying, analysing and disseminating experience in nature conservation, it was necessary also to explain to the general public the importance of the establishment of public and private organizations in all countries. The conservation of nature in its practical aspects could not be quickly developed without parallel increase in appropriate scientific research. Successful work in rational utilisation, conservation and restoration of natural resources could be expected only when there was close cooperation between scientists on the one side and administrators in nature conservation on the other. The key-stone of this research must be the estimation of the results of man's influence on natural complexes. Higher educational establishments must play their part in training nature conservation specialists. Special chairs of nature conservation must be created. Dr. Shaposhnikov pointed out that integrated courses on nature conservation were being given in a number of countries and an important task of the Commission on Education was to promote the establishment of agencies for nature conservation to exercise control over the

utilisation, conservation, restoration of all natural resources. The Commission must found its activities on the realization of the fact that successful solutions of conservation problems depend on obtaining knowledge about the very complex relations between natural processes and the activities of man. Activities in the field of nature conservation education were of great importance for the establishment of rational ties between man and nature, and for the conservation of nature in all its remarkable manifestations for the benefit of present and future generations.

#### 18. International cooperation on conservation education

Two papers were presented.

18. 1. International Cooperation in Conservation Education  
by J.L. Gray, U.S.A.
18. 2. International Coordination in Conservation Education  
by J. Goudswaard, IUCN.

The authors read the summaries of their papers as published in these Proceedings.

#### DISCUSSION

The main points raised were as follows :

Carvalho (Brazil) : in the Brazilian contribution to the International Biological Programme, there is a project entitled "Assessment of institutions and programmes related to conservation of nature in elementary and high schools and in higher education in Brasil". The project will start in 1969 and be finished in two years. The Brazilian Foundation for Nature Conservation is collaborating in the project.

The delegate from Chile, Hartwig, referred to the European Conservation Year being organized by the Council of Europe for 1970. He suggested that a similar Year should be held in Latin-America in 1975. The Chairman said that this proposal could be included in the Recommendations of the Conference. Dr. Hartwig continued that in Latin-America there was a wider range of literature on conservation than was generally realized.

Mendonça Paz (Argentina) : in 1966 Argentina organized the first Latin-American course on national parks and renewable natural resources. He suggested that other countries should run similar courses at interval to be agreed upon.

Barrientos (FAO) : in the field of instructional coordination of conservation education, there exists the FAO panel on forestry education, which advises any organizations on adequate orientation

in forestry education at various levels.

Gray (U.S.A.) : at the request of CLAPN it was proposed to stage a six-weeks short course on the teaching of natural resources conservation at a level of conservation faculties of Latin-American Universities. It would be held in 1969. Each Latin-American country would be requested to send two participants who must have a university degree, at least two years experience of teaching and hold a valid contract to teach a subject related to natural resources or natural resources conservation at the time that he was nominated as a participant. Further details would be made known through CLAPN at a later date.

Buchinger (CLAPN): the Fourth International Short Course on Administration of National Parks and Equivalent Reserves would take place in the U.S.A. this year. She also informed the Meeting that in 1967 also a course on national parks had been held in Argentina.

Cain (U.S.A.) : suggested that in preparations for a Conservation Year, particular attention be given to communication industries, newspaper writers, radio and television. At the present time science reporters dealt mainly with medicine and the physical sciences, while outdoor writer generally dealt largely with hunters and fishermen, acquainting them with conservation. Conservation ment much more than this.

Carvalho (Brazil) : round-table Conferences on conservation had been held by OAS and the Technical Center of the Inter-American Press Association in collaboration with local organizations, the first in Mexico, in July 1967, the second in Rio de Janeiro, in November 1967, and the third in Costa Rica, in March 1968. The Proceedings of the Mexico City round-table were already published by the Mexican Institute of Renewable Natural Resources. The Proceedings of the Rio round-table were in press. At these round-table Conferences, there were scientists and newspapermen, editors and reporters. They contributed significantly to an understanding of conservation in Latin-America.

Budowski (UNESCO) : as a result of the round-table Conferences mentioned by Carvalho, there was now an excellent press campaign based on information offered by scientists which did not have emotional overtones which might damage the cause of conservation. Although he agreed with Hartwig that the literature of conservation in Latin-America was now great, it was largely unknown or unavailable. Listing of the material and possibly republication were essential.

In view of the lack of time, the discussion was cut short at this stage.

## 19. Conservation needs at various levels

Four papers were presented.

19. 1. "Conservation education at primary and secondary schools"  
by Arturo Eichler, Venezuela.
19. 2. "Conservation training at University level in Latin-America"  
by Gerardo Budowski, UNESCO.
19. 3. "Conservation education at the post-graduate level"  
by Kenton E. Miller, IICA.
19. 4. "The training of technicians in conservation of natural  
resources at all levels"  
by Jose M. Gardia de Duenas Naranjo, FAO.

The authors of these four papers were all present at the Conference and discussed their papers.

### DISCUSSION

Pritchard (IUCN) : summarized the four papers. He pointed out that the first dealt with the very foundation of the development of conservation education by infusing the concept of environment and conservation to all school children at the stage when they are most receptive. It was especially needed in Latin-America which had such a high proportion of young people who would in due course have to manage their own destinies. Were we preparing them to live in tomorrow's world ? Dr. Eichler had suggested how this might be done on a wider scale. The second paper outlined the problem of training those whose vocations dealt with environmental management. The issues had been stated clearly, one of them being the economics of training. Were the mental manpower and financial resources available being properly utilized ? If not, how could more efficiency be obtained from the use of human and financial resources ? He agreed with Dr. Budowski that the directors of natural resources, administrators and government officials, and members of parliaments and presidents of the future would be derived from present classes in the universities. Were the universities aware of their responsibilities in the field of environmental conservation ? How could we as conservationists help and in particular how could IUCN help ? He too had been appalled by the lack of communication between universities in all parts of the world. The conference should stress the need for documentation and communication services. The third paper covered the wider question of postgraduate training, and its importance as the basis of the development of sound policies in practices in environmental conservation. In the fourth paper, Dr. Miller dealt with the training of professional men concerned with natural resources and stressed the need for choosing the right students.

It was necessary to formulate the right training programmes relevant to the tasks they would face. Finally, it was necessary for there to be adequate jobs for them to go to. He had emphasized the value of fellowships and on-the-job training.

Rivas Larralde (Venezuela) : was opposed to the idea suggested in the fourth paper that the Forester was the only Officer who could deal actively with conservation and renewable natural resources. Conservation was dynamic and demanded interaction between different disciplines. It had been suggested that new university faculties for forestry should be founded. Marida University, however, already offered recognized courses, and FAO was sponsoring the establishment of a Latin-American Institute for the education of professionals. Recently post-graduate courses had been established with the help of International Organizations. For these reasons, the proposal to establish new faculties indicated ignorance of what had already been done in Latin-America.

Contreras (Venezuela) : the increase in the population and consequent developments had lead to the rapid destruction of natural resources, which all organizations concerned with land-use must cooperate to combat. He considered that the armed forces of each country should contribute to the work of the administrations concerned, and assist the efforts of the scientists to find a solution to the problems of conservation. In Venezuela a branch of the armed forces, the "Gardia Nacional", carried out, among other things, the task of safeguarding renewable natural resources; together with officers of the Ministry of Agriculture, they ran a rural education programme, and organized Conferences on natural resources and on the prevention of forest fires for conscripts during their military service. For this reason, IUCN should recommend that training in the conservation of natural resources be expanded in the armed forces of each country.

Magnanini (Brazil) : in Brazil the Law on Fauna protection and the Forestry Code legislated for the introduction of sections on forestry education and the protection of fauna into school textbooks, and the radio and television stations were obliged to broadcast programmes on forestry and the protection of fauna each week. It was considered that similar instructions should be included in new conservation laws prepared by other countries.

Godoy (Argentina) : emphasized the need to train teachers of primary schools. Until this was done, adequate knowledge would not be available in these schools, which were after all responsible for educating the minds of the young.

Cain (U.S.A.) : the profession of forestry must be credited with being the first to realize that sustained production from renewable natural resources depended upon management in relation to

the plant and animal community and its physical environment. Thus management of forests for their products became based upon relations of the species of commercial interest to other plants and animals under the concept of forest types. As to the environmental characteristics of the forest types, the relationships are characterized by site and quality types. As a consequence of the broadening interest of forestry, the development of soil and wildlife conservation, fish and wildlife management, nature protection and recreation were dealt with in schools and departments of forestry. For many government agencies and some forest industries as well as universities, these historical developments have come together in the concept and practice known as multiple use, which, however, is a concept that did not itself accomplish resource allocation. However, he recalled that several governmental agencies and universities have formed organizations for natural resources collectively. Already in this Conference the advantages of integration of all natural resources in education, planning and management had been suggested; while one could have no objection to the broad conservation programmes of forest institutions, it appeared that a better route to travel in the future is even broader than the modern forestry. It was that of all natural resources in a coordinate manner, with also the pertinent areas of social learning, such as economics, public administration and law. After all the forest industry on a global basis was not really dedicated to conservation. It was not committed to the ecosystem, but to products, such a lumber and pulp wood.

Lopez Villalba (Paraguay) : there was an urgent need for international conservation organizations to pay more attention to higher and intermediate school-levels, especially in developing countries such as his, where it was difficult to deal satisfactorily with conservation problems. In this way, a contribution would be made to the permanent prosperity of the nations.

Pontussi (Argentina) : the faculty of natural sciences at Salta, under the National University of Tacuman, gave degree courses at University level in biological sciences; in these courses the study of nature as a resource was recognized as of primary importance since it was the renewal of natural resources, which made human life possible. Previously the universities in the Argentina had not provided for careers directed to conservation and management of renewable natural resources. In North-West Argentina, the area influenced by the National University of Tacuman, problems of conservation and management of natural resources concerned forests, grassland, fauna, hydrography, soils and others. On each aspect observations should be made giving concrete examples concerning prejudices, detrimental as much as to the economy as to society. The causes are the same in each case : the lack of specialized technicians for the rational use of resources. The proposal to create an Institute of Conservation and Renewable Natural Resources under the Faculty of Natural

Sciences of Salta, which now was near realization, was of the greatest importance therefore. Its initial objectives were :

- 1) to select an initial team to investigate conservation problems;
- 2) to diagnose situations regarding conservation in the region concerned;
- 3) to prepare the course for the teachers for the next "teaching" stage.

This will affect not only the new faculty, but also education at the levels of primary and secondary schools.

Freiherr von Fürstenberg (Chile) : considered that as most forestry engineering and agronomy schools taught conservation, the teaching of conservation in high schools was not as rare as had been made out in paper 19.2. The problem was to improve the quality of, and priority given to, the classes which already existed in Universities.

Luti (Argentina) : in the Faculty of Geobotany, in the Department of Botany of the National University of Cordoba, which comprised Ecology, Plant Geography and Phytosociology, conservation was taught as part of applied ecology. This Section had been enlarged in the current reorganization of the studies for future biologists and teachers of biology.

Vereau (Peru) : Speaking as a journalist, discussed the importance of reaching a wide public in order to educate opinion on conservation. In Peru, conservation propaganda was conducted through articles on camping, hunting and fishing. He considered that other countries might well follow this example.

Miller (FAO) : recently an annotated bibliography concerning conservation publications in Latin-America had been compiled at the Graduate School of the Inter-American Institute for Agricultural Sciences at Torialba, Costa Rica. This had been presented and accepted at the Meeting of the Latin-American Forestry Commission in Trinidad in December 1967, and it had been recommended that it should serve as a base for more intensive work on this subject in the future. It was in Spanish and English and classified according to subjects and authors.

Prego (Argentina) : in 1958 the Institute of Soils and Agricultural Techniques of INTA in Chile had prepared a booklet on the conservation of water and soil. This booklet had not been widely distributed outside Chile, and he proposed to organize some means of circulating bibliographies to repair this omission.

Peters (Argentina) : the Province of La Pampa encouraged the teaching of agro-pastoral technology in rural schools. It was

recognized that conservation education was of great importance in a Province which depended on the export of renewable natural resources. Such education could not be limited to occasional campaigns, but had to be organized on a systematic and continuing basis by all appropriate means. Development technicians are, therefore, in permanent contact with teachers in the schools, where projects adapted to each zone are put into practice. Such courses require 60 hours each year, and culminate in the "Week of the Soil" in July and the "Week of the Tree". It is essential that teachers know that they can rely on the support of the technicians, whether for meetings or for organizing days for students and farmers. In addition to broadcasts from the national radio, Santa Rosa, and articles in the newspapers of the province, series of slides and short films had also been made, which were widely used.

20. The Role of conservation of renewable natural resources in education.

Under this item there were two papers.

20. 1. "The role of natural resources in education"  
by Carl S. Johnson, U.S.A.
20. 2. "The role of renewable natural resources in education"  
by L.K. Shaposhnikov, U.S.S.R.

The former document was discussed by the author, showing slides of diagrams; owing to lack of time, the latter document was not discussed as the Chairman had dealt with it briefly in his opening address.

#### DISCUSSION

Cain (U.S.A.) : asked for definite recommendations to correct the errors in documentation suggested in the talk.

Johnson (U.S.A.) : owing to lack of time it had been impossible to go into full details, but figures and recommendations were included in his paper.

Prego (Argentina) : in the past, soil conservationists and nature conservationists have been separate. In future, they should unite their efforts in the fundamental field of education, because their aims were essentially the same.

Rosero (Ecuador) : emphasized that programmes for conservation must be realistic for each country, so that they would be effective in relation to political considerations. Advantage must be taken of politicians to make these policies known to the public. In Ecuador, they had a decree of reafforestation by the army,

which had to spend one month each year planting trees. He considered that in Latin-America there was a tendency to form centres and organizations for landuse planning, which would accept plans presented by technical organizations. It was essential that such landuse planners should cooperate with other disciplines in forming their development plans, in order that adequate financial provision be made for conservation of renewable natural resources.

The Chairman thanked the participants for the part they had played in a most interesting discussion, and he wished them the best of success in their future activities to promote conservation education, and closed the meeting.

18. 1. "International Cooperation in Conservation Education"  
by John Gray, Director, School of Forestry, University  
of Florida, Gainesville, Florida U.S.A.

It is a great honor to be asked to appear before such a distinguished group as the International Union for the Conservation of Nature and Natural Resources. Although participation in forestry and conservation activities at the international level is a relatively new experience for me, I have heard much about the International Union and particularly about the Union's Latin-American Committee on National Parks through my good friend, Dr. Maria Buchinger, who is Secretary for this Committee. My interest in the Committee was stimulated still further by reading Mr. and Mrs. Laurance Rockefeller's impressive feature, "Parks, Plans and People" in the January, 1967 issue of the "National Geographic" magazine. Near the beginning of this article, Mr. Rockefeller made the following statement, "Since the formation of the Latin-American Committee on National Parks in 1964, the concept of conservation has perhaps grown more dramatically in Latin-America than in any other part of the world". That is indeed an impressive tribute. It is also a statement which aroused my curiosity as a former extension forestry specialist with a strong interest in how public opinion is shaped and key leaders motivated to take positive action in worthwhile causes.

At this point, let me indicate my concept of the term "conservation". I interpret it to involve the wise use of natural resources to meet a great variety of human needs on a continuing basis. In this context, I visualize it as embracing an array of intensities of use ranging from the preservation of a wilderness area to the application of improved soil and water conservation practices on a family farm or ranch.

#### Need for Strong, Private Conservation Federations

If we are to succeed here and around the world in reestablishing and maintaining a healthy, diverse and productive natural environment which can supply a great variety of needs for a

mushrooming human population, it is obvious that we need to mount a continuing conservation education effort at many levels which will employ a variety of approaches to meet a variety of objectives. Let us think together for the next several minutes about some particular audiences which we must reach and some of the approaches which might be employed.

Unless all the references I read in connection with the preparation of this paper are in error, a sound, national conservation policy and programme does not exist in a vacuum. It will be found on a permanent basis only in those nations where there is a well conceived general economic and social development plan, including agriculture and landuse, in the making, or being carried out. Further, my references suggest that in the developing countries, government, rather than the private sector, must assume primary responsibility for initiating and conducting a development programme.

Given that reasonably progressive leaders are in power, how can we assure the development and correct implementation of an adequate programme of natural resources conservation ? How can we make the leaders aware of the need for such a policy and programme ?

Dr. Maria Buchinger, in a paper presented before a recent symposium held the University of Guayaquil in Ecuador, made this statement which is relevant at this point : "The future of Latin-America depends on the conservation education of its citizens ... In advanced countries, there is an impressive group of private organizations which comes into action when some of the natural resources are in danger of being exploited, or a new use allocation is proposed. As a contrast, it has to be mentioned that in most Latin-American countries, there is seemingly no strong public protest against the disastrous exploitation and depletion of the natural resources."

Thus it seems self evident that every nation with a democratic type of government should have a strong private organization, or federation of private organizations, to mobilize private resources and support for sound conservation policies and speak for private citizens and interest groups in the natural resources area. Such federations are needed to assure that opportunities for effective economic development of natural resources plus sources of multilateral and bilateral assistance are not overlooked by national planning institutes, development banks and chiefs of state. They can present the case for parks, national forests, nature reserves, wildlife refuges, marine reserves in economic as well as aesthetic and ecological terms - an approach too seldom employed to optimum effectiveness in conservation proposals. They can suggest needed legislation and even hire their own attorneys to draft model bills for delineating

boundaries of newly proposed parks, for prohibiting trespass and squatting on conservation reserves and national forests and for establishing protective agencies. They can help assure that national forest services, or ministries administering natural resources programmes are adequately staffed, adequately supported and doing the job expected of them.

These organizations will find many opportunities for informing the planners, chiefs of state, development bankers and legislators on natural resources policy needs and for broadening their understanding of methods for intelligent and diverse exploitation of resources in the long-run national interest. National congresses could be sponsored to which such leaders would be invited to share their views with conservation leaders on the merits of important proposals such as the establishment of a new national park or system of parks, the development and scientific forest management of large unit cutting concessions on government forest lands to attract new large-scale forest industries, the initiation of new hunting regulations in a given territory to promote tourism, or the strengthening of land reclamation regulations in connection with mining operations. Through skillful publicizing of such congresses, such issues, as well as the views of leaders concerning them, could be brought into public view as appropriate and necessary.

One of the most effective ways to inform legislators of the merits of a given conservation proposal is to sponsor a legislative conservation caravan or tour whereby the legislature as a body has the opportunity to view a proposed river valley development, national park, rangeland improvement project, or a reserve to protect an endangered species of wildlife. In my own country, on several occasions a railroad has provided a special train and successfully induced entire state legislatures to adjourn for a day to attend a field demonstration and tour of modern timber growing, protection, harvesting and utilisation operations. Part of the programme is always set aside for a discussion and, where possible, a demonstration of the services performed by the individual state forest service and the need to provide adequate legislative support for this agency.

A conservation federation at the national level could be influential in still another way. In cooperation with its nation's ministry of education, academy of science and leading university or universities, it could sponsor a natural resources lecture series for students in certain selected fields such as economics, law and political science where those who will be the national planners, development bankers and political leaders of tomorrow are being trained. Such lectures could deal with subjects directly related to the student's chosen profession and still provide a background in resource dynamics and conservation principles. I can visualize that a series of lecture on the legal

aspects of water rights could include a considerable amount of elementary hydrology plus principles of river basin development planning. Similarly, a series on the economic of landuse planning could include comparative values developed under various cropping systems, factors responsible for deterioration of basic soil productivity and the time and costs involved in restoring it, and values associated with progressive soil conservation methods.

Education of the nation's policy makers with respect to conservation issues and needs is of course partly the responsibility of those who administer the publicly supported ministry, commission, research institute, or school programme involved in implementing policy. But they must be supported by organized, influential, private citizens if they are to be effective.

In the development of an adequate natural resources conservation programme, once the desire for wise use of such resources has been implanted in the minds of key leaders and an initial policy has been identified, the next step is to provide the professionals, technicians and skilled workers needed to translate such policy into action on the ground.

At the risk of appearing naive and belittling my own role as a professional educator, I feel that the recruiting and training of professional foresters, wildlife managers, marine biologists, range ecologists, park administrators, game and forest wardens, soil conservation technicians, foremen for fire fighting, road, terrace construction and tree planting crews and similar personnel constitute the most easily attained and best understood segments of the total conservation education effort needed. I hold this opinion for several reasons. For one, I gather that the combination of F.A.O. assistance in organization and initial staffing, coupled with United Nations Special Fund partial temporary financial support, has many times proven to be an effective mechanism for the establishment of new schools and research institutes in forestry, forest products and fisheries as evidenced by successful organizations now in operation in Argentina, Chile, Peru and Venezuela, to list but a few examples. I am aware also of successful institution to institution relationships between certain U.S. forestry schools and their counterparts in Latin-America such as Utah State's relationship with the Forestry Institute at Merida, Venezuela, and Michigan State's assistance to the Forest Institute at Medellin, Colombia. My own school at the University of Florida does not have such ties but we are seeking such a relationship preferably with an institution in the tropical region of Central or South America. This is a second reason why I am here this week.

I am aware that there are shortcomings in the training of professionals and technicians for service in developing countries. I gather, for example, that textbooks and technical bulletins

in Spanish or Portuguese written to apply to Latin-American conditions are lacking in some subjects but that the Interamerican Institute of Agricultural Sciences at Turrialba, Costa Rica, the Universidad de Los Andes in Merida, Venezuela, the Mexican Institute of Renewable Natural Resources (IMRNR), the U.S. Information Centre in Mexico and the F.A.O. Forestry and Forest Products Division all are engaged in preparing such teaching materials.

This is the encouraging aspect of this phase of conservation education. While the need is great, we are getting on with the job. In 1960, Budowski estimated that a total of 5000 graduate foresters were needed in South America to administer government owned lands and to plan for and help establish national parks. In that same year, he estimated that there were only 500 foresters in Latin-America and that half of these were in Mexico. In that same year, he identified seven universities or colleges offering professional undergraduate training in forestry, six schools offering ranger or technician training and one offering forest guard type training (Budowski, Gerardo).

I have no actual figures to illustrate recent trends but at the Tropical Forestry Symposium held at Duke University in 1965, T. François indicated that the activities of F.A.O., coupled with U.N. Special Fund support, would provide a forestry school in almost every country of South America in the near future.

At the same symposium, Flavio Bazan of the Servicio Forestal, Peru, identified four U.N. Special Fund Projects in forestry education or research as underway in Argentina, Brasil, Chile and Peru.

### Schools of Natural Resources

In many environmental situations, complex interrelationships are found between wildlife, range livestock, range forage, timber, watershed hydrology, fresh water fish habitat quality and recreational values. For this and other reasons, some thought should now be given towards selecting perhaps one existing forestry school or institute in each major physiographic and language region in Latin-America as a nucleus for developing a school of natural resources along the pattern of the school at the University of Michigan, or the College of Forestry and Natural Resources at Colorado State University in the United States.

Schools selected for such expansion should be located in major universities. They could serve a three fold purpose. First, they would train professionals for service in each of the resource fields listed above and could include in such training emphasis on interrelationships between resources and how these

can and cannot be manipulated to lasting human advantage. This approach is not always done well in purely forestry schools.

Second, they could offer training in natural resources conservation at both undergraduate and graduate levels as an area of specialization for students in other disciplines such as law, economics and planning, architecture, banking, civil engineering. By so doing, some much needed professional hybrids would be created for careers as specialists in government and industry.

Third, and perhaps most important of all, these three or four initial schools of natural resources and conservation, with authorization and cooperation from ministeries of education where appropriate, could be expected to develop orientation courses in conservation and be responsible for initiating them as required subjects in certain curricula as their own and other institutions of higher learning throughout the region served. Your own International Union has urged that special courses on conservation be required subjects in nearly all major curricula offered by institutions of higher education (Buchinger). This is a most worthwhile objective but if, through schools of natural resources, you could succeed in getting such courses taught and required only in pedagogical and agricultural curricula, you would deserve well of the conservation interests in your country.

I would suggest that, as a minimum, all persons training for careers as school teachers in public elementary or secondary schools and all training to become agricultural extension agents, but preferably all studying for an *Ingeniero Agronomo* degree, be required to take a two course sequence in the field of conservation.

The first course in the sequence might be identical for students in agriculture and teaching. It should employ both classroom and field laboratory instruction. It should cover the character and extent of major natural resources; values associated with them; human attitudes toward such resources; basic ecological principles and resource interrelationships; conservation programmes needed at the individual farm, community, city, national and regional levels, and the current and potential role of such resources in economic development.

The second course in the sequence for those training to become teachers would emphasize and materials for teaching natural resources conservation at the elementary and secondary school levels in either a rural or an urban environment. I understand that Argentina and Brasil have developed an integrated approach to teaching biology and zoology and are passing this along through teacher training programmes to excellent effect.

The second course in the sequence for those studying agriculture or extension methods would feature farm and range conservation practices such as landuse capability planning, terracing, strip cropping, windbreak and water erosion control planting, drainage, farm pond fish production, water systems and sanitation, management of native range, habitat improvement and other cultural measures for encouraging beneficial wildlife species, forest planting and selective harvesting, and improved utilisation of native woods and timber in farm and ranch operation.

Establishing and requiring such courses in the training of teachers and agriculturalists is not a new idea. According to Flugger, in Mexico conservation courses were offered as far as 1947 in the Escuela Normal Superior and also in the School of Biological Sciences at the National Polytechnic Institute. In Venezuela, a course in conservation is offered at the Universidad de los Andes, the National Pedagogical Institute, etc. In 1960, Budowski listed 28 schools of agriculture in 13 Latin-American countries which offered courses in forestry to their students-

It will take a high degree of skill and diplomacy to organize such schools and get them to function as outlined above. In sequence it will require interdisciplinary, inter-institutional and international cooperation and effort. The interdisciplinary phase has been successfully established in my country under the leadership of individuals such as Dr. Stanley Cain of Michigan University and Dr. Paul Sears of Yale University. I suggest that they and others like them would be most valuable in a technical advisory role in getting such schools of natural resources organized and underway.

### Conservation Education in Elementary Schools

Schools of natural resources, in cooperation with national academies of science and professional societies, could play an important role in helping plan and conduct in-service training programmes in conservation and conservation teaching methods for teachers already employed in elementary and secondary schools. I gather that a programme of this type is already underway in Argentina through cooperation between the Ministry of Education and the National Council of Scientific Investigations (Consejo Nacional de Investigaciones Cientificas) with support from the Ford Foundation and the National Science Foundation. I understand further that specialists from the University of Maryland, under the sponsorship of the American Institute of Biological Sciences, took part in this programme and then were assigned to visit individual schools to help teachers adapt methods and materials to the individual school situation.

There is a tremendous job to be done in making the public aware of the nature and importance of natural resources and their conservation in the life of the region, the nation, the

community and the individual. The best opportunity to reach and influence the attitude of a large segment of the population in a systematic manner is through the public schools. In Latin-America, it appears particularly vital to incorporate conservation training into elementary school programmes, since 91% of the student population is enrolled at this level.

The job will not be easy and there are differences of opinion as to how it should be approached. Some favor integrating conservation into existing subjects such as history, geography, biology; others feel that a separate block of time and effort devoted to conservation as a subject in its own right is the only way to teach it effectively. My own feeling is that the approach used should depend on the individual school situation. It seems logical that children from farm families who are likely to engage in farming when they finish school should have training in applied conservation - particularly in soil, water and forest conservation practices. Such training could be given through both classroom teaching and 4-H club group and individual project activities.

This will involve specific blocks of time to work on projects and to visit farms, ranches, forests and research stations to observe applications and results. Thus a direct and separate course in farm conservation or an integration of conservation in a course in vocational agriculture or modern agriculture is indicated. A more indirect approach incorporating natural resources conservation in teaching history, biology, geography might be reasonably effective in urban schools.

In any event, the ministry of education or similar organization responsible for curricula in the public schools, is going to have to be sold on the need for including and supporting such training in elementary school curricula and on the need to provide in-service training to the teachers who will be responsible for teaching it. Here is still another situation where a strong federation of private conservation groups might bring influence to bear to convince the ministry that such a programme should be adopted. Further, the federation might provide encouragement through helping pay for teaching materials for certain local schools.

- At the university and normal school levels, developing and teaching two courses sequences in conservation to be required of students studying to become agriculturalists and school teachers.
- At the public school, and particularly the elementary school level, requiring the teaching of conservation in the curricula and providing needed in-service training who will have this responsibility.

I have suggested that, in addition to existing organizations, the above efforts require a strong federation of private conservation groups to help sell and support such activities. I further suggested that the development of schools of natural resources at some of the major universities could help assure that the above programme is effectively implemented. Finally, although I have not attempted to list all sources of multilateral and bilateral talent available, I believe that the competencies required to help establish such federations and schools are available through a variety of sources and could be brought to bear as needed.

In a paper entitled, "Dangers of Pessimism in Conservation", delivered before the 1966 North American Wildlife Conference, Ronald C. Clement stated : "The future is always open, indeterminate and subject to our influence."

Let us help build a brighter future for our respective peoples by convincing them, through effective conservation education programs, of the need for constructive action to establish a permanently healthy relationship between man and the natural environment.

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18. 2. "International Coordination in Conservation Education"  
by Johannes Goudswaard (Secretary, IUCN Commission on  
Education)

How to achieve greater diffusion around the world of the necessity for the conservation of nature ? It is useless to create large National Parks or strive for good legislation and good agreements in this respect directed towards the protection of rare animals, if the idea of nature conservation is not based on the conviction of the people in general. Therefore the specialists in the field of nature conservation have, besides their tasks directly related to that conservation, the very important mission of divulging and fomenting the education of the people and at the same time to preserve the natural treasures.

The International Union for the Conservation of Nature and the Natural Resources (IUCN) since its foundation in 1948 counts with a permanent commission in charge of promoting education. This commission is no less important than others of great interest within the IUCN, such as : Landscape Planning, Ecology, Legislation, National Parks, Survival. Between these commissions there exists a very close cooperation.

The activities of IUCN are developed on a world-wide plan in collaboration with other international organizations such as FAO and UNESCO.

The Education Commission of IUCN maintains positive contact with UNESCO and its regional study groups, without forgetting that in all this work of collaboration the duplicity of activities must be avoided.

Europe maintains also a perfect relationship with the European Council (Strasbourg, France). The Consultative Assembly of the Council of Europe, is not only a political organization, but it also deals with a multitude of cultural european problems. The conservation of nature is an important question and specially the education of people to that purpose. The IUCN takes part in all the meetings of the study groups, specially those concerned with the conservation of nature of the European Council.

The European Information Centre for the Protection of Nature of the European Council, in close cooperation with IUCN, gathers all the facts and information material relating to education, to preserve the natural wealth of all the member states of the European Council.

In 1970 the Year of Conservation of the European Council will be celebrated, and in all the member states multiple activities will be displayed, in the field of education of conservation of nature : study conferences at national and european level, itinerant european expositions, and international cinematographical

competition destined to european television (Eurovision, in which the european states collaborate), and the emission of a european stamp to stress the idea of the conservation of nature.

Outside Europe, the education commission of IUCN, has already collaborated in special IUCN projects. In Africa : Arusha, Tanganika 1961, Symposium on conservation of nature and the natural resources in the modern African States, followed by a workshop of Conservation Education which was celebrated in Nairobi, Kenya, in 1963. (IUCN Publication new series Supplementary Paper No. 7).

In the Asiatic Southeast : in Bangkok, Thailand, 1965, a conference on conservation of nature and natural resources of Southeast Tropical Asia.

The problems presented by the education of the conservation of nature were treated at a university level in the Symposium on Conservation Education in Lucerne, Switzerland, 1966. (IUCN Publication new series, Supplementary Paper No. 9).

The Commission for Education of IUCN is composed at the same time, of regional commissions which are in contact through annual conferences. For the last eight years a Committee of North-occidental Europe functions; in 1967 a Committee of Oriental Europe was founded. Plans have been worked out to establish regional commissions in North America and it is believed that after the Bariloche Conference, in close cooperation with the Latin-American Committee of National Park (CLAPN) of IUCN, an education commission of IUCN could be established.

In the field of International Co-ordination in regard to conservation education, many other possibilities are given due to the relation with already existing international organizations:

1. Explorers' organizations ("boy-scouts")
2. 4 H and Young Farmers' Clubs
3. Natural History Associations and Natural Science Organizations
4. International Youth-Shelter Organizations
5. Biology Students Organizations
6. International Federation of Landscape Architects (IFLA)
7. International Youth Federation for the Study and Conservation of Nature (I.Y.F.)
8. International Tourism Organizations

In this relationship, not only international organizations which deal specially with the conservation of nature in one way or the other are included. It is also very important to collaborate with other international organizations which are in contact with a much greater amount of people. Because this is the only way

to reach the objective proposed at the beginning of this paper.

Therefore, it is necessary that the Commission of Education of the IUCN starts to work in common agreement with all these organizations to achieve the proposed task.

19. 1. Conservation Education in Primary and Secondary Schools  
by Arturo Eichler, Venezuela

Conservation of nature and natural resources influences human affairs in economical, cultural, recreational, scientific, and aesthetic aspects. It is therefore imperative for all individuals to become conscious of conservation principles and practices through conservation education at all levels, beginning in elementary schools.

When introducing conservation into educational systems, two questions arise :

- 1) what are the objectives of conservation education;
- 2) how should conservation enter the school curriculum ?

As to the aims of conservation teaching, social aspects bear prime importance : the promoting of positive attitudes towards our natural environment and heritage; developing habits of mutual helpfulness and cooperation based on thorough appreciation of the sources of human existence and progress. Some common misunderstanding should be avoided. The differences between conservation education, and technical conservation must be kept in mind. The former is not aimed at resource conservation and management in itself, but rather at the conservation of human minds. It is necessary to distinguish the means from the ends.

Conservation understandings should gradually become more complete at successive educational levels, for instance according to the following stages :

- 1) study of nature and its laws;
- 2) conservation of natural resources, interrelations;
- 3) ecology of man.

With regard to fitting conservation into schools, two possibilities are best known. One, integrating of conservation themes in a variety of subjects, such as nature study, biology, geography, history, economics, social and health studies. This method is suggested for grades one to five in primary schools. The alternative is a separate course (new assignation) recommendable for the sixth, and last grade of primary schools, and for all five years in our secondary schools.

The value of conservation instruction as a vocational guidance is considered. Characteristics of different student groups in rural and urban schools are dealt with, and student activities in conservation education are mentioned. Furthermore, the paper approaches the problems of teacher training, and selection of appropriate teaching materials. The establishing of a Latin-American production centre of audio-visual teaching aids is suggested.

19. 2. Conservation Training at University Level in Latin-America by Gerardo Budowski, Principal Forester, Inter-American Institute of Agricultural Sciences, Turrialba, Costa Rica, on leave of absence since 15 December 1967. At present, the author is a Programme Specialist (Conservation and Ecology) in the Natural Resources Research Division, Department for the Advancement of Sciences, UNESCO, Paris. The author is particularly grateful to Dr. M. Buchinger, Executive Secretary of the Latin-American National Parks Committee, for the Helpful advice and for the interesting documents she made available for the preparation of this paper.

### Summary

Although it has been repeatedly stated that there is an obvious need for conservation training at university level in Latin-America, little has been done to bring about concrete recommendations for implementation. The present paper attempts to analyse the different possibilities that are open and which may eventually lead to the establishment of the conservation career in Latin-American universities. At present, however, solutions of compromise have to be reached, especially in view of the fact that many factors act against the strengthening of the cause of conservation. These are the lack of understanding of what conservation means and the low priority it has in a region longing for quick development-. The word "conservation" itself is often misleading, sometimes being associated with the stopping of "progress". Moreover, conservation cannot be easily classified or fit into another curriculum because of its multiple implications and connections with many sciences.

Until the timing is ripe for the career in conservation, there are several possible ways of introducing this subject into the existing universities through different means, listed hereunder in decreasing order of desirability :

- 1) the regular courses of conservation to be taken by university students, of which examples from Czechoslovakia intended for teachers, agronomists and foresters are given;
- 2) the offering of short intensive courses on conservation or specific aspects dealing with conservation through highly

qualified specialists who could devote the necessary time to teach such a course, since it involves a relatively short period of time;

- 3) a series of lectures by leading authorities on the subject;
- 4) the addition of conservation subjects to other courses.

The last item is probably the least desirable because conservation deserves a place of its own. Whenever associated with ecology, it may help however to eventually build up the case for a separate full course in conservation.

Finally, some brief comments on the scarcity of publication materials and some suggestions on recruiting of teaching staff through better use of international organizations are included.

### Conservation Training at University Level in Latin-America

#### Present situation

There are very few faculties in Latin-America where conservation is taught as a regular course (1), and none as a career. Mexico seems to be an exception, since conservation is taught as a regular course in faculties, as described by Prof. E. Beltran in his paper "Reports to Standing Committee on Conservation for period 1961-1966". Mexico Report No.8. 11th Pacific Science Congress, Tokyo, Japan, 22 Aug.-10 Sept. 1966. 2p - Prof. A. Eichler, a well-known conservationist, teaches this course at the Faculty of Economics of the University of the Andes, Mérida, Venezuela. An FAO staff member teaches wildlife management at the Forestry Faculty of the Agrarian University, La Molina, Peru. In the Graduate School (Master of Science degree) of the Inter-American Institute of Agricultural Sciences in Turrialba, Costa Rica, conservation is taught in two quarterly courses, and several students have prepared their thesis on this subject. There may be other centres in Latin-America where conservation is part of the curriculum in faculties of forestry, agronomy, biology, or natural resources, but lack of information makes it impossible to give details.

Although conservation is occasionally taught as a course or part of a course in faculties of agronomy, forestry, biology, pedagogy or natural resources, one can safely assume that this is inadequate for the needs of Latin-America, as has been stated in many reports. In trying, however, to modify the present situation, it is necessary to point out that any change will imply an unfavourable reaction, mostly because of the scarcity of funds for the addition of new curricula, and it becomes necessary to examine which are the factors that are opposed to a greater importance to be given to the teaching of conservation and which are the favourable ones which may be taken advantage of.

## Is there sufficient interest to teach conservation ?

The question seems to be a challenge for anyone who has had some contact with aspects of conservation, but for the sake of objectivity the question should be asked cool-headedly so as to find out what difficulties have to be faced. Seen from this angle, one has to admit that, in the face of the overwhelming problems confronting the Latin-American countries in their "revolution of expectations" and their desire to develop, nature conservation seldom occupies a choice place when it comes to priorities in university education. This situation, however, is bound to change. In recent years, and as an indirect consequence of population increase and of the greater expectations of Latin-Americans, a number of factors, all of which tend to awaken the conscience of the public to the need for welfare programmes, has arisen. This has favoured the cause of conservation as a science to be directed by well-trained professionals. Although it is hard to admit, such awakening has been the result of catastrophes due to men's misuse of nature, erosion, water pollution, permanent extinction of animals and plants, and other damages, many of which can be expressed in financial terms. Moreover, it has been realized, although only in part, that such a situation cannot be changed by the enforcement of law alone, and that remedies imply scientific knowledge and the application of a specific technology. At the same time, there has been an awakening to scenic, recreative and scientific values.

On the other hand, expansion towards lands previously considered as marginal has produced a logical reaction and an outcry to have well-trained conservationists fulfil an important function regarding planning in colonization programmes, agrarian reform, tourist expansion, and in general with all types of organizations concerned with planning (2). Of course, the conservation profession is not yet well established, and as a result it is being absorbed by other professionals, particularly agronomists and foresters with little training in conservation. Obviously, the goal will have to be a group of professionals capable of presenting conservation as a field with a solid scientific basis and with important economic implications regarding development and welfare programmes within their countries. There certainly is not a single country that does not require at this stage such a group of well trained conservationists to meet the needs concerning national parks, biological preserves, watershed management, wildlife management, tourist development, hunting and fishing, and, generally speaking, the needs of all organizations dealing with the promotion of development.

## How to name the course or the career ?

A large section of the population has not yet understood the full meaning of the word "conservation" as "conservationists"

would like to have it interpreted. This is true for the largest portion of the general public, and even for university authorities and others in key positions. The trouble is that conservation is often associated with the idea of maintaining the present "status quo" as regards land use, and that new clearings of hitherto untouched lands are systematically opposed, all of which tends to present conservation as a field with an undeserved and highly prejudiced reputation, since the inter-relationship between conservation and advance, development, reform, change or, in one word, "progress" is not at all understood. Despite the valuable efforts by local conservationists and international organizations it must be recognized that the implications of conservation are very diffuse in the minds of too many, which is to be expected of such a young science.

It is therefore worthwhile examining whether, in Spanish- or Portuguese-speaking countries, conservation should be taught under this name, or whether a more appropriate terminology, that might reflect the dynamic situation involved in rapid changes and the craving for better living, should be sought.

At the Inter-American Graduate School in Turrialba, Costa Rica, for instance, the word "conservation" has been avoided and "development of wildlands" is being taught. The specialist who teaches several courses in this field is called "Specialist in wildland management". Probably every country will have to solve this situation according to its own idiosyncrasies, but the purpose of this discussion is to draw attention to a problem which is real in many countries and which it would be unfortunate to ignore.

#### Conservation is a science which does not lend itself to incorporation in classification systems

Compared with botany, forestry, agronomy or hydrology, conservation has boundaries and relations which are not easily defined. Since it presupposes basic knowledge in many fields, it has been said with obvious logic that, in the beginning, it is better to introduce teaching at the graduate rather than the undergraduate level (3). This is quite correct, but the weakness of such reasoning lies, of course, in the fact that much personnel at university level is urgently needed for the various tasks requiring well-trained conservationists and that this goal can hardly be reached through postgraduate training only. In the present paper, postgraduate training will not be analysed, since this has been entrusted to Dr. Kenton Miller, well-known conservationist, who teaches this subject at the Graduate School in Turrialba, Costa Rica, and is well qualified in this field.

## How to teach conservation at university level

Ideally, the whole career in conservation should be the ultimate goal, but this will be difficult to attain during the coming years. It is necessary, therefore, to find an immediate compromise which will make it possible at a later stage to introduce the full-fledged career in the university. Eventually, a five-year curriculum could be visualized, possibly divided into a basic cycle and a provisional cycle of 2 and 3 years respectively and connecting the various courses of the basic years with those that may be found within the different faculties of a university where biology, agronomy or forestry are being taught. In the meantime and for the sake of immediate application, provisional solutions are to be found and these can be divided into four aspects of university level education :

- a) teaching of conservation as an appendix to other courses;
- b) a cycle of conferences by noteworthy conservationists in some university within the country, to be attended by university students;
- c) short intensive courses on conservation in general or on some particular aspect of conservation (national parks, for instance);
- d) the regular course on conservation within a faculty.

The numbering a) to d) corresponds to the degree of desirability, and the last one being, of course, the most appropriate of the four, will be discussed first.

## Establishment of the Chair of Conservation

At the Inter-American Specialized Conference dealing with problems connected with the conservation of natural renewable resources of the American continent, (4) conservation was dealt with extensively, and it was recommended that "...in those member states of the Organization of American States which do not yet have courses in conservation, the national organizations dealing with this matter should create chairs for natural resources as an effective measure for protection, conservation and rational use of those resources as well as the training of technicians and professionals thoroughly specialized in this field ..." It was also recommended "... to promote the training of professionals and auxiliary technical personnel in universities and institutes for secondary education in the disciplines connected with conservation and administration of natural renewable resources in the general field or in some particular field".

In a recent publication issued by the International Union for the Conservation of Nature and Natural Resources, through its Committee on Education(5), many papers on education of conser-

vation were presented, but there was no example for Latin-America.

Obviously, any faculty where conservation is taught should be connected with a university where many of the basic courses which are indispensable prerequisites for conservation are already being taught. It is not necessary to enter into details as to the nature of these courses, since they are usually the same (botany, zoology, physics, etc.) plus a few others connected with the particular nature of the career. As an example, a few basic aspects of such a conservation course will be summarized here as they have been programmed for Czechoslovakia, (6) to serve as a discussion for Latin-America. The two curricula designed could well serve as the basis for this course in Latin-America. It is interesting to note that the first one corresponds to a teachers' college at university level, while the second is meant for agronomists or foresters. Both were presented by Dr. Jan Cerovsky, Vice-President of the Education Commission of the International Union for the Conservation of Nature and Natural Resources.

Noteworthy aspects of a university course for pedagogues, educationalists and cultural workers

Part I : Nature conservation in general

- a) Nature conservation - definition, classification, importance, etc.
- b) Historical development of nature conservation
- c) Natural resources (definition, classification, etc.)
- d) Special protected parts of nature
- e) Care of the landscape.

Part II : Nature conservation in Czechoslovakia

- a) Historical development
- b) Legal basis
- c) State nature conservancy and organizations involved
- d) Parts of nature that deserve special protection
- e) How nature is conserved in Czechoslovakia.

Part III : Conservation Education

- a) Propaganda of nature conservation - different possibilities
- b) Conservation education - definition
- c) Some special forms of educational work - youth patrols, medals, competition, co-operation with other organizations
- d) Selected films and literature.

## Noteworthy aspects of a university course for agronomists and foresters in Czechoslovakia

1. Introduction to nature conservation - nature conservation as a new science. Present tasks of nature conservation. The importance and execution of conservation programmes.
2. Both positive and negative relations between nature conservation and agriculture and forestry.
3. Care of the landscape - biological balance in the landscape, landscape and engineering biology, natural, cultural, industrial and devastated landscape, landscape conservation.
4. Origin and development of nature conservation.
  - a) History of nature conservation in Czechoslovakia; nature conservation abroad.
  - b) Legal status of nature conservation in Czechoslovakia, the organization of the state nature conservancy.
  - c) State nature conservancy and its work, the part of Czechoslovakia in international nature conservation.
5. Special protected parts of nature in Czechoslovakia - all types of protected territories, objects and species.
6. The special protected territories in different regions of Czechoslovakia.
7. Short survey on Czechoslovak flora and fauna from the nature conservation point of view.

## Short courses on conservation or some of its aspects at university level

After the regular course on conservation, this way of including conservation in universities appears to be most desirable. It is intended to be organized through selected professors a short intensive course within the university framework. This has the advantage of obtaining for a short time the collaboration of outstanding conservationists, so that university students are exposed to modern trends. The disadvantage lies in the fact that one can hardly have a formal course of longer duration that would provide opportunities for lengthy reading assignments, field assignments, written papers and formal examinations. If, however, it could be arranged for students not to attend other formal courses during that period, it would be possible to cram into six weeks many of the basic aspects that should be included in a formal conservation course, with the advantage that one, two or more professors would be at hand to deliver the course. This method seems to be particularly appropriate for those universities which have budgets for visiting professors who can only stay for a short period of time.

## Cycles of Conferences on Conservation

The talent of local leaders or foreigners should be recruited to dictate a series of lectures followed by discussions, so as to prepare the way to offer conservation as a more formal course. It is important to display imagination and opportunism to make such an initiative successful. An interesting co-operation should be sought between universities and the scientists of the International Union for the Conservation of Nature or others to take the maximum advantage of the itinerary of those scientists and "recruit" them for those lectures during their passage through this country or in the vicinity.

## Conservation as an appendix to another course

This method has been criticized by several specialists, more particularly Baer (7) and Buchinger (8) and with good reason. Conservation should not be an appendix and has sufficient merits of its own. But again, one has to take into account that it is necessary to work on the basis of compromises, because of little funds available. Under the circumstances, there is one possible exception that is worthwhile analyzing in order to obtain the maximum of possibilities from existing opportunities. This is the combination of conservation with ecology, the latter is already a well-established course in many faculties, and because of its interdisciplinary approach, it lends itself much better than other courses to incorporation of conservation. Moreover, a course which covers many aspects could be eventually divided in two. Both ecology and conservation could be taught by the same professor, if there is no one specialized in conservation. According to a study of the Inter-American Institute of Agricultural Sciences (9), ecology is taught in many faculties of agronomy in Latin-America and a similar situation may also exist in faculties of biology, forestry and sciences in general. In the curriculum designed for basic ecology, there is room for several appropriate themes and practices related to conservation.

## Other Aspects connected with Teaching of Conservation at University Level

Besides the availability of a highly qualified teaching staff who, it is worthwhile mentioning, is extremely scarce, the other deficiencies are to be examined. They are mostly in the bibliographical aspects and the lack of teaching materials for each country. Much remains to be done. It is only very recently that the two outstanding volumes on conservation by Professor Eichler and the excellent publications of the Mexican Institute of Natural Renewable Resources have been published. (10)

However, in the light of the needs and the increase in international co-operation, particularly through international organizations such as FAO, UNESCO, IUCN, OEA, IBP and bilateral

programmes of developed countries, one cannot help thinking that the field lends itself to a much greater and more effective help from such organizations. It is unavoidable to conclude that many universities simply are not well informed of the multiple possibilities that are open to them, and it is necessary to clarify such a situation.

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- (2) Budowski, G. Forestry and colonization of humid lands in Latin-America. 6th World Forestry Congress, Madrid, June 1966. 15 p.
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- (4) Mar del Plata Conference, 18-22 October 1965, Final Report. Pan-American Union, Washington, D.C. 1966, 58 p.
- (5) Conservation Education at the University Level. International Union for the Conservation of Nature. Papers presented at the Symposium on Conservation Education held at Lucerne, Switzerland, 23-24 June, 1966. Morges, Switzerland, 1967, 73p.
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- (7) opus cit.
- (8) Buchinger, M. The role of conservation education in the future of Latin-America. Presented at the Symposium on conservation in Latin-America. Guyaquil, Ecuador, 1964.  
  
Buchinger, M. 1966. Some problems of conservation education. Background paper for a discussion at the 11th Pacific Congress in Tokyo, Japan. August 1966. 7 P.
- (9) International Seminar on Training of Ecology and Soils in the Faculties of Agronomy of Central America. Inter-American Institute of Agricultural Sciences, Northern Zone, Guatemala, 1967. 120 p.
- (10) As both Prof. A. Eichler and Prof. E. Beltran, Director of the Mexican Institute of the Natural Renewable Resources will present papers on conservation, they will certainly be dealing with this matter, and hence it was not deemed necessary to enter into more detail here.

19. 3. Conservation Education at the Post-Graduate Level  
by Kenton R. Miller

The general characteristics of the post-graduate student, namely his relative maturity and personal experience, require that conservation education at his level deal with technical methodology, principles and solutions which take into account the various aspects of each particular problem.

The central problem in conservation is the need to guide decisions for allocating and managing wildland resources. Economists, ecologists, civil engineers, and landscape architects have been dealing with this problem, and while each has contributed vital elements, none has provided a comprehensive model for the tasks of analysis and planning. Several basic points of conflict arise in comparing these fields which lead to difficulties in inter-disciplinary studies.

The post-graduate student must extract and weave a model for resource management from the fundamental fields and their many associated branches, and he must employ the conservation philosophy to give direction to his endeavor.

It is recommended that post-graduate education in conservation be focused upon the resources of geographic or economic regions, and deal with all of the opportunities for augmenting man's welfare always including rigorous examination of the vital interdependencies of the ecosystem and resource base. By systematic analyses, clear statements of goals, and efforts to understand both man's use of resources and the resources themselves, the student can become better prepared to choose alternatives which will render goods and services as well as maintain ecosystems for the long run.

It is recommended that the graduate programme be based upon the following elements : theory and practice of planning, elementary systems analysis, risk and probability, case histories of past and current resource management programmes, and individual research projects. These bases have been applied at the Inter-American Institute of Agricultural Sciences of the OAS, in Turrialba, Costa Rica. In cooperation with the United Nations Special Fund and the FAO, the Forestry Department has been offering a programme in Wildland Management at the masters level which consist of a course in the fundamentals of managing wild lands, research and consulting projects, international and local field trips, and these projects.

Future work in conservation will be carried out by resource specialists and resource managers. Experts in these two general categories will form teams for the planning of national parks,

watersheds, and other similar areas, and will treat all the relevant aspects of the particular problem area. The current supply of these specialists is small and can only be augmented by offering more opportunities for specialized training, granting more acceptable salaries and social status, and by creating employment in relevant organizations.

It is recommended that conservation as a philosophy be presented in all of the regular course work of each related field, and that one required course be offered which covers the fundamentals of the elements outlined previously.

On-the-job training programmes are becoming available as are funds for post-graduate training purposes. The critical problem is to make the existing funds available for those specializations which are deemed most important.

As resource specialists and managers become more technically oriented and objective in their treatment of resource problems, it is reasonable to expect that these experts will attain political offices of high responsibility and thus be able to influence public resource management policy.

19. 4. The training of technicians in conservation of natural resources at all levels

by J.M. Garcia de Duenas N., FAO/FO Officer, Forestry Training Centre, Conocoto, SF/253, Ecuador.

The conservation of Renewable Natural Resources and Forestry Activities

It is unnecessary to emphasise the intimate relation existing between the Conservation of Renewable Natural Resources and the technical application of Forestry Science. It is evident that the strict application of the Forestry Technique in the management of Forests calls for a better conservation of the timber growing stock proportioning constant rates in species; the permanent protection of the soil against the agents of erosion; the regulation of the waters in the affected zones, diminishing the oscillation of the volume of flow caused by the alteration of the rainy season and low water, and, finally maintaining the biological balance, the survival of the autochthonous flora and fauna.

It could be objected that the intensive utilisation of the virgin forests will change the actual ecological characteristics and thus we could not speak of the coexistence between the Conservation of the Natural Resources and the application of the Forestry Technique.

Nevertheless, the incompatibility is, to our opinion, only apparent; the application of modern techniques, when the eagerness of profit does not turn the rational utilisation into a vulgar exploitation, will permit the establishment of reserve zones that may secure the conservation of real living natural museums.

Even in the today virgin zones, where the utilisation starts a secondary forest, the application of forestry management principles, that should be, in every case, rigorously demanded, can change the features but will permit the achievement of conservation benefits (conservation of soil and timber growing stock, and regulation of waters) that can only be efficiently assured by an adequate forestry cover. Besides, the forestry activity does not only comprise the management of existing forests but also the forestation in marginal zones for agricultural cultivation, the correction of watersheds and the restoration of different inestable soils that will recover lost resources or will create a new wealth for the future and, in both cases, the conservation benefits that the existence of the forest will bring.

The renewable natural resources (with the exception of sea resources) are either found in forestry zones or originated in them and always intimately depend of the proper utilisation of these forestry zones. Thus leaving aside the sea products and the zones dedicated to agricultural production we will consider, in the present work, as synonymus the terms "Conservationist Education" and "Forestry Education".

#### The responsibility of Forestry Activities

The forestry lands can be private or public properties; the first ones can be large properties or small parcels.

It is clear that a small land owner will prefer to dedicate his land to agricultural cultivation because in general, he will not have the economic condition that will permit him to wait for the more or less long time required for forestry exploitation. Of course, for community practices the forestry activity is better than the agricultural (which permits to obtain fixed annual rents once the production is normalized) although it is well known the traditional resistance of the rural population to live in community. The forestry recuperation of these lands could be possible if the Government organizes the joint forestry enterprise and give, during the first years, the necessary credit (easily in the form of daily wages) until the forest begins to produce. The large property comprehends extensive forestry areas (with or without trees). The agricultural utilisation of the rest of the farm provides the sufficient profits as to leave the forestry area abandoned, in the best case.

Unfortunately, the destruction of the wooded area, in order to amplify the pasture zones, is frequent.

It is also frequent the parcel out and sale of these zones to farmers that will dedicate them to marginal agriculture.

Little can be expected from this private sector (except in few ones) in the field of forestry activities, it seems Utopian to try to achieve effective action of conservative character from this sector.

The forestry lands of public property are the reserve for the future, a good part of them are still in natural state, and others are being slowly invaded by colonists, that substitute the forest by agricultural cultivation; others are distributed by the Government for colonization and suffer the same destiny as the previous ones; we are ready to accept the necessity to incorporate new lands to agricultural cultivation but this cannot be done in an indiscriminate way. The information and approval from the responsible Forestry Service should always be demanded and also the forestry conservation of the zones, which does not include, in any case, the possibility that these lands could be given to people without land and that would use them only for forestry purposes. The technical aspects of these forestry zones (those distributed and those kept by the Government) should always be the responsibility of the Administration. And thus, most of the forestry activities would fall under the Government's responsibility; the private initiative will never take care of purely conservation activities and rarely to attaining forestation; it could only be expected the interest in the utilisation of their own forests, when there are immediate benefits, or in obtaining concessions on public forests, but also in this case the Administration should interfere in technical aspects supervising the utilisation so that it may be done according to conservation techniques.

#### Need of Trained personnel of different levels

As a consequence of the above mentioned we can state the following :

- 1) In order to attain the Conservation of Renewable National Resources we should technically apply the Forestry Sciences.
- 2) The forestry activities are principally responsibility of the Administration.

Now, the Administration, in order to carry out its function according to its activities, should dispose of a group of technicians that could study the peculiarities of the problem, determinate the priorities framed into the National Plan of Development; compile the specific projects, execute the plans

and defend these resources from destruction.

Naturally, the number of technicians that form this group, as well as the different levels of the same, depend on different factors that may vary from one country to another, such as forestry area, financial possibilities, social, economical and political importance conceded to this problem, human disposability, etc.

However, in large or small number, every country has the necessity to dispose of forestry trained personnel that with the variations advised in each case, could be listed under three categories :

- a) University level
- b) Medium technical level
- c) Qualified auxiliary level or vocational

The University level will provide the technicians in charge of the planning and direction of the Forestry Policy of the country; these who will be in charge of the compiling and execution of the projects and those who will be responsible for research and education. The technical knowledge of these professionals should cover all the fields in Forestry Sciences and since this level will provide the personnel that will occupy the high directive posts, their training should be as high as possible.

It would be antieconomical that this personnel highly qualified should be in charge of all the technical matters; the secondary aspects of the study process, compiling and execution of the projects should be left to technical personnel non-universitarian that however, should receive and adequate education in order to collaborate efficiently with the University personnel. This technical personnel of medium level is, in some countries, called Forestry Rangers or "Ayudantes de Montes".

Finally, the management of the forest requires the disposition of abundant personnel dedicated to vigilance and police functions (Forest warden); also specialized workers are required to direct the workers teams that do the different forestry works as well as specialized personnel in charge of the maintaining nurseries, forestry machinery depots, Stations for fish culture, acclimatation Stations, etc., all this personnel could be called Forestry Foremen. The number of persons needed in each level besides depending of the previously mentioned factors also depends of the internal organization of the corresponding Forestry Service. It also depends in the training given to the personnel of each of the two lower levels.

## Training at University Level

The grade of training that these professionals should acquire is very high, and the Forestry Science field is today very ample. Considering the initial dilemma that if the Formation Centre for this type of professionals should depend of the Forestry Service installed in the forest or should form part of a University we are inclined to accept this last system, since the majority of the Centres of Forestry Education at a higher level are vincu- lated to Universities it favours this preference.

Accepted this vinculation of the higher forestry education there arises a problem : which should be the faculty in charge of the forestry training ?

## Forestry Engineering Faculty in the national plan

Under the educational point of view, the best solution, in order to achieve a complete professional education at an adequate level is, to our opinion, the Faculty of Forestry Engineering being the forestry activities so complex it demands a profound basic formation in Exact Sciences, Physics, Chemistry and of course Biology that serve as a base to the variety of specific knowledges that a forestry professional at University level should have in order to fulfill his functions. These subjects being so complex demand its own Centre of Education.

This solution is, apparently the most expensive for in most of the cases it will demand the creation of a new Centre with the different installations and extense fields for practice; and to these costs will have to be added the maintenance of educa- tional personnel at full time, most of which would have to be contracted from the exterior since the national personnel will have responsibilities in the respective Forestry Services which would not permit them to dedicate sufficient time to regular teaching.

These Faculties of Forestry Engineering would be justified when the personnel graduated from them is of about 20 Forestry Engineers per year, and conditioned to the possibilities of work that the country could offer to this type of professionals. In the first years the only possibilities of work would be those offered by the Public Administration, for which this factor can be easily estimated.

Perhaps at present, and due to several reasons, only few countries of the region are in conditions to receive a suffi- cient number, each year, of this type of professionals, thus this solution may not be viable at present. Nevertheless, this is the solution which should be accepted and will probably be accepted by most Latin-American countries in a more or less short time, when the present considerable forestry resources

begin to produce and the Government's interest is raised to create new forestry zones for the future.

The Technical Schools at a medium level of which we will speak further on can be the starting point for these Faculties of Forestry Engineering and they should be founded, if not immediately at least in a near future.

#### Forestry Education in the Agronomic Faculties

Until the country is in possibility of using a considerable number of University professionals, but requires of a Forestry Service with qualified professionals at this level, other emergency solutions may be adopted. The more used solution is the vinculation of Forestry Education to Agronomic Faculties for this system admits two modalities with different variations.

The nearest modality to Forestry Engineering Faculty considered above, consists in the creation of a Forestry Engineering School dependant of the Faculty of Agronomists and Foresters will have two or three years of common studies of basic subjects necessary for both specialization; when finished this first part of the studies the students will take two or three additional courses of Agronomics or Forestry Engineering according to the different cases.

This system, although more economic than the one considered above, is still expensive because even through most of the installations of the Faculty of Agronomics can be used it is necessary to increment the equipment and it will be necessary to dispose of a large number of professors (naturally smaller than in the former case) and since it is used for a smaller number of students will result relatively more expensive than in the previous case, even if the total cost is inferior.

On the other hand the two or three years of common education for both specializations though it is true that some subjects are of interest to Agronomists and Foresters they are not always of interest in the same measure; they should be taught differently in each specialization.

Another method is organizing short courses for specialization. Those courses could be under the responsibility of the skilled personnel of the Forestry Service and they, according to the necessities of the Service, will decide on the subjects to be taught at the course.

This is the system that should be followed by the recently created Services that have enlarged their lines with professionals coming from the agronomic field.

As an emergency solution it is perfectly valid since it is economic and it solves the most urgent problems, providing skilled personnel, that may attend the necessities of the Service. However, it is evident that under the academic point of view, it is the most imperfect system since the technicians formed this way can only have a partial view of the vast forestry problem; this inconvenience can only be remedied with the course of the years.

#### The Faculty of Engineering in the International Plan

We consider that the Faculty of Forestry Engineering exclusively dedicated to the teaching of Forestry Sciences at a high level can solve the problem providing skilled technicians that will cover the necessities of the Forestry Service.

We also consider that few are the countries that fill the conditions required and that permit the creation of a Faculty of this kind for its own and exclusive utilisation.

We think that the best solution would be the creation of an International Centre of this kind. This Centre will receive students from several countries with similar characteristics, specially under the forestry point of view. Logically, this Centre should be situated in the country that has greatest need for forestry technicians.

This solution would be perfect for the students of the country in which the Centre will be established; the problem is for the students of other countries since having to study out of its own country, for a period of 5 or 6 years, brings an economic overturn. We suggest that the plan of studies should permit the students to study, at least, the first years, in their own country with the basic subjects included in their studies and for which the Centre will provide the adequate texts and will recommend the proper books. The students could assist to classes of similar subjects of those of their programme of studies in the different Faculties of Agronomics, Science, Economy etc. of their respective Universities and could also receive the benefits provided by the Forestry Training Centre. At the end of each course examinations should be held or (under the supervision of the Centre) questionnaires should be answered. The students demonstrating their ability should be awarded with a fellowship to study at the International Centre. This system is the same as the fellowships for postgraduates in Agronomics Science but presents the following fundamental advantage :

- 1) The Centre (Professors, Installations, Field of Practice, Programmes of Studies, etc.) will be headed to solve the specific necessities of the countries for which it operates.

- 2) The characteristics of the host country should be similar to those of the rest of the countries of the group so that the practical experience obtained could be immediately applied to their own country.
- 3) The students received by the Centre will have an absolutely homogeneous previous preparation. The variety of previous knowledge of the students may be an inconvenient of transcendental importance for the best success of the courses at an International Centre (this variety is not only manifested among students of different countries, but also among those from different Faculties).
- 4) It means a considerable rationalization of studies for the students, for they will only need to take the subjects that they will use in their profession.
- 5) It also means a considerable economy for the Governments for it is an unjustified inversion to prepare as Agronomists people that will never work in this profession.

The respectively Forest Service should provide to the future students of the Centre, the possibility to practice in the field during the periods of vacations during their studies in their country of origin for this will help them to gain useful experience for their studies at the International Centre.

### Fellowships

The systems of fellowships for graduates and post-graduates will continue to be efficient for the countries that do not have possibilities to give forestry education with the methods above analyzed, and also those that having this possibilities wish to obtain specialization that cannot be achieved in their country.

For the best utilisation of these fellowships the fellows should fill the following requirements :

- a) Complete a period of professional forestry experience that will allow them to get to know deeply the national characteristics of the problem for the solving of which fellowship prepares them.
- b) To study seriously the basic subjects necessary for the better comprehension of the special studies that they will have during the fellowship, according, naturally, with the characteristics of the Centre in which they will study.

### The training at a medium level

As stated before, the good function of a Forestry Service demands the existence of a professional intermediary level between the Engineering Corps and the Forest Guards. The need to dispose of this group of forestry professionals at a medium

technical level is aggravated when the Forestry Service does not count with a number of professionals with complete forestry education. The Forestry Service can render considerably if all the secondary activities are left for this type of professionals that should receive a practical formation.

#### Forestry Training Centre for medium grade personnel

For this professional level we think that few countries will not be in conditions to employ an annual quota of 20 or 30 graduates and this justifies the creation of the corresponding Forestry Training Centre at a national level. The costs of this Centre will be, of course, lower than those of a Centre of University level.

The professional education at this level should last 2 or 3 years depending on the technical level that will be given to the professionals and of the previous knowledges received before entering the Centre.

Strict selection of the students at the Centre will allow to reduce to two the years of forestry education if the National Plan for Secondary Education provides the students with the basic knowledges of Mathematics, Physics, Chemistry and Natural Sciences so that at the Centre they should only take the necessary subjects which are needed in the exercise of the profession. If the knowledge obtained by the students at the Secondary School is not sufficient and does not permit them to follow normally the course then it will be necessary one year of preparatory in order to give the students the necessary knowledge. The programmes will be made based on the same subjects for the formation of university technicians with the logical reduction in intensity of the studies and considering that of a medium technical level the "hows" are more interesting than the "whys" in each question. If the economical conditions do not permit another possibility the teachers should be the same Engineers of the Forestry Service. But this has the inconvenience that these professionals will not be able to teach at full-time or nor can they assure a continued teaching due to the necessity of the Service. Therefore, it is more convenient that the Centre should have its own professors at full-time. It will be useful to count with the Forestry Service personnel specially in the organization of short courses, seminars, and other activities.

We think that this type of Centre should form part of the National Direction of Forestry Services and located near the capital of the country so that the functionaries of the Forestry Service may visit it for inspection or in order to give help in any way. The Forestry Service should leave at the Centre sufficient space for practices, not only in the place were it is located, but also other regions of the country of forestry interest.

## Other Functions of the Forestry Training Centre

In those countries where a University Centre dedicated to forestry education does not exist, but whose characteristics foresee that such Centre should be mounted in the near future (this is the case of the majority of the countries of the region), the Forestry Training Centre of a medium technical level, should be considered as the point of start for the attainment of the University Centre. In this sense the Centre should be planned so that can be used by the Faculty of Forestry Engineering, at least the complementary installations, for example, it would be useful that the Training Centre initiates arboretum as soon as possible with indigenous species and also exotic ones of interest for the country since this is an indispensable element in any Forestry Education Centre, and which cannot be improvised. Until the country does not count with its own Faculty of Forestry Engineering, the Centre should participate in the forestry education at University level according to the methods adopted by the country, organizing short courses for specialization in order to train the functionaries of the Service (not foresters). In any of the cases of combined Agronomic Forestry education the Centre could always offer its library and other installations and the teaching personnel could, as far as the Centre permits, give lectures. The Centre could give special help for the previous national studies and this will enable the students to assist afterwards to courses at the International Forestry Institute and in this case (it will be considered a normal activity of the Centre) the attention given to the national candidates of the International Centre.

Even though the investigation work is not considered proper of a Centre of this type until an Institute for Forestry Investigations or at least a Faculty of Forestry Engineering is available, the Forestry Training Centre should be responsible for the investigation work and always in close collaboration with the Central Forestry Services and with the local Delegations and in a special way in the fields of practice that each region should have and where the corresponding Experimental Stations should be installed.

## The Training at a skilled auxiliary level (vocational)

### Forest Guards

Normally they should be responsible for the vigilance and police functions of a more or less extense territory which depends on different factors (population of the zone, topographic characteristics, transport facilities, etc). They could also be responsible for forestry installations or inspection or installation of certain work and in this case they should receive special training.

This personnel should fill the following requirements : Moral integrity, and capability to impose the authority they represent, both are personal qualities and do not depend of the education they may receive but this should be taken into consideration when selecting the personnel.

Another characteristic, a good guard should have, is a perfect knowledge of the territory where he is going to work, this experience is learned few months after they are working in the post, and for this reason it cannot be taught.

The knowledge they should have of the territory comprehends also the flora and fauna existing in the place. Since the territory a forest guard should take care of, is not too big the species he should know are not too many. Of course, a forest guard should have perfect knowledge of the Law and should see to the fulfillment of it with a clear concept of their obligations and rights.

Useful elemental knowledges as how to put out a starting fire or precautions adopted to prevent the spreading until the extinction brigade arrives, how to destruct malign animals, all this complements the technical knowledge this personnel should have; generally these are matters that require ability and practice instead of academic education, so this leads us to think that an extense theoretical instruction is not needed, and that three months of education will be sufficient together with a complementary three monthsperiod of practice.

The theoretical instruction can be received at the Forestry Training Centre or can be given by local delegations, according to the necessities, and in this case it can count with the collaboration of the teaching personnel of the Training Centre. The practice should be done in a zone similar to that where the forest guard is going to work having an experienced guard as instructor during that period.

#### Forestry Foremen

In this group we include the foreman, that is the responsible for a group workers that do different forestry jobs, and also the personnel in charge of different forestry installations of the Service. In both cases, they are skilled workers that should be in charge of restricted activities, and in general, this personnel is contracted "in situ" and among persons with similar activities to those in which they are going to be specialized. Also in this case the fundamental thing is not the education but the the proper selection of the personnel, choosing the most capable among the available ones and in the case of the foremen, those which have prestige among the workers and thus it will be easier to direct the works.

Each of these skilled workers should have perfect knowledge of the work so they can attain better results in their work using modern techniques; he should know how to use the machinery, the tools, etc. perfectly and should be in conditions to do the necessary reparations; he should also know the risks in his job, the prevention systems against them and if necessary, first aid.

Being the specializations so different there is no way of knowing how long the apprenticeship will last for this will vary not only with the specialization but also with the human characteristics of the personnel and with the technology used for the organization of the work and for the mounting of the installations. The instruction should be given through short courses at the Forestry Training Centre giving preferent emphasis to practical aspects. If the students are not enough in number to justify a short course they can be received at the Centre to attain professional experience in its installations, all this can be taught by professionals of the Centre and by skilled workers in charge of the installations.

#### Diagram of the Forestry Training

As a summary of the above mentioned and in spite of the peculiar characteristics of each country, we can synthetize a diagram of the organization of the forestry training which in our opinion, responds to the actual necessities and possibilities of most of the Latin-American countries and that can be adapted to the progressing necessities and possibilities of each country.

We suggest the creation of a Forestry Training Centre in those countries where it does not exist, fundamental mission should be the formation of technicians of medium grade by means of regular courses. This Centre will also be responsible for the training of forest guards, forestry superintendents and skilled forestry workers. A superior forestry education should be solved at international level, through the creation of the FACULTY OF FORESTRY ENGINEERING at the service of a group of countries of similar characteristics. This Faculty should be for specific forestry education for the last two years of study. The first years of study of University level should be taken at the country of origin with the help of the respective Forestry Training Centre and of the Faculties of the University, which teach similar subjects. These previous studies will be controled by the International Centre in order to attain the necessary homogeneity among the students.

Besides the regular courses, the International Centre will organize specialization courses according to the necessities of the countries for the students graduated from the Training Centre as well as for Engineers of the Forestry Services (specially for the agronomic engineers that the different countries have at present ).

As complement of these educational activities it is of maximum utility that the Forestry Services should give the students (of superior and medium level) opportunities to work in the different forestry activities during their vacation periods.

The Forestry Training Centre should be considered as the starting step for the future Faculties of Forestry Engineering of each country and so the necessary steps should be taken to facilitate this change in the educational level.

20. 1. The role of natural resources in education

by Carl S. Johnson, Professor of Conservation, Ohio State University, U.S.A.

By your participation in this Latin-American Conference on the conservation of natural resources you prove your concern about man's relationship to the land. You know that man and land affect each other. You know that man's effect on land is not always good. You know that man does not always have regard for the very natural resources on which he is dependent.

You would that many many other people were as aware of these things as you are. You would that they also knew that man does not live by bread alone, that he does have needs other than the material ones, that beauty, mystery, grandeur, and awe are essential to the uplifting of man. You know that the quality of living is not measured in either numbers of people or in the satisfaction of material needs. These things we know. However, we are not certain what to say or teach to cause others to come to these realizations.

Your questions, your reason for coming to this conference, are : How can we get more people to understand ? How can we communicate the conservation idea ? How can we develop the conservation ethic ? How can we get conservation applied?

Determining what to say

The very first step in communication is to determine quite precisely what is to be said. The effective message is not a generalization such as, "Soil conservation is important". To be effective the message must be much more specific. Furthermore, it must be convincing. Conservation messages must impart recognition of a problem by those to whom we communicate. To effect this we must know the people to whom we wish to speak as well as know the nature of the natural resources we want them to use more wisely. I cannot determine the messages for your many countries. One must know much more about the people, the natural resources, and the communications media and materials available. We in the United States have not commonly considered all these

factors. Therefore, conservation communication has not been effective enough.

### Who Needs be Educated ?

There are idealists who hold that all the people must understand conservation. I doubt that any of you really subscribe to that ideal. It simply is not ever possible for all to understand anything, if any here doubt this, let them try explaining "space walking" to people who "know" that "what goes up must come down". In any event, even the idealist must accept the achievement of his goal by degrees.

There is another practical consideration, "practical" meaning that which is possible within the means and time available. There is an urgency for conservation; we cannot wait until we have convinced all people of the need for new action. You will therefore concentrate the effort that is possible on those persons, that part of the people, that will be the most probable of producing needed actions.

In the United States, judging from the examination of 8,000 different pieces of "free and inexpensive" printed material dealing with natural resources, it seems that conservation agencies generally try to reach all the people. We do not believe they are succeeding. Fortunately, action begins when a relatively small number of people, key people, become deeply concerned.

For example, we have been concerned about soil erosion for some time but that concern did not produce effective action until a number of congressmen and a president were agreed that the erosion problem was serious enough to merit governmental help. One man stands out among those who knew that soil erosion was serious. His name is known to Latin-Americans too because of his studies of the soil erosion problem in several Central American countries more than 50 years ago. That was Hugh Hammond Bennett (Brink, 1951) who knew that it was more effective to have people involved in gathering information about the condition of a resource than to tell them that the resources must be conserved. Thus in 1933 we got the now world-renowned Soil Conservation Service, counterparts of which exist in several Latin-America countries.

### You need select your audiences

A key problem that you face is that of selecting the audience or audiences that are most important for effective action on conservation. A commonly-made assumption is that the key audience is composed of those who actually own and manage the natural resource. This, however, is not necessarily the most effective audience for this purpose even though those people must ultimate-

ly be reached. As an example, you are probably aware that the advertising experts sometimes address their communications to women to cause some things to be bought by men ! Or is not such indirection possible among our Latin friends ?

The research on which I base my report to you does not provide the answer to this question : To whom shall we direct communications on conservation ? However, you are not naive on this matter. Furthermore, we can say that the discipline we call "political science" has developed techniques for finding the more effective audiences. The fields of sociology, social psychology, and advertising have done much research herein. (Klapper, 1960; Stevenson, 1967) You have or could have access to their sophisticated skills.

I also would commend taking notice of the research and development of "agricultural extension". You call it Servicio Extension Agrícolas and Instituto Nacional de Tecnología Agropecuaria. This has been a major development in the communication of agricultural technology not only to farmers. It has reached the whole agricultural industry. Sociologists working with agricultural extension have even learned that one cannot address all farmers as one audience. Extension, as it had been carried on in the United States, was being surpassed or bypassed by those farmers the sociologists describe as "innovators", these themselves being shunned by most other farmers (Bohlen, 1962). These studies indicate that that group of farmers they call "early adopters" is more often followed by other farmers. They do not follow the elite independent farmers classed as "innovators". The studies do not make it clear as to what is the best communications medium through which to reach these "early adopters", the one's whose practices are followed by many other farmers. The communications research previously mentioned provides techniques which could be used to find out.

Several of the agricultural colleges of the United States are working with you in applying some of that knowledge and experience in your own countries. I know that many professors from the College of Agriculture at my Ohio State University have been working in Brasil. I know that the Rockefeller Foundation has been working with several among you in trying to speed the adoption of agricultural technology in your countries. You, however, need to and want to make the process faster and more efficient. You also want to avoid, if possible, that which did happen in the United States : injury to some natural resources as a result of technologies directed at increasing production. You also want to be more efficient at communicating conservation ideas than we have been; you, therefore, will be selecting audiences as targets for the major communications efforts.

## You thereafter choose the means for communication

Your experts in sociology and political science can identify the audiences that are most influential for molding new opinions and for effecting desired actions. When you make use of the services of such specialists, you will have avoided a major error made by the majority of the governmental agencies in the United States that have been producing thousands and thousands of free printed materials on conservation. Our producers of printed materials on conservation, including private organizations as well as both state and federal governmental agencies, have often attempted to produce materials for ALL the people. This, we are certain, is not efficient. Our research indicates that this may also not be effective.

Having determined the audience or audiences to be reached, you next face the problem of how to reach those people. A more specific question is : Which of the available means of communication is the most effective for each particular audience ? The research hereon is not as good for our purposes as that on selecting audiences. Research has tended to concentrate on how to make a particular medium more effective rather than on which among the media is the most effective. Television programmers want to know how to win viewers; they do not try to find out whether or not radio may be better for a particular objective. They do not seek to determine which is the more effective medium.

Producers of free printed materials on conservation have not often asked themselves whether or not some other means of communication might be more effective. The major exception to this generalization is probably the advertising industry, those businesses which do advise their clients as to which medium e.g. radio, television, newspapers, popular magazines, prestige magazines, etc., is the best for reaching some particular kinds of people.

One significant finding of research on television is that that medium is not usually effective for changing opinions. It reinforces opinions already held; the viewer who holds an opinion contrary to that being presented will turn the programme off or, if he watches it, he is stimulated to hold his contrary opinion even more firmly (Klapper, 1960). The recognition of this phenomenon has given rise to research on how to get the attention of the viewer in order to subtly change his view (Stephenson, 1967). To put it more plainly, skills are being developed at changing our attitudes and opinions without our being aware that this is being done !

## What has all this to do with printed matter ?

The research which is the cause of my having the privilege of participating in this Latin-American Conference on the Conservation of Renewable Natural Resources deals with free and inexpensive printed materials on conservation. (Johnson, 1966). Why then all the foregoing on audience and media selections, matters already known to you ?

In the course of collecting printed materials we personally visited over 100 producers. The avowed purpose of the visitation was to find out how much and what kinds of materials we would have gotten had we personally visited all producers. We got 3.4 times as many pieces when visiting their offices as we had gotten from those same 106 producers by mail. Quite naturally, you say, because personal contact is more effective than is mail.

A more subtle purpose of the visitations was to find out why the materials were being produced. We wanted to learn what policies and practices were being applied to increase the effectiveness of communications. With rare exception, the production of printed materials was a trial and error process. Rarely had the producers asked themselves whether some other media might be more effective avenues. An often admitted purpose for the production of free printed material is to advertise the producer; the materials say, "Look what we do. We are important to you". This is just as true of governmental agencies as it is of private organizations and of business and industry. This objective does stimulate communications actively; that is good. It tends to prevent cooperation among related agencies; that may not be good. It could, because of competition for attention, lead to better communications through the elimination of those who do it poorly. This it has not tended to do in the United States.

Among persons who have been producing free printed materials are some who have not only doubted the effectiveness of those materials but have wanted critical evaluation of their agency's communications programme. It was this concern that led to a three-year research project at Ohio State University, a project supported by the U.S. office of Education. We chose to concentrate on free and inexpensive printed materials. We were not attempting to determine whether these are a better or a poorer communications medium than are alternative media. We simply wanted to analyze factors which control the effectiveness of these materials. This included distribution systems as well as quantities and qualities of the materials. We called the project "Conservation-Materials Conservation".

The remarks about the selection of audiences and media precede my telling you what we found about free printed materials because we believe all available media for communication should

be considered. The investment required to effect a significant portion of an audience is considerable. Neither we in the United States nor you in Latin-America have the means to use all the media to mold the attitudes of all the people. The things we found out about free printed materials on conservation tell us that while much is spent in printing them, over \$ 100.000.000 a year in the U.S.A., they have not the qualities which will cause them to be very effective.

#### We were concerned about materials for schools

We asked 2.400 potential producers of materials dealing with natural resources for copies of "free and inexpensive printed materials on conservation prepared for or given to schools". We were concerned about those materials that were being given to schools. We realized that schools were being given materials prepared for adults but we were not, at that time, intending to make a study of materials directed to adult audiences.

More than three-fourths of the 2.400 agencies, organizations, industries and industrial associations responded. Nearly 1.000 of the respondents did send us some printed materials. We received over 8.000 different pieces of so-called "free or inexpensive" printed materials. Through visiting 106 of the producers and by the examination of producers' lists of publications, we calculate that around 6.000 titles are being produced each year and that there are over 20.000 different pieces available from all producers at any given time. The amount of these materials is astounding.

Most of the materials we received seem to have been addressed to the general public or large segments of it, e.g. housewives, farmers, hunters, and campers, etc. Only about one-fifth of our collection is material addressed to students or teachers but this is over 1,500 different pieces. We learned, however, that most of the materials that agencies and organizations send to schools has been prepared for the public at large, for everybody.

#### Most of the materials being produced are for technicians

Roughly two-thirds of the 6.000 or more titles produced each year are addressed to technicians : to scientists, to resource managers, and to those who counsel resource managers. Most of this material is very difficult to read and is drab in appearance. It certainly has much information in it but only the technically trained can read and comprehend most of these thousands of pieces of "technical" materials.

Herein lies a dilemma Educators have often expressed, a desire for more information. This is a major reason for getting these supplementary reading materials. That which has much information is so highly specialized, so difficult to read, and so unattrac-

tive in format that few students can or will use it. That which may be readable and attractive has little information in it.

### Quantities are seldom adequate

True, with thousands of titles produced each year it would seem there are titles enough to cover all possible topics. There is however, much duplication. More about this later. Audiences in the United States are large and the numbers of copies produced of each publication is very seldom sufficient to cover the intended audience. For example, there are now over 2,000,000 teachers in our public schools and over 50,000,000 students in grades kindergarden through 12. Advertising, as well as some tests we made on "teacher awareness" of materials, say that it takes a multiple of an audience to saturate it. Extremely rare is the publication that has been produced in quantity even equal to the audience.

### These materials are cheap

The median cost for the printing of these materials was four cents a copy. The average cost was 12.7 cents. The cost per copy for those materials our analyses judged as good or as able to capture interest and attention was a minimum of 20 cents a copy. These figures, however, do not include any of all the costs other than the printing itself.

So many titles are produced, we estimate at least 6,000 per year, that, despite the low cost per copy, the total expenditure is a large figure. The median number of copies per title is 15,000; the mean is 172,000 copies. From these figures on numbers of title, copies per title, and cost per copy one can calculate the aggregate annual expenditure for the printing of "free and inexpensive" materials on conservation in the United States. The estimate is over one-hundred-million dollars!

### Free materials are ephemeral

Free printed materials are not only seldom printed in adequate quantity but the supply is soon exhausted. Thirty percent of the materials is undated, that is it shows no publication date. We checked the publication dates of 5,297 pieces and we also found out when the undated pieces were published. We learned that the "half life" of free printed materials is only two years, that half of the titles printed in a given year are out of stock two years later. Free printed materials in our country are ephemeral.

Educators prefer that the materials used in schools carry a publication date. Some of the producers of materials do not put a date on them thinking that they will then remain useful longer. We found no significant difference in the duration of supplies between dated and undated materials. We did find lower teacher acceptance of undated materials.

### Some resources are slighted

We hypothesized that minerals are the neglected resource. We found that soil and water also get much less attention than do forests and wildlife. Of the 6,744 pieces in our collection that deal primarily with some one of the natural resources, 6,7 percent treat soil, 7,4 percent are on minerals, and 9,6 percent discuss water. These three basic natural resources share 24 percent of total titles the while plants and animals, mainly forests and wildlife, have 37 percent.

You and we stress the interrelationship of natural resources, that the use of one effects others, but only 10 percent of the free material on conservation in the United States deal with more than one of the resources. Scope of the materials is broadest in materials for teachers, narrowest in materials for the public. Free materials do reflect the specializations and vested interests of their producers.

Newly recognized problems such as air pollution, pesticides, and excessive population growth are discussed in very few of the free printed materials. We noted that they appear in the technical materials long before they appear in materials for schools. It does seem that the process which produces free printed materials for conservation education will lag far behind the scientists' and technicians' recognition of new problems.

### What is in the materials ?

We also wondered what is in the materials. One of our workers read about 2,000 pieces and tallied the topics treated. The materials for scientists, technicians and resource managers are strikingly different from those for teachers, students, and the general public. The technical materials do treat the solution of conservation problems and so would seem to be the best materials for educational use. This, however, is not so for some reasons other than the content. Those reasons will be revealed later.

Erosion is a topic in more than half of the student materials on soil. Soil mapping and land judging is next in frequency but nearly always addressed to students of vocational agriculture. Land use ranks only a little ahead of soil erosion in the materials for the general public.

The water materials mention pollution more often than any other topic. Drought is seldom a topic; municipal and industrial water needs are common topics. Again, as with soils, management receives less attention than do uses, needs and problems. The problems discussed are primarily those already widely known. For example, erosion is very often mentioned but the deterioration of soil structure and the depletion of soil fertility are rare topics in the free materials.

The commonest topics in materials related to mineral resources are rocks, minerals, fossils, and stratigraphy. Identification of the resource is the emphasis. This is true with respect to all the resources. There is very little on minerals conservation problems. There is literally nothing on minerals conservation in the materials prepared for schools.

Plant and animals materials also emphasize identification but only the identification of wild species, not of the plants and animals we have domesticated ! The identification of trees is the main topic of three-fourths of the plant-related materials. The problem most often mentioned is forest fire. The management topic most often treated is how to plant a tree, - and this in the time that foresters discuss selective cutting and block cutting to have natural reproduction instead of planting being the means for replenishing forests !

Identification of wild animals is the prevailing topic in the materials on animal resources. What animals ? Birds foremost, mammals next, all other vertebrates a poor third. Even the insects, concerning which we know that over 1000 titles are printed by the Extension Services each year, are mentioned in only four percent of our collection of materials related to animals.

"If I were to develop a definition of conservation based on free materials sent to schools", said our student analyst (Copenig, 1966) after reading 2.000 pieces, "conservation means to protect plants and animals and to stop fire, erosion and pollution. To do this we must first be able to name the resources we must protect."

But, you say, identification is a tool.

Identification of plants, animals, and other natural resources is a tool, a means for finding out more about them. This I do not intend to contradict. We, in our study of materials, tried to avoid defining conservation; we asked the producers to send us that which they considered to be conservation. Thus we got 8.000 different pieces and from looking at what we received we report to you their collective concept of what conservation is.

The while preparing this paper I studied the tentative agenda for this Latin-American Conference on the Conservation of Natural Resources. I noted that you chose to limit it to the renewable resources thus omitting minerals but perhaps also omitting wilderness, if wilderness is not renewable. I guessed from the topics listed that we would not at this conference have much to say about wheat, corn, forage plants, and cows. If I guessed right, you are fitting the scope of things discussed in printed conservation materials in the United States. The resources you choose to discuss tend to define "conservation".

We asked 2.400 possible producers of printed materials to send us their stuff on conservation. Fifty-one state Extension Services, Puerto Rico being included, sent us materials or their publications lists asking that we select - which we would not do. We note that they publish thousands of pieces on the plants and animals of agriculture but they seldom sent us other than their materials on forests and wildlife. In the opinion of the agriculturally oriented, conservationists are only interested in forest and wildlife.

#### The materials are difficult to read

We measured "readability level" for nearly 4.000 pieces. The Dale-Chall system (Dale, 1948) we used does not pretend to determine the grade level of the material; it does measure relative difficulty. One of Dr. Edgar Dale's students produced a similar equation for measuring readability level of Spanish (Spaulding, 1956). American newspapers seldom write above "grade-level nine". Readers Digest (circulation 25.000.000) has a mean readability rating of nine. (Johnson, 1966). The English version of this paper averages level ten; the paper in Spanish rates "moderately difficult", a comparable rating. Textbooks used in our public schools seldom vary more than one from the grade at which they are to be used.

Only 18 percent of the total of materials addressed to students had readability levels below seven; in the U.S.A. grade seven is commonly the beginning of secondary school. Mean readability for student material is 10.7. There is very little material suited, readability wise, for the elementary school. Yet, there is more opportunity for teaching conservation in the elementary than in the secondary school. There is opportunity, and elementary teachers are commonly eager to use it but there is little in free printed materials that is suited to their students.

Journalism advises that sentence length and vocabulary be held down. These are the major factors in measuring readability. Newspapers and magazines that follow this advice, and most do, have readabilities ranging from seven to nine. Printed materials on conservation prepared for public have a mean readability of 12. Less than five percent has readability below seven. The mean level for technical materials is 13,3 and much of it has so many big words and such long sentences that it went beyond the Dale-Chall scale.

This, then, is why the technical materials are not useful for schools. Not even the teacher can understand them !

#### There is little for the social studies

Each of the 1.541 pieces in the analyses sample was rated by three sets of judges, three in each set. One set was conser-

vationists; another was professional educators other than public school teachers; the third set was composed of an elementary teacher, a secondary science teacher, and a secondary teacher of social studies. The social studies include geography, sociology, government, history, and economics. Each judge rated appearance and quality. The professional educators rated potential for use in schools. The teachers rated its usefulness to themselves or their students. It was discovered that conservationists, representative of those who produce these materials, were not good predictors of teacher rating of the materials !

The teachers agreed with our objective findings on readability : there is little material readable by students. They also made it clear that very little of all this material is prepared to assist in the social studies. The materials are science oriented. Conservationists in the United States have not yet recognized that there may be more opportunity for dealing with conservation problems in the social studies than in the sciences. You apparently have. (Union Panamericana, 1966).

#### What effect has appearance on the acceptance of materials ?

The nine independant ratings of each piece yielded some interesting data on appearance, on quality, and on correlations between the two. The system rated technical materials highest for informations quality and student materials lowest. On the other hand, student materials received the highest appearance rating while technical materials were lowest. Nevertheless, correlation was high. Most of the pieces rated high for informational quality were also rated high for appearance. This does not prove that all good looking materials are good; it does support the belief that attractive appearance of printed materials not only arouses interest but tends to create the impression that the information is good.

But quality, as we judged it, did not turn out to be the best index to teacher acceptance of the material. Conservationists rated quality high on the technical materials the while teachers rated them seldom useable. Conservationists tended to rate quality low for materials prepared for elementary grades; they seemed biased against things written at vocabulary and concept levels appropriate for children.

Only 102 out of the 1.541 pieces judged were rated useful by at least two of the three teacher judges. We found that the mean appearance rating of these 102 pieces was markedly higher than the quality mean. We graphed the decile distribution of these pieces for both quality and appearance ratings. Appearance outweighs quality of content in determining whether or not teachers will use free printed materials on conservation.

### But what makes for good appearance ?

Appearance, you say, is a subjective evaluation. How then can one know what will be considered attractive ? Specialists in commercial arts have both talents and knowledge hereon. Merchandizing in general says, "Not what you thing is pretty but what those to whom you sell think." We tried out the simple "Q-test" (Stevenson, 1962) and found that on basis of how a teacher sorted ten pieces of materials we could predict how she would rate appearance of all the materials.

Color, we found, was important but one color other than black and white was almost as effective as "true color". Line drawings outranked photos. White space has positive effect on ratings. Offset printing is not distinguished from letter-press printing. Eighty percent of the material in the upper quartile for appearance has a cover of heavier paper. The only materials which teachers said they would use even though they did not rate them high for appearance were "cut-color-paste" materials for students to use, e.g. poster kits and materials giving directions for student activity.

### What will increase Teacher use of Materials ?

In our country free materials must compete with good looking materials sold by commercial publishing companies. Their materials are generally attractive and quality is commonly good; competition tends to eliminate the poor. Materials produced by conservation agencies and organizations must compete for attention with attractive materials.

We are guessing that being available "free" is not the advantage it once may have been. The affluent society buys great numbers of books, magazines, textbooks, etc. Free materials may be considered poor or biased because they are free. We found high teacher acceptance of materials for which small, even only token, charges are made.

In the U.S.A. materials for students will win over materials addressed to teachers. Teachers welcome things which will help them in working with students. They resist things which seem to add to what they must teach; they welcome things which help teach that which they feel they must teach. This factor emphasizes the need for more materials suitable for elementary grades and for the social studies.

Materials for all audiences need be based on some knowledge of communications approaches which will win the attention of the audience. Appearance and readability are important but there are also other factors. Concept level must also be appropriate.

Cooperation among producers might lead to great improvement of conservation communications. One might thus have finance and talent to consider alternative media. Cooperation should help broaden the scope of the communications. It could also, increase the credibility of the communications. It would reduce some of the needless duplication of efforts. The adoption of some of these measures for increasing the effectiveness of conservation communications could lead to the "conservation of conservation materials".

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## 20. 2. The role of the renewable natural resources in education

by L.K. Shaposhnikov

Chairman, Commission on Education IUCN,  
Chief of the Central Laboratory on Nature Conservation  
of the U.S.S.R.

At present time nature conservation has become a great economic and social problem. It can be solved with the help of the scientifically proved measures system directed to wise and manifold utilisation of all complex of natural resources, their conservation and restoration, to the creation of the most favourable natural environment of the society's activities in the interests of present and future generations. All circles of population and all peoples are interested in nature conservation. And this interest is growing on the par with the increasing damage and unfavourable changes in the biosphere introduced by the society. For this reason the principles and ideas of correct regulation of interrelations between man and nature which were put forward by science support in all countries of the world.

The international movement for the conservation of nature is also becoming stronger and its development is more and more connected with the United Nations Organization, the Organization's organs and specialized agencies. The International Union for Conservation of Nature and Natural Resources is becoming the universally recognized centre of scientific and consultative character in the mentioned international activities.

While developint the work in different directions the Union pays great attention to the propaganda and education in the sphere or scientific nature conservation, to the problems of education of population in the spirit of wise attitude towards natural resources. This work is being organized and fulfilled by the IUCN Commission on Education, established in accordance with the decision of II General Assembly of the IUCN (1950, Brussels). The Commission's membership consists of scientists and specialists from different countries who devote their activities to the conservation of nature. During ten years the Commission functioned under the chairmanship of professor Gabrielson, the american scientist (the Director of the Washington Institute of Wildlife Management). From 1960 the duties of the Commission's chairman have been fulfilled by me.

The Secretary of the Commission is Mr. Goudswaard (the Netherlands). At present time the following persons are the members of the Commission : vice-chairman Dr. Cerovsky (Czechoslovakia), professor Hoeg (Norway), Dr. Pritchard (Great Britain); members Dr. Dottrens (Switzerland), professor Eichler (Venezuela), Dr. Esping (Sweden), Mr. Kesteloot (Belgium), Dr. Lohmeyer (German Federal Republic), Dr. Magnianini (Brasil), professor Miller (U.S.A.), professor Söyrinki (Finland), professor Puri (Ghana), Dr. Szczesny (Poland), Mr. Holliman (the International Youth Federation for the Study and Conservation of Nature).

The sub-divisions of the Commission are its regional committees and the decision about the creation of them was made by VII IUCN General Assembly in 1960 (Poland). From 1961 the North-West Europe Committee of the Commission on Education is working very successfully. In 1967 at the Conference at Prague the East Europe Committee was formed. This Committee is composed by the specialists from the socialist countries, including USSR.

At the committees' conferences their members - the representatives of different countries discuss important materials concerning experience and methods of teaching and popularization of nature conservation, working out concrete proposals on the development of activities in this field in their regions.

The IUCN Commission on Education is striving to establish in the nearest future the regional committees not only in Europe, but in other continents. In such organizational structure of the Commission it is necessary to strengthen the activities in the field of conservation education not only in the developed countries, but (and it is of particular importance) in the developing countries of Africa, Asia and Latin-America, the natural resources of which are under the threat of the exhaustion.

One can hope, that as a result of consultations among the participants of this Conference the Latin-American Committee of the IUCN Commission of Education will be organized. Taking into account the local natural conditions of the region, economic and social systems of the Latin-American states, the Committee would promote the fulfilment of tasks of the IUCN Commission on Education here, in the Latin-America.

The committees of the Commission and it is very important, should provide opportunities for regular mutual business-like contacts, exchange of experience and materials. It is also extremely important for the regional committees of the Education Commission to work in close contacts with the regional committees of the other IUCN Commissions, which in future would give good bases for possible improvement of all IUCN structure in the direction of the establishment of the united IUCN regional organs.

The participants of this conference have the possibility to acquaint with the address of the Chairman of the IUCN Commission on Education, in which there is a summary of major results of the Commission's work. The document was distributed at the Conference. In this paper I shall pay prime attention to the tasks of the Commission which in my opinion faced by the Commission at present moment and which it is necessary to decide in order to comply the activities in the education of nature conservation ideas in full with the interests of peoples.

Care for nature is the duty of all population. For this reason the educational work, first of all at schools is of particular great importance. From the very early days children should recognize the necessity of careful attitude to nature of native land, to get the habits and skills in the protection of useful animals, plants, natural monuments. It seems, that it is not quite necessary to introduce to schools a special course on nature conservation. This opinion shared by many teachers. Such a special course on nature conservation should be incorporated to the programmes of the high education establishments, about which I shall say later on.

But nevertheless all the programmes of primary and secondary schools must take into consideration the ideas of nature conservation. Its fundamentals should be taught at schools of all levels, including appropriate themes and examples into general subjects (natural history, botany, zoology, biology, geography, chemistry and others).

For instance, while teaching "Botany" the lecturer has to explained to pupils the role of plants in nature, economy and life of man, to tell about methods of conservation and plantation of trees, about the protection of rare plants, legislation needed for their conservation. Giving characteristics of types of flora it is necessary to say about the examples of rare communities of plants, which should be provided with protection and careful management. Here it is also important to attract attention of pupils to the conservation of mountain and forests which play important role in water protection, climate regulation and conservation of soils.

Studying zoology the pupils must understand why it is necessary to conserve and increase the resources of the animal world, to acquaint with works in the introduction and restoration of populations of animals. During the chemistry lessons it is useful to pay attention of pupils to the protection of natural environment from harmful influence of chemical plants wastes, to explain the importance and methods of control over the pollution of air, water basins and soils, to underline the importance of protection of green plantations and etc.

In the USSR great attention is being paid to out-of-doors naturalistic work of pupils. This work is inseparately closed with nature conservation measures. Young naturalists take part in conservation and plantation of forests, feed useful wild animals, make plantations in settlements, on roads, ravines and etc.

The organization of school reserves, forest - gardens, wild-life sanctuaries is the important form of introduction of children into the work on nature conservation. For example, in a sanctuary organized in one of the schools of Yakut Autonomous Republic children feed animals, make and distribute artificial nests for birds and ring them. In the school forest reserves of the Byelorussian Republic pupils themselves grow saplings, plant trees and take care of these plantations. The establishment of forest-gardens is very popular in Armenian Republic, at the North Caucasus, in the Carpatian region, where the young naturalists make annually tens of thousands of inoculations of cultural plant kinds at different wild kinds of fruit-trees. Now school forest-gardens are being established also in the other regions of the USSR.

The success of propaganda and education in nature conservation among young people mainly depends on the skill and knowledge of teachers in the field of nature conservation. For this reason the themes concerning the conservation of nature should be included to the programmes of qualification courses of school teachers and administrators. These people have to listen the lectures on the methods of teaching nature conservation, about the local tasks in the sphere of rational utilisation of natural resources, about the best ways of organization of school museum on nature conservation and etc.

Thinking about the future work of the Education Commission and its regional committees, I believe that we must besides studying and analysing and dissemination of experience in nature conservation, popularize also the development of the public forms of movement for the conservation of nature and its wise use from the social point of view, explain the importance of the establishment in all countries the public organizations, uniting in their ranks all levels of population, and doing their best in order to mobilize the efforts of people in the direction of nature conservation.

In cooperation with the Ecology Commission, the Commission on Education must explain the necessity of working out the fundamentals of scientific nature conservation, and the creation of special research institutions for this purpose.

The conservation of nature in its practical aspects could not developed in our time without the parallel development of the

appropriate scientific research. Sincronization in the progress of practice and science in nature conservation is the necessary and natural phenomenon. It is necessary because the practical complex management of interrelations between nature and society, of the exploitation of natural resources which includes their preservation and reproduction can be succeed only on the bases of scientifically founded recommendations concerning such management.

Natural confirmity in coordination of the development of research and practical measures in the fiels of conservation and rehabilitation of natural resources becomes clear if one takes into account that the negative results of influence of man's activities on nature which are discovered by the scientists and naturalists affect the living (often many-sided) interests of the society and give stimulus to prevent and to eliminate these negative results.

The most successful work in the field of rational utilisation, conservation and restoration of natural resources can be expected only in close cooperation and contacts between the scientists on one side and the administrators in nature conservation on the other. For the conservation of nature has great importance the research made and making by the resource managers, soil scientists, hydrologists, hydrobiologists, foresters, botanists, zoologists, game scientists, ichtyologists, hygienists, geologists, geographers and by the other specialists.

As a result of studying natural resources, their status and changes under the influence of economic activities the scientists worked out recommendations concerning about conservation and restoration of soils, forests, fish stocks, game; on the protection of water bassins and air from industrial pollutions. It is very important to fulfill these proposals on greater scale than now.

Research directed to the preparation of measures connected with the preservation, prevention of pollution and restoration of separate natural resources should be promoted further. They are extremely important for the increase of the productivity of agriculture, forestry, fishery and wildlife management, for better supply of industry with raw materials, for the improvement of water supply of all industries and for food stuffs.

Simultaneously it is necessary to develop and strengthen the integrated studies, based on the interrelations and interconnections in nature.

V.V. Dokuchaev, the founder of the modern soil science considered studying of interrelations of natural phenomena on the surface of land to be of great importance. He showed that the historic process of soil formation is conditioned by complex

interaction of maternal rock, plants, animals, climate and relief. The ideas of V.V. Dokuchaev were developed further in the works of sylviculturists, geobotanists, geographers, hydrobiologists, animal and plant ecologists.

Valuable material showing the interrelations in nature, biogeochemical rotation of substances, giving the picture of different ecosystems one can find in the remarkable edition : L'écologie Science Moderne de Synthèse, Vol. 2, Ecosystemes et Biosphere. Bruxelles, 1962, and in a number of other works very popular at nowadays.

The material of such kind, which presents the object of ecology (in its broad sense) and the achievements of this science are extremely important for the determination and solution of the tasks of nature conservation.

The conservation of nature is served also by biogeozenology - the science right for the existence of which was proved by V.N. Sukachev and which in accordance with his definition studies "the interrelations and interdependance of natural phenomena, developing on the land surface".

But the basis of nature conservation should be its own science. The object of this science is the natural complex being studied in interaction with man's activities.

Man involves into economic turnover great amounts of different substances, processes them, moves them over and disperse them into space. This leads to quick and steady changes of all natural resources, chemical composition of waters, soils and air; means using the terminology of V.I. Vernadsky the change of structure of the biosphere. Practically at present time there are no such regions on the Earth where one does not feel the influence of the economic activities of the society. The volume and scale of the geochemical activities of Man even now could be considered as colossal.

Studying the dynamic of natural complexes (biogeozenosis, ecosystems) in connection with man's activities, the science about nature conservation takes into consideration natural processes on the background of tasks appearing in the development of all economy, work out practical recommendation on conservation, rational utilisation and reproduction of natural resources as a whole paying attention to manifold and ever growing material and cultural needs of the society.

Taking into account the degree of the society's influence on nature the science about nature conservation deals with the following three types of natural complexes.

1. The complexes included into the permanent process of utilisation (Cultivated lands, exploited forests, water reservoirs and etc.) Here the science is trying to define the best ways of conservation and improvement of the general biological productivity of such complexes at the expense of different natural resources, as well as to work out measures aimed at the protection of environment from pollution.
2. The complexes destructed by man's activities (industrial dumps, quarries, sandpits, and etc.) The task is to restore the biological productivity, aesthetic values and sanitary-hygienic importance of these complexes having in view different natural resources.
3. The complexes existing in conditions of growing economic activities in a state of relative undisturbance (wilder-ness). The task here is to expose the most valuable of such complexes and to show the ways leading to their conservation keeping in mind manifold needs of present and future generations of mankind. All this affair is closely linked with the strivings to protect rare and vanishing species of plants and animals, the survival of which can not be provided without their particular environment.

The methods of nature conservation research are partly specific and partly are general with other branches of science. The very key stone, in other words, the most characteristic features of these methods is the estimation of the outcomes of man's influence on the natural complex.

The question about the name of the science on nature conservation has not been decided yet. The Polish scientist, professor W. Goetel in 1965 proposed the term "sozoology". It seems to me that it is better to use the expression "sozoecology" (where "sozos" - conservation, preservation, "oikos" - environment and "logos" - science).

Sozoecology is the science about the conservation of the natural environment (biosphere), in other words, about the conservation of the living conditions of man. This science can be successfully developed in close interaction of scientists representing different directions of natural and social sciences. In a number of problems it has ties with technical sciences, for instance in the sphere of working out of measures of restoration of lands destroyed by industry.

The existing network of scientific research establishments of the world studying ways of conservation and reproduction of natural resources deal mainly with separate resources only - soils (soil science and agronomical institutes, laboratories

and faculties), waters (Hydrological and water economy research institutions), vegetation (botanical forest economy and other establishments), fauna (zoological and wildlife management institutes), etc. These research establishments approach to natural resources generally as to separate objects and that is the result of the specialization of sciences and the demands to them on the part of the appropriate branches of economy.

In order the scientific works directed to the solution of problems of harmonic utilisation of natural resources taking into account existing interrelations among the components of nature as well as the influence of man at the natural ecosystems will be success, it is necessary to organize special research establishments. In our opinion such establishments must be created in the form of institutes on nature conservation.

During some past years the institutes on nature conservation were organized for instance in the Netherlands, German Democratic Republic, Austria, Poland, Czechoslovakia. From 1962 the Central Laboratory on Nature Conservation has been operating in the USSR. The Laboratory's staff now is 50 scientists.

The success of research and practical activities in the field of nature conservation greatly depends of the cadres of competent specialists. The specialists in nature conservation first of all deal with the natural complexes. Spreading their interest in separate resources they have to consider the questions of the conservation and restoration of the natural resources from the broader positions than the specialists engaged in particular branches of economy for example in forestry or water economy.

For the forestry first of all it is important to get the maximum timber production from some squire unit. But besides this the tasks of nature conservation include the development of forests as soil protective, water and climate regulating factors, the creation in forests the favourable conditions for fauna and recreation. For this reason, for instance, forest one-crop species, plantations of which are widely made by foresters do not confirm the mentioned tasks.

The water economy specialists are striving to provide population and different branches of the economy with water, but the nature conservation specialists can not limit themselves only with this. They should take the integrated approach to water utilisation which include measures of reproduction of fishes, of the preservation of good conditions for life of useful animals, of the protection of rivers and lakes as an important social factor integrally tied with the landscape.

Great role in training nature conservation specialists belongs to high educational establishments and it seems to me, first of all to universities where it is useful to create special chairs of nature conservation.

It will be of value also if universities have opportunities to accept a theses for defence of scientific degrees in nature conservation. On the par with training of cadres of scientists and specialists in nature conservation it is necessary to read a special course "Nature Conservation" at different high educational establishments keeping in mind that the future workers of different branches of industry, agriculture, public health, culture or education should know the tasks and principles of nature conservation and take them as a guide line in their practical activities.

In our opinion, the course "Nature Conservation" must have two parts : general and special.

At any educational establishment irrespective of its type it is necessary to define the tasks and ways leading to the realization of nature conservation as an integrated problem; the reason of the development of all this affair, ecological interrelations in nature, consequences of the violation of the biological balance, history of nature conservation movement, legislation, organization scheme of nature conservation in a country, its international aspects, the duties and functions of different agencies, society and population.

The special part of the course it is useful to differentiate taking into consideration the profession chosen by students for their future activities. For instance it seems to me while reading the course to the biologists there is no special necessity to tell about methods of conservation and increase of population of different animal and plant species. With this questions they should be acquainted from the courses of zoology, botany and ecology. But it will be of interest for the students-biologists to come to know from the course "Nature Conservation" about the influence of different forms of the economic activities and the environmental pollution at the biological resources, about the economic and social role of correct utilisation, conservation and restoration of the animal and plant resources.

It is not necessary to say additionally about the questions related to the control over soil erosion and raising of soil productivity to the students of the agricultural high educational establishments who study them in the courses of soil science and agrochemistry. At the same time it is extremely important ot tell them about methods of land restoration (recultivation), spoiled by industries, about the agrotechnical measures promoting the conservation of useful fauna, methods of combating against the pollution of the environment by agricultural wastes, as well as to touch other themes connected with the influence of the agriculture at nature.

In the lectures for the students of technical specialities it is necessary to pay bulk of attention ot the methods of combating the pollution of air, water and soil, to elucidate the positive experience of work in this respect of the industrial enterprises in different branches of economy.

For the students training in the pedagogical field it is important to know the methods of teaching nature conservation at schools.

In our opinion the course "Nature Conservation" will give the best results if read during the last or next year of education at high educational establishments when the students have studied already the special subjects. It is very important to combine lectures with out-of-doors studies during which to acquaint the students with different practical measures in the field of nature conservation.

The integrated course of nature conservation is being read at a number of universities and other high educational institutes of Poland, Czechoslovakia, German Democratic Republic, Finland, the USSR, the USA and of some other countries.

The important task of the IUCN Commission on Education is to promote the establishment in countries the agencies for nature conservation which exercise state control over the utilisation, conservation and restoration of all complex of natural resources. Striving to fulfill this task the Commission should generalize and disseminate the experience of those countries, where there are such agencies.

The Commission on Education have to found the activities on the understanding of the fact that the successful solution of nature conservation tasks depends of deep knowledges about very complex relations among natural processes and activities of man. The activities in the field of nature conservation education is of great importance for the establishment of the most rational ties between man and nature, for the conservation of nature in all its remarkable manifestations on the benefit of present and future generations. The Commission hopes that it will make its own contribution to the development of this activities.

INTERNATIONAL COMMISSION ON NATIONAL PARKS

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Saturday 30 March, 1968 : Afternoon Session

Prof. Jean-Paul Harroy took the chair and pointed out that the Papers for this Session concerned three items. The Secretary of his Commission, Fred Packard, was unable to attend and so his place would be taken by the Executive Secretary of the Latin-American Committee on National Parks, Dr. Buchinger.

21. National Parks and scientific investigations:

21. 1. "National Parks and scientific investigations" by Milan Dimitri, Argentina.

The author spoke to his Paper, a summary of which is published in these Proceedings.

21. 2. "Scientific Research in National Parks" by Richard S. Cowan, U.S.A.

The author summarised his Paper, emphasizing that the proposals for close international cooperation and guide lines for mutually agreeable participation, were in a preliminary form and were presented for reaction and discussion. He would welcome suggestions for modification of them.

21. 3. "The Relation of Research to park management" by E.M. Nicholson, I.B.P./C.T.

The Chairman pointed out that IBP was at present holding its Third Annual General Meeting and that Mr. Nicholson was, therefore, unable to be present. He called upon Dr. Budowski, UNESCO, to summarise the Paper. In describing the Paper, Dr. Budowski referred to the proforma for management plans for national parks, game reserves and nature reserves, controlled areas, etc., which had been prepared by Dr. E.B. Worthington, Scientific Director of the International Biological Programme.

21. 4. "National Parks and scientific investigation" by Dr. Enrique Beltran, Mexico.

In introducing Dr. Enrique Beltran, the Chairman referred to his long connection with international conservation, and pointed that not only had he been a Member of the Executive Board of IUCN, but also that he had received the John Philips Medal for distinguished service in international conservation at the General Assembly of the Union, held in 1966. The summary of the Paper is present in these Proceedings.

## DISCUSSION

Magnanini (Brazil) : the International Agreement, proposed by Dr. Cowan, was very interesting, but it could not be used in National Parks and Equivalent Reserves. Brazil had more than 850 million hectares from which only 4 million hectares were protected as National Parks. It was of course essential that international collaboration in research and national research were needed, and that inventories, based on serial collections were urgently required. They should be conducted outside national parks and not inside them. In Brazil they were not against research, because they understood well how essential it was. They were, however, strongly against serial collections on preserved ecosystems.

Castex (Argentina) : three points were made. Firstly, that investigations in National Parks were essential for their appropriate use, and conservation, and the parks must have adequate equipment to do the basic research, in order to avoid overlapping and violation of reserved areas, a department of scientific coordination of investigations in national parks was necessary. Secondly, the comments of the previous speaker from Brazil are valid only if a species occurs outside the national parks. If a species occurs only within the park, obviously the scientific investigation on it must be done there. Thirdly, Dr. Cowan's project touches a problem about which the National Academy of Sciences in Argentina has been seriously concerned. Individual research workers constantly enter the National Parks, and prepare Papers and Reports which have not been discussed with local organizations and scientists, who are in a better position to know the true facts. The case had recently occurred on the peninsula of Valdes in connection with sea elephants. It was essential that visiting scientists should take into account local legislation and the knowledge already acquired by scientists in the country. He welcomed Dr. Cowan's project as being of great international importance.

Munoz Pizarro (Chile) : also welcomed Dr. Cowan's project, as establishing the sort of exchange which was required in Latin-America. Many of the original type specimens, collected in Latin-America, had been taken to other countries and very few of the countries of Latin-America retained them. It was essential to obtain an agreement in which type and original specimens remain, while the co-types go to Organizations in other countries. If this had been done in the past, then many of the expensive trips to Europe and North America would become unnecessary. The Cowan project should refer, not only to national parks, but also to all typical locations. If the types were originally taken in an area which was now a national park, it is obviously essential to collect again in those areas. If the type-specimens had remained in Latin-America, faster progress would have been made in taxonomy.

Cain (U.S.A.) : despite the fact that public visits to National Parks and related areas had increased explosively to nearly 140 million in 1967, it was estimated that no more than about 5% of the land has been developed by roads, camps, etc. for public use. Nevertheless the National Park Service was now designating roadless wilderness areas for action by Congress. When approved by Congress, it is guaranteed that the areas will not be developed in the future. In addition, the National Park Service is establishing special areas for three different purposes:

- a) basic research
- b) studies needed for management guidelines
- c) areas for nature interpretation, which may be called "Lands for Learning".

Also the Service is now encouraging the establishment of laboratories for research in the parks. They already exist in:

Hawaiian National Park, for studies of vulcanism  
Everglades N.P. for marine science  
Grand Teton N.P. for general science  
Yellowstone N.P. for wildlife and other studies  
by qualified scientists.

The Service is also preparing broad research plans for each individual park. These plans will be referred to in the preparation of Master Plans for the parks. The research plans are developed by teams made up of scientists from the academic field as well as those employed by the government. So I am happy to say that there is in recent years an upsurge in the USA of research on park problems so as to improve conservation management and to enhance visitor understanding and enjoyment of the parks. Although basic science is not the purpose, much fundamental knowledge is being acquired.

Swem (U.S.A.) : at the close of the First World Conference on National Parks in Seattle, Washington, U.S.A., July 1962, the possibility of recognizing the 100th anniversary of Yellowstone Park was discussed and recommendation no. 27, adopted by the Conference which stated:

"The First World Conference on National Parks recommends that this centennial be celebrated by publicizing the occasion, especially with appropriate publications in the various countries urging the formation and development of national parks, and by a conference to be held in Yellowstone Park and attended by representatives of all countries".

It seems fitting again to convene those who share responsibility for national parks and equivalent reserves throughout the world to take part in the 100th Anniversary of the establishment of Yellowstone, and at the same time to review progress over the past ten years and to plan together for the future. It is gratifying to see that fruits of the first conference are now appearing in many parts of the world. The economic aspects of national parks have been recognized by an increasing number of countries. Most satisfying of all is the greater awareness of the part national parks and equivalent reserves play in the lives of our people.

Although 1972 is still four years away the National Park Service is at work on basic proposals for a 1972 Centennial Commemorative Programme for Yellowstone National Park. We expect that within a few months preliminary plans for the Second World Conference to be held in conjunction with Yellowstone's Centennial can be announced.

You may be interested to know some of the things we are planning to commemorate the Yellowstone Centennial. A special effort is being made in establishing new National Parks, developing natural resource plans involving national park and historic sites; books and other illustrative materials on parks and resource conservation are being prepared and programmes to stimulate education in parks and other natural reserves are being initiated.

I am convinced the next ten years will be very critical in the field of national parks and related natural and historical resources. Working together on a world-wide basis we can more effectively stimulate processes necessary to provide rapidly expanding populations with suitable systems of parks to meet their needs. I hope later this year that the second world conference on National Parks can be announced, also that many other Governments will plan to participate.

Chairman : this Conference welcomes the statement made by the Representative from the US National Parks Service, although 1972 is still four years away, representatives of all countries should be aware of the proposal for the Second World Conference on National Parks, with which IUCN has been closely identified and he hoped that all would give it their full support.

Carvalho (Brazil) : the Brazilian Foundation for Conservation of Nature had sent a document to three Ministries in the Brazilian Government, suggesting that a special effort be made in the next five years to reorganize the Brazilian National Parks in order that they might reach high international standards. The three Ministries had accepted the proposal, which had been

made to celebrate the Centenary of the Yellowstone National Park, as homage to the country where the idea of National Parks was born.

Chairman : hoped all other countries would do their best to assist in celebrations and he, himself was arranging for the United Nations List of National Parks and Equivalent Reserves to be revised so that the next edition might be ready for the Yellowstone Park Centenary, in 1972.

Hartwig (Chile) : read a statement as a proposed Resolution, considering that national parks exist in bio-geographical areas, which are contiguous within the countries of Latin-America, the Chilean Delegation invites the countries concerned to combine their efforts and integrate their scientific investigations within parks by the exchange of information, methods and professional personnel.

Mendoza Paz (Argentina) : the policy of Argentina was fully in accord with the proposal made by the delegate from Chile. In fact, his Delegation had proposed to read at the end of the Session a draft Resolution to the same effect. He pointed out that there were already agreements between Argentina, Chile and Brazil and he hoped that similar arrangements could be agreed upon between other countries in Latin-America.

Chairman : this concludes the discussion on scientific investigations and national parks. As the Delegates knew, CLAPN chaired by Ing. Italo Constantino, receives information from scientists, concerning new data on national parks and forwarded it for the attention of interested governments. We have just received a message from INCORA, Instituto Nacional Colombiano de la Reforma Agraria, which reads as follows:

"Today we have completed and submitted information concerning the National Park of la Laguna de la Cocha o Patascoy in the Department de Narino, this report is based on information sent by the Scientific Secretary of CLAPN in 1965".

## 22. Marine Parks:

Two papers had been prepared for this item.

22. 1. "Conservation and Management of Seashore and Under-Water Areas for public enjoyment" by George B. Hartzog, Jr. U.S.A.

T. Swem (U.S.A.), apologized for the absence of the author of this Paper and said that he had requested him to take his place. Mr. Swem accordingly read those parts of the Paper which he considered to be most important.

22. 2. "Some concepts about Marine Parks" by Pablo Rosero

The author discussed his Paper and ended by giving six suggestions for the competent establishment of Marine Parks. He emphasized that when he had been asked to write the Paper, it was a new subject to him, and that he had done his best to go through the relevant literature and had included a bibliography.

DISCUSSION

Caldevilla(Uruguay) : referring to the previous Paper, many Papers on the geology, ecology and fauna and flora of the coasts of Uruguay were available. He did not agree that the only areas for development were on the Pacific coast. Uruguay had no natural resources such as the Andes, but that they had got 500 kilometers of beaches. 4,000 hectares of sand dunes had been planted with conifers from France, and the problem now was not one of development, but how to preserve the areas of coastline with its natural characteristics. The decree of the 2nd of June 1966, however, formed a National Monument of 26 Kilometers of coastline with 1,000 hectares of sand dunes. This will preserve for future generations sample of the original coastline. This area is in Cabo Polonio and they are also studying the sea-coast alongside in Laguna Catenia.

23. National Parks and Tourism:

The Chairman called the attention of the Meeting to IUCN's Publication No. 7, the Ecological Impact of Recreation and Tourism upon Temperate Environments, which was Part I of the Papers of the Technical Meeting held in Lucerne in June 1966. He proceeded to the two Papers prepared for this item:

23. 1. "Parks and Tourism" by Lawrence S. Rockefeller, (U.S.A.).

As Mr. Rockefeller was unable to attend the Conference, his Paper was presented by C. Carlozzi, U.S.A. He said that it was a particular pleasure for him to read the Paper, because Mr. Rockefeller had been a great advocate for conservation in the Caribbean, an area in which, he himself, had done much of his work. The Chairman pointed out that this Paper emphasized that there need be no antagonism between conservation and tourism, but there must be adequate cooperation to ensure that research, administration go hand in hand.

23. 2. "National Parks and Tourism" by Alberto E. Mendonca Paz (Argentine).

This Paper, a summary of which is included in the Proceedings, was discussed by the author. Whereas the previous Paper had given

recommendations in general terms, he would deal mainly with the National Parks in the Argentine, but nevertheless it would be possible to draw conclusions of a general nature from them. The Chairman called on the Secretary to make a statement:

Buchinger (IUCN) : at the Fifth Meeting of the Technical Commission of Investigation and Organization of the Inter-American Congress of Tourism, held from 29 February to 5 March 1968, in Washington, the following Resolution was unanimously adopted:

"Having been informed by the Latin-American Committee of National Parks, through its Observer, and owing to the importance of conservation of nature and natural resources as a means of promoting tourism, it was agreed to recommend to the Executive Committee and to the permanent secretariat of the Inter-American Congress of Tourism that they maintain close collaboration with the Latin-American Committee, so that they might develop draft plans to reconcile tourism and conservation".

Erize (Argentina) : he represented a Tourist Company, which was largely concerned with fauna and flora. Tourism in Latin-America at present was concerned with scenic beauty, and in general not enough attention was paid to nature and the fauna and flora in particular. In Africa, for example, a large part of their income from tourism was derived from people who wish to see the fauna and in Latin-America large numbers of naturalists could be absorbed in the Parks and National Sanctuaries. To do this, however, the guard system must be built up and they would have not only to patrol the National Parks, but also to educate the general public. He suggested that funds could come from such things as rights of way, and he hoped that the richer nations and international organizations would also help.

Mendonça Paz (Argentina) : thanked the previous speaker and pointed out that the matter of finance for the Parks in the Argentine was under consideration, in particular the question of charging admittance fees. Consideration in the next plan would be given to an increase in the number of wardens, but it must be remembered that each one inclusive of house, transport, etc. came to between 8 and 10 million pesos.

Chairman : pointed out that it was now very late, and that it was impossible to continue the debate. He asked, however, Mendonça Paz to read some Resolutions.

Mendonça Paz (Argentina) : proposed two Recommendations on the protection of scenic resources outside National Parks, and a system of National Parks in the Western Hemisphere, which were incorporated in Resolutions Nos. 22 and 23.

Munos Pizarro (Chile) : supported the proposition.

Chairman : with these two proposed Resolutions, this Session must now close.

21. 1. "National Parks and scientific investigations"

by Milan Dimitri.

In this work the author presents several considerations about the importance which scientific investigation bears on National Parks, equivalent reserves and new areas to be included in that protectionist regime.

Inasmuch as the fundamentals for the creation of a National Park must be given by specialists, so as to avoid the inclusion of inadequate areas, it is also convenient and unavoidable that all the National Park services have at their disposal a special-ited department for continuous investigation of the flora, fauna, the scenic beauties and archeological, paleontological and ethnographical treasures.

If any other conservationist policy would be attempted, it could lead to an empirical consequence, and worst of all, through lack of fundamentals, could produce the degradation of the resources which are to be preserved.

Within this team of researchers, the intervention of the ecologists should predominate. Ecology is a branch of Science which studies the relationship between living organisms and their environment, and gives the guideline for a correct management of a National Park or equivalent reserve.

Finally, it is deemed urgent that all studies related to natural resources and conservation of nature were introduced in Universities and higher educational institutions, where National Parks and equivalent reserves would play a fundamental role. Not only because of their richness, natural beauty, but also for being true sanctuaries of nature and the center of the concentration of species, where the researchers will find invaluable material for their scientific investigations.

21. 2. "Scientific Research in National Parks"

by Richard S. Cowan.

It is remarkable that at a period in its history, in 1833, when even survival was a daily concern for the five to six million souls that populated the United States, the first suggestions for the creation of National Parks by the Federal Government were recorded. However, the first such natural reserves were not established until 30 years later with the setting aside of Yosemite Park in 1864 and of Yellowstone National Park in 1872; the thirty-first National Park was created just five years ago when the population of the country had grown to 180 million. The establishment of the first National Park at a time when man was in dynamic competition with the biosphere is scarcely more impressive than those created most recently when man has won so much from his environment and competition has centered more within the human species. In the early days of the North American colonies people were more interested in exploitation, rather than conservation, of the natural resources. Although one can hardly say that economic exploitation of the land is past, the existence of more than 40 million acres of various sorts of natural areas indicates a growing concern by the people of the United States to preserve for future generations an interesting and varied environment in which to live. Nor is this a phenomenon peculiar to the United States, for all over the world, men of vision are removing from severe disturbance, representative parcels of the natural heritage with which each nation is blessed - in Latin-America, in Southeast Asia, in Africa, and elsewhere.

But is there any common philosophy underlying these actions? Really, why should we eliminate such areas from potential development. Perhaps, part of the answer is contained in the Act of 1916 which established the Park Service which included these words: "The National Park Service shall promote and regulate the use of the Federal areas known as national parks, monuments and reservations... to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations". Today, especially in the last ten years with the growth in popularity of outdoor recreation, many of our people view National Parks as campsites, as playgrounds, primarily recreational in nature. Their use of the parks for such purposes and the accompanying development of roads and clearings have profound, sometimes irreversible, effects on the natural environment, which we must understand better, through research programmes.

Numerous reports, the most recent and authoritative, a 1963 National Academy of Sciences report to the Park Service, have called in distressful tones for the natural history research

which should, indeed must, accompany any alteration in a park area. Although some research had been accomplished in the preceding 50 years, the Academy report states it "has lacked continuity, coordination, and depth". Now, the national conscience has stirred, partly as a result of this excellent report, and there is every indication of major scientific attention to the research needs for intelligent management of these precious "vignettes of primitive America", as an earlier report described them.

It is no accident that the improving climate for scientific research in National Parks has evolved with the growing use of the words "ecosystem science" as a definition for ecology. The realisation by the majority of ecologists that understanding the environment depends on studies of the entire system, is leading to subdivision of National Parks into sections, some of which are left totally unmodified where natural processes are free to operate without any manipulation even by researchers. Other sections are maintained in a natural-appearing state and are affected to some extent by public use. Still other sections, for camping, hiking, swimming, and other recreational uses, are clearly set apart from the natural and undisturbed ones. The ecosystem scientists, that is, the ecologist, thereby has available what he must have now and into the future: unspoiled areas to serve as standards for observing how such systems operate naturally, for comparison with adjacent areas in which varying degrees of disturbance and recovery have occurred. The very availability of such research areas invited his attention, especially in view of the tragically rapid disappearance of unprotected areas for his researches.

As a member of the U.S. National Committee for the International Biological Programme, I would be remiss if I did not attempt to indicate the relevance of my subject to IBP activities now getting underway. The principal goal of IBP is a worldwide understanding of the potential productive capacity of the many ecosystems we know exist. This is no esoteric goal, for it is founded on the obvious fact that human population is rapidly outrunning the presently available techniques to feed and clothe its burgeoning numbers. Nor should we be content merely to be alive, to sustain life, for aesthetic, spiritual values can also be preserved, if we act wisely sufficiently early. With this primary goal, the IBP involves to a major extent what I have referred to as ecosystem science. We will be successful in matching biological productivity to human needs in proportion to the level of understanding we achieve regarding the natural processes active in every ecosystem. Thus, it becomes absolutely critical that representative natural areas - those to be left undisturbed, those for manipulation, and those which have been altered severely already - be preserved now

while they still exist. But preserving them in a legal sense is not enough unless adequate protection against the poachers, the squatters, the lumbermen, and the engineers is sought and finally obtained.

This may be as good a place as any to stress the need for preservation of representative aquatic habitats - rivers, estuaries, and the parts of the sea along our coasts. Certainly the sea, man's greatest and most abused disposal system, holds enormous potential for the future but, just as on land, there is scant, even less, knowledge about its inhabitants, their interaction with each other, and the physical factors involved in this largest of all our ecosystems. As many of your countries begin planning your participation in the IBP, I hope you as the guardians of your nation's natural resources will embrace IBP goals as your own and participate to make this great international dream a reality.

Now, let us ask specifically what needs to be done, what can be done, not only in the newer national parks over the world but in those of the United States as well. One of the most basic requirements for ecosystem research has not been realized in many of our natural areas - the indispensable inventories of the plants and animals which populate the system. Often nothing more can be done initially, and these inventories must be completed as rapidly as manpower and funds permit. The establishment of a national park or other natural area anywhere in the world should include plans for such inventories, without which there can be neither significant research nor intelligent management of the ecosystem. This poses very special problems in less populated areas, in the tropics for example, for neither the manpower nor the funds are available in any one country to support this sort of basic research. As one result, the biologists of the world look to each other for collaborative, cooperative arrangements which will provide basic inventories for the use of those who lay the groundwork for wise use of natural resources. These arrangements are particularly important, often critical, in the case of research in parks and reserves in view of the special status and requirements for protection in such areas. However, to ensure maximum cooperation with the increasing numbers of visiting scientists involved in the IBP and other international programmes, advance agreements are of enormous importance regardless of whether or not the research is carried out in a reserved area. Already there has been a start in this direction with individual agreements involving varying degrees of cooperation, based on generally accepted practices. In view of the urgency and importance of such efforts, it has occurred to many of us concerned with tropical biotas where so much remains to be discovered, that we may have reached the point at which more formalized agreements governing the planning, execution, and equal sharing of results of field studies in each other's

countries should be agreed upon. With this conviction in mind, the directors of the principal systematic collections in North America agreed last March to the preparation of a draft document which would provide the basis for fully cooperative research agreements between institutions and individuals from one country working in another. Several of my colleagues at the Smithsonian Institution, the official repository for the National Collections of natural history objects in the U.S., have worked with me to prepare the draft I am about to present for your consideration and reactions. I will emphasize that it is only a draft with which we need the assistance of biologists and conservationists everywhere, so that when it is presented in final form for acceptance by research institutions over the world, it will represent the best possible effort of all of us to establish a meaningful foundation for working together in the decades ahead.

### Proposed International Convention for Field Studies in Natural History.

Preamble: Science, living organisms, habitat types, climate, and natural biological principles disregard political boundaries. Because natural history, especially systematic biology, includes a large number of disciplines and subdisciplines requiring enormous numbers of specialists, international cooperation is not a matter of taste or preference, but an absolute requisite to the successful pursuit of biological and geological researches. No single nation can train and support more than a fraction of the specialists required to define, identify, and describe the natural world in which we live. Therefore, biological research programmes, of necessity, become large-scale, international, cooperative undertakings.

In order for such collaboration to function smoothly, an internationally accepted Convention, consisting of statements concerning policies and practices governing the actions of both scientific institutions and individual scientists, is required. Adherence to this Convention and observance of its provisions will greatly facilitate the orderly movement of scientific people, materials, and information, increasing the effectiveness of investigations in the field, in the museum, and in the laboratory.

### Section I. Institutional Practices, Policies, and Responsibilities.

Article I-1: A signatory institution accepts responsibility for the actions of scientists under its sponsorship who undertake research in another institution or country.

Article I-2: Civil and scientific authorities in each country are encouraged to extend all appropriate assistance and cooperation to the scientists representing the signatory institutions adhering to this Convention. Cooperative efforts are often facilitated by assistance in the host country with visas, import and export permits, required licenses or permissions, local transportation and other field perquisites, etc.

Article I-3: Each institution adhering to this Convention accepts the responsibility to protect and preserve the collections, and other data deposited with it, in a manner consistent with the best interests of science and will, insofar as possible, maintain generally accepted standards for such caretaking.

Article I-4: Adhering institutions recognize their obligation to make collections and data deposited with them accessible to qualified scientists without regard to nationality or to institutional affiliation, subject only to normal measures required to protect the collections and to comply with special institutional regulations and work schedules.

## Section II. Responsibilities of Scientists.

Article II-1: Frequently, expeditions or field investigations are undertaken through cooperative arrangements and cooperative efforts between visiting and host institutions. In recognition of such cooperative support, results will be shared, both in terms of specimens and data collected, and by the publication of research results in media accessible to scientists and other users in the host country.

Article II-2: Visiting scientists will identify and correspond with the appropriate local authorities, scientific and/or other, to inform them of the kind of research proposed and the anticipated locality (-ies) of the host country in which the research may be carried out. Such correspondence should be sufficiently in advance to permit effective cooperation by both host and visiting scientists; it should include a statement of research objectives, personnel involved with their sponsorship and affiliation, and the nature of any cooperation desired.

Article II-3: Whenever possible and practical, it is desirable for the results of joint collections and research to be published jointly with the host scientists involved. When this is not possible, adequate acknowledgement will be given to the local authorities and/or scientists whose permissions and cooperation made the expedition or investigation possible.

Article II-4: Guest-scientists will provide to host scientists and/or other authorities in the host country, notification of results of the expeditions or investigation, copies of publications, and any other appropriate scientific information.

Article II-5: Particularly in developing countries, guest-scientists as often as practical and mutually desirable, will include in their planning the training of qualified students and young scientists of the host country. This will often take the form of participation by host country personnel in some capacity.

Article II-6: Visiting scientists will respect the laws and regulations of the host country. Host countries are encouraged to make information on pertinent legislation available to the visitor, who will, in turn, use such information to become familiar with any and all laws and regulations pertaining to his activities in the host nation. Where special permissions are required, visitors will obtain them from the appropriate authorities in the host country.

Article II-7: Scientists of all countries have a special responsibility to support and observe the conservation laws and regulations of the countries in which they work, particularly those relevant to protection of rare and endangered species.

Article II-8: Scientists of all countries will not make excessive requests for specimens of rare or endangered species. Host countries are urged to recognize that protection of such species is best accomplished by regulations pertaining to individual species, based on their total biology, rather than by general laws governing all scientific collecting.

### Section III. Sharing of Voucher and Study Collections.

While acknowledging that circumstances governing the sharing of specimens will vary widely, depending on the nature of the collections, the relative contributions of host and guest scientists, the needs and facilities of the host institution, and especially the mutual, advance agreement reached by the two parties, the following will be used as guidelines to disposition of collections. These are not to be interpreted as legalistic statements but are presented as a basis for advance negotiation leading to mutually acceptable understandings. The guiding principle is that disposition of collections must be accomplished in a manner that will best serve the needs of international science, as well as those of the host nation.

Article III-1: Except for endangered and rare species, collectors will strive to obtain adequate series, sufficient to permit sharing of all or most collections by both the host and the guest institution (-s) for future intensive study, rather than the minimum required for voucher purposes or that required by common courtesy. Because the exchange of collections between institutions is a well-recognized means of disseminating biological information around the world, the practice is encouraged and the legitimacy of collecting for this purpose is recognized. However, scientists will not collect in excess of reasonable scientific requirements.

(a) Plant collections are commonly made in suites of ten or more replicates, any of which, if properly collected and prepared, serves to represent a plant population; these are usually deposited in the herbaria of as many institutions.

(b) Collections of insects, smaller invertebrates, and small vertebrates are usually made in sufficiently large series to permit division without loss of information content and may properly be deposited in two or more institutional collections.

(c) Difficulty in capture and preparation of large vertebrate collections often makes impractical the collecting and housing of large series. In such instances, representative specimens may be selected that will satisfy the needs of two or more institutions without serious information loss.

(d) It is incumbent upon host and guest scientists that mutually acceptable plans for disposition of specimens be determined in advance of actual field operations, so that adequate quantities and kinds of samples will be obtained by the collectors. The spirit of the preceding articles will be used in sharing data and kinds of collections not mentioned herein.

Article III-2: Consideration of the appropriate location of type specimens of new taxa will be based on the inherent responsibilities of institutions for their protection, and the accessibility of such type materials to scientists everywhere.

(a) Since new taxa are usually not recognized until the collections have been studied by specialists, part of each collection, or series, should be deposited in a host institution. Such materials may subsequently serve as primary types or secondary types.

(b) Designation of the place of deposit of types of all kinds, taking into account the provisions of the International Codes of botanical and zoological nomenclature, is the responsibility and prerogative of the scientist who describes the new

taxon. This may be the host institution, the guest scientist's institution, or that of the specialist who describes the taxon but is not affiliated with either the host or the guest institution.

Section IV. Agreement.

In recognition of the opportunities, rights, and obligations of both guest and host scientists, as well as their sponsoring institutions, to advance man's knowledge of his environment and in the spirit of true sharing in the tasks of study and documentation of the natural history of the world, I, \_\_\_\_\_, signify the

(Responsible Officer)

intent of \_\_\_\_\_ to adhere to the

(Institution)

foregoing principles and articles of this Convention.

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Institution)

\_\_\_\_\_  
(Date)

That is the document as it stands in preliminary form, ready for your suggestions to improve it. You will have noted that, for the most part, it is couched in general terms. This is deliberate because a document that is too specific would not apply sufficiently widely to the diverse institutions and conditions over the world. The document draft attempts to present a philosophy, a spirit, on which institutions can agree as being desirable and within which advance arrangements ensure sharing in participation and results by both the host country and the visiting representatives of another. I would be very pleased indeed to have your comments, individually and collectively, and I will make myself available for consultation with individuals and groups throughout this conference. Thank you for your attention and, in advance, for your assistance.

21. 3. "The Relation of Research to park management"

by E.M. Nicholson.

It is becoming widely recognised that the relation of science to the selection and management of natural areas is not simple, and is more controversial than has usually been assumed. The following brief outline may serve as an agenda for the fuller discussion of these problems which is urgently needed.

How should a choice be made of an area to become a National Park? In earlier days grandeur of scenery, peculiarities of landform and tourist values played a predominant part in some countries, while faunistic and floristic interest and ecological richness, especially for conspicuous wildlife species, were paramount in others. This divergence of objectives and functions is no doubt healthy and legitimate, but it does call for more serious analysis of the role which scientific considerations should play in the choice of new National Parks, the degree to which a single National Park can by zoning and other means, be enabled to serve fully both tourist and scientific requirements, and the methods by which the necessary survey, advice and consultation are better secured at a sufficiently early stage in the project. The conclusions thus reached may point to the need for either the setting aside of larger areas to serve diverse needs, or the creation of separate series of Nature reserves safeguarding scientific areas independently of National Parks system orientated mainly towards human leisure needs.

Not only the decision whether or not to constitute a given area as a National Park, but the demarcation of boundaries, raise important and difficult scientific issues. The Serengeti National Park in Tanzania was, as Dr. Grzimek demonstrated, wrongly constituted and failed to allow for the seasonal mass migrations of the vast herds of herbivores forming its principal and unique interest. Efforts to correct these errors later have led to endless difficulties, although thanks to an enlightened attitude on the part of the government the essentials have been safeguarded. Similarly the geometric boundary lines of Mount McKinley National Park, Alaska, conflict with any ecologically meaningful unit. In many cases it is politically or economically difficult, if not impossible, to adopt the boundary which would be most satisfactory scientifically. In such cases what principles should govern compromise?

Next come the scientific aspects of human impacts. How far should buffer zones be included to provide against actual or future pressures? Which types of multi-purpose use are consistent with the aims of the Park - a point which may be illustrated by pressures for winter sports development in Parks as far apart as New Zealand, Japan and Canada. Hydro-electric projects, mining enterprises and telecommunications structures are other

frequent sources of controversy which tend to be considered rather from their aesthetic than from their scientific implications. Grazing, and to a less extent, fishing, raise the issue of permitted cropping of renewable resources. Traffic and other facilities can give rise to interference with drainage, erosion, pollution, pest infestation and other evils, apart from their frequent tendency to compete for sites which are of high scientific value. Even much walking can sometimes do much damage as the University of Colorado study in the Estes Rocky Mountains National Park has shown.

Probably the best medium for measuring and evaluating such problems is by preparing a scientific management plan - very different from the administrative Master Plan which is most often the only basic document for supervising the development of a National Park, based on Olmsted's pioneer plan for Yosemite just over a century ago. Such plans have been used with success on a larger scale in Great Britain, and also in East Africa and other parts of the world. An outline of what they contain, prepared by Dr. E.B. Worthington, now Scientific Director of the International Biological Programme, is attached as an Annex for information.

A particularly difficult problem is presented by modern experimental methods sometimes involving severe local disturbance or destruction to a habitat - for example by felling of trees or massive collecting of animals. Should such activities be permitted in a National Park, and if so, within what limits? If not, what alternative provision is to be made for them, and how is effective consultation to be maintained between the scientists and the land managers concerned? These questions were briefly discussed at the First World Conference on National Parks, at Seattle in 1962, but further explanation is needed.

Another neglected aspect in which the scientific element is important is the regular monitoring, recording and reassessment of the actual as distinct from the intended results of management and the evolution of the fauna, flora and landscape. It is probably true to say that nowhere on earth is this essential function yet fulfilled to an adequate standard. It cannot be done by busy non-specialist park managers: in physical terms it is more comparable to the financial audit of a large agency and it calls for similar skill, time and independence.

Finally there is the problem of reconsidering at intervals the role of National Parks and the extent to which they are fulfilling it. The whole future orientation and success of National Parks depends on this being done well, and to do it well needs a built-in element of scientific advice. A comparison of the twin Iguazu National Parks, one in Argentina and the other on the Brazilian side, will demonstrate how differently

National Parks even in the same place can develop. These differences are significant, and their study can teach us much.

## ANNEX I

### Pro Forma for Management Plans for National Parks, Game Reserves, Nature Reserves, Controlled Areas, etc.

by Dr. E.B. Worthington, Scientific Director of the International Biological Programme.

#### 1. Name and general information.

Give such basic data as location, legal status, area, altitude, references to available maps and to air photographs with dates. There may be references also to ground photographs or films which provide material for subsequent comparison.

#### 2. Reason for establishment and history.

Summarise what has happened to the area both before and after it became used for conservation and the circumstances which lead to its present state.

#### 3. Surveys and scientific information.

Divide into a dozen sub-headings (according to the area more or less may be needed). They are arranged in a logical order dealing first with the physical factors of the environment, then the soils and vegetation which are dependent thereon. And so, via the fauna, to the human activities. This section should be a summary of everything that is known about the area and it should include if possible, complete references to publications.

- a) Topography
- b) Geology
- c) Climate
- d) Water regime
- e) Soils
- f) Vegetation and flora
- g) Fauna
- h) Land Use history
- i) Archaeology and ancient monuments
- j) Communications
- k) Public interest

#### 4. Objects of management.

This is generally much the shortest section of the plan, but the most difficult to write. It comes here rather than at the beginning because the objects need to be thought out against the background of everything that is known about the area. The

fewer and shorter the sentences used in defining the objects the better, but it may sometimes be helpful to classify the objects into such categories as economic, scientific, conservation, public access.

#### 5. Management Programme.

This provides the real body of the plan arranged in a programme covering a period of say five years. It is convenient to break this down into subsections such as:

- a) Scientific management of water, soils, vegetation and fauna;
- b) Estate management, such as improving and maintaining communications, buildings, fences, etc.;
- c) Subdivisions, e.g. a part open to the public and another part closed, or special areas ear-marked for testing the effect of management operations such as controlled burning or cropping surplus animals.

#### 6. Public Access.

This has special importance in the case of National Parks where the visiting public have to be provided for and controlled in various ways.

- a) Permits to visit, collect, photograph, etc.
- b) Rights of way and by-laws
- c) Special problems such as safari lodges, camping sites, hazards, public education.

#### 7. Time schedule, finance and priorities.

This is in some measure a summary of sections 5 and 6 but rearranged in a clear schedule and where possible costed.

#### 8. Staff and division of responsibilities.

- a) Headquarters staff
- b) Specialist Officers
- c) Wardens
- d) Delegation of functions to juniors

#### 9. Progress reports and routine observations.

This section is important as a reminder to the staff in charge.

#### 10. Bibliography.

Arrange as for a scientific paper.

21. 4. "National Parks and Scientific Investigation"

by Dr. Enrique Beltran.

National Parks should serve three different functions: a) recreation; b) education; and c) preservation of undisturbed areas for research.

Frequently it is difficult to coordinate such aims. Generally recreation is the one which receives most public support, and, in trying to give as many facilities as possible to visitors, an undesirable impact is made on areas that should have remained untouched for scientific research.

As public demand for recreation is very strong, it is almost impossible to resist it unless a compromise is accepted. As a practical way to ensure that at least a portion of the parks remain undisturbed, the author proposed at the International Congress on National Parks at Seattle, the "Zonation" principle as follows:

- I. Recreational areas near the access points to the park, with all needed accommodation and facilities as required by visitors.
- II. Intermediate areas open to all visitors, but with no automobile roads, only trails and occasional clearings for camping.
- III. Restricted areas prohibited to the public, open only to qualified scientists with specific permits for research.

Using when necessary the above-mentioned zonation, three types of scientific research are required, according the three purposes of a National Park.

- I. For administration purposes: general knowledge of the Park; basic maps of different sorts; simple inventory of the flora and fauna. The results will provide the basic information for sound management.
- II. For educational purposes: better knowledge of the geography, geology, flora and fauna of the Park with the aim of establishing a Museum, as complete as possible, and of preparing materials such as manuals, leaflets, guides, posters, etc., to be used by teachers and pupils.

Those two lines of research should be considered as direct responsibilities of the National Parks Service, to be carried on by their own scientific staff, which must be an essential part of it.

III. For scientific research: any basic and important project that will need the possibilities of the undisturbed area. This kind of research will not be a responsibility of the N.P. Service, which role should be only to open the restricted areas to qualified scientists, giving them as much help as possible, but not allowing undue disturbance of the area, as opening roads for vehicles, or building permanent constructions.

22. 1. "Conservation and Management of Seashore and Underwater Areas for public enjoyment"

by George B. Hartzog, Jr.

With man's expanding knowledge, pressing numbers, and consumption of his natural terrestrial environment, he turns now to the last great earth-bound frontiers, the oceans, in his search for food, oil, minerals, and other economic resources, as well as for pleasure and recreation. To some, it may seem to be a rekindled instinct from our ancient hereditary relations with the sea. To others, it is a response to an urge to get away from the tempo of the city. We now are seeing deep drillings for oil and gas in the oceans and great lakes of the world. Diamonds are being mined off the coast of South Africa. New methods of fishing with the use of electronic devices bring new and increasing catches. Scientists are exploring the seas to ever greater depths, and man is now able to reach a whole new dimension in this vast water world.

In the course of these developments man has rediscovered the seashore, the great meeting place of the world of land and the world of water. He has come to realise that the margins between these worlds are zones of increasing importance to his economic and social existence. Here, where land and sea meet, oxygen and sunlight join with the waters to permit a special array of living things to grow, and to create beauty for man's refreshment. But he also has come to realise that under the oceans, beyond the shore, lies a vast and even more mysterious marine world which awaits his attention.

Whatever motivates us to visit the sea, it is a compelling force. This growing interest is world-wide, and moved the First World Conference on National Parks (Seattle, Washington, 1962) to invite: ".....the Governments of all those countries having marine frontiers, and other appropriate agencies, to examine as a matter of urgency the possibility of creating marine parks or reserves to defend underwater areas of special significance from all forms of human interference....."

I am happy to see there is a world-wide response toward finding, while there is yet time, opportunity to preserve outstanding examples of seashore and underwater parks and recreation areas. I am sure you know that many countries are

now engaged in programmes of preserving the best examples of their coastal and marine environments. Nations on every continent have begun to recognise this need, and nowhere is this need greater than in the Western Hemisphere.

Though many of us have close ties with the sea, we find it difficult to realise the seriousness of the industrial and commercial inroads which have been and are being made on the seashores, beaches, and estuaries the world over. In this shrinking world the very society which created means by which man can more fully enjoy his environment is also providing the tools for its destruction. Pollution, the development of seaside industrial complexes, dredging and filling, petroleum and mineral extractions, are some of the expanding forces that are causing irreparable damage to marine environments.

This threatened destruction affords us, as resource administrators, both an obligation and an opportunity. We must make sure that such exciting experiences as hearing and seeing an ocean crash upon the beach, of exploring the dunes or tidal pools, or just viewing that area of eternal conflict between the sea and the land, are not lost to this and future generations. We have a duty to inventory our beaches, estuaries, and seashores, and to arrange for the preservation of a sufficient portion of them to meet our peoples' needs in the years ahead. We will sell our future short if we fail to do this. If we neglect this task, succeeding generations would condemn us. It would be sad indeed to contemplate life without some natural seashore where man can renew himself and again be, for a time, part of that life-giving environment.

In my own country we began in 1935 to seriously study the human values of our seashores. The National Park Service made an inventory of the available unspoiled shoreline areas of the Atlantic and Gulf Coasts, and recommended the purchase and preservation by the Federal Government of some 450 miles to be dedicated to public recreation. In 1954 this survey was updated and revealed that only 240 miles, or 6-1/2% of these coasts, including Acadia and Everglades National Parks, were then in Federal or State ownership and protected for public recreation. At that time it was strongly urged that not less than 15% of the total 3700 miles of shoreline should be taken into public ownership for preservation and management by all levels of government. Similar studies and recommendations were made on the Pacific Coast and the Great Lakes.

The people, the Congress, and the Executive Branch of our Government have given enthusiastic support to this continuing effort to secure shore property. The National Park Service now administers about 350 miles (excluding Acadia and Everglades) of outstanding beach and related coastal types in seashore parks such as Cape Cod in Massachusetts, Assateague in Maryland, Fire

Island in New York, Cape Hatteras and Cape Lookout in North Carolina, and Padre Island in Texas, as well as 56 miles at Point Reyes on the California coast. The governments of the States and municipalities have also been active in this effort, so that the chances for future public enjoyment of the seascape seem much brighter now. This expanding programme has also led to the designation of lakeshore and river areas in the inland states as well.

As a postscript to this account, I must point out that delays in starting this acquisition after the 1935 report have cost various levels of government in my country many times the purchase price of these lands at the cost levels of the 1930's. Let me cite examples. At Fire Island near New York City, properties selling in the late 30's for \$800 to \$1,000 now command ten times that much. On the Pacific Coast, near metropolitan areas, the cost of ocean frontage advanced an average of 2% per month during the 10-year period from 1954 to 1964. With this cost background of the recent past, what of the future? Clearly, we who hope to save examples of our shorelines must act promptly.

Despite this escalation of costs, it has become a tenet of my government that the people's heritage of shore, beach, and water shall be adequately preserved, and shall be available to future generations.

I would not presume to say that a crisis is imminent in other parts of the world, but there are indications in the Caribbean countries, where beaches adorn the islands- like jewels in a necklace, that competition for the best shoreline is rapidly removing many fine sites from public consideration. A recent study made by the University of Massachusetts of St. Croix, St. John, and St. Thomas in the U.S. Virgin Islands found that public ownership of beaches on these islands is severely limited, and that several of the remaining public beaches have been virtually destroyed by such actions as removal of sand for ever increasing building construction. If this trend is typical, seashore preservation programmes must be implemented with all possible speed.

We found that the most productive process started with our inventory of potential sites. This is needed to determine what and how much is left, where it is, who controls it, and how it relates to human needs now and in the future. After these data were assembled, the next essential step was a careful study of individual sites and all of the factors affecting them.

Once a site is determined to be of national import and is proposed for protection, a preliminary master plan is needed to support the proposal. This planning process usually includes a

regional impact study. Some of the questions to answer are how and to what extent does the proposal concern the region - will it attract people? If so, how many, and how and when will they arrive? Would its establishment involve expanding development in the existing communities and create needs for additional housing, roads, transportation, etc.?

We believe that such regional studies and the involvement of local communities in planning a new area is vital. We find that the long-range success of a conservation project must always have the understanding and support of the people of the community and region in which it is located. The earlier and more fully they are informed, the more comprehensive will be their understanding and subsequent support. The process of developing good community relations is very important. Our information must be factual, forthright and understandable. We tell the people what their opportunities will be in terms of providing overnight accommodation for visitors and the many other services the public will need. For example, the local communities in the immediate area of Cape Hatteras National Seashore now enjoy substantial increases in steady employment and property values. They participate in a thriving tourist industry that provides more than 57% of their basic income. Before establishment of the national seashore, the general economy of this whole region was on the down-grade.

Preparation of the master plan also involves a penetrating analysis of the proposed area, an examination of its tentative boundary the flora, fauna, geology, and the human factors. These include economic, social, public access, protection, interpretation, management, and staffing aspects. Estimates of the cost of land acquisition and the costs of development and public facilities are important items.

The results of these studies combine to form the area master plan. This plan becomes the basic document to guide use, development and management of the area. The major portions of the total plan are made available to the public so they may more fully understand our programmes. Often we hold public meetings or formal hearings in the affected communities as one method of informing the public and generating support for the proposal. Usually the proposed master plan undergoes refinement and strengthening during this process. Finally, the total proposal, including the master plan, is presented to Congress for consideration. Whatever your legislative or executive processes, you may find some modification of this system suitable to your own programmes.

In my country, generally, areas are added to the National Park System by individual acts of Congress. As soon as possible after Congressional action we provide a basic staff of employees

and institute site protection and management in accordance with the master plan. Orderly programmes of land acquisition, site development, and operations follow as rapidly as funds become available. The existence of a comprehensive master plan paves the way.

Important as these inventory, study, and planning stages are, they are no more vital to the final result than are the processes of development and management which quickly follow, once the park is established.

At the shoreline we have one of our world's most active natural laboratories. Its complex of interlocking physical and ecological forces dictates a "go-slow" policy if the natural values are to be preserved. Here we draw upon the basic studies made during the master planning phase to recognise special components of the area, such as historic sites and unique natural or scientific values which need consideration in development planning. Too, there may be segments of the area which lend themselves to mass physical recreation without jeopardizing the natural or historic features, and other sections which cannot support heavy public use. The planner has a real challenge to relate all these values without destroying any of them. What facilities should be provided, and where, for the public? What will be their capacity? What does the Service need in administrative structures and facilities? How can they be located and constructed without contributing to the loss of the very values we strive to preserve?

Without this attention to the many interrelated features of an area and its use, great natural values could be lost or seriously damaged by unwise developments. The effects of resource developments outside the area also can be damaging. The Everglades National Park in Florida is one of the best known cases where this has occurred. The diversion of fresh water and drainage outside the park which began in the 1880's had so changed the aquatic environment within the park that the whole complex biota was threatened. I am happy to say that important steps have been taken to restore sources of fresh water which are designed to reverse the trend and save the endangered ecosystems and wildlife in the park. The bioluminescent bays at Puerto Rico, where an exceptionally delicate ecological balance involving certain marine dinoflagellates provides the "Fire of the Sea" phenomenon, are today threatened by pollution from incompatible developments tributary to these bays. It will require careful regional planning and cooperation to protect the intrinsic values of these natural areas. Proper master planning must recognise and help solve these problems.

Not only must great care be exercised in planning which may affect the organic environment, but the physical realm as well. The almost immeasurable force of the sea can be used to save as well as destroy if it is understood. Witness the beautiful sculptured contour of a dune or the building of a small sand spit which seem immune to the tides and storms, while nearby a carefully planned and well-constructed dock or beach shelter has been destroyed by the same forces. Man must therefore learn about and respect the power of the sea if he is fully to enjoy it.

In practice, at some of the seashore areas in the United States we build our facilities on a test basis in the sense that they are removable or even expendable if the winds and tides turn against them. We must admit that the science of this new seaside management is inexact, and the manager who proclaims that he has found an exact and permanent solution to these problems, whether structural or operational, is either inexperienced or overconfident. Experience is the reward of care and patience.

From what has been said, you will recognise research as a co-equal need with master planning. The marine scientists of the world have made a good start in this task, but the spectrum of subjects for investigation is limitless. The manager must be concerned with such matters as dune stabilisation, salt marsh ecology, estuary pollution, sand transport, the food pyramid of a coral reef, the stabilising of tidal inlets, and many more.

Recently, our scientists on the eastern seaboard set about consolidating their research programmes with the view to working out general applications of research findings useful to many seashore and underwater areas. We hope their results will soon be forthcoming and will be useful internationally. At the moment we are fortunate in having many institutions specialising in oceanography and marine biology. They are making important contributions to protection, management, and use of seashores. But let me emphasise that additional research into coastal dynamics is everywhere needed and should be prosecuted wherever possible. The hour is late, but the rewards will be great if we get ahead with the job.

Having now provided our seashore area with its master plan and on-going research, and recognising the fragility of the habitat, we might imagine that management's major worries are over. Not so. We are affected by and dependent upon our neighbours. Along a heavily populated seacoast, the proliferation of man's works is a continuing threat to the existence of the unspoiled and wild beaches, even though they may be many miles distant. Let us see what can happen.

Pollution of waters is the most obvious offender in the vicinity of cities and industrial complexes. Domestic and industrial wastes are capable of rendering waters unfit for native biota and for human use many miles away from their sources. Whole estuaries of the Atlantic Coast of the United States have been so poisoned that the fish, shell fish, waterfowl populations, and the invertebrate forms on which they feed are moribund.

Other works of man are also taking toll of the coastal strip. For example, the draining, dredging, filling, and dam building in our river basins, estuaries, and bays have done much harm to the noble beaches of our Atlantic States by the simple process of starvation. Drainage has eliminated a great source of organic nutrients for aquatic life. Sand retained behind a river dam or dredged out to make landfills is sand which can no longer find its way into the sea and thence into the beaches in the historical pattern. This vital river of sand in the surf zone along our coasts has in many places been pinched off, deflected, or otherwise impaired to the point that its recipient or deposit beaches are vanishing.

The argument here is a familiar one. It is simply an argument for regional planning - or treating the "total environment" - to mitigate adverse influences on our landscapes and seascapes. It is an argument for comprehensive consideration of our environment to safeguard and improve the quality of life.

Getting back to the immediate problems of our seashore manager, he need not feel entirely helpless before the seemingly endless array of threats to the natural resource entrusted to his care. There is, for example, an over deepening sense of public conscience in the United States which is coming to realise that preservation of the natural scene demands reasonable relationship to and even some control of any private or public endeavour which would impair that scene. Hence, we see in many communities the current success of zoning provisions set up to protect the cherished natural resources against intrusion. Zoning is important at Cape Cod National Seashore in obtaining protection of park values through volunteered cooperative effort, as well as by law. Such zoning can be more effectively applied if its need is recognised in the law establishing the area. This should always be considered. Much has been accomplished in this field, but much more remains to be done. All of us must find and use opportunities to persuade our neighbours to collaborate in these defensive tactics.

Thus far I have been most concerned with the conservation basics of the subject. I should now like to talk about operations management of water recreation sites. If we do not understand how our visitor to the seashore and marine areas will behave, and perhaps what motivates him, we will not manage in his best interest or to his best satisfaction.

Earlier, I have mentioned some of the pleasures that bring our citizens to vacation at the seashores managed by the National Park Service in the United States. Swimming, fishing, boating and camping cover the great majority of visitor intentions. These are strong drives, these urges to get wet in the surf, to comb the beaches, to pit skill against saltwater fish, or to put to sea in a boat. We find many of our seashore users driving hundreds of miles from their inland homes to enjoy a brief weekend; others plan a year ahead to take their two weeks' holiday at the beach and to stay in campgrounds which often are full to overflowing.

These fellow citizens stake a good sum of money and considerable time in getting to the seashore, and it is our duty, as managers, to have the capability to meet their requirements adequately. For the swimmers, changing rooms are needed, life-guard service, fresh water showers and safe, clean water. The fishermen require bait and tackle shops, fishing piers, and rental or charter boat service. Launching ramps, docks, fuel supplies, and even rescue services are a must for the boatman. All of these people require food services and sanitary facilities. A great deal of attention and investment must go to these mass-use requirements. We enlist the participation of private enterprise (concessioners) to supply many of these wants.

Then there are the certain groups of users for which we feel special responsibility and affection in our Service. I speak of those who seek an interpretation of the story of the sea, the bird-watchers, the hikers, the serious photographers, the snorkelers and scuba divers, or those who merely seek to find solitude beside the vast waters. Maintaining conditions which satisfy these users is vital, for together they often represent a vocal majority of our people. This can be accomplished by activity zoning controls provided in the master plan. Sufficient sections of an area must and can remain undeveloped to assure these continued opportunities.

As with park planning everywhere, at the shore we must determine where an automobile road is necessary and where its presence would be a nuisance or an intrusion. The best defense of seclusion and naturalness is the absence of a surfaced road. Boat or ferry service only should be considered for many situations, since this kind of transportation has an intrinsic value as recreation in itself and may serve to keep the automobile away from fragile seashore sites.

Our experience indicates that many administrative facilities and services for the public can well be located outside an area, thus relieving pressure on precious space within the area. This kind of zoning also increases the flexibility of management and protection of park values.

Many seaside vacationers seem to have one unfortunate but human characteristic that must be mentioned. They seem determined to risk their lives in whatever ways may seem to offer a reasonable thrill. The site administrator must be concerned with protecting people against themselves as they find their fun in the unfamiliar and occasionally dangerous environment of the shore. The most common chance taken, of course, is to risk drowning, either while bathing or in a boat. Lifeguards, boat patrols, boat inspections, and posted information or warnings all play a part here. In the United States the tremendous increase in the number of private boat owners has made this problem acute for waterside managers.

Boating safety involves the application of restrictive regulations, and this is always a most controversial subject. How much regulation is enough; how much is too much; what can be enforced, and how can it be made known to the public? The social scientist will tell us the human spirit resents regulations or prohibitions or controls when on vacation at the seashore. But too few of the boaters remember the import of the familiar prayer: "Lord, Thy sea is so great and my boat is so small".

One approach to this problem which should be tried is the information-interpretation treatment, having as its central idea the belief that a better informed person is a safer person. When you can interest a visitor at a wayside exhibit in the peculiarities of the stinging jellyfish, he is less likely to let his child pick one out of the surf. If a map layout of the local currents and tidal rips captures the attention of a novice boat operator, he will be less likely to go out with too little gasoline or take other unreasonable risks. Interpretation protects not only the visitor but also the resource. The informed visitor has more respect for the natural scene and will be less likely to abuse it. Also, the understanding visitor gains much more pleasure from his experience.

Let us now consider underwater marine areas as opposed to seashores, although they naturally are closely related. It is pertinent to observe that almost three-quarters of the earth's surface is covered with oceans, yet less than one-twentieth of this oceanic area has been explored below the surface in any detail. It is also true that we now know more about the surface of the moon than we do about the sea floor that lies no more than seven miles below the surface. This tremendous area, and the vast amount of water covering it, offers resources of a variety and magnitude almost beyond imagination. However, knowledge about the underwater world is expanding rapidly. The conquest of the sea by man is inevitable.

The dive in 1960 of the Trieste I to a depth of 35,800 feet, with men aboard, marked the beginning of a new era of man in the sea. Subsequent development of other vehicles and other techniques enabling men to penetrate the depths, and to do effective work there, have been rapid. Awareness of the coming surge of exploration and exploitation of the oceans that this portends, gives us reason to plan now for the identification and protection of the natural resources and the wilderness qualities of the underwater world that may otherwise be lost through uncontrolled and thoughtless utilisation. The scientific and economic values of these resources are very great. Despite the tremendous extent of the underwater world, evidence is growing that its living resources and many of the physical ones are fragile, that they are subject to destruction by the acts of man. Most certainly, representative samples of ocean bottoms should be preserved. Similarly, the life in the waters above them requires protection and wise management. Moreover, the international character of the oceans beyond territorial limits makes it obvious all nations have a cooperative role to play in underwater resource conservation.

But let us now go below the water surface and examine what has been happening in certain of the undersea preserves which in comparatively recent years have come under public administration and use. For the most part we are concerned with that portion of the ocean floor referred to as the continental shelf, the relatively shallow area that skirts all land masses. Here man has the best opportunity to observe and enjoy the colourful and fascinating life in the sea, and the beauty of the coral reefs and other physical formations.

In the United States, all of our national seashores provide gateways to the underwater world. In addition, several national parks and national monuments offer the same opportunities. The principal ones are the Virgin Islands, Acadia, Olympic, and Everglades National Parks, and Fort Jefferson, Buck Island Reef, Cabrillo, and Channel Islands National Monuments. But we have only begun to learn how to manage these underwater areas and to make them available for people to enjoy.

From our experience in Virgin Islands National Park, we know that underwater use by visitors is feasible and can be enjoyable. We know from experience that underwater exhibits and marked trails for swimmers are possible, and that the average person interested in snorkeling or skin diving can easily enjoy these trails. Such underwater trails have been laid out at Fort Jefferson National Monument in Florida, in Trunk Bay at Virgin Islands National Park, and another in the deeper waters of Buck Island Reef National Monument near the island of St. Croix. These trails are marked with surface buoys as well as underwater information signs easily read by the face-masked viewer. Although

they are experimental, we feel they have opened up a whole new world for the marine park visitor.

To find reasonably simple safe and comfortable ways to view this underwater world, by which more and more people can see and enjoy it, is one of the most challenging problems before us. Although several types of recreational underwater craft have been built, varying in size and in passenger capacity, they are yet very few in number and are just now beginning to attract the attention of the public. Probably the largest and best known underwater vessel for recreational use was the 40-passenger submersible built by Dr. Jacques Piccard and used in Lake Geneva, Switzerland. The recreation world is waiting for someone to invent an inexpensive, durable, safe, and efficient mechanism wherein numbers of people can, in comfort, watch activities in the water. A great deal of thought is going into this effort right now, and some of the obvious devices are being built or have been built on a trial basis. Submarines, diving bells, underwater tubes, semi-submerged chambers are all in the thinking stage - as well as closed channel television.

Surely, great strides in underwater equipment are just around the corner. In our Service, we know from the popularity of our first attempts to provide underwater nature trails that public demand for every sort of viewing device is certain to be heavy and enthusiastic. However, we must remember that any equipment of this nature must be introduced and used with great care. The inventor's task is not easy when we recognise that the underwater reef, as only one example, is a fragile habitat which can so easily be thrown out of balance or destroyed by the crudities of man's concrete, metal, or plastic intrusions. Perhaps even more than in terrestrial environments, the underwater world must be protected from the yet rough and clumsy hand of man.

How can the visitor view and learn more about the beautiful and exciting underwater phenomena, the coral as it builds for tomorrow, the underwater flora, the fauna, the ever-shifting sand and light which make up this fascinating and strange underwater world which is so new and strange to most of us? Only time will tell, but our responsibility to guide this new adventure is almost frightening. The resources in our care belong to all mankind, and they never can be replaced.

Probably I have said enough in support of the thesis that seashore and underwater conservation and management is an inexact science. It would be presumptuous of me to offer exact answers in the face of the broad range of problems and experience which is implicit in this audience of many nations. Each of us is faced by a different sort of public demand, or has different resources to conserve, to develop, and a different visiting

public to serve. Common to all of us, however, is the need, quickly, to find these outstanding resources, to identify their value to mankind, and to protect them for this and future generations.

## 22. 2. Some Concepts on Marine Parks

by Pablo Rosero G.

### Introduction

The kindness of the International Union for the Conservation of Nature, sponsor of this Latin-American Regional Conference on Conservation of Renewable Natural Resources, has given me this opportunity, for which I wish to express my gratitude.

The object of this Meeting, according to the point of view of the organizers, is "to provide the opportunity to discuss the best methods to obtain an effective cooperation, at a local, national, regional or international level to support the growing interest of the Latin-American people in conservation", which end is no other than organizing the rational utilization of the important natural resources the region still has and "to help promote the well oriented use of the natural resources in the Latin-American countries". One outstanding aspect in the mentioned objective is that "these resources are valuable for economical, cultural, scientific, and recreational purposes that affect the standard of living and furthermore make the natural media of which health and welfare of present and future generations are dependent".

Upon analyzing in detail the subject of Marine Parks, an aspect of great importance in Latin-America, it is observed that all the material related to the subject refers especially to Japan, U.S.A., the Philippines and the Caribbean and only in a small part to Latin-America. The material of great value in this respect is that presented to the Special Symposium on Marine Parks, which took place in September 1966. In any case, due to the fact that Latin-America has incredible natural resources to enter into this field of Marine Parks, it is necessary to deal with the subject with the maximum attention to our problems; i.e. the development of our beaches as a natural resource, the utilization of which, can be effected immediately after the existence of access ways and thus generally these have recreation purposes, but should be studied duly for the most adequate balance of their functions.

## Definition of Marine Park

It is an area of land in contact with the sea, whether submerged or emerged; in the first case it is a sub-marine park and in the second it may be totally separated from the continental mass, as an island, or it may maintain contact with the continent, taking on several geographical forms such as a peninsula, a cape or any of the various land formations which have contact with the sea.

I wish to refer to each one of these aspects with the several factors that have relation to their development, or which should be duly studied, in order to make these marine resources a balancing factor for the welfare of man.

## Classification of Marine Parks

National Beaches constitute a marine resource of immediate utilization to man. Its system of use should worry us as under the legal aspect, in our regions, I believe the majority of them are of state property, thus these beaches are public. As far as this resource is utilized by man the same generally serve to overvalue the areas next to the beaches, which are used commercially for the construction of small recreational houses.

As the beaches are a point of contact between two forces, land and sea, these are two factors of a biological cycle which man should keep as a harmonious utilization of these resources, or in other words he must seek a balance of nature, which can be obtained when the elements of a complex system of components mutually dependent are balanced and interrelated.

## Special climatic factors

The South American beaches maintain special characteristics that may be summarized in elements of weather and climate. Among these, even though the influence of atmospheric pressure and winds have importance, these do not acquire more importance than the temperature and precipitation which in synthesis determine the characteristics of weather and climate. The high temperatures tend to produce low pressures and the low temperatures give place to high pressures; however, there are enormous differences in pressure without maintaining a direct relation between the two referred to elements. The pressure rises from the Equator to the sub-tropical zone, that is 30-35 North and South and then goes down to the low sub-polar pressures of 60-70 to give rises to the high polar pressures.

The circulation of the winds in the southern hemisphere is the nearest to the former correlation, as in this hemisphere almost everything is water; in the Northern hemisphere with the

succession of great continents and oceans, the areas of various pressures are few, this due to several atmospheric circulations, cyclones and anti-cyclones on land. In winter for instance six different pressure centres could be observed : the lower parts of Iceland and Aleutians, the higher parts of the Pacific, Bermudas or Azores, North America and Asia. In the low latitudes the insolation exceeds the terrestrial radiation and in the high latitudes the contrary occurs, however without gradual climate variations in the different latitudes.

In order to maintain the necessary balance, nature maintains a way to transmit the heat of low latitude regions to regions of medium and high latitudes, a balance that is verified both by atmospheric circulation as well as by the ocean currents which are very important in our geographical media.

In latitudes 5 to 15° , North or South, there exist masses of humid rising air and the dry trade winds dominate in the season of less solar radiation (winter) and the rising winds in the season of great radiation (summer), thus there are two seasons : one dry and one humid. There is not much influence of the trade winds from the 5° to the Equator, although less humid seasons are observed in the vicinity of the Equator.

In the latitudes 30 to 40° there exist the masses of descending wind of the high subtropical pressures and the tempestuous counter-trade winds of the West. There is displacement towards the poles of the dry high subtropical pressures, thus dry summers and wet winters are obtained. The monsoons are present in this regular migration in the interior of the continents, dominating thus in the oceans and coasts of the West.

In latitudes 60 to 70° with low sub-polar pressures there exist at the same time tempestuous counter-trade winds of the west and the winds of polar origin.

Furthermore, there exist monsoons, system of winds that change the direction of the dominating one between winter and summer. The seasonal differences of temperature originate pressure contrasts which change the direction of the winds. Thus the interior of Asia is exceedingly cold in winter, giving as result a continental termic anti-cyclone or high pressure centre. On the seas at the east and south with the highest temperatures, there are lower pressures. The resulting pressure gradient goes from the continents to the oceans, as in the winter monsoon. The low pressure limit of the winter asiatic monsoons is located south of the Equator, in the Indian Sea, and the warm interior of Australia.; in Japan they come from the West and Northwest, the same as in the North of China and North and Northeast of the South part of Asia, as these winds

are dry and of continental origin, they do not produce precipitations, consequently the winter in this region is the dry season.

In the oceans which are colder, the pressures are higher, thus the pressure gradient goes from sea to land, this is the mass of marine tropical air called summer monsoon with abundance of steam producing rain; thus summer is the humid season in the monsoonic regions.

There also exist the secondary terrestrial winds called terrestrial and marine breeze related with the differences in temperature during 24 hours of the day. There also exist currents that go from land to the sea of heavy and cold air during the night and in different direction during the hot hours of the day.

These conditions give habitable and healthy conditions to the adjacent coasts, for example in Senegal (West Africa) at 12.30 in April the temperature was 37.8° C with a northeast land wind and a relative humidity of 3 %; at 12.45 the wind was northeast from the sea and the temperature went down to 27.8°C, however the relative humidity was 45 %.

The movement of the water in the ocean is also a climatic factor, being the winds, temperature, precipitation and humidity one of its agents.

The trade winds on the sides that face the Equator, or in other words subtropical zones of high pressure tend to push the surface water through the oceans. Due to the rotation movements as deviating force to the right in the Northern hemisphere and to the left in the southern, a Westerly or equatorial current is obtained. This strikes the South American continent dividing in two; one section goes northeast and the other southwest, the first, warm, curves towards the Caribbean sea, goes by the Yucatan Strait to the Gulf of Mexico and returns to the Atlantic through the Florida Strait, joining the current that comes from the Antilles to conform the gulf current the runs parallel to the American Atlantic coast. We must also consider the cold current of the Canaries, as well as the current of the North Atlantic which in turn originates the Labrador Current.

When considering that the warm currents generally originate in the low latitudes and proceed towards the poles, and that those generated in the high latitudes are cold, we may conclude that in the lower latitudes, 35 to 40° , the hot currents are directed to the eastern coast of the continents and the cold tend towards the west coast. Thus the cold waters of the western coasts of low latitudes, Peru for example, the northern

part of Chile, northwest and southwest of Africa, southern California and several other regions as well, comes from a depth of 100 meters or more along the coasts.

There exist a direct correlation between the oceanic and the climate, due to the fact that there is a temperature variation in the influencing land; thus in the Northeast of Europe with influence in the continent of the Northern Atlantic gulf stream warm current, having temperatures of 8 to 11 higher than the one it corresponds in some areas of this region, while for instance the eastern coasts of the U.S.A. and Japan maintain constant temperatures according to its geographical location due to the fact that the wind blows towards the sea. However in winter the temperature tends to go up because the frequent trade winds in fronts of cyclonic tempests create increments of irregular air from the temperate waters.

The Peruvian cold current which runs parallel to its coasts has as consequence that its temperature are 5 colder than the coast of Brasil, thence the great difference in utilization of the same, this latitude corresponds to both positions, however there exists a hot current in Brasil.

The cold water coasts in low latitudes have as characteristics aridity barrenness drought and existence of fog. Although it seems a contradiction as the fog is formed with the cooling of hot air in the oceans caused by the cold current of its coasts and its contact with air of immediatly higher strata, the fog forms a strip very close to the coast.

The aridity is thus the result of the cooling of the base of a mass of marine tropical air directed towards the continent. The cooling of lower strata increases its density, resulting in the inversion of the temperature. Thus the mass of air becomes more stable, it doesn't rise nor produce rain. There are desert areas in the northwestern part of Peru, at 5° from the Equator caused by the influence of the cold current of Peru which takes aridity to eastern Equatorial Pacific. Other examples of the influence of marine currents are the coast of the Canarias and southern California and Northwest Mexico; on the contrary the warm currents near the coast tend to produce an increase in atmospheric humidity and also precipitations.

### National Beaches

Now that I have made a brief analysis of the influence of the weather and climate factors in the Latin-American areas, especially in what refers to the marine influences, it is necessary to analyze the situation of our marine resources of present exploitation. Unfortunately upon reviewing available

material, I have only been able to find the work of Robert Rose, Geologist Researcher of the National Parks of the U.S., who presented his work on "Some national coasts in the National Park system".

The following are listed :

A. National Coast of Cape Hatteras

Correspond to an area of high exploitation influence in the XVI century, or in other words these coasts were subjected to a fast degradation. However, between 1930 and 1940 a rehabilitation project of the devastated areas was initiated. These works compiled previous experience in this field, developed in France, Germany, Denmark, New Zealand and other places. Laboratories were organized, meteorological data were checked and experiments on trials on sand fixation systems were continued. Among the results, the good works on grouping of bushes fixed on sand with the same thickness, dimension, and position were observed, giving positive results in the fixation of sands. An analysis of the results was clearly stated in the book "Nature on the Rampage" written by Ann and Myron Sutton in the United States.

B. National Park in Cape Cod - Massachusetts

It is a part of a peninsula in the south end of Massachusetts, its beaches are considered a treasure as a source of recreation, as also under the scientific aspect, being the last of the national uninterrupted beaches of the region. Here too, works on the fixation of sands and erosion control are continued.

C. The Isla Padre, Texas, is also reported

It is washed by the Gulf of Mexico, starting at Corpus Cristi on the north. This island is separated from the continent by ten miles. There are sections in its ends that have been developed privately, however there exists in the island a national sector 80 miles long with a natural beach, being at present the longest beach in the 50 states of the Union.

D. Punta Reyes - California

Located in the Pacific Ocean in the Punta Reyes Peninsula, 35 miles to the north of San Francisco and covers 53.000 of the 63.000 acres which is the total area of the Peninsula. It is private for the most part, however it is planned to purchase 28.000 acres to be incorporated in the National Beach.

#### E. Fire Island - New York

The National coast of the Fire Island covers 31 miles of the island towards the mouth of the Mariches on the Northwest. Its western end is only 50 miles from the heart of New York, having easy access. It is desired to increase the national beach progressively from the present private property. Plantations for the stabilization and modification of the land are also being performed.

There is the opinion in the United States that scientific studies, especially those on Ecology, Geology are of utmost importance, for the planning of development and maintenance of beaches.

It is also necessary to consider that under the natural conditions it is possible that the natural factors be operating in such a way that they may be helping the plans projected by man. Furthermore, it is necessary to consider that the works performed by man may help the natural evolution itself.

#### Summary on National Beaches

Although there is no detailed knowledge in South America regarding the geographical situation, weather conditions, utilization facilities and capacity of our beaches, their intensive utilization on the Pacific side is real, resulting from favorable climatic conditions, however this natural factor which is there for the use of man must be duly organized and studied with the changes that the natural beaches must undergo. It is necessary to combine the recreative factor of the medium with the other cultural factors necessary for the implementation of the proper use of the resources, this is with the establishment of museums, visitors centres and complementation of all the tourist facilities, as well as a permanent tourist education system regarding the way of utilizing and treating the resource at his service.

#### Some Submarine Parks

I believe this field is completely unknown in South America and I will list the parks that under developed conditions have already reached a series of basic studies managing to define its utilization for scientific and recreational purposes.

#### Buck Island

Dannish territory until 1917 and then purchased by the U.S. The island was rented by Cornelius Pentheny for raising goats in 1920, but the fishermen exterminated them.

Since 1936 the island has remained under the control of the Government of the Virgin Islands and it was declared National Park in 1948. The majority of the reefs of the West Indies have a strip formation, the coral reefs grow near the beaches or in small spots separated from the beach, usually in shallow and quiet waters. Its waters have a beautiful emerald green color contrasting with the dark blue green outside the reef barrier.

Its front is a solid mass of elkhorn coral descending in an abrupt 35 fr. slope, alternating at the bottom with strips of staghorn coral.

This mass is intercrossed by narrow channels. Buck Island has no drainage from land that may contaminate the sea, for which reason the lagoon has a marked clarity being rich in colored fishes and other submarine animals. There is a problem of mongoose invasion which introduction to control the rats in some western islands gave as result the invasion of this animal; an eradication programme has been planned of this invading species which has exterminated as well the colored Ameiva polops lizzard. The extermination of some species like the turtles and sea birds is due to their utilization by the fishermen. The ship anchors, even when these are thrown with care damage the more delicate corals of slow growth; even man can be another destructive factor. Furthermore fishermen eliminate important species of fish in the reefs. The use of the harpon is harmful as the fish become cautious being difficult for the swimmers to observe them who wish to look at and photograph them. At present there are 6 boats in permanent service to take visitors at the western end of the beach where those with little experience are taught to use masks, breathing tubes and flippers in the sands free of sea urchins and corals and then you may pass to the reef section where visitors may explore them.

In 1961 President Kennedy declared it a National Monument; these are 850 acres of area including the island and its reefs; the fishing of turtles and reef fish is forbidden in the waters surrounding the island. Equally forbidden is the removal of corals, medusas, molusks and other marine animals.

The boat operators are permitted to anchor in a certain place. Furthermore in the same area the same marine preservation systems are applied in Fort Jefferson and in Dry Tortugas, 75 miles west of Key West, established in 1935, with seven small islands none of which surpass one square mile, however, the coral reefs reach 100 square miles.

In 1959 the Exuma Cays Land and Sea Park was established in the Bahamas and in 1960 the Pennekamp Coral Reef Preserve was established; it is possible that the Phosphorescent Bay park has

already been declared in La Parguera in Puerto Rico. The Buco Reef well protected for several years and Trinidad must now be taking the necessary measures for its formal protection.

#### Utilization of Equipment and Communication Systems in Sub-Marine Parks with Devices for Breathing under Water

Several diving systems have been devised for the utilization of sub-marine parks; thus diving is performed without diving suit for archeological and historical purposes such as salvage, inspections, marine conservation explorations, counting and identification of fishes and collection of specimens for exhibition in aquariums.

Diving with equipment is utilized furthermore when the expert swimmer wishes more recreation and intimacy with the underwater world, but these dives must not exceed one hour; there are problems in communication although the use of electronic communication is being investigated.

The system called "watercom" is being utilized at present, which consists in the utilization of a transistorized microphone inside the mask.

There is the system of breathing tubes which gives the opportunity for the swimmer to introduce the face under the water with the transparent mask; this is easy to use, but not advisable for weak swimmers; its communication is easier. The good utilization of this system is in accordance with the ability of the leader, advising groups of no more than 15 swimmers. It is advisable to carry light rafts for protection in deep waters, in reefs with rough bottoms where it is not possible to stand.

Nowadays the autodirected tracks are used; exhibitors may be found which introduce the track which is usually a curve of one or two kilometers. Signs and short texts or clear numbers are observed. These systems of autodirection have proved to be quite adequate and give the opportunity for an important network of signs under the water supported by concrete blocks which contain the signs; thus a complete network of information is maintained giving the swimmer the opportunity for a maximum and fast vision of the underwater park. It is believed that in Buck Island approximately 36.000 divers used these services between 1962 and 1964; they are very important in the use of submarine resources.

The utilization of submarine transportation is also being initiated with wet submarines, with capacity for one or two persons. These are impelled with pedals or rotation of the propellers, a faster system that is used only with diving suits.

The submarines designed thus has a normal atmospheric pressure and sufficient air.

The Perry Submarine Company of West Germany is producing submarines for 5 persons. It is considered that something like fifty submarines are used at present. In the last National Fair of Sweden, Dr. Piccard exhibited a submarine for forty persons. Submergible chambers are used for great depths, the french sphere "Archimede", and the american "Trieste" where this last one reached a record depth of 11.000 mts. in the Pacific Captain Coasteau's Flying Saucer, called "Denise", with capacity for 2 men uses electric water propellers.

For recreational purposes, the most adequate is the vehicle which is easy to use at 50 meters depth due to it price, easy movement, simple operation and security. Surface boats are also used, especially in shallow waters, as they can submerge only 2 meters. The boats with transparent glass bottoms are common, but less effective as their movement is fast and very superficial.

Sea travelling in motor launches is not effective, especially because of the difficulties of communication.

One of the most adequate systems and of unlimited potential is that of roads suspended under and over the water surface. For example, in the Bermudas there is a wooden bridge that reaches 15 meters towards the sea and a marine cave connected with the sea by underground passages which gives visitors the opportunity to watch underwater life.

With less possibility of vision there are the underwater stationary chambers the auditoriums, tunnels and wells, as well as observation chambers, a system that has not been spread fully.

It is necessary to consider in all these systems the danger of interrupting the local currents which can give as result a great mortality of important species which feed on plankton.

There exists in the Mediterranean a partially submerged parabolic dome, with a 95 meter diameter, two of the four stories are submerged and light the sea roof with great reflectors. Three of the four levels have great aquariums with salt and fresh water tanks, the visitor may even dine in the restaurants.

Of special importance are the scientific efforts towards the studies that take place in the coral reef communities in the west coast of the Kii peninsula in Japan. This coast, south of

Shirahama is known as the northern border of the coral reefs which maintain some octocorals which are the biological non-pelagic elements of most importance in the underwater scenery; unfortunately these corals have been utilized as decorative pieces and a legal regulation is their required protection. It is interesting to note the need of control of submarine parks; i.e. in 3 marine life refuges : Hopkins, San Diego and Bodega, only fishing with cane is permitted; it is illegal for any person to take or possess any invertebrate or specimen of marine vegetal life in the refuge area. The permits for scientific collectors are granted only to scientists registered in the State, permitting the removal of reasonable samples. The reasons for such measures may be summarized in that such protection gives the proper atmosphere for the required ecological study; the plant and animal association in a more natural state may be observed through important periods of several years, it gives the opportunity to have species of little scientific value available for the visitor and maintains specimens in permanent study without major disturbances.

The legislation that preserves Punta Lobos park, is a model of maintenance and care of this world famous park, maintained at its natural state.

In the Japanese seas important studies have advanced as well to know the existence and ictiological distribution. Thus, two fauna areas have been defined in Japanese waters, towards the Pacific side Inubo cape and the Hamada Province in the Japan sea side. The cold and hot water currents are important sources of fish distribution in the Pacific. Some of the Japan sea fishes reach up to Formosa, the Indian Ocean, Philippine islands, the South Seas and the Australian Sea having some circumpolar habit. Some 317 families of marine fishes have been identified in the southern zone, 28 in the northern zone and 41 are cosmopolitan, demonstrating clearly the profuse evolution of species in the warm rather than the cold part of the world, as it happens with animal species. Although Japan maintained, 39 national parks in 1962 including an area of 5.68 % of its territory, it is surely among the countries that continue studying the future of marine parks. Studies on the correlation of vegetation of algae in its submarine function have been performed. They divide the country into five zones each one with legal classification and its comparative study.

The constant scientific efforts of the Philippines may be summarized in the following biological stations : Puerto Galera, at the north end of Mindoro, its great variety of ecological conditions render enormous quantities of specimens.

The National Park of the 100 islands located at the western part of the Lingayen Gulf northwest of Luzon, is a world attraction site, specially for scientists, students and tourists; an ocean station will be maintained shortly.

The Manila aquarium, destroyed during World War II, was rebuilt after the end of the war. Furthermore there is the Biological Station and Macajalar Bay, that of the Luzoniano institute established to train students on marine tropical flora and fauna in its natural atmosphere. There exists furthermore the Cebu marine club where divers are trained, with for high ability.

The conservation of the natural water resources in Argentina is entrusted to the Marine Biology Investigation Centre. Important investigations are made on water resources whether they be renewable or not, in relation to their ecology : waste, exploitation, radioactivity, genetic importance. Serious problems exist in relation to the extent of its water atmospheres, scarcely populated far away places.

The regulation in this respect is not complied with, there exists fishing abuse on the part of foreign fishing fleets. The progress obtained during the last years is due to action taken by the General Direction of National Parks and the National Council of Scientific and Technical Biological Marine Investigations in Puerto Deseado, Laura Bay, Blanco Cape.

Galapagos Archipelago : the first Decrees for Protection of Flora and Fauna in the islands were issued in 1936 in Ecuador. In 1958, 100 years after the publication of Darwin's book, who visited the Archipelago in 1835, to obtain his theory on the "origin of the species", cooperation for its preservation was sought; several scientists recommended the issuance of effective laws and it was 1959 when the Archipelago was declared a National Park. Since the same year the Charles Darwin Biological Station was established, performing important studies on flora and fauna. In 1964 an international scientific symposium took place in which the most important scientific studies of the Archipelago and their correlation with other studies of the world were presented.

It is also worthwhile to mention to great reef barrier in Australia, where fish was the first preoccupation of its Biological Station, however later its attention was directed to the conservation of nature.

## Some suggestions for an adequate establishment of Marine Parks

- a) Before establishing a marine park it is necessary to determine first the area that is possible to supervise efficiently in order that the laws and regulations be correctly enforced.
- b) It is necessary to define the type of destruction that must be avoided. Fishermen and tourists are the cause of this destruction, specially in those areas of high density. Corals are generally of slow growth for which they must be preserved. Excessive collections with few specimens however important must be well regulated. Frequently the chemical contamination of the water is due to fuel, oil and other causes, and this should be controlled.
- c) It is necessary to consider if the area is exposed to storms, cyclones, marine currents or other natural factors i.e. the removal of corals by tourists can only be referred to breakable species such as the "Acropera", which also breaks easily during cyclones, which can destroy in one day an amount larger than what can be destroyed by thousands of tourists in 100 years.
- d) It is of utmost important to lend all the investigation facilities in all the fields of marine parks. If it were the case of a Biological Investigation Institute, special measures must be taken to give adequate means of work. This would mean sufficient reserve areas for example, for biological studies. Consequently we must avoid the temptation to give unlimited regulations that cannot be practiced.
- e) In these studies as in any other function that has relation with renewable natural resources, the studies must be planned tending towards adopting control measures in a given developing time. Thus the expansion plans for recreation that tend to be made before the studies must be regulated by means of the most adequate practices and regulations.
- f) There must exist a necessary and permanent co-existence between the corresponding biological stations and the foreseen studies in a Marine Park and the Forest Service Branch that is encharged with the development of the Renewable Natural Resources, and if there exists already a National Parks Government Agency, this should take charge of the administrative functions coordinating adequately the technical activity that takes place in each Marine Park.

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### 23. 1. Parks and Tourism

by Laurence S. Rockefeller

I am particularly sorry not to be able to be present and participate in this significant conference on Conservation and Renewable Natural Resources. Mary and I treasure the trip we were able to make two years ago to many of the extraordinary national parks and scenic areas of our southern neighbours, and I would have welcomed the opportunity to come there again and meet with those who help to make them possible.

I am grateful for the invitation of your leadership to write a brief message containing my thoughts on the relationship between national parks and the natural areas and tourism.

As one who is both a lifelong conservationist and also keenly interested in the development of resort facilities, I believe both national parks and tourism contribute to national well being.

For purely social purposes parks are an important part of national life. They provide places where people can renew their energy and spirit, where they can gain perspective on their everyday lives, and often where they can learn more of the history of a nation. Parks also serve as a strong stimulus to tourism.

Tourism, we all know, can be a very important part of a national economy. Indeed in many states of the United States it is listed as the number one industry. We are finding that in the United States we must do a great deal more to encourage visitors from other countries. We need them for our balance of payments problem, and I believe that increased international travel cannot help but increase international understanding.

But there are sometimes real conflicts which can arise between parks and tourism. Basically, the issue is to manage our natural treasures so that the people they attract do not destroy the very thing they come to see by the weight of their numbers. We must provide for attractive and comfortable tourist facilities; yet we must preserve the integrity of the natural environment.

The science of ecology and the experiences of our past failures show us that there are absolute limits to the intensity of development and use of any particular natural area. In the past, many of our park management mistakes have been corrected by the great resiliency of nature, but in the present age of massively applied technology, the margin between success and

disaster is far smaller. Today, if a select natural area is overdeveloped or unsuitably developed as a park, it will be destroyed, either biologically or esthetically. Therefore, if our natural heritage is not to be squandered to short term expediency, we must first clearly understand those absolute limitations which nature places upon us, and then learn to plan and develop within that natural framework.

Parks must be planned for nature, but they also must be planned for people - many different kinds of people : people of different tastes and of different interests; city people and country people; rich people and poor people; people who come by car and people who come by plane, train, boat, bus, on foot or on horseback. However, they all come to the parks for a similar reason : to participate in a recreation experience which is in some way in strong contrast to their workaday lives. Some will merely enjoy taking part in organized tours and social activities in the immediate vicinity of their hotels; others will not be satisfied until they have pulled an eighty-pound pack on their back and have escaped into the wilderness. Whatever their needs and interests, modern park planning must insure that there are a multitude of different experiences available for every type of visitor.

The key ingredient, of course, in making these decisions is a sense of delicate balance between the carrying capacity of nature and the needs of the people. We must have the judgment and the taste to strike these balances carefully.

In the United States, our park planners are now using a very effective management tool to help them. It may be that some form of this system can be of help in other countries. It is called a classification or zoning system. Briefly, this system places available park lands and potential recreational demands into six broad classes : High Density Recreation Areas; General Outdoor Recreation Areas; Natural Environment Areas; Unique Natural Areas; Primitive Areas; and Historic and Cultural Sites. These six categories cover the whole spectrum of park use. No computer can tell us just how many acres should go into each category, but the use of this classification system does provide a framework in which rational decisions can be made. For example, if a region containing a national park, a national forest and other resources is zoned according to the classification system, a balance of various kinds of recreational use can be provided. There will be high density areas and space for facilities, outstanding natural and historic sites will be preserved, and primitive areas will be delineated.

The use of this system also enables us to defend those areas where development should not take place. A proposal for development, a new road or any other change in use can be evaluated in terms of the existing zoning. A high-density parking lot or hotel should not be placed in any area zoned for unique natural values, but if the system has been applied properly, there will be a place for cars and hotels, and it will be a place that was determined initially by looking at the overall needs for the area - not one dictated by opportunity or by following the course of least resistance.

In summary, parks are for nature and for tourists, and we must accept the fact that there are two distinct and sometimes conflicting jobs to be done. It is important, therefore, that park planners adopt some form of a long-range decision making process to allocate their resources and energies between them.

But I suggest that expert, balanced management of national parks is well worth the effort. Parks can be done of a nation's great resources both for the renewal of its own people and for the attraction of tourists which can be a mainstay of an economy.

## 23. 2. National Parks and Tourism

by Alberto Mendonça Paz

To be able to understand and try to solve the problems related to the Argentina National Parks, it is necessary to know some facts about them.

They cover an area of approximately 2.500.000 Has. (about 6.250.000 acres) and form part of a system of 11 Parks and 1 National Monument. Two more Parks have been created by law, but they do not yet belong to the said system. There are some other areas which have been considered as future Parks. The whole would amount to a 1% of the continental surface of the country. At present they cover 0,7% of it.

Their existence dates from the year 1903 when Dr. Francisco P. Moreno granted five leagues of land near Puerto Blest. At that time, the basic idea and aim of the National Parks already existed : "To preserve the area of exceptional natural values for the utilization and enjoyment of all men". This fundamental concept sustains the structure of the National Parks Act, passed in the year 1934 and partially modified in 1958.

Sometimes these two aims, to preserve the natural environment in an almost perfect condition and offer it for the utilization and enjoyment of man, can be in opposition.

When we talk about man, we are not considering the primitive settler, but the one that comes in a transitory way surrounded by all the by-products of an industrial and urban civilization created by himself, and seeking in the Parks a necessary change. He can be considered a "tourist" and may belong to different types classified according to the nature of his need : rest, enjoyment of beauty, recreation, knowledge, etc. There is an answer for each, and as a whole, these men generate a current of cultural and economical interchange with a direct influence on the development of local economies.

Tourism generates a distribution of wealth from the high income areas to the lesser ones. International tourism, insufficient for the present, but desirable, also means foreign currency, highly convenient to the economy of the country.

Let us consider now the internal flow of tourism towards the National Parks, and among them the principal attractions : Nahuel-Huapi (150.000 visitors a year) - Lanin (30.000 visitors a year) - Los Alerces (5.000 visitors a year) in the south, and Iguazu in the north (10.000 visitors a year). In the rest of the Parks there is scarcely any tourism, only of regional or merely local type, or sometimes it does not exist at all.

Anyhow, it is to be remarked that promotion, arrangement, organization, etc., of tourism itself do not belong to the Bureau of National Parks but to specific official entities of national, provincial and sometimes even municipal order. Therefore, the function of National Parks is to work in a coordinate manner with the said institutions and control the areas of its territory. Its function comprises the management of these areas, sometimes the administration of some hotels belonging to it and the rendering of transportation services on land and water.

To really understand the internal flow of tourism towards the Parks, we should take into account the characteristics of the population distribution in the Argentina Republic.

Near one third of the total population of the country lives in the Gran Buenos Aires area, which has a radius of approximately 32 miles. The population of the other urban zones mainly located in the central part of the country amounts to a bit more than the 60% of the total population of the Argentina Republic.

If we choose Nahuel-Huapi in the south or Iguazu in the north, the distances by land to the principal centre of urban population would be more than a thousand miles, and distances varying from five hundred to a thousand miles to the other population centres of lesser importance. Neither of these Parks

has a completely paved road of access, but in both of them the final sections are under construction. Nahuel-Huapi has railway-service and good airport, but Iguazu has no railway and actual landing strip, built some years ago by National Parks, is only now going to be replaced by a modern airport for jets which will only be fit for service in two years time.

So, from internal tourism point of view, we have to consider around 200.000 visitors a year concentrating mainly in one point, and a future increase of this quantity during the next five years, owing to the improvement of access roads. Youth should be encouraged to visit the Parks, and also their beauty should be available to different social levels.

The Argentina is a country with a very important middle class with a quite considerable income, but, nevertheless, during previous years the flow of tourism to the Parks, specially to Nahuel-Huapi, was characteristic of very select and reduced groups. Owing to this, Nahuel-Huapi and its area of influence show a very high level in buildings and services, possible too, because the State, through National Parks not only planned the work to be done, but also executed part of it, cooperating in the rendering of services.

This review of history of our Parks connected to tourism leads us to the actual problem, where the basic facts to be considered are the following :

1. Critical evaluation of what has been done and should last long.
2. Maintenance of existing property and services.
3. Study of planning in order to solve actual and future problems.

We estimate that the State should continue planning through National Parks, but integrating its action with the plans and policies of the zone where the Parks are located, clearly defining its field of action and that of private enterprise. As a good example for Cerro Catedral Mountain Centre (Nahuel-Huapi National Park), where National Parks control the safety, efficiency, frequency, continuity and fares of the services rendered by private hands, and maintains indispensable connection between the works, in time and space, in order to assure organized and sustained development.

Referring to this point there arises two controversial positions, at least in our country :

1. Should private activity be welcomed in such particular areas as those of National Parks ?

2. Is the Bureau of National Parks the institution which should rule touristic and recreational activities in the Parks, when there exists a National Bureau of Tourism and similar entities in the Provincial and Municipal areas ?

The answer is affirmative for both.

Because of the existing legislation of the country, the State performs a better function as controller and coordinator than as operator. The private enterprise is quicker and more aggressive in everything concerning calls for tenders, acquisitions, designation of personnel, etc.

The indispensable control, the limits of the utilization of the Parks by man, is the fundamental principle for us as it is for other nation. National Parks should manage all the areas under its charge, without excluding a coordinated action with every National or Provincial institution dedicated to tourism.

The Bureau of National Parks will gradually transfer to private hands all functions which it does not consider indispensable to be performed by itself. It also considers as its proper function to plan the sale and concession of property and services of tourist interest determining the convenient moment to do so.

Now, if we think of tourism as an industry, we realize that it generates important human concentrations which require a clear policy regarding the proper site of future settlements, in order to protect the Parks.

The distances sometimes will continue to force future construction inside the limits of the National Parks, but the necessities and problems greatly vary if we consider the Patagonical Parks or Iguazu. In the first case, the Parks are more in need of camping facilities and refuges for recreational and sporting activities than of first-class hotels inside the limits of the Parks themselves. Iguazu presents a different problem as the impressive falls in the middle of the forest constitutes the almost sole attraction of the Park. In this place it is convenient to consider the advantages of hotels of high international level in the near proximity of the falls. This would allow a better identification of environment and view, even disregarding a bit some economic and exploitation considerations.

Much has been done by the Institution through the years with regard to access routes to the Parks and inside them, but some of these do not longer qualify as proper roads. National

Parks has to bring them up to date without leaving aside the general rules about their construction as well as respecting the tourist problems and the ones connected to view and environment.

A rough estimate of what National Parks has invested through the years for tourism would amount to the following figures in Argentina pesos (present value) :

1. Roads - \$ 2.400.000.000.-
2. Buildings - (hotels, inns, restaurants, refuges, etc.)  
\$ 3.000.000.000.-
3. Crafts - \$ 400.000.000.-
4. Cable-cars and the like - \$ 600.000.000.-
5. Vehicles - \$ 60.000.000.-

Piers, garages, shops, ship-yards, bridges, lodges, etc. as well as the system of pipes, the electric and telephonic facilities have not been considered in this estimate.

Up to this point, several problems connected to tourism have been taken into account from the National Parks point of view. Tourism has not yet been studied as a whole, as a historical, social and economical phenomenon, leaving these considerations to specialized institutions of national and international order. We can only add that the foreign tourist in the country is attracted by the Nahuel-Huapi and Iguazu areas. In recent years they have left in the country around 35 million dollars per annum, but figures do not surpass the quantity expended by Argentina tourists abroad.

As recently the United States have restricted the expenses abroad, our Parks will probably be visited by people requiring a high level of hotel facilities and services.

Anyhow, whatever the origin of the tourists, his economical capacity the number in which he arrives or the motivations he has been attracted by, the actual fact of his presence is the same for National Parks as Institution.

Man is the ultimate goal in the action of this Institution which preserves the natural and scenic values, common inheritance of the Argentina people.

POLITICAL AND ADMINISTRATIVE I

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Monday 1st April 1968 : Morning Session

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Opening the Session on behalf of IUCN, Dr. F. Fraser Darling announced with regret that he would shortly be leaving Bariloche and introduced as his successor, as IUCN's senior representative, his colleague and fellow Vice-President of the Union, Dr. L. Hoffmann.

Dr. Hoffmann said that it gave him great pleasure to invite Dr. Manuel Flores Mora, Minister of Agriculture of the Government of Uruguay to take the Chair for the present Session.

The Chairman then opened the discussion of the first topic,

24. The necessity for ecological investigations as a prerequisite for satisfactory planning

by calling on the authors to present the papers contributed as a basis for discussion.

24. 1. "The importance of Ecological Studies as a basis for land-use planning", by Dr. Stanley A. Cain (U.S.A.)

24. 2. "A Conservation Programme for Ecuador", transmitted to the Conference by His Excellency the Minister of Agriculture and Animal Husbandry of the Government of Ecuador, Jarine Mantilla Mata.

Presenting this paper on behalf on his Minister who had unfortunately at the last moment been prevented from attending the delegate of Ecuador, Mr. Pablo Guillermo Rosero Galarza summarized the scope of the Paper, as published in these Proceedings, with particular reference to the establishment of new National Parks planned with the assistance of an FAO expert Dr. Richard E. Warner. These proposals would go far to implement the imaginative concept of a National Park extending along the line of the Equator from which the country itself took its name.

"The organization of natural resources in the Dominican Republic 1965-1966".

Dr. Maria Buchinger (U.S.A. stated that a paper in Spanish on this subject had been submitted by the Dominican Government and could be made available to all interested delegations.

## DISCUSSION

Caldevilla (Uruguay) : expressed appreciation of the new light thrown on development and conservation problems by the papers presented.

Riney (FAO) : the Ecuadorian Government is to be congratulated on its far-sighted programme, which accords with the important modern concept of a systems approach to National Park planning.

Martinic Beros (Chile) : in the light of world experience of deterioration of soils, it seems clear that every Government should have a special department or office responsible for land-use.

Pereira de Araujo (Brazil) : in Brazil this service is provided by the department responsible for agrarian reform.

Cain (U.S.A.) : many countries have had special land-use planning sections, but their influence has depended on the effectiveness and logic of planning and their effectiveness in turn depends on them being invested with a degree of executive authority and, above all, on adequate funds with which to put plans into effect. The creation of a special department may therefore be one answer but not necessarily so.

### 25. Conservation principles in an agrarian economy

Three papers were presented as a basis for discussion.

#### 25. 1. "The Conservation Principles of Agricultural Development", by Antonio J. Prego (Argentina).

In the author's absence the summary of this Paper was read by A.E. Ragonese (Argentina). In doing so he point out that the eleventh and final point of the Paper, concerning the essential role of education and agricultural extension work if any progress is to be adviced, was not included in the summary of the paper and should be added to the published version.

#### 25. 2. "Forestry and Agrarian Reform" by J. Prats Llaurado (Brazil)

- based on a paper under the same title presented to the World Land Reform Conference held at FAO headquarters, Rome, in June/ July 1966.

In the absence of the author the paper, as published in these Proceedings by kind permission of FAO, was read by F. Barrientos (FAO).

25. 3. "Conservation principles in the agricultural economy of Brazil", by Harold Edgard Strang (Brazil).

Introducing his Paper the author prefaced his remarks by reference to the tendency towards selective destruction of hardwoods, on which the economy of the forest sector had hitherto largely depended, and their replacement by soft wood plantations. On the Paper itself he wished particularly to emphasize the point that while the Brazilian Constitution guarantees property it also provides for expropriation, with compensation, in the public interest but only if this (a) is necessary for scientific research or (b) serves the needs or protects the natural resources of the country or (c) is for the purpose of reafforestation. The aim is always to evaluate priority areas and make a proper integrated analysis of all technical projects, so that the opening up of any area takes full account of the stability of ecosystems.

#### DISCUSSION

Budowski (Unesco) : the problems of agrarian reform and their relation to conservation have been fully discussed in recent years, especially at the Meeting on Human Conservation in Central America, held in Guatemala in 1965 and at the Symposia on the Humid Tropics held in Lima and Belem in 1966. On both occasions it became clear that there is an excess of optimism about the productivity of tropical lands, resulting in a marked tendency to open up new land for agriculture and grazing as a matter of political expediency.

Barrientos (FAO) : FAO is very much aware of the need for better cooperation between Forestry and Agrarian Reform departments and his planning a symposium to discuss this which will probably be held in Brasilia towards the end of the year.

Rosero Galarza (Ecuador) : a problem which must be faced is the reconciliation of the legislative requirements of agrarian reform with those of conservation. It is usually the forest department which has the best technical knowledge on the lands proposed for colonization including their soil conditions and it is essential that the Foresters should be given the opportunity and authority to decide what lands should or should not be opened up - a policy which is now being followed in Ecuador.

Maria Buchinger (U.S.A.) : attention should be drawn to the excellent work undertaken by the Colombian National Institute of Agrarian Reform, which has made full use of the expertise of National Universities and international organizations.

Strang (Brazil) : in Brazil, when lands are under consideration for colonization, the Agrarian Reform Institute undertakes a complete inventory of its resources, with modern methods such as soils and vegetation mapping, so that the allocation of the new area to agriculture, pastoral purposes, forestry and National Parks or biological reserves can be made on a sound basis. Only when this work is finished, is the further development of the project handed over to the Ministry of Agriculture and the Institute of Agricultural Development.

Chairman : in closing the session, expressed his appreciation for the privilege of presiding at a meeting of those who do not want in the words of Dr. Fraser Darling, to create artificial obstacles to human progress but are determined to overcome all difficulties. The beauty of the Conference environment at Nahuel Huapi demands that this should be the approach to the problems discussed at the Session.

24. 1. The Importance of Ecological Studies as a Basis for  
Land-Use Planning

by Dr. Stanley A. Cain

On July 12 last year I testified for my Department before the Subcommittee on Science, Research, and Development of the Committee on Science and Astronautics of the House of Representatives of the United States of America. The subject of this Hearing was a Resolution expressing support of the Congress for the International Biological Programme, the worldwide scientific effort that is largely centered on the science of ecology. At that time, I said :

I believe that we have long had an imbalance in our scientific effort. Biology has made its advances, of course. These are well known in biochemistry, biophysics, and genetics, and through their pay-off in medicine and health. But it is the "hard sciences" in support of physical technology that have done more to change the modern world and its industrial processes.

Our concentrated attention to physical technology with quick profitable pay-offs has worked - up to a point - but we are now appreciating that our relative neglect of systems in nature, especially the vastly more complicated systems of biology and culture, have given us the urgent critical problems of our time.

It is not reasonable to criticize past actions on a basis of present knowledge, although we may have ample cause to regret them because it is so costly to correct our mistakes. Today it is unreasonable not to manage our land resources so as to avoid destructive soil erosion, our water resources so as to curb destructive flooding, our forests and grasslands so as to maintain their natural productivity, and our fish and wildlife so that they will continue to supply us and give us pleasure. The knowledge that permits sound management of natural resources stems from all of the natural sciences; botany and zoology with their many subdivisions such as physiology, nutrition, genetics, and pathology; chemistry and physics, especially as they bridge the life sciences through biochemistry and biophysics; geology, soils, climatology, and meteorology, as related to living natural resources.

Indispensable as they are, these separate scientific disciplines cannot yield an ultimate understanding of nature because they are essentially analytical and too compartmentalized. They must be made to work together. They must be interrelated as their objects of study are in nature. What is being appreciated gradually is that ecology is the science capable of synthesis

because its attention is not directed at things, processes, and conditions as though they existed in isolation but at the inter-relations among them.

I am convinced that ecology - or perhaps better, the ecological way of looking at nature - is beginning to provide the means of synthesizing the sciences and of finding out how nature really works.

We are beginning to appreciate that the atmosphere functions as a system, and that the hydrosphere, the soil, and biological communities do also. But these are really no more than sub-systems, complex as they are, and they interact to produce ecosystems which may be defined as organizing plant-animal communities together with their inseparable physical environments.

While I am convinced that ecology is the science that can weld together the other natural sciences in the use of natural resources, it seems equally clear that biological ecology alone cannot provide the basis for land-use planning. Planning is done by people. This means that sociology, cultural anthropology, economics, political science, and law must also make their technical contributions to land-use planning. Because the emphasis is still on interrelations, some of us would broaden ecology to include these inputs that enhance the understanding of human ecosystems.

History is full of costly mistakes and some fiascos that would not have occurred had there been adequate ecological information or even a feeling for ecological relationships in nature. Here are a few examples that are well known :

Around the turn of the century in the United States after we had pretty well cut over Eastern and Great Lakes timber and inroads were being made in the Gulf States and the West, there was a surge of afforestation programmes in fear that we would run out of timber. Many of these plantations were complete failures because of the use of illadapted species or strains from climates quite different from the new plantings. Even as we developed more sense about this, it took a few more decades to realize that most conifers grow better with intermingled plantings of broadleaf species because of their effect in maintaining mineral balance and structure in the soil.

In the early post-war years Britain undertook an extensive groundnut programme in East Africa and lost some millions of pounds because the interrelations of savanna vegetation, savanna climate, and savanna soils were not understood. The planners with a proper feeling for the nutritional need for more oil and protein among native peoples had ground prepared, peanuts

planted, and hearts broken when the dry-season soils became like concrete.

Again in the early post-war years Unesco started a Hylean Amazonian programme that was to develop a new breadbasket for the world's hungry people. There were international political troubles, but a central cause of failure was an inadequate understanding of tropical rain forest ecology, including lateritic soils. Something similar happened to Ford's rubber plantations and other efforts at monoculture in an area of the world's most complex natural vegetation.

Much of the devastation and deterioration of soils in East Africa is due to dependence on cattle. Dr. Fraser Darling and others have pointed out that more useful animal flesh suitable for human consumption is laid down on the several species of native ungulates, and this is done without loss of range productivity. Something similar can be done about much of our treatment of the arid and semi-arid Western United States where overgrazing by cattle and sheep has seriously depleted range productivity. We, too, have participated, even continue to do so, in what has been called the Saharaization of the land.

A pesticide programme in Nova Scotia was embarked upon to control spruce budworm. The budworm was inadequately controlled, other insects had damaging exploded populations, valuable insect-eating birds were killed, and salmon almost disappeared from the streams.

In Pakistan, in the U.S. Southwest, and many other arid and semi-arid places faulty irrigation practices have ruined the soil for crop production by accumulation of salts at the surface and the development of shallow hardpans.

In parts of South Florida the combination of over-drainage and over-draft of aquifers for irrigated agriculture has destroyed the productivity of the soil, in some cases in a few years time.

As I have said, it is not entirely fair to judge the acts of history in the light of subsequent knowledge, but it is fair to say that the checks and balances of nature never seem to have caused enough concern. The attractions of immediate profit and the stultifying influence of traditional practices cause many persons to think only about immediate conditions, forgetting or ignoring possible longer-term consequences of their actions.

We are still pursuing too many essentially single-purpose programmes, running the risk of failure - not necessarily failure to accomplish the narrow objective, but failure to anticipate the

consequences of our actions. These consequences, often unexplored side-effects, are ignored until they bear down upon us with intolerable changes in the environment. In some cases the cost of these changes may far exceed the direct benefits of a project.

Most of our pollution problems of air, water and soil have arisen because we have come late to consider the effects of emitted gases, solid wastes, organic trash on the environment on which our very lives depend. Clever engineering went into everything but exhaust trash of internal combustion engines. Clever engineering goes into paper making and a thousand other manufactured products - and the poisonous effluents pour into streams, lakes and the seas. Only now, after decades of unconcern are we mounting an intensive programme to handle human wastes by means other than pollution dilution. We are just now beginning to be given cost estimates for the correction of our oversights, and the tag is in the billions of dollars. In these terribly important matters environmental science is still in its infancy.

We have spent millions on research and control of lamprey in the Great Lakes and are now spending more millions to re-establish lake trout and whitefish and control alewife. The lamprey and alewife came into the Great Lakes from the sea, using canals which were constructed with no thought for biological consequences.

Today we are financing a Commission that is studying a sea-level canal to be built somewhere in Panama or Northern South America. There are two aspects of thinking about this, at least up to now, that suggest an almost complete ecological ignorance. One is the biological consequences of joining the Caribbean Sea and the Pacific Ocean that have been separated for 25 million years. The other is the possible, I would say probable, consequences of excavating the canal by nuclear explosions - consequences on man and nature. Any problem of radio-active isotopes is by no means a local one. Such materials pass along the food chains. Atlantic tuna have recently been found to cross from one side of the Atlantic to the other. Some migratory birds move between the area and the Arctic. Crustacea accumulate these substances, as they do pesticides and pass them along the food chains.

High dams have been built without consideration of the warming of downstream waters and its effect on valuable fish resources, and sometimes without provision for passage of anadromous species.

As more and more nuclear power plants are being constructed we are only belatedly, even in these times of scientific sophistication, beginning to design them for avoidance of heat pollution.

The physical destruction of estuaries by dredging, excavating and filling has been continuing with little thought for the ecology of these complicated natural areas and their value for commercial and sport fisheries, wildlife, natural beauty and recreation.

We are now well embarked upon a programme of research and pilot experimentation with weather modification. It is an attractive and challenging idea, and one that promises to provide supplementary water in places where it is needed. But up to now there has been no significant attention paid to consequences of weather modification if it should become operationally successful. It is my guess that the necessary studies on the biological, economic and legal consequences of weather modification would be as expensive as the reasearch to accomplish it, which now is running about \$ 5 million a year. And monitoring the modification could be a continuing cost as great as seeding the clouds. If precipitation were to be augmented 10 %, perhaps 15 % or 20 %, ecological systems could be shifted hundreds of miles under certain circumstances, and the economy of entire regions could be disoriented.

The record is not all bad. Ecological knowledge has been put to work in many cases with great success, and the pay-off has been important. Better fundamental knowledge of biological systems to serve as the basis on which applied findings may be derived is a second source of return from the IBP investment.

Knowledge of freshwater systems is being put to work in fish pond developments, especially in our Middle West and South, which produce as much as a ton per acre of fish. And in rice-growing areas fish are raised with paddy, or rotated soybeans and rice.

Aquaculture is being extended to salt and brackish waters in the cultivation, the farming, of oysters and shrimp.

Reservoirs and lakes are being stocked with carefully selected organisms to fill out a productive food chain.

Forest and range units are becoming more productive of a wide variety of goods and services because their management is firmly based on knowledge of plant and animal ecology.

Systematic, long-term research into the central Pacific as a complete environment system has led to the discovery of such things as the equatorial undercurrent, factors explaining distribution and abundance of tuna, and prediction of skipjack catch on the basis of seasonal warming and location of water masses.

The programme of our Soil Conservation Service, designed in the 1930's to help correct the mistakes of our past soil and water mismanagement has matured into a land capability system that helps allocate each acre to its highest sustainable use.

Comparative agrobiolgy and agroclimatology are guiding land-use developments around the world, or at least have the capacity to do so.

Identification and study of planktonic eggs and larvae in the California ocean current system have led to discovery and development of Pacific hake resources to support an expanding fishing enterprise off the State of Washington.

Many massive health programmes are founded on detailed ecological knowledge of vector roles and their niches in the biological-environmental systems of nature. Disease problems in every part of the world, from rain forest to desert to tundra and high mountains, have caused medical researchers to look closely at the natural and agricultural communities in which people live.

In conclusion I wish to recognize a fundamental dilemma that faces people in many parts of the world. Some have called it "land hunger", because there seems not to be enough arable land on which food and other products can be produced for hungry and ever more numerous millions of people. Others feel that limited natural resources are not generally the basic problem. Instead, they say, the problem is our failure to organize, politically and economically, to put to work the science and technology that already exist so that productivity of living resources can be enhanced, and so that minerals and other resources can be made usable without needless destruction of other values.

When human needs are so great, how can the planner say to the small farmer who has no other land for his family's subsistence, "Don't grow corn on that hillside, the slope is so great".

The dilemma, as Malthus said long ago, is that it is easier for human population to double and double again in a few brief decades than it is for production increases to keep pace. For nearly a century and a half it seemed that Malthus<sup>1</sup> thesis was incorrect because technology in some few parts of the world was producing an abundance that mankind had never before known. But today in many parts of the world what we now call the "population explosion" is causing hundreds of millions of people to suffer the consequences of the Malthusian dilemma.

Ecological land-use planning will help to solve the dilemma, but that alone is inadequate. The human ecosystem is not only the web of interrelations between man and natural resources; it is the much more complex web of interactions that include all of the societal factors that affect what we do and how we do it.

#### 24. 2. "A Conservation Programme for Ecuador"

by His Excellency the Minister of Agriculture and Animal Husbandry of the Government of Ecuador, Jarine Mantilla Mata.

##### Summary Statement

The government of Ecuador recognizes fully the need for a sound and scientifically based programme of natural resource conservation. To achieve this, it has delegated the principal authority for natural resource conservation to the Direccion General de Bosques, through its Ministry of Agriculture. The following four action programmes are proposed. The assistance of the Latin-American Regional Conference on Conservation of Renewable Natural Resources, and of the individual international organizations represented at this conference, is earnestly solicited, to help our country achieve the important goals of these programmes.

### Proposed Action Programmes

1. The development and implementation of laws, regulations, and necessary administrative procedures which effectively promote the conservation of wildlife and other natural resources, and which provide for the development and maintenance of a system of national parks and reserves.
2. The establishment, through delimitation and other appropriate measures, of a system of national and provincial parks, forest reserves, and special sites, to be accorded permanent protection for the benefit and use of the people of Ecuador. The selected and contemplated sites, to which additions will be made in the future, are listed and discussed in appendices A, B and C
3. The conducting of a programme of integrated research, to provide a sound scientifically based, and progressively improved national programme of natural resource conservation. An important aspect of this integrated research programme is the providing of basic information which may be utilized in achieving the goals of 1 and 2 above.
4. The fielding of a Galapagos Islands Resource Study Team, to provide basic ecological information on the renewable terrestrial and marine resources of the Galapagos Islands; and to assist in the development of those natural resources which can be exploited without jeopardizing the integrity of the Galapagos Islands National Park.

### International Assistance Required to Achieve Goals

1. Resource Management Consultant : A mature expert in the legal, administrative, and research aspects of natural resource management, to assist the Director General de Bosques in the formulation of laws, regulations, and policies which will provide the foundation for the activities of the Department of Natural Resources. This expert will also become the leader of the Natural Resource Research Team discussed below.
2. Natural Resource Research Team : An integrated research team composed of experts in wildlife ecology, plant ecology, range management, freshwater fisheries, ethnology or anthropology, archeology, and national park management. This team will conduct studies on proposed parks and natural areas, and upon natural resource problems of special interest throughout Ecuador to provide the factual base for their proper protection, management and exploitation.

3. Galapagos Islands Resource Study Team : A team of three experts, including a wildlife ecologist, a fisheries ecologist, and a resource management specialist. This team will study the ecology and management potentials of the principal terrestrial and marine animal species, so as to provide the guidelines for programmes of sustained yield harvest and animal control which are in harmony with the basic mandate of the Galapagos Islands National Park.
4. Short Term Natural Resource Consultants : Experts for shorter periods of time, totalling 36 man: months, to deal with special problems arising in the conservation programme as deemed necessary by the Direccion General de Bosques and the Resource Management Consultant.

#### Plan of Action

The government of Ecuador, realizing as it does the need for a sound and scientifically based system of protection and conservation for its forestry, wildlife, freshwater fisheries, scenic and related natural resources, has assigned, through its Ministry of Agriculture, the responsibilities for these resources to the Direccion General de Bosques. The basic guidelines for the administration of these responsibilities have been provided in the Forestry Law of 1958 and Decree number 1211 of 1966. These laws provide generally for the various aspects of forest and forest products management, and for the establishment of national parks, forest reserves and other conservation programmes required by the country.

#### The Department of Natural Resources

Within the present administrative structure of the Direccion General de Bosques is a functioning Department of Natural Resources. However, due to the recency of creation of the Direccion de Bosques (1961), and the lack of available personnel trained in parks management and other aspects of natural resource conservation, only limited progress has been possible in such areas as the development of specific laws and regulations pertaining to wildlife and national parks, and in the establishment of specific conservation programmes. It is the intention of the Direccion General de Bosques to enlarge the scope of activities of this department as soon as competent staff and adequate funds are available. These activities will include the development and administration of

- a) a wildlife conservation programme;
- b) a national parks and forest reserves programme; and
- c) the establishment of special conservation programmes based on the particular conditions and needs of the Ecuadorian natural resources.

### Proposed Specific Action Programmes

Four major action programmes are proposed, to be undertaken immediately by the Direccion General de Bosques. They are as follows :

1. Establishment and implementation of laws, regulations, and necessary administrative procedures for the conservation of wildlife and other natural resources for which the Direccion General de Bosques is now responsible, and for the development of a system of national parks and reserves.
2. Establishment, through delimitation and other appropriate measures, of a system of national and provincial parks, forest reserves, and sites of special interest. In appendices A, B and C will be found a list of selected and proposed sites, to which additions will be made in the future together with more detailed data on those already studied.
3. Conducting of a programme of integrated research to provide a sound, scientifically based, and progressively improved programme of natural resource conservation. This integrated research programme will be addressed to
  - a) the characterization, delimitation, and development of management programmes for preserved areas;
  - b) ecologically oriented studies of the fauna, flora, aboriginal populations and other special characteristics of preserved areas; and
  - c) integrated or independent studies of special natural resource problems in other parts of Ecuador, as deemed desirable by the Direccion General de Bosques for the protection and wise use of the country's natural resources.
4. Conducting of an ecologically oriented resource analysis of the principal terrestrial and marine animal species of the Galapagos Islands, to provide guidelines for programmes of sustained yield harvest and animal control which are in harmony with the basic mandate of the Galapagos Islands National Park. Attention will be focussed on the feral goat, pig, and cow populations, and upon the lobster and tuna fisheries. Basic ecological information will be developed for these species, which will permit analysis of the possibilities of sustained yield exploitation and control as indicated. Special emphasis will be placed on the development of natural resource industries for the permanent inhabitants of the Galapagos Islands. At a later stage in the investigation the Centro de Dedarrollo Industrial

(CENDES) will be brought into the programme to assist in the establishment and financing of those exploitation programmes that are commercially feasible and biologically sound.

### International Assistance Required to Achieve Goals

The technical assistance needed to achieve the goals of this Conservation Programme is discussed below. It can be best described by indicating the proposed activities of the personnel required for their successful achievement.

1. Resource Management Consultant : A mature expert in the legal administrative, and research aspects of natural resource management. This expert must be sufficiently experienced to be able to assist the Direccion General de Bosques in the formulation of laws, regulations, and policies which will form the foundation for the operations of the Department of Natural Resources. At the same time he must be sufficiently creative and open-minded that he can, while adapting existing resource management concepts to the Ecuadorian situation, find new and improved methods of administration and management which are relevant for the special needs of Ecuador. This expert will also become the leader of the scientific team described below, and liaison officer with the Direccion General de Bosques. One of the principal activities of this expert will be to assist the Director General de Bosques in the establishment and implementation of laws and regulations which will halt the destructive use of natural resources while the longer term scientific studies are underway.

This expert will ideally be provided for an initial period of three years, with provision for a one or two year extension according to the needs of the Direccion General de Bosques. The government of Ecuador will provide one or more counterpart personnel for the Resource Management Consultant. It is highly desirable that provisions be made for one year study fellowships for these counterpart personnel, at suitable institutions where they may receive special training in natural resource management and administration.

2. Natural Resource Research Team : An integrated research team, composed of experts in wildlife ecology, plant ecology, range management, freshwater fisheries, ethnology or anthropology, archeology, and national park management. This team will have four principal functions :
  - 1) to conduct a programme of integrated research on sites already selected or contemplated as national and provincial parks, forest reserves, etc., in order to

provide a sound scientific basis for their permanent preservation and use by the people of Ecuador. This programme will have the highest priority, and will be directed principally toward those proposed and contemplated sites listed and discussed in Appendices A, B and C;

- 2) to conduct both integrated and independent research on selected natural resource problems of special interest throughout Ecuador, in order to provide the Direccion General de Bosques with information which will facilitate development of sound programmes of conservation;
- 3) to consult with and to provide technical information to the Director General de Bosques through his Resource Management Consultant on all aspects of the natural resources of Ecuador, which will further the development of a functional and scientifically based administrative programme and policies for the Department of Natural Resources; and
- 4) to work with the Centro de Capacitacion Forestal, Conocoto, in the development of curricula and teaching programmes which will provide suitably trained personnel for the developing conservation programme. This may include limited periods of teaching, the writing of syllabic and other reference and teaching material, directing of field study programmes, and consultation with the Project Director of the Centro de Capacitacion Forestal on current and anticipated training needs.

The members of this team should be fielded as nearly simultaneously as possible, to permit the maximum integration of their various areas of specialization, particularly in the study of parks and reserves. The period of activity of this team will be two years, with the provision of an additional year for all or part of the team as dictated by progress and needs at the end of the two year period. Their leader will be the Resource Management Consultant.

While Ecuadorian counterparts are not required owing to the special nature of the research programme, the assignment of one or more selected Guardabosques and or university students to each scientist as research assistants is most desirable for the valuable training and experience it will provide.

3. Galapagos Islands Resource Study Team : A team of three natural resource scientists, including a wildlife ecologist, a fisheries ecologist, and a resource management specialist. This team will be responsible for :

- 1) basic studies on the ecology and population dynamics of the feral goat, pig, and cow populations, and upon the lobster and tuna fisheries. Data on the ecology of other important species, such as the rat, dog, and cat, will be obtained to the extent that they contribute to the principal goals of the programme;
- 2) the development of information which will permit analysis of the potentials for economically sound, sustained yield harvest programmes. Efforts will be made to integrate the harvest potentials with the specific biological needs of the Galapagos Islands National Park, and with the needs of the permanent inhabitants of the Galapagos Islands;
- 3) with the assistance of CENDES and other commercial development groups, to analyse the potentials for economically and biologically sound, sustained yield harvest programmes;
- 4) to work closely with CENDES and other commercial development groups in the commercial development of those harvest programmes deemed feasible and desirable, and to provide consultation and guidance so as to assure the permanence of the industries and their continued harmonious relationships with the Galapagos Islands National Park;
- 5) to evaluate the biological effects of increasing tourism on the Galapagos Islands National Park, and to assist the Direccion General de Bosques in the development and implementation of policies and regulations which will protect the natural values while providing for reasonable and non-destructive use by visitors.

Due to the complexity of the environment and the logistics problems inherent in island studies, the initial research and development programme will be for a three year period. The first two years will be devoted to basic ecological studies of the species of principal interest; plus analyses of past resource harvesting industries in the Galapagos Islands, to evaluate their economic histories, their effects upon the animal populations, and the causes of their cessation. Sufficient data will be developed by the middle of the second year for CENDES and possibly other development agencies to commence their studies. The third year will be devoted principally to the establishment of sustained yield harvest programmes which meet the requirements of the ecological, economic, and national park guidelines established during the earlier portions of the study. Ecological studies will be continued to the extent that they contribute information which can be utilized in the sustained yield management programmes. The evaluation of the potential effects of tourism will continue throughout the study period.

Adequate provisions will be made before the end of the third year of study for continued scientific supervision of the exploitation programmes. It is proposed that, if economically feasible, the industries developed by this programme provide the necessary financial support for the continued presence of an ecologist or resource management specialist to assure a balanced programme of sustained yield harvest.

While the Galapagos Islands Resource Study Team will have its own identity, and its leader will be one of the team members appointed jointly by the Direccion General de Bosques and the supporting agency, a close working relationship will be established with the Charles Darwin Research Station. The Station will become the base of operations for the Study Team, and appropriate arrangements, both procedural and financial, will be made for use of the laboratories, secretarial and supporting staff assistance, and so forth. The activities of the Study Group will be integrated to the greatest extent feasible with the research and conservation activities of the Station personnel. The team may also establish contact with the Instituto Nacional de Pesca and the Direccion General de Pesca for exchanges of information and cooperative effort as deemed necessary by the team for the research effort.

4. Short Term Consultants : A total of 36 man months of Short Term Consultant activity is required to deal with special problems arising in the conservation programme. The problems to which these consultants are assigned will be determined jointly by the Direccion General de Bosques and the Resource Management Consultant. They will generally be problems requiring special knowledge or experience not available in the Natural Resource Research Team.

25. 1. "The Conservationist Principles of Agricultural Development"

by Antonio J. Prego

In general, in Latin-America, the natural environment constitutes, even at present times, the basic resource and commonly it is not properly utilized. On the contrary, it is in a rapid process of deterioration. Therefore, it is important to dedicate any effort to prepare an integral analysis of this problem.

As starting point, it is necessary to establish with realistic objectives and free of political prejudices, the role that the rural sector plays in the economy of every country.

For assessing the importance of this faction, it is necessary a carefully survey or inventory of the natural resources implicated from the rural point of view.

Aerophotogrametry and photo interpretation constitutes the modern methods more suitable to determine, classify and recording the renewable natural and integration resources, including the cropland. Data obtained by these techniques permit a rapid evaluation, delimitation, characterization and mapping of the different elements of the environment.

A previous work for any agricultural development programme is to determine the potential productivity (aptitude, utilization and limitation). This important task should be done by a team of experts representing the different fields of work.

The complex and hard problem of land-tenure conditions, which interfere with the applications of modern practices, should be solved considering the following fundamental principles : to obtain the maximum productivity according to systems of management best suited to land conservation and taking into account the human dignity. Hence it will be necessary to search for an harmonical system that permits an efficient and human treatment of the natural resources.

The group of specialists, using an integrated criteria, must study the regional, local and predial characteristics, each of this steps with more accuracy, in order to decide the use and management of the ecological elements. The planned production system should be flexible enough so that it can be easily adjusted by the farmer, to a changing economic environment to which the rural enterprise is subjected.

Selection of the best methods and farming practices, in a wide sense, requires experimentation and basic research. To accelerate the application of modern techniques, use can be made of information acquired already in other countries, choosing a balanced scheme of farming practices which should be later confirmed by experimental work.

More over, to facilitate the more effective application of development programmes it is necessary local, and regional studies to determine the technical, social and economical feasibility of the systems, mainly those of soil management and utilization.

The generalized adoption and application of the traditional principles in the agricultural environment demands a well balanced dose of stimuli to encourage and help the farmer to the

adoption of technology and to take responsibilities as a producer in support of the basic sources of production. Listed as adequate means of promotion are : printed and supervised credit, specific reduction of tariffs, planned taxation with a production criteria and putting into practice specific work of infrastructure : roads, communications, health and education centres, water supply, etc., which are so much needed in Latin-America.

## 25. 2. "Conservation Principles in an Agrarian Economy"

"Forestry and Agrarian Reform" by J. Prats LLaurado

### Introduction

Before embarking on an examination of the forestry aspects of agrarian reform it will be useful to explain what we understand by the term "forest land sector" which we shall be using frequently throughout this paper. Perhaps the simplest way of defining this sector is to refer to the products and benefits derived by society as a whole from it. The products are not only the obvious one of timber, but also all the numerous secondary forest products (fuelwood, gum, fruit, etc.), together with forage, water, wildlife and fish; the benefits include vital functions like erosion control and water flow regulation and increasingly important services like the provision of facilities for outdoor recreation.

Owing to its special physiographical features, the interdependency between its various functions, the social benefits it provides and the economic role of forest production, the forest land sector has its own distinctive character and specific technical and managerial requirements. This is reflected in the nature of the institutions concerned with its control and management, and may explain why public or collective ownership of forest lands - or at least some degree of State control - is generally considered as being in the public interest. In fact, three-quarters of the world's accessible forest land areas are under public ownership.

This must be borne in mind when considering the role of the forest land sector in general agrarian policies, theme which is discussed in this paper in the light of the fundamental aims of agrarian reform programmes :

- a) to eliminate the elements of social injustice in the agrarian system, and
- b) eliminate the obstacles which an out-of-date agrarian structure places in the way of agricultural development.

The low man/land ratio which prevails in the forest land sector does not usually give rise to acute instances of inequitable or socially unacceptable situations. However - and this point underlies the whole approach of this document - the developing countries, in their efforts to promote agricultural efficiency and productivity and raise rural standards of living, need to mobilize the forest land sector's potentials in order to dispose of a very effective means of intervention in addition to the measures applicable to the agricultural sector itself.

There are many ways in which the forest land sector can contribute to the success of agrarian reform programmes : by raising rural incomes, by offering increased and more diversified employment and by easing rural exodus problems. It properly developed and assessed, forest lands may be of considerable help in financing agrarian reform programmes; the forest industries based on them can act as catalysts for rural industrialization.

The forest land sector has also a role to play as a reserve of arable land; while agricultural development depends essentially on raising the productivity of the agricultural sector itself, there are situations where agricultural production can be increased by opening the forest land sector to colonization. However, it must not be forgotten that efficient agriculture depends on the maintenance of an adequate balance between forest and agricultural land. The retention of forest cover and, where warranted, conversion from agricultural to forestry use, constitute key elements of land use policy.

#### Distinctive features of the forest land sector

The forest and agricultural land sectors share certain basic characteristics such as the natural factors on which plant growth depends and many similarities in their production processes. But the differences between agricultural and forestry land uses should not be overlooked :

- a) In agriculture, the production cycle is usually short, often annual; in forestry it covers a number of years.
- b) In farming, man can modify environmental conditions by irrigation, fertilization, etc; in forestry, for technical and above all economic reasons, the natural environment is less open to modification.
- c) In farming, the yield is easily identifiable; in forestry it is difficult to distinguish between the product and the means of production.
- d) The main forest product - wood - is voluminous, heavy and grows over wide areas; this requires harvesting and transport techniques quite different from those used in agriculture.

- e) Economic development coincides with a rapid decrease in the direct consumption of unprocessed forest products, while the forest sector's economic role as a producer of raw material for industry becomes ever more predominant.
- f) The numerous benefits and indirect yields derived by society from the forest sector from part of the socio-economic infrastructure without it being possible, in general, for them to be replaced or imported; for this reason, these benefits and yields are considered as being of public interest.

Other marked features of the forest sector are the long-term repercussion of policies, the almost irreversible consequences of abuse and the unassessable and collective nature of many of the benefits provided by forest lands.

These characteristics of the forest land sector are reflected in the attitude of private operators, in the optimum size of forest enterprises, in forest production and harvesting methods, and in the public authorities' approach and responsibilities.

#### Forest tenancy : forms and evolution

State ownership of forest land is largely predominant in developed countries under a socialist economy; in the other developed countries, a substantial part of the forest land sector is under private ownership. In the developing world, most forest lands are under public or collective ownership, although this is not always ratified by possessory actions on the part of the public administration. There exist, however, numerous and important exceptions : artificial forest plantations set up by private firms or individuals are generally recognized as being private property; in Latin-America a large proportion of the accessible forest land is under private ownership.

In the developed countries, although readjustments are constantly being effected, there has been no generalized change in the regime of forest property in recent years', except for the nationalization of forest lands in various countries of Eastern Europe shortly after the Second World War.

In the developing countries, the situation is much more fluid. In general, the question of public versus private ownership of forest lands tends to be viewed within the framework of general land use problems and policies rather than in purely juridical terms :

- a) Where population pressure on forest lands is relatively low, there has been a tendency to consolidate public ownership over lands which, although legally belonging to the State, have not yet been brought under effective control. Usually this has been done through the declaration of forest reserves. In certain cases, public ownership has been extended over former private lands.
- b) Where population growth and the expansion of agricultural crops bring about high pressure on forest land, the trend has been towards private appropriation of public forest lands within colonization schemes and through the legalization of squatters' settlements.
- c) Where forest lands play an important role in the food production cycle of traditional economies through shifting cultivation, grazing, hunting, food gathering, etc., there has been a fairly extensive tendency to transfer the use of State lands to local communities.

The forms and situations of tenancy common in agricultural areas are not widely practised on private forest land, as forest operations do not provide the type and range of employment that give rise to the landlord/peasant system. In public lands, contractual arrangements for timber disposal, forms of use based on customary rights of usage, and utilization of forests in common, can be considered as typical examples of forms of forest tenancy. Security of tenure, in terms of contractual guarantees accorded to the forest user, formal recognition of rights of usage, etc., plays a no less important role in the forest land sector than in the agricultural sector.

Adequate forest harvesting contracts are among the best institutional tools for promoting forestry development with minimum capital and management inputs on the part of the government. A number of developing countries are paying increased attention to facilitating in this way investments in the forest infrastructure and manufacturing installations. Under the Honduran Forest Law, for example, special contracts may be granted in order to attract large forest industries. The Forest Law of Venezuela (1965) authorizes contracts for a period up to 50 years over as large an area as is necessary for the type of forest industry to be established.

The forest land sector plays an important role in traditional economies through such practices as nomadic grazing and shifting cultivation. In the long run, the extinction of traditional land use forms which imply primitive socio-economic conditions - notably the lack of sedentary habits - seems logical, but in many countries their continuation is to be

expected for years to come. The forest sector will continue to provide the space in which these uses occur and the problem to be faced, therefore, is one of reconciling forest rights of usage with the role of the forest land sector within the overall economic framework.

Clearly, the solution must be found in the spread of agricultural and stock-raising methods which make possible a more intensive use of the land than that afforded by the customary practices. But, at the same time, better use must be made of the land and labour at the disposal of the rural population. Many developing countries are aware that this can be done through a policy of forestry development. For example, the employment of rural manpower in forest plantations offers great possibilities for capital formation.

Measures designed to maximize the direct contribution of forestry development to the social and economic improvement of rural life should be coupled with the progressive rationalization and control of traditional forest usage rights through regulatory means. First of all, the importance of different usage rights for the local communities must be carefully weighed in each particular case. Next, a distinction must be made between traditional forest usage rights which are incompatible with the aims of forestry development and those which are not. For this reason hunting and fishing, as well as the collection of certain minor forest produce, are authorized in many forest reserves, while lighting fires grazing cattle and shifting cultivation are strictly forbidden. Furthermore, since forest areas are set aside with different aims, it is possible to allow the exercise of certain customary rights of usage according to circumstances. This expressed in the forest legislation of certain countries, by the differential treatment of usage rights in "reserved" forests and in other public forests. The abolition of damaging usage rights in forest reserves may be compensated by the creation of communal forest plantations, or by making financial compensation to communities deprived of exercising these rights.

Under favourable institutional and technical conditions it may be advisable for the State to relinquish tenancy over certain forest areas to rural communities, which can then develop a strong sense of responsibility towards the protection of these reserves and produce a wider range of the forest products needed by a community in progressive development. When local communities can obtain a share in forest revenue, when priority is given to reforestation on communal lands where desired and when adequate compensation is given for temporary drops in revenue (which may result, for example, from the

reconversion of land from shifting cultivation practices to forestry), then forestry development can win the backing of the local population and become a real force for rural progress.

### Forestry aspects of agrarian reform

The land reforms which took place after both World Wars were primarily the result of a change in the possession of political power. Nowadays, land reform programmes increasingly place the accent on economic objectives. The role of the forest land sector in such programmes has to be seen against this background, with, therefore, particular reference to developing countries where the large-scale redistribution of rights over the land is becoming a major tool of agrarian development. These are countries, like several in Latin-America, where the quantity of land available per inhabitant is still fairly high and agrarian policies often focus on allocating uncultivated land to agricultural settlers rather than on undertaking far-reaching institutional changes. However, there is a growing tendency to make greater use of the institutional framework in order to transform the agrarian structure. This makes it possible to increase the direct contribution of the forests to the well-being of the rural population, not only as reserves of land, but as an active element in the general strategy of development.

Forest potentials should never be neglected in land reform, as the forests, like soil and water, constitute a basic renewable resource at the disposal of the community. Governments that are implementing or contemplating agrarian reform programmes can apply, within the context of these programmes, very effective measures for ensuring adequate timber supplies and fostering industrial development. The formation of forest holdings of sufficient economic size, the continuity of forest production undertakings, the establishment of forest cooperatives and the supply of credit can be promoted by the inclusion of appropriate institutional measures in land reform schemes. Such measures will contribute to the success of these land reform schemes by stimulating productive investments in afforestation, forest operations and infrastructural works, by providing employment, by diversifying production and by controlling excessive exploitation and destructive practices.

Numerous agrarian reform laws recognize the special character of forest lands by providing for the promulgation of a specific forest law (e.g. Bolivia, 1953), devoting special chapters or sections to the forest resources (e.g. Cuba, 1959); (Panama, 1962, Ecuador, 1964), or otherwise giving special treatment to lands defined as belonging to the forest land sector. Fewer agrarian reform laws, however, give a precise description of what is understood by "forest land". Some laws

(e.g. Bolivian Law) define forest lands on the basis of physical criteria (gradient, altitude, etc.). These criteria, although necessarily restrictive, are simple and therefore useful for the purpose of determining a minimum nucleus of forest land. Certain laws (e.g. the Venezuelan Law of 1960 and the Nicaraguan Law of 1963) apply criteria based on the suitability of land for agriculture and thus imply a definition by exclusion of forest lands. Other laws adopt basic purpose criteria in the allocation of lands to different uses, entrusting a government body with the task of judging whether an area of land is technically and economically suited for forestry.

The way in which forest (and other) lands are affected by agrarian reforms varies from country according to the general objectives of their respective agrarian policies. Certain common patterns are noticeable, however, in the treatment of forest lands in recent agrarian legislation.

Non-appropriated State forest lands are usually allocated to agrarian reform purposes (e.g. agrarian reform laws of Guatemala, Honduras, Nicaragua, Peru); forest reserves and other State forest lands devoted to definite productive or protective purposes are usually exempt from agrarian reform (e.g. laws of Cuba, Honduras, Nicaragua, Panama, Venezuela).

Private forest lands are affected by various agrarian reform laws, normally under expropriation measures or under regulations regarding taxation of idle land. The properties affected are not necessarily the largest ones (this reflects the fact that largeness is a help rather than a hindrance to good forest management, as can be seen in the "industrial forests" which abound, for example, in Sweden and U.S.A.); the normal criterion is that reforms affect private forests characterized by absentee landlordism, bad management or failure to reinvest profits. Thus, the 1962 Agrarian Transformation Law in Guatemala decrees that private forest lands where afforestation and other forestry operations are not effected according to law shall be subject to the Idle Land Tax. Under the Colombian Social Land Reform Act of 1961, proof must be given that forest operations are part of a regular, organized forestry undertaking if forest lands are to be considered as economically worked. The Agrarian Reform Acts of 1962 in Honduras and of 1963 in Nicaragua, however, simply state, without qualification, that forest land shall not be considered uncultivated or idle land.

Numerous reform laws specifically exclude from reform certain categories of private forest land. The lands thus excluded are usually :

- 1) man-made forests (e.g. Colombia) ;
- 2) forest lands attached to agricultural holdings not subject to expropriation and necessary to the economy of these holdings (e.g. Guatemala, Venezuela);
- 3) efficiently managed natural forests (e.g. Nicaragua).

The fact that there exist different government bodies specifically responsible for implementing forest laws and agrarian reform laws points to the necessity of defining clearly the respective jurisdictions of these bodies. The administrative frameworks adopted vary from country to country.

In certain countries there is not yet any clear division of powers and responsibilities and this can give rise to a certain degree of overlapping and rivalry among the various services interested in the forest land sector. Some recent laws, however, place much emphasis on avoiding such a situation : the Venezuelan Forest Law of 1965, for example, devotes a special section to forestry questions in land reform areas.

Whatever the administrative solution adopted, it is necessary to intensify understanding and co-operation among the members of the various professions concerned with land use. Training and research programmes should reflect this need. As a short-term measure, inter-disciplinary seminars, of the type already held in various Latin-American countries, can lead to greater consideration being given to forestry views and methods in agrarian reform programmes.

The establishment of forest co-operatives, having as their main objective the provision of labour on the part of their members, can be an important supporting measure in land reform projects. There are interesting examples in certain Latin-American countries : numerous charcoal and fuelwood production co-operatives exist in Cuba. In Ecuador, peasants' co-operatives undertake afforestation work during slack agricultural seasons, with technical assistance and equipment provided by the State, on land made available under agrarian reform projects or ceded by private owners in exchange for a given share of the future returns from plantations. Forest workers' co-operatives may be encouraged through land redistribution measures, loans for working capital, social services, marketing arrangements, etc. Their establishment may be forested through the general measures already included in many land reform laws (e.g. Brazil, Cuba, Dominican Republic, Nicaragua, Panama, Venezuela).

## Forestry aspects of colonization

The reform of agrarian structures brings with it changes in the form of land use; with growing population and the consequent need for expansion of agricultural crops, the most common of such changes is the process by which new lands are brought under cultivation. However, the logic of land allocation does not work exclusively in one direction : in many cases, treeless lands previously under cultivation or grazing will have to be afforested. This, of course, under adequate land use planning, is not incompatible with but complementary to agricultural colonization.

In Latin-America, many of the lands opened to colonization are forest lands, because there is an abundance of such lands available, because they are - at least initially - fertile, and because they are usually under State ownership. The bringing under cultivation of forest lands may take place as an uncontrolled process or as part of agrarian reform programmes. The former, i.e. the settlement of forest areas by squatters, is still one of the most common forms of colonization and its harmful effects on the forest resources are incalculable.

Another type of settlement is organized colonization based on irrigation works. The colonization of lands through irrigation requires forestry works both in the catchment areas on which the reclamation projects depend and as part of the infrastructure within the project area itself.

The various phases in the evolution of agricultural settlement in forest lands which took place in long-settled areas can now be witnessed, as population pressure increases, in some of the comparatively underpopulated regions in the world.

In the pioneering phase, men individually or collectively settle on the land and clear the forest for agriculture, forest utilization being almost exclusively limited to the domestic use of unprocessed forest products. In a second phase, clearing proceeds at an ever-increasing rate and the harmful effects of massive and uncontrolled deforestation become apparent. Finally, the growing value of forest products and recognition of the protective role of the forests eventually lead to investments in the forest land sector : afforestation is intensified, rational management and logging techniques are introduced and forestry industrialization may begin.

Government action to speed up the process which leads to the conservation and full realization of forest potentials, is most difficult when colonization takes place in the form of squatters' settlements or in other unorganized forms. In such cases, a

prerequisite to any effective action for forestry development is the control and legalization of the settlements, as security of tenure will ease the pressure on neighbouring lands and the granting of tenancy rights can be made subject to the observance of conservation norms.

Organized colonization is the more preferable from the point of view of forestry, the more directly and completely the settlers are helped and controlled in their activities. Government intervention should go at least as far as marking out the wooded areas exempt from distribution - i.e. to be held in common or to remain as public domain - and granting technical assistance to the settlers in the field of forestry. But the greatest advantage of organized colonization is that forestry requirements and potentials can be taken into account at the planning and organization stages; this opens the way for forestry development projects.

A first type of forestry project to be drawn up as part of a colonization scheme concerns harvesting operations in forests destined for clearing. Such projects should ensure maximum economic profit and be so timed as to proceed in co-ordination with the expansion of agricultural activities. Another type of project concerns the large blocks of forest which are to be retained within or near the colonization area. These forests should be brought under management plans according to the purposes for which the forest is to be used - protection, production, or both. This type of management is based on concepts of conservation and sustained output.

The preparation and implementation of these forestry projects and activities require considerable specialized knowledge and a fully-fledged organization. In practice, all such activities should be entrusted to the forest service and this underlines the importance of co-ordinating the responsibilities of the various government agencies concerned with land use.

### Conclusions

The treatment of the theme quoted in the introduction is far from exhaustive. Perhaps enough has been said, however, to illustrate that :

- a) forestry development is a complex process which does not depend solely on measures in the technical, economic and industrial fields but calls also for steady and concerted institutional improvements, this being particularly so in developing countries facing weaknesses in their administrative structures or characterized by the persistence of traditional patterns of land tenancy; and that

- b) agrarian reform must be considered within a broader context than that of cultivation and stock-raising alone: reform which embraces also the forest resources can achieve far more effective results and make a greater contribution to overall economic development than one which affects exclusively the agricultural sector.

In the light of these facts, it seems possible to draw a number of specific conclusions :

- 1) adequate forest utilization contracts can greatly contribute to forestry development by offering guarantees and incentives to investors and efficient forest users while safeguarding the national interests; the control and enforcement of these contracts require highly competent forestry personnel;
- 2) forestry development needs will often require the limitation or abolition of certain forest usage rights; this should not be done without careful consideration of local conditions and should be combined with compensation schemes for which forestry development itself offers distinct possibilities;
- 3) the general socio-economic benefits derived from the forests justify maintaining or establishing an adequate forest domain under the exclusive control of the State;
- 4) there should be close relations at a sufficiently high level between State forest services and colonization and agrarian reform agencies in order to ensure effective co-ordination;
- 5) legislation governing land use should contain adequate provisions for defining and demarcating forest lands and for specifying their role in colonization, reform and conservation;
- 6) forest plantations and forest roads should be considered as standard infrastructural works in colonization and land reform areas;
- 7) agrarian policies should aim at the gradual elimination of unorganized land settlement in forest areas.

To the extent that the development of the forest land sector is recognized as a major objective of land use policies, forestry aspects should be fully considered in land reform and colonization programmes. This is a challenging task for which research and expertise are urgently needed. Industrialized and developing countries alike should be alive to this fact.

Tuesday 2nd April 1968 : Morning Session

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At the commencement of this session Dr. Hoffmann (IUCN) invited Mr. Norberto A.R. Reichart, Under-Secretary of State for Agriculture of the Republic of Argentina, to assume the Chairmanship of the Session.

26. The role of private organisations in Conservation

Two papers were available for discussion.

26. 1. "The role of private organisation in Matters of Conservation" by Dr. C.H.W. Foster of the Conservation Foundation, Washington D.C. U.S.A.
26. 2. "The role of private organisations in conservation Matters" by Dr. C.B. Jijon (Ecuador).

After an introductory address, Dr. Foster read his paper, 26.1. In the absence of the author of the second paper the Chairman referred to the summary.

DISCUSSION

Beltran (Mexico) : stated that in Latin-America the types of private organizations mentioned by Dr. Foster are almost non-existent. He himself represented a private organization which had been in existence for fifteen years during which time it had become only too clear that private citizens in Mexico have no wish to participate in what they believe to be Government's own responsibility.

Erize (Argentina) : drew attention to the difficulty of acquiring new land for national park purposes and advanced the opinion that much more consideration should be given to gaining the active cooperation of the private landowners. He wished in particular to stress the need for the creation of reserves on private land, which should be given adequate legislative backing.

Takacs (Argentina) : enquired how the private sector could most usefully participate in conservation matters ? Private organizations are already in existence, such as the Institute of the Friends of the Land, a private group which participates in the

deliberations of the National Technological Institute for Agriculture and Pastoralism.

Pastrana (Argentina) : drew attention to the existence of the Association of Friends of the National Parks, a private non-profit-making society, established to teach the concepts of conservation and to emphasize that public opinion is the ultimate guardian of these resources. This ten years old organization acted in concert with conservation organizations in the public sector, as well as publishing a Bulletin and arranging monthly lectures.

Eichler (Venezuela) : In Venezuela private institutions had an important function. The country had several organizations of high calibre and prestige such as the Venezuelan Natural Sciences Society which included a number of professional biologists, and which had established biological stations where forty separate ecological studies have been made, including investigations into the effects of fire. Several of these studies had been accepted as these for university degrees. Moreover, this organization acted in an advisory capacity to the Government, and had published a series of books including The Birds of Venezuela. Another private society had been formed to safeguard Lake Valencia.

Munoz Pizarro (Chile) : The Chilean representative stated that private organizations would be very desirable in Chile but at present they do not exist. The various scientific bodies in the country have been for some time concerned about this state of affairs. Unfortunately, however, appropriate remedial action has not been taken in this regard, and the speaker wished to obtain advice on how best to set about establishing an effective group to safeguard wild areas.

Buchinger (CLAPN) : observed that neither private nor state organizations could work without each other. The need is for the problem to be defined by the one and implemented by the other. For this reason she considered that both types of organizations were absolutely necessary, and complementary.

Correa Luna (Argentina) : drew attention to the fact that in addition to the Cultural Association of Nature, other conservation organizations existed in Argentina. One edits a Bulletin of World Conservation News which has been in existence for 25 years. The Bariloche Foundation undertakes professional studies of water, power, soil, national parks, etc. This institution was established for the study of the Patagonian region, and is currently undertaking a private study in an area near Bariloche-

Godoy (Argentina) : considered the essential requirements to be 1) at the scientific level to advise and direct programmes and policy; 2) to act in the capacity of "the soul and conscience of the people", thereby fostering and keeping alive the interests of the people at large.

Villalba (Paraguay) : mentioned that in his country there exists a Federation of Lumbermen and Industrialists, on whose advice the Government has prohibited the commercial exploitation of six species of redwoods with the purpose of protecting these valuable species.

Benavides (Peru) : emphasized that in considering Peruvian conservation problems one must take into account the political difficulties that exist. It is sometimes impossible to expect men to fight publicly against vested interests - unless they are in the position of being economically independent. Moreover, some officials are in urgent need of support from the general public on occasions when in the interests of conservation, they have to intervene in Parliament against powerful vested interests supporting fishing, hunting, filming, etc. It is not generally appreciated that public employees are subjected to strong pressures and that authorities and policies do not remain constant. Fortunately, there are a few individuals who have grouped together to protect national patrimony. He cited the killing of 80 blue whales off the coast of Peru after the International Whaling Commission had imposed a ban on the slaughter of this species, as an example of both the responsibility and the influence of private organizations in situations which the Government itself could not easily handle. He also reminded the Symposium that several years ago a foreign whaling fleet had operated within Peruvian territorial waters and that pressure of public opinion had forced the Government to take remedial action, including confiscating the oil and imposing a heavy fine on the fleet owners. He voiced his concern at the continuing slaughter of the blue whales by fishing fleets further south.

Carvalho (Brazil) : spoke of "The Brazilian Foundation for Conservation of Nature" which had achieved excellent results and was recognized by Government. It was organized on the basis of a governing council supported by a series of technical commissions each comprising a small group of specialists, and working in close conjunction with both federal and state governments. Conservation centres have been established in Brazil and enjoy a wide measure of autonomy, although they are subsidiary to the main body and adhere to the principles laid down by the Foundation. The organization has 2.500 members and the regional centres altogether approximately the same number. The Foundation works closely with other similar organizations elsewhere in Latin-America.

The representative of Costa-Rica indicated that circumstances were different in his country. He cited the Cabo Blanco Reserve which, in spite of being officially proclaimed, had virtually ceased to exist. Because of the almost total absence of a public conscience the Government had taken no interest in the matter : had the Government been stimulated by private conservation interests this situation would not have arisen.

Sir Hugh Elliott (IUCN) : One point of special importance in relation to the role of the private sector in conservation which has been mentioned by Dr. Foster and also referred to by Mr. Erize deserves emphasis. For the proper conservation of wildlife resources even the best designed network of national parks is unlikely by itself to be sufficient : there will always be instances of rare species, particularly of flora, birds and small mammals, which occur outside park areas and for the survival of which quite small areas - often of not more than 2 to 3 hectares can serve a most valuable purpose. It is here that private organizations and even private individuals can play a vital part - first by finding and identifying localities in which such species occur and, secondly, by taking steps to obtain an assured status for these localities by arranging for leases or even by simple agreements with the land-owners concerned and, if possible, by arranging for the registration or recognition of the areas by Government. Thus, the Swiss League for Protection of Nature have earmarked numerous small areas in this way - often for a single species of flower. Similarly, in Great Britain very large numbers of what are called "sites of special scientific interest" have been registered by the Ministry concerned, most of them still held by private owners who have agreed to give care and protection to the species for which the site has been chose. Finally, the initiative of the Conservation of Terrestrial Communities Section of the International Biological Programme in organizing an international registration system for such sites provides a convenient channel by which governments which support IBP can identify, assess and register small sites, which I repeat are of the very greatest scientific and conservation importance.

Erize (Argentina) : The Latin-American countries can be proud of having contributed to safeguarding some of the species which occur on the Red Data Book list.

Cain (U.S.A.) : As a general comment it is clearly desirable that the distillate of wisdom and experience in Foster's paper should be made available to other countries and regions. The only really effective solution to international problems concerning rare species lies in some kind of international treaty. A basically similar problem existed in the United States over inter-relationship of the Federal and State Governments. It is impossible to overstate that if governments are responsible to the will of the

people, the will of the people needs to be given coherent expression. In Latin-America, as elsewhere in the world, far too many people who are out to make a quick dollar, or peso. In each country there is a need for organizing the strength of citizen opinion - and for maintaining it constantly alert - the precise method differing according to prevailing circumstances. Furthermore, one should not overlook the fact that one of the main threats frequently stems from other governmental agencies. Thus, in the United States, the Department of Defence was probably the biggest menace to conservation. There is no substitute for militant public opinion, and natural areas will not continue to exist unless public opinion is prepared to work hard to secure them and as part of the process to be adequately prepared and equipped to confront opposition from many quarters.

27. Bilateral and multilateral conventions in conservation

The single paper available :

27. 1. "Bilateral and multilateral agreements concerning the subject of conservation" by Dr. G.M. Caldevilla was presented.

DISCUSSION

Munoz Pizarro (Chile) : This meeting does not appear to have made any notable advance towards achieving an agreed course of action at the international level. It is important that the substantial effort currently taking place in the conservation field all over the Americas should be effectively coordinated. On behalf of the Chilean delegation he wished to propose that the meeting should give serious consideration to the need for a systematic investigation of natural resources throughout Latin-America.

Godoy (Argentina) : supported the previous speaker and emphasized the need for a common effort to resolve some of the more pressing problems. One of the most important documents in the conservation field for the Latin-American region was the Pan-American Convention of 1940. Unfortunately, however, this admirable document does not have the support of all Latin-American countries. He appealed to all countries to join in signing the Convention, citing the successful Arctic Treaty as an example of the very real benefits that can stem from such action. In the Latin-American context studies of the proposed development of the Plata watershed underline the need for such an approach. Preliminary steps have already been taken for a joint Argentinian/Chilean investigation into the establishment of National Parks in the Andes region. He expressed the hope that

it would be possible for Argentina to act in similar close conjunction with Brasil in resolving conservation problems of mutual interest.

Carvalho (Brazil) : During the course of various previous meetings the Brazilian Foundation for Conservation of Nature has expressed the need for the sympathetic consideration and support of the press - which the press representatives had agreed to give on this matter. Brazilians would be glad if a Biological Reserve were to be established in the Chaco (Mato Grosso and Paraguay) the only area where large concentrations of neotropical fauna still exist. At present it is used as a safari hunting ground. The Brazilian Foundation is anxious to undertake a study of this area.

Prego (Argentina) : What system does IUCN adopt for the implementation of decisions at the international level and the translation of scientific conclusions into action programmes ?

Hoffmann (IUCN) : summarized action by IUCN as follows :

- 1) The passing of recommendations and resolutions in cooperation with representatives of the countries directly concerned.
- 2) Personal contacts established between the Commissions and representatives of IUCN on the one hand and representatives of individual countries on the other. He doubted whether IUCN could devote much attention to Latin-American problems at the present time. This was a matter to be decided by the IUCN Executive Board at its next meeting. The answer would largely depend on the availability of funds.

Harroy (IUCN) : intervened to add that the Commission on National Parks maintains contact with the relevant Departments and Organizations in every country and is always glad to give careful consideration to any requests for advise and assistance. However, it is obvious that the initiative and the driving force must stem from within the countries concerned and that IUCN could act only as a catalyst.

Buchinger (CLAPN) : It is also necessary to explain that there is in existence a Latin-American Committee on National Parks which functions in cooperation with the other IUCN Commissions. At present lack of funds restrict action but, nevertheless, a certain amount can be done even without adequate funding. CLAPN offers advice on request and, since its establishment some four years ago, has mobilised three million dollars of assistance without possessing a cent itself. It may not be generally appreciated that given drive and determination substantial sources of funds can be tapped.

Magnanini (Brazil) : This is a very delicate matter since any foreign aid must be approved by international agreement. Insofar as the Brazilian section is concerned the UN List of National Parks produced by Harroy is completely inaccurate - an example of lack of cooperation at the international level. Brazil is only too glad to cooperate with neighbouring countries as well as direct with IUCN's National Parks Commission but is not prepared to extend that arrangement to regional committees.

Hoffmann (IUCN) : According to the IUCN Statutes it is entirely a matter for the Executive Board to determine IUCN's policy towards Latin-America and this matter will be discussed in detail at the next Executive Board Meeting.

Benavides (Peru) : On behalf of the Peruvian delegation I strongly support the recommendations put forward by the representative of Chile. I also wish to take this opportunity of thanking the British Government for sending Ian Grimwood to Peru. He has done an outstanding job. At the same time our gratitude extends to FAO for their fine work, the Belgian Government for their important aid, IUCN for the interest it has taken in the establishment of the Manu National Park - which was officially declared three weeks ago - and WWF for generously financing studies of the Manu Park. It is the only unspoiled part of Peru that remains and has been preserved by virtue of the presence of indigenous Indian tribesmen who are by far the most effective guardians of the country's wild fauna. That they take their responsibilities seriously is shown by the attack carried out on Ian Grimwood. On behalf of the Indian tribesmen concerned I apologize to him for the incident, and am relieved that it did not result in reducing him to his minimum requirements.

Hoffmann (IUCN) : expressed gratitude to the stenographers for preparing the Minutes in such a short time. However, these were only provisional and must be checked by Chairman of Commissions, etc. The final Minutes will be issued as soon as practicable.

26. 1. "The Sole of Private Organizations in Matters of Conservation"

by Charles H.W. Foster, The Conservation Foundation, Washington, D.C. U.S.A.

This Conference has invited me to present my views on the role of private organizations in matters of conservation. I intend to do so by outlining the opportunities and responsibilities of private action and illustrating their potential by way of actual case histories drawn from our experience in the United States.

If our experience proves of value, then the underlying purpose of this Conference, the encouragement of the wise use of renewable natural resources, will have been well served indeed. My fondest hope is that you will thereby be able to avoid many of the mistakes that have proven so costly in the United States and chart a clear and secure future for your rich conservation heritage.

The United States - A Brief History

Like yourselves, we in North America are fortunate in having a rich and varied resource base. The United States, for example, is a nation with some 3.5 million square miles of land area - more than ten acres of land for every man, woman and child. Despite extensive tracts of national and state forests, parks and other public domain, two out of every three of these acres are still privately owned.

Historic roots

Our tradition of private land ownership dates back to the very founding of the nation. Although the British Crown laid claim to the lands settled by the original colonists, liberal grants were made to the trading companies and their later governing bodies to encourage land development and establish proper governmental functions. Individuals, in turn, were persuaded to become colonists by the promise of generous land grants for themselves and their families.

Following the Revolution, the original colonies agreed to cede to the new national government the bulk of their land claims to the west. These public lands were augmented by later purchases from Spain, France, Mexico and Russia. The so-called "public domain", at its maximum, once encompassed nearly three million square miles!

This extensive national land bank was a major factor in the rapid growth of the new country. Outright grants of land encouraged families to establish homes and farms, aided in the

development of the first roads, canals and railroads, and provided the new states the land they needed for schools and other public facilities. Our forty-ninth state, Alaska, is to this very day selecting lands from the public domain for its future use and development.

It was not until a century later that public figures such as President Theodore Roosevelt began to question whether wholesale disposition of the public domain was really in the public interest. In direct response to the previous period of exploitation came a strong counter-movement for preservation, resulting in the withdrawal of the first units of the national forest, park and refuge system from the public domain and the many benefits we enjoy today.

### Developing land ethic

In the early days, the frontier was only an enemy to be conquered. Wild lands had little to offer unless lumbered, planted or grazed. At the time, all man could afford to appreciate were the pressing demands of his own physical needs.

This attitude was enhanced by the objectives of the early immigrants who yearned for property of their very own. Land was a secure possession on which a man could subsist through his own endeavors alone. He need serve no other master. These settlers, who came from around the world seeking a new life for themselves and their families, thus began the tradition of self-reliance so characteristic of the United States today.

As the country grew settled and physical survival became less of a problem, more complex questions of resource usage began to arise. What about the urban dweller who could not afford to own his own land but still needed access to the natural environment ? And what about the interests that people hold collectively in certain resources - wild animals, for example, which are the property of all of the people in the United States ?

An equally strong tradition began to emerge for public ownership of land, and governmental conservation actions in the general public interest. These now offer real hope that environmental and other attributes will be preserved for the long-term benefit of mankind.

### Significance to Latin-America

In short, our United States attitudes towards land can be summarized as follows : first, a tradition of intense personal pride in private ownership; second, an emphasis upon self-reliance due to our pioneer history; and lastly, a growing realization

of the need for governmental action in the general public interest, but only where the jobs to be done are too big or too costly for private means.

The United States experience should be considered neither right or wrong per se for Latin-America. The attitudes developed are merely the end result of a series of historical events, much as will be the case in your own countries. They are mentioned here only to provide background for the remarks to follow and to help explain the reaction of many North Americans to the problems you face in Latin-America.

### Types of Private Organizations

The United States conservation directory, issued annually by the National Wildlife Federation, lists some two hundred private resource organizations at international, national and regional levels. There are at least two hundred more within the fifty states, and the list is far from complete. The Federation's own magazine, National Wildlife, for example, is estimated to reach three hundred thousand individuals and organizations annually!

### Special interest organizations

Many of these organizations have arisen with special interests in mind. Protectionist groups are especially common. These organizations may devote themselves to particular kinds of organisms (birds, furbearers, wildflowers, etc.), or to particular segments of the resource field (forestry, soil conservation, nature preservation, etc.). The motivating force in these instances is the desire to see a specific resource area given proper attention.

Professional organizations are also frequently encountered. Groups of specialized scientists, technicians or administrators find considerable comfort in organizations of their own, but also practical opportunities to advance high standards of performance and ethics within their particular professions. Their influence on public programmes and policies is often of great significance. Among many commendable organizations of this type, I would cite the American Association for the Advancement of Science and the American Institute of Biological Sciences.

Trade associations of business or civic interests are another common form of private organizations. Industry groups frequently form associations to advance their own commercial interests, but these can also perform highly commendable public services.

The Advertising Council of America, for example, sponsors important public service advertising projects such as Smokey the Bear and Keep America Beautiful (anti-litter). The "Tree

Farm" and "Busy Acres" programmes of the American Forest Products Industries are examples of effective industry-sponsored projects aimed directly at the private landowner.

Womens, garden and other civic groups constitute a potentially enormous army of private conservation colunteers who can be of great assitance. The League of Women Voters, for example, has become the most knowledge and effective citizen force in the United States in the fiels of water resources. The garden clubs of Maryland are well-known and respected by their state legislature on matters affecting natural beauty and conservation.

A special word should be interjected here concerning the role of international resource organizations. It seems imperative in this troubled world that secure bridges be built between nations. The language of the land is certainly one common link to be pursued irrespective of national policies and programmes. For this and many other achievements, the efforts of the International Union for the Conservation of Nature and Natural Resources and its Latin-American Committee on National Parks should be warmly commended.

Inevitably, a few private organizations will arise to perpetuate the personal ambitions of their organizers. Every human being yearns for special significance or recognition and the conservationist is no exception. It is important not to prejudge private organizations as a whole by the actions of a few !

#### Broad-based organizations

Many private organizations have arisen to serve conservation in a total sense. These were either created by a visionary group of founders, or gradually became broad-based following the realization that conservation is a multi-faceted and interdependent discipline. These private organizations serve their communities, their regions and their nations with great distinction.

In general, these private organizations arise from a combination of long-term need and immediate crisis. For example, the distinguished Audubon movement was sparked by a world-wide interest in birds, but also by the alarming situation caused by continuing inroads on bird populations for food, sport and plumage.

Many of our private and professional forestry organizations were formed in response to the unwise practices that leveled eastern and midwestern forests during the late nineteenth century.

## Organizations in general

It is difficult to generalize on the best form of private organization for conservation purposes. Nothing can be more troublesome than the narrowly-conceived private cause. Equally discouraging, however, is the organization so broadly-based that it has no practical mission in life. The best criterion for any organization remains - does its programme really work ?

One useful approach in the United States has been the natural resources or conservation council, composed of individual special interest organizations but dedicated only to the advancement of those interests they share in common. By providing a forum for its members, and a means by which information can be shared more readily, a cohesive conservation force can often be marshalled at state, regional or national levels.

## Role of Private Organizations

Private individuals and organizations can be instrumental in matters of conservation in five principal ways :

- 1) by their direct role as an exclusive private action force;
- 2) by their indirect role in assisting the programmes of public agencies;
- 3) by their direct influence as participants in governmental programmes;
- 4) by their indirect influence through education and political action; and
- 5) by their individual actions as private owners of land.

In the United States, the role of the private sector has clearly become so pivotal that without such assistance and support no public programme is likely to succeed.

## Direct action

Direct action by private agencies has enjoyed a long and distinguished tradition in the United States. For example, the internationally-respected North American Wildlife and Natural Resources Conferences had their origin at the turn of the century when a private organization of Massachusetts sportsmen grew concerned over the future of wildlife in the absence of sufficient scientific attention.

Grand Teton National Park in Wyoming, host to more than two million visitors last year, would probably not be here today if philanthropist John D. Rockefeller, Jr. had not purchased and donated the valley floor of this five hundred square mile wilderness for the enjoyment of generations to come.

A combination of wind, drought and poor farming practises in the 1930's began to turn some 15 million acres in the ten state Great Plains region into a vast "dust bowl". Western farmers forged an important private action vehicle, the soil conservation district, to restore the fertility of the land and insure that no disaster of this magnitude ever occurred again.

America today is marked by such stepping stones of dedicated private action. There are sound and practical reasons for this direct form of private enterprise.

Private organizations can undertake the small and scattered conservation jobs, leaving governmental entities free to concentrate on the larger problems at hand. Witness The Nature Conservancy's two hundred privately-held preserves, some no more than a few acres in size, but important individually and in the aggregate for the public purposes they serve.

Private organizations can also step in where public agencies are not free to act because of procedural or policy limitations. The Save-the-Redwoods League, for example, has moved to acquire key tracts of old growth redwoods in California in advance of governmental action using funds raised entirely through public subscription.

Private organizations can also set the pace well in advance of current need. Private foundation funds, for example, enabled a reconnaissance survey of the United States coastline in 1954. The resulting Vanishing Shoreline report documented the rapid changes occurring along the seashore, underlined the irreplaceable nature of these resources, and set the stage for a whole system of national seashores ranging from Cape Cod, Massachusetts to Padre Island in Texas.

#### Assisting the public agency

Indirect action by private organizations, in close cooperation with public agencies, can be vital to the achievement of governmental objectives.

An act to preserve the state's remaining salt marshes was sanctioned by the Massachusetts legislature in 1965, but the real story lay in the private efforts to win legislative approval. A decisive factor was the two year study of marine resources conducted by a citizens committee which convinced the commercial fishing industry that its very livelihood could depend on these valuable nursery areas.

A citizens committee was formed in 1963 following submission of the Outdoor Recreation Resources Review Commission report to Congress. Convinced of the need for a national programme in this

field, the committee waged an imaginative and successful campaign to win public acceptance of the report's recommendations. The resulting Land & Water Conservation Fund now provides more than \$ 100 million annually to federal, state and local agencies for the acquisition and development of recreational lands.

Twelve thousand acre St. Vincent Island was destined to become just another Florida real estate venture last year despite its unique value for national wildlife refuge and ecological research purposes. Though deeply interested in its preservation, the federal Department of the Interior could satisfy neither the procedural steps required, nor the full asking price of the owners, within the time deadline at hand. A consortium of private conservation organizations, including the Smithsonian Institution, The Conservation Foundation, the Philadelphia Conservatiionists and the Nature Conservancy agreed to provide interim help. The Conservancy now holds the island securely under purchase contract, pending later acquisition by the federal government.

#### Participation in government

In recognition of the promising role of private individuals and organizations, the United States has begun to experiment extensively with devices which involve the private sector directly in government. This approach recognizes as a cardinal principle the fact that the most successful programmes are generally those the closest to the people.

Hosts of advisory boards, councils and commissions have been established to provide a private flavor to public agencies. Most are advisory in nature only, but others serve a more direct administrative function by approving regulatory actions and shielding the professional from undue political pressure.

Secretary Udall's Wildlife Advisory Board, for example, recently displayed courageous leadership in proposing a new Interior policy governing the reduction of surplus animals within national parks, a highly sensitive area of public policy.

The particular desirability of advisory panels of scientists should be emphasized. These individuals can remain reasonably free from the practical, short-term pressures inherent in any public administrative post. Furthermore, since conservation is so deeply rooted in the natural sciences, it seems imperative that our public programmes and policies always be able to withstand the test of scientific validity.

The current discussions within the United States over the need for an Office of Ecological Survey, or a Presidential Board of Ecological Advisors, are examples of this principle.

Private entities can also be useful in helping government evaluate its public conservation efforts. Periodic assessment of conservation programmes by responsible but non-agency private citizens can constitute a highly constructive service. A National Water Commission, for example, has just been established by Congress to provide a thorough citizen review of public and private efforts in this vital natural resource field.

### Outside influence

The role of the private individual or organization as a positive force for education or political action is, of course, too well known to warrant much comment. The accomplishments, however, can be staggering. Just recently, for example, the citizens of the state of New York approved a \$ 2 billion bond issue for public transportation improvements following a persuasive explanation of its merits by proponents.

The important point to remember is that citizen support can bring about pioneering efforts in the public interest, but also insure their continuation beyond a particular governmental administration. Since many natural resource programmes require decades for completion, a high degree of continuity can be absolutely critical.

### The positive role of dissent

Inevitably, though, there will be times when the private organization must speak forcefully against a governmental proposal. By sampling, influencing and marshalling even a negative public opinion, the independent organization can play a responsible role in shaping public policy.

To the public administrator, already beset by more operational problems than he can possibly handle, the prospect of an opposition citizen force can seem bad news indeed. His tendency will be to view the event with alarm without full appreciation of its positive potential. Private individuals and organizations can be useful adjuncts to the seasoned administrator, particularly if their criticism is applied with tact and good taste and with full knowledge of the issue in question.

For example, an aerial spray programme for the control of a forest insect in Massachusetts was modified drastically following responsible citizen criticism of its possible effect on the total environment. This criticism permitted the public administrator to utilize new and somewhat experimental techniques despite their several-fold increase in total cost.

And just last year, a community water supply reservoir was proposed within California's Forest of Nisene Marks State Park.

Because of past water shortages, state officials were understandably reluctant to oppose the project actively. Thanks to citizen action groups, who protested the unwarranted invasion of an ecologically-intact park area, other potential reservoir sites were brought to light which proved more consistent with the best use of the area's total resources, even if somewhat less convenient for the community in question.

### The private landowner

This paper would hardly be complete without some reference to the potential role of the individual landowner within the conservation movement. It is this individual who is frequently a prominent factor, and the principal target, in public conservation programmes.

A major land use study was conducted within the Boston metropolitan area a few years ago. Before long, it became evident that the region's park, recreation and open space needs - and virtually the character of its future environment - rested with some fifty private owners who held key blocks of property in critical locations. In almost every instance, an uncertain if not unfortunate relationship existed between the responsible public bodies and these private landowners. Their demonstrated sense of stewardship, and obvious concern for the land, were being steadily eroded by spiraling property taxes and adverse community attitudes without recognition of the fact that this very private ownership was preserving at no cost to the taxpayer the very character of his community!

If the major land resources are not held individually by private owners, they are often subject, in large measure, to private decisions. Generally speaking, the greater the ability and standing of the individual, the more extensive will his influence over such resources be.

I can recall trying out this principle in the course of a series of speaking engagements before women's garden and other civic groups. In general, any given group of fifty individuals in the United States is likely to have a potential influence over at least ten thousand acres of land! Very little of this substantial figure will be represented by outright ownership. The bulk will occur through such potential indirect influences as membership in land-owning organizations, stock ownership in private corporations, or personal relations with family and friends.

### New approaches

The United States is now vigorously exploring ways in which individual stewardship and private action can more clearly serve

the public interest. Contractual arrangements not to develop land in return for tax concessions, encouragement of clusters of housing to maximize environmental amenities, acquisition of lesser rights in land such as scenic easements, and the establishment of private land trusts are all promising tools designed to make full use of the nation's strong tradition of self-reliance.

New York's privately supported Open Space Action Committee represents a good case in point. This Committee offers central professional services to private landowners in order to encourage a permanent pattern of open space within the metropolitan area through private philanthropy and stewardship.

Further advances have occurred in the northeastern United States where self-determination through local government, as in much of the world, is a cherished tradition. In 1957, the state of Massachusetts authorized its communities to establish municipal resource agencies, known as conservation commissions, to serve as the focal point for resource policy, planning and action at the local level of government. This unusual device has now spread to six other states. In New England alone, more than three thousand private citizens are engaged in such official activities. Conservation commissions have given the local citizen a potentially direct role in conservation, and an entity close at hand to which he can address his particular conservation problems.

#### Significance of Private Organizations

From the above comments, it is obvious that private action can take many forms - can occur at many different levels - can be direct, indirect, collective or individual. In general, the more variations there are present, the greater likelihood there will be of a significant contribution.

For example, the great private foundations such as Ford and Rockefeller have contributed in countless ways to a productive and improved environment. The benefits of their philanthropy are simply incalculable. Yet just last year, the impact of a simple postage stamp on the supporting letters of tens of thousands of determined private citizens was sufficient to move a major animal welfare reform bill through the halls of Congress.

Similarly, the success of a conservation programme is too often measured by the size of the bureaucracy established in its behalf. Yet the collective impact of an individual land use and conservation plan, carried out by thousands of willing farm or woodland owners, can change the face of an entire continent and drastically alter its patterns of resource utilisation.

And, finally, the spirit behind even a modest, private gift of land for conservation purposes may, in its own way, prove as significant as the most extensive system of public parks established by governmental action. Consider, for example, this actual excerpt from a deed to a forty acre wildlife sanctuary accepted by a private organization a few months ago.

"During my life I have seen the constant depletion of Maine forests and fisheries and of the natural beauties of this glorious state as roads have pushed almost everywhere ... I crave to leave a lasting memorial of my affection and appreciation to the people of Maine and the Town of Georgetown ... It is my hope that in hereby transferring my property ... I can provide a quiet, natural breeding and shelter area where wildlife can propagate and breed, as unmolested as possible."

### Participation by people

The key to successful private action, therefore, seems simply this - participation. Although other resources can be singularly important, people need only their time to become potentially effective.

And because it is so singularly man-related, conservation can only succeed if it makes sense on the land, and to those who will enjoy the benefits of those resources now and in the future.

So essential do we feel these private action forces to be that the organization with which I am now associated, the Conservation Foundation, has established a special unit to work exclusively on matters of citizen action and leadership training. Our objective is simply to supply private organizations the information and skills they need to make an effective and responsible contribution to public conservation affairs.

### Ingredients for action

Now what are the essentials of an effective vehicle for private action? I would list these as the principal points to bear in mind.

The organization must, first of all, be broad in membership and talents. It must serve as the voice of many, not the forum of a few.

Its leadership must be responsible, as well as responsive to conservation needs. The best leadership will usually occur in depth.

Its programme must be both sound and timely. There is no substitute for being right - at the right time!

It must gain a reputation for having the facts, and then putting them to work effectively. This can mean honest disagreements, argued aggressively but not disagreeably!

The most useful private efforts will be notable by their own records of success. They will be measured not just by one accomplishment, but by many over time.

### Keys to accomplishment

From my several decades of experience within and without government, I am now convinced that the conservation programmes most likely to succeed are those derived from private initiative, supported by professional public agencies, and carried to completion by the combined efforts of public and private entities alike. The key elements will be mutual confidence, good communications, and underlying credibility.

A close partnership of public and private talent can move or even save mountains, intelligently develop a nation's resources, and transmit to future generations a sound and secure conservation heritage.

I commend to those of you assembled here today a sincere dedication to such objectives. If you succeed in this challenging course of action, there is every reason to believe that the countries you represent will make Latin-America a conservation model for this century.

### Summary

In the United States, and possibly other countries as well, the role of private conservation organizations is emerging as a pivotal factor. The extent to which this is so rests in large measure upon the quality of the organizations themselves and the attitudes of public officials with whom they must work.

Private individuals and organizations can be instrumental in five general ways :

- 1) as an independent action force;
- 2) as an assistant of government in action programmes;
- 3) as a direct participant in governmental programmes;
- 4) as an outside influence on public policy and programme decisions;
- 5) as a private owner of land.

Private actions can taken many forms - can occur at many different levels - can be direct, indirect, collective or

individual. In general the more variations there are present, the greater likelihood there will be of a significant contribution.

The key to successful private action rests with the simple term participation. People need only their time to become potentially effective.

The ingredients of an effective private action vehicle usually include sound organization, responsible leadership, timely programme, factual presentations, and successful end results over time.

The conservation programmes most likely to succeed are those derived from private initiative, supported by professional public agencies, and carried out by public and private entities alike.

Public-private cooperation will work only if there is mutual confidence, good communications, and an underlying credibility to the programme.

## 26. 2. The role of private organization in conservation matters

by Cristobal Bonifaz Jijon

### Summary

It seems evident that the role of private organizations is to serve as motors which create the active feeling and interest of the people for conservation; to coordinate the actions of interested individuals and organizations and to cooperate with governmental agencies which in the end are the sole responsables to issue the necessary legislation and its recommendations to ensure sound conservation practices.

Objectives and projects have to be discussed in free democratic talks among participants representing different sectors and point of view; thus the problem becomes clear cut and put into a general frame, such proceedings will specially benefit the governmental representatives who can appreciate all difficulties and benefits of the proposed project.

To accomplish this task the private organizations must work under special conditions, primarily to have complete freedom of action and be free from all political pressure; a constant goal and a continuous action towards achieving it; intensive fund raising campaigns to promote or maintain the projects. To have freedom of action the private organization has to be "non-profit" thus it can also better coordinate between all conservationists, the government and the groups which exploit the natural resources.

The problem is more delicate if the private organization has to deal with several authorities, governments or countries. Or if they are international institutions concerned with problems of world wide importance. If such is the case, it is prudent to have a national administrator and foreign scientists, who will not loose their time in administrative problems. Such arrangements will also help to avoid local human frictions, which are always dangerous.

When an individual or an organization presents a plan to be implemented the project should be studied until exhaustion from the scientific and financial points of view before submitting it to the pertinent authorities. The group has to have the prestige of being competent.

Private organizations must have contacts and influence with the legislative body and other branches of the government. Financial aspects of private organizations are very important, they can receive and give help much easier than governmental agencies. They can obtain donations, industrial and commercial support, governmental grants, cooperation of scientific institutions, private individuals and through many other means.

Private organizations can stimulate, guide and watch governmental actions and thus they are together with the authorities responsible for the development of adequate conservation programmes.

#### The role of private organizations in conservation matters

The role of private Organizations in matter of conservation is of first importance, for they should be the motors which activate, coordinate and give life to the conservative machinery of a country and furthermore in many occasions, to various countries for preserving a resource in danger and of world interest.

In effect, government organizations are generally occupied with the maintenance of some problem and are generally or always in our Latin-American Republics limited in action, because of their lack of budget.

Further more they feel uncomfortable, legally speaking, of playing two incompatible roles, that of judge and part in conservative material.

They are apart, because that is exactly the motive of their existence. But they are also the technical organisms of the governments or of the legislative counsels which are going to be consulted, soliciting information of critical judgement, which will be the base and the advising over which the highest

authorities will dictate the conservation, laws, which will be compulsory with restrictive and punitive effects.

From this it is deduced that it will always be difficult for an official organism to propose and after, with its right of authority acquired by law, to judge and dictate the new corresponding conservation law.

Furthermore, politically speaking, it would be anti-democratic, outside the political current of this century. Natural and logically, it would provoke angry protests from individuals and areas affected in dictatorial manner and therefore would provoke more damage than benefits for the effects of conserving the renewable natural resources.

Nevertheless it could have happened in practice, even if it were to provoke the peoples enthusiasm and its logical consequence the creation of private organizations which would relieve them of that blameworthy situation.

From what has been exposed, it is clear and easy to deduce that the created private organization is going to have the role of coordinator between the interested in conservative material and the government authorities, be they local or central. And yet a third sector, not always present, is to be considered which would be the possible exploiter of the considered natural resource. For more clarity lets consider the case of the California sequoias.

One sector exploits the beauty of the scenery of a Forest of sequoias with touristic attractions bringing enormous amount of persons and therefore enormous sums of money in circulation favoring the central and north zones of California. It is a very rentable way of exploiting natural resources, because if it produces substantial fortunes, it also protects, at the same time, the capital representing by the Forest of sequoias.

Another very potent sector wants to exploit the lumber capital of the tree, which obligatorily tends to make disappear the capital of the natural resource, which we know by scientific studies will not be replaced before various centuries; something most improbable, or better say impossible, as actual conditions and the ones of coming centuries will undoubtedly be infinitely more aggressive than those of past centuries, that permitted the formation of these forests.

The problem stated in this manner is even larger for there is to consider the local government - California State - and the participation which the federal government of the United States of America is going to have in the problem.

From which derives many created interests and political influences which can ruin the sequoias to the distress of foreigners who definitely cannot understand all the process which can tend to make disappear that world beauty scenery.

With matters like this, would it not be profitable for a private conservative entity to provoke reunions and round tables to discuss in an exhaustive manner all the aspects of each group considered ? Would these reunions not be of great advantage for both governments in order to take the indispensable measures necessary to harmonize if possible, all the interests of each group ? And lets suppose that a satisfactory solution for everyone has been reached; isn't that intelligent and coordinating action the main finality of the private organization considered and created for that only end ?

We have seen three sectors fighting to obtain a solution in a given case. But it is easy to understand that those sectors may vary without limit according to the case considered. Nevertheless, I think there will always be three entities present : the government, naturally the scientific sector and the exploiters of the considered natural resource, whatever the form of exploitation of the said resource. And it will be due to the private conservative organization to harmonize interests and, - while studying under every facet the considered problem -, describe eventually new aspects of main interest, unknown maybe, up to that moment.

We have considered up to now national problems with some probable difficulties. Which one of these difficulties would not exist being this conservative problem of world-wide, or even if it were only a problem of two bordering countries ? When finding nationalists susceptibilities, be they political, scientific or even regional, shouldn't the harmonizing interventions of the private conservative organization be infinitely more delicate ? And how many other problems which escape my limited judgment could arise, all trying to be solutioned by that private organization, that in some way is going to serve as a softener between the foreseen collisions between the different considered sectors.

But if all that has been exposed up to now is present in almost all the consciences of people which occupy themselves with these problems, the modus operandi is something very different.

How should the private entities in conservative matter be organized in order that they may perform their role as activator and coordinator of the problems of protection of the renewable natural resources ? What norms should be followed to accomplish such noble end ? And as all human activity is subject to the available economic means, wouldn't the private organization have some influence for the obtaining of indispensable funds for the functioning of the protectionist entity created ?

That is what we are going to consider and try to explain based on our limited personal experience.

The first condition of all conservative private organization should be its entire liberty of action, which obligatorily implies to it two essential conditions : first, to be absolutely apolitic - and in second place, to become organized without views of profit, under any aspect.

Political liberty, for every private organization should be, by definition a politic. It is clear that the regional organisms will defend their points of view before the national organization for any given project; but as it is the common good of the region or the nation which is on hand, it cannot be considered at any moment as the patrimony of a political party and much less to extol one or several political personalities of a country.

And the consideration is even more forceful when dealing with frontier problems, that are common to two countries, for the considered ecological zone needs conservative support in spite of the frontiers and parties which govern.

The matter becomes even more delicate concerning international organization which tend to protect a wordly or continental conservative problem. Generally the problem doesn't even present itself in the directive part of the considered organization. But on the other hand the subordinate personel which works in a strange country many times or most of the time, over limits itself with the residents, defending the protected fauna and flora, as they feel supported by the civil authority, that represents the law and generally belongs to a definite-political group. If to this you add, as it too often happens in our Latin-American Republics a political change in the central government it is perfectly compatible and human the reaction of the colonists against the subaltern too confident in the preceding authority.

From this the harmful disagreements for conservative ends because of lack of tact or too much zeal in the entrusted commission.

Specially now that the unfortunate, word underdeveloped has been invented which too frequently serves as a screen for feelings of superiority of frankly colonialists type, or to cover commercial proposition completely inadequate to the considered environment. In addition it must not be forgotten that the colonist is generally the underdeveloped and the foreign technical many times without even knowing the language of the country, the person that considers himself superior and hurts, unmercifully and to no purpose the susceptibility of the native.

The second liberty is the liberty of action as there cant either be industrial or commercial influences of evident created interest : on the contrary, the private organizations should make it understood that they help in order that the natural resources be renewable, which definitively will favor the rational interests of all those who are exploiting those resources. More so, they could be a fountain of rentability which would help the conservative ends, if they understand the usefulness of cooperation between the conservative ends and the industries.

The private conservative organization, not being of profit by definition, as we have seen, it is natural to deduce that the persued aims be constant, for the exploitation of any resource would bring them to an end and therefore, finish the main finality proposed at the creation of the conservative organization.

It is natural, nevertheless, that for this to happen, the goals should be studied carefully, before being proposed for consideration of the governments, the only ones who have the right to formulate the corresponding laws. This which seems of simple logic, is not so simple in practice.

I am going to cite a case of a decree by the government of my country, declaring as National Park the crate of the Pululahua volcano near Quito, of undoubtedly beautiful scenery and of great geological interest, all adduced motives for such a declaration. Nevertheless the bottom of this crater for the past hundreds of years has been cultivated, and constitutes a farm belonging at present to the Social Assistance of Ecuador. Then what are we going to preserve ?

The beauty scenery ? The geological importance ? Of course, but not the national park with its, native fauna and flora, which didn't even exist when the decree was given.

To sum up, the enthusiasm of a group of politically influential people of evident good faith, obtains a law which confuses the international definitions, simply by an enthusiastic precipitation, that when reflected, denotes the lack of sufficient study to frame the goal proposed in the category which corresponds to it. The consequences are immediate as they produce confusion in the national circles and with more reason in the international organisms which are preoccupied with those matters and complicate infinitely the tasks of those organisms, as the terms or definitions change from continent to continent and even from country to country.

And I want to take this opportunity to ask for a clear definition and in various official languages of the international organizations United Nations, Unesco, etc., of basic concepts of

the conservative goals, avoiding local translations which can be misinterpreted or terms changed, producing more confusion, that is exactly what is trying to be avoided.

While carefully studying a problem, the management of private organizations when establishing a goal should not be able to modify it later on unless special circumstances would require such modification but in any event under technical advise. Generally such changes might occur because of the lack of previous studies; this is why it is of utmost importance the declaration of "zones of reserves" before the declaration of national parks or some similar definitions, by laws, which are more difficult to be changed in the future, as we all know how complicated it is to arrive to the establishment of such laws, and even more so to obtain their modification even if apparently they are clear and necessary.

Finally it is easy to understand that the continuity in the goals are one of the fundamental reasons of conservative private organizations for the proposed goal for them is an unchangeable end for the directors. This is not so with the governmental organizations, for the change in officials can and unfortunately happens frequently, bring fundamental changes in the concepts or goals ending projects already realized or on the way to being realized. The critic is easy; it is the art which is difficult, says a French proverb and thus a new official may frequently consider as errors certain concepts and ends of his predecessor.

This is one of the very important points of the private entities in defending the already realized or proposed projects duly studied and considered practicable. The same definition of the word conservative means to guard, to preserve from changes. Well studied goals may be increased, but by definition, the already in existence are to be preserved whatever value they have. Therefore the private organization should watch over innovations many times more harmful than beneficial in the conservation aspects of the renewable natural resources. (In the conservative literature, the majority of authors employ the words with the following definitions : "Conservation", is defined as the wise use, without waste, of natural resources. "Preservation", is defined as maintaining the actual state of an area or of a category of living organisms. "Protection" is defined as protecting an area or living organisms against modifying influences).

But there is another very important practical aspect to be considered and it is the economical. Any project must be considered under two fundamental aspects : attainment of a technically practicable project and support of said project.

Without these well studied requirements resolved practically, there is no possibility of continuity in the proposed goals and even any conservative attempt in a country may fail-

On the other hand, as we had defined the primordial end of the private organizations as proposers of complete projects to the competent authorities of government, that they may resolve and transform them in protectionist laws, it is clear that a project will not be complete unless the economic aspect of its establishment is boarded first, and its maintenance second. From this springs a clear division in the private organizations, for many of them can only control the maintenance of an old project which might have economic difficulties that could damage or annul it completely, while other organizations would dedicate to organizing the attainment of economic resources that would finance a given project. And under this aspect, private initiative is much more effective than government organizations.

Naturally other aspects of differentiation than merely the economic may present themselves. They will generally be of private interest because of local circumstances therefore, we will only mention them, as we cannot try to resolve all the incident and local circumstances that could be produced in all the cases to be considered.

The enthusiasm of a group of individuals interested in a given problem, is generally the creative group of a private conservative organization. Once the group is united and the goals to follow clear, it would be convenient to take notice of the following considerations of general order.

Once the group is organized, it would be desirable for them to convoke to a round table government agents, industrialists, merchants, tourist promotion groups, etc., interested in the given problem to provoke fruitful discussions in the free game of opposed interests : in this manner, judgments are rectified, new motives of interest in the considered problem are surmised, in brief the horizon is amplified and above all the government organisms are put on guard over the difficulties to avoid and the concrete plans to support in the law of protection to be dictated in defense of the considered problem.

With this opportunity a harmonization should be procured of the opposed interests between conservative and profit groups of the natural resources in question.

Also logically the economic sources will be surmised which will permit the functioning of the conservative measures to be put in action to solution the considered problem. Once more advantage will be taken of the sessions to propose and try to

obtain financment cooperatively from the government entities and private entities and frequently even from the enterested in the exploitation of such resources.

In brief and under this aspect, it is up to the private entities to try and foment the economic sources which will enable the governments, or at least facilitate the practical application of such protectionist law. It is to be left clear that speaking of government or government entities, of the central government entities and local departmental government entities, provincial or other similar denominations of each country, they should be considered inclosed. The only explanation is that when dealing with local governments, it would be profitable to also invite central government agents, because the problem may be considered as national, or as promotion help by the Central Government for the regional of the considered country.

In this manner, in free and democratic discussions of opposed interests, more just, durable and beneficial solutions for everyone should be obtained.

It is relatively easy to propose a good conservative project over some generally known subject : to avoid fires during dry seasons; protect some variety of fauna or flora which all know is in danger of disappearing, etc. But to formulate projects in our republics without available funds, without great interest of the population, be it caused by inertia or lack of knowledge, is a much more difficult problem. Therefore and in each particular case it should be explained why and how the protectionist idea will be applied for such an abject.

In other words create the necessary and indispensable ambience among the inhabitants of a region so that by understanding what it is all about they may cooperate in the proposed programme. Courses given at schools, presentation of films allusive of other countries where the problems have already been resolved, the diffusion of explanatory pamphlets are some of the means employed to diffuse the idea of a possible project.

It is easy to understand that for such object, the collaboration of the Ministeries of Agriculture and Education are very valuable, as they have the human means (professors, school inspectors or agricultural technicals and veterinarians) as well as the necessary printing offices and localities, which enormously facilitate the work.

But it is also to be considered that many human groups, organized for other ends, will gladly help with these jobs of instruction and diffusion of the conservative problems.

And we find once more that it is up to the private organization to ask for fruitful help, provoking the indispensable enthusiasm to obtain the desired success. The Andinist groups, the boy-scouts association, the touristic organizations, the cultural investigator groups, etc., are entities which are going to understand the urgency is preserving the natural resources, and gladly lend help in diffusing a project, receiving suggestions, which later on will or could be of valuable help in amplifying the horizon of a project or in accomplishing another.

This aspect encloses tacitly another which is not evident at first sight being for this motive relegated and even lost. Frequently a conservative project implicitly has unexpected repercussions over certain very distant aspects of the same problem and therefore easily escaping in the discussions to that respect. Four eyes see more than two says the Spanish proverb, and this is how many times distant timid groups or without apparent connexion suggest the benefit or damage of the considered project.

The declaration of reserve zones should be insisted upon, previous an intense study of the zone for extensive protection even if after an exhaustive study the problem would have to be reduced to a minor extension, for example of autochthonous groups to protect for any given reason, completely unknown at first.

I will cite an example of my personal experience. When the Biology Station was going to be built in the Santa Cruz island of the Galapagos Archipelago, a beach was chosen with a name that summed up the protection of Galapagos, main finality of the entire project. It was in 1958, and a few months later the waves provoked by the earthquakes in Chile literally swept with the beach, the lagoon and the huge rock, over which the projected station was going to be built.

Fortunately this happened before the construction of the buildings, and it was necessary to change the locality of the Station to where it is at present. It is clear that the cited example is not exactly a part of the conservative project, but it is comprehensible that if the buildings would have been destroyed by the waves, the project's entire economy might have suffered a terrible blow that probably would have ended the entire project.

Naturally all this great variety of activity of the private conservative organization will not be realized without a narrow and comprehensive collaboration with the government entities, generally distributed among various Ministries. And many times this collaboration is extended to international organizations.

That is why we have thought it best and beneficial in our country to maintain inside the directives of the private organization and as technical advisers, two members, one representing the government and the other FAO, in which manner we believe we shall be able to polish and better present the projects before the legislatures or government.

It is clear that the number of these useful advisers will vary in each country, according to each problem and even according to whether the problem is of local or national interest. Moreover, in the private entity which I am honored to preside (It refers to the "Asociacion Ecuatoriana para la Conservacion de la Naturaleza Territorial" (Ecuadorian Association for the Conservation of Territorial Nature). Apart from its conservation and defense ends, it tries to foment education for the right protection of the renewable natural resources of the country), we have thought that in order to harmonize judgments, to divide the country into well marked ecological zones, something very simple in Ecuador, because of the different zones characterized for geographical motives and for diverse climatological influences, with its respective representative, of great influence in his zone endeavoring also a political balance to avoid where possible unilateral judgments, and also to be able to always have a certain influence over the politics governing or legislators, which enormously facilitates the bureaucratic works and shortens the always long proceedings.

This Central entity wants, to branch off by zones, provoking the creation of regional groups which will be alert in giving voice of alarm in time to remedy or avoid the creation of a given problem. I have permitted myself to cite my personal problem as in my organization. We have believed that in this manner we would be able to accomplish the conservative ends. Moreover, we tried to form a directive counsel with students in these subjects better prepared than these Central directive groups, but devoid of the surrounding atmosphere influences.

It was our purpose to have them learn the philosophy of conservation and form in the future the complete national directive body that will duly direct the conservative destinies of my country.

It is obvious that unfortunately in everything that has been exposed there is much theory. But I also believe that one should carry an ideal that will awaken the enthusiasm and enable the foreseen goals to be realized.

Let us now consider the same problem but at an international level taking as example the CHARLES DARWIN foundation for the Galapagos Islands. The private entity was created at Unesco in

Paris on October 1959. And if it is true that for many years various world scientists had thought of protecting the Islands fauna and flora, it was the government of Ecuador that promulgated two protective decrees for the islands : the first in insinuated by Dr. Van Hagen, and the second presented to the legislature in August 1958 by the directives of the National Committee of the International Geophysic Year, and finally obtained by decree at the beginning of March 1959. Later it was amplified by agreement between the government and the Foundation after the 1964 Simposium.

In its seven years of life the Foundation has carried out praiseworthy and valuable work not only for the conservation of the Galapagos, but of other rare species peculiar of the island such as the Comoran optero, the terrestrial and marine iguanas, the Darwin's finchs, etc. Also it has procured the conservation of the flora. At present the plankton studies have started; its results may serve as a base for the protection and national exploitation of the renewable marine resources, of main importance as a protein source for the human nourishment of Ecuador. For the future, marine parks inside the island are foreseen. Some for studies of vital cicles in the riparian fauna and flora which are very important to evaluate the ichthyologic richness. Others, for forming subaquatic parks for recreation, actual tourist novelty and a source of money for the neighboring people. This type requires certain conditions of tranquil and transparent waters difficult to stir, where natural conditions can be admired; or create and cultivate a beauty scenery of attracting novelty. Naturally the proposed scenic variety may vary infinitely according to local conditions : fresh water, marine water, moderate or tropical climate, etc., each one with its different beauty character.

In the Galapagos Islands the conservative end would also be to avoid by those means, the depredation of the fauna and flora of invaluable scientific world value, as the population would go to the beaches in search of larger incomes, bettering its level of life; in this manner the less productive agricultural expansion would be avoided. The reserve zones would notably improve as well as the conditions of the autochthonous fauna and flora.

Another point of importance in the considered case is that the Director of a station be an able National administrator, preserving the post of Technical Director for the eminent scientist, generally a foreigner, - liberating him of the administrative proceedings. The native will know more about these annoying proceedings with the local authorities, and be more accessible to the possible claims, just or unjust, of the population avoiding the irritating human friction. Furthermore,

and this is not a minor consideration, the burdensome expenditure of paying the scientist a high fee for administrative matters, many times of no importance, will be avoided and the scientist will dedicate all his attention to his own problem.

Finally the possible formation of a representative commission of the various involucrated ministries in the given problem would serve as coordinator of the private organizations scientific studies which I believe might be the best solutions. National programmes of education or investigation of the interested universities or politechnics would be studied, many times visualizing the production of fountains or richness rationally useful.

That is exactly the spirit of the presented memorandum to the government of Ecuador for the case of the Charles Darwin Foundation.

To finish, it is easy to understand that a great number of private and semi-private organizations are interested in the matter of conservation. Naturally the objectives are varied, and interested and specialized people are needed. In others, the organisms consider general problems, less technical, but necessarily more extensive.

The possibilities of considering the wise use of natural resources without waste are infinite from the irrigation water according to certain special conditions, the simple plowing of the soil, according to its slope, to the thorough study of marine microorganisms, base of a possible exploitable and renewable ichthyologic richness with repercussions on the human nourishment of the riparian country. Other times the prevention of constructions that clash or do not harmonize with the surrounding atmosphere of natural beauty that permits the touristic and recreation exploitation of an area near an urban population, may raise conservative interest.

By the few examples cited, so different one from another differing in goals, the immense field for action of the conservative private organisms will be understood. And this only considering the goals, without taking into account the economic subdivision of creation or maintenance of the considered organism as we have seen before.

Many times we will have to start from local problems to be able to arrive to a generalization; others, we will have to start from general problems towards a local problem. Therefore, this aspect will be ruled almost exclusively by its special conditions, this is the motive why I am only mentioning it.

I hope to have clarified certain concepts, perhaps only the main ones, over the role of private organisms in conservative matter. The examples cited will only serve as a pattern for the selected members of this important international meeting and I would be extremely satisfied if this small contribution might help to clarify and facilitate proper solutions, profitable and durable in problems for the conservation of nature in the republics, fraternal Latin-American republics.

27. 1. Bilateral and Multilateral Agreements concerning the Subject of Conservation

by Dr. G.M. Caldevilla

Summary

America has carried out significant efforts in Conservation saving areas for the future generations, from the Andes to the Rocallosas, preserving their panoramic, historical, botanical and wildlife values.

In spite of this effort many areas show evident signs of impairment through lack of foresight and or disregard, but mainly for the want of economical means to detain them, it is deplorable to observe this situation.

On the other hand, countries that have accomplished with the preservation of areas, feel deeply the deterioration because of the over use caused on these by man, and as well the waters and the atmosphere feel the contamination that threatens to change the habitat of fishes and plants. The lack of means and excess of use are the causes that affect the natural values. It is necessary to gain efforts in order to protect the unprotected areas.

When the economical means of a country are inadequate, due to agreements with neighbouring countries with common interests it could be successfully fulfilled.

An adequate manage policy of bilateral agreements could save natural renewable values, in accordance of neighbouring countries, for which a catalogue is recommended for those types of areas in that geographical situation and promote the urge of resolutions.

An adequate managed system of national parks and lateral areas in Latin-America could help to ease the human impact, that parks and areas of public usage of North America receive at present and will receive in the future, since the greater cost of the displacement is compensated by a lower cost of stay plus

a greater difference of landscape, language, history, etc., that increase the sensation of travelling. Why cannot there be also agreements between not neighbouring countries so as to obtain a more complete benefit of America's value nearer each day, with the problems of transport ?

As yet, within the boundaries each country has the possibility to perform the multilateral agreements for the exploitation of all their human resources of equipment and economical availabilities in order so as to obtain their goals impossible to attain by isolated specialized services.

Likewise it is advisable and desirable to count with agreements with international institutions concerned that apart, from their contribution through technical assistance, to help by giving economical support to the countries that require it in order to carry out the protection of their threatened natural renewable resources.

A greater intervention of FAO, UICN, UNESCO, OEA through the American governments, as to encourage the recommendations worked out during years of conferences, and symposiums that have not been applied, by establishing a conservationist permanent committee to sustain the governments interests respect to the defence of the values of the natural renewable values of America.

ON CONSERVATION OF RENEWABLE NATURAL RESOURCES

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SAN CARLOS DE BARILOCHE, ARGENTINA  
27 MARCH TO 2 APRIL, 1968

Translated from the original Spanish,  
which remains the definitive text.

1. Vampire Bats

Recognizing that Vampire bats, Desmodontidae, constitute a serious economic, veterinary and public health problem in Latin-America, not only because vampire bats can transmit rabies and other diseases to domestic animals and man but also because their sole food is the blood of birds and mammals, including man,

considering further that the eradication of vampire bats, whether desirable or not, is impracticable due to their wide distribution, abundance and inaccessible roosts, and

considering that many other species of bats, commonly found roosting with or liable to be misidentified as vampires, play an important role in nature, for example in the control of insect pests of economic importance,

the IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

recommends to all governments concerned that necessary control of vampire bats in problem areas be based on sound biological, ecological and immunological studies, aiming at selective reduction of local vampire populations only, and

further recommends that personnel charged with the application of control measures be properly trained and that special care be taken to avoid indiscriminate and mass destruction, particularly by dynamiting and fumigation of caves and other roosting places which may shelter large numbers of bats and other animal and plant species beneficial to man or of great scientific interest.

2. Nothofagus Forests

Recognizing the great scientific interest of the complex of Nothofagus forests in the southern part of South America, and the need and opportunity for continuing the excellent research recently undertaken in Chile and Argentina by further detailed investigation of many problems, such as distribution, biotic

associations and effects on the forest habitats of introduced species, and

considering the various existing and potential threats to the continuing existence of adequate samples of all types of Nothofagus forests for the purpose of such studies, and

considering further that the Nothofagus forests of Chile and Argentina constitute the main area of this genus in the world, that these two countries have the centre of dispersal of Nothofagus and that the forest is in an unchanging biological equilibrium,

the IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

recommends that international organizations and governmental and academic authorities concerned collaborate in bringing Nothofagus research within the scope of the International Biological Programme and, in particular, in ensuring that samples of all types of forests are selected and classified on check-sheets of the Section on Conservation of Terrestrial Communities of IBP, with a view to guaranteeing their status as study areas and meeting the future needs of science.

### 3. Conservation of Forests

Considering that burning, grazing and cutting of forest-land in order to provide new land for agricultural or livestock purposes is a common practice in Latin-America as in many other countries and that this is often done on lands where slope, nature of the soil or other physiographic characteristics clearly indicate that the land involved is suitable for forest,

considering that this practice may lead to a temporary increase in productivity but that there are also many indications that in the long run there is usually a decrease in productivity per unit of surface and that erosion and irreversible soil deterioration often accompany this process,

the IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

recommends that the governments of Latin-America intensify investigation of the problems of land use, taking into account the productivity of soils on a sustained or permanent basis, and favouring particularly the solutions which would increase productivity in the most promising areas rather than opening new land in areas where climate, soil, topography and other factors have not been sufficiently studied and where land use maps are still lacking, and

further recommends that every effort be made to promote measures which will produce optimum results on a permanent basis, while avoiding continual encroachment on comparatively undisturbed natural areas.

#### 4. Soil Conservation

Recognizing that the conservation aims of all countries are similar in relation to their conservation problems,

the IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

recommends to the States of Latin-America that closer cooperation be established between their soil conservation, nature conservation and forestry administrations, both within, and between countries.

#### 5. Wild Bird Protection

Aware that a Conference of the International Council for Bird Preservation, Pan-American Section, was held at Caracas, Venezuela, March 18 - 24th, 1968,

the IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

expresses its concern at the alarming decrease which many bird species are stated to face in most countries, and

supports in principle the resolutions adopted by the Conference of Caracas. (These are appended after Resolution No. 27)

#### 6. Protection and Future Development of the Vicuna

Considering with alarm the rapid decline in the populations of the vicuna *Vicugna vicugna* which has brought this animal close to the verge of extinction,

aware also of the special values of this animal, not only scientific, cultural and aesthetic, but also its economic potential as a tourist attraction and a producer of high quality wool,

the IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

commends the Government of Peru for establishing the first reserve for vicuna at Pampas de Galeras, Ayacucho,

supports the request of the Government of Bolivia to obtain technical and financial aid to establish a Bolivian reserve for vicuna, and

recommends that the Governments of Argentina, Bolivia, Chile and Peru organize a meeting without delay, to examine, in detail, the immediate problems of the vicuna's protection, and the long-term problems of its future development as a recreational and economic resource.

## 7. Marine Turtles

Considering with alarm the serious decline in populations of the five genera of marine turtles : Caretta, Eretmochelys, Chelonia, Lepidochelys and Dermochelys, in Latin-American waters, as a result of over-exploitation,

aware also that the turtles' most vulnerable period to human predation is when they emerge from the sea to narrow zones of shore to breed, and that no animal can survive if its reproduction is prevented,

the IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

commends the Governments of Costa Rica, Mexico and Surinam for the measures which they have already taken to conserve and to study the marine turtles, and

urges the governments of all maritime countries in Latin-America to adopt, and energetically to enforce, legislation to prohibit the taking of turtle eggs and the killing, molesting or any other interference with nesting turtles on any mainland or island shore.

## 8. Marine Turtle Migrations

Considering that tagging studies have shown that the Green Turtle Chelonia midas population of the Brazilian coast is derived mainly from Ascencion, a small island 1,200 miles away, in the South Atlantic Ocean,

the IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

draws attention to this fact to illustrate the futility of undertaking restoration or management programmes for marine turtles without an adequate knowledge of their migrations,

expresses its concern that no information on this subject is available for other coastal waters,

recommends the governments of all maritime countries in Latin-America to initiate or expand ecological research into marine turtles, which should include tagging programmes for the purpose of determining routes, extent and seasonality of turtle migration.

#### 9. River Turtle Podocnemis expansa

Considering with alarm the serious decrease in the river turtle *Podocnemis expansa* throughout its range, mainly as the result of uncontrolled collection of its eggs,

aware also that the eggs of this turtle once formed an important constituent of the diet of local peoples and could do so again, if this resource were properly conserved,

the IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

recommends that the governments of all countries in which this turtle occurs should take the necessary steps, if they have not already done so, to prohibit in its totality the commercial exploitation of their eggs for a period of at least five years, while at the same time regulating within tolerable limits the collecting which has been taking place traditionally by the native population in order to supply their personal needs.

#### 10. Protection of Orchids and other Species of Plants

Considering the serious decline in the distribution of orchid species, of Cactaceae, Bromeliaceae and succulent plants in general in many parts of Latin-America,

aware also that the main reasons for this decline are modification of the habitat and uncontrolled collection,

the IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

recommends governments to select and establish sanctuaries for native species and to enact any required legislation for their protection.

#### 11. Landscape Planning - Development Projects

Considering the importance of the social, cultural and scientific values of landscape as a heritage of the peoples, and

considering the experience that the expansion of agricultural development and different public works tends to an increasing occupation of land in many Latin-American countries, and

in view of the fact that such development often leads to pressure upon natural and semi-natural areas,

the IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

recommends that all such development projects should be executed in the frame-work of landscape planning, in which "protective" and "creative" measures should be integrated as a joint responsibility of ecologists, forestry experts, agronomists, civil engineers and landscape planners.

## 12. Landscape Planning Services

Considering the cultural, economic and ecological values of recreation and tourism and the necessity to study rationally the development and protection of the landscape,

the IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

recommends to the Latin-American governments the establishment, within their respective institutions in charge of national planning, of a service to undertake the study of the development of recreation and tourism in relation to landscape planning, and in coordination with institutions of other countries that have direct responsibility for the control and preservation of renewable natural resources.

## 13. Landscape Planning - Urban Areas

Whereas the majority of the population in an increasing number of countries is concentrated in urban areas, and

whereas the modern way of life and mobility enable the population to seek easily accessible outdoor recreation areas,

the IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

recommends that these social needs should be carefully considered in landscape planning, in relation to urban and suburban areas.

## 14. Landscape Planning - Training Landscape Planners

Whereas there is a pressing need in many countries of Latin-America and elsewhere for the planning of landscape in all rural and urban areas, and

whereas there is a serious shortage of adequately trained technical personnel in this specific field,

the IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

recommends that the training of qualified landscape planners should be furthered at both the higher and medium levels of education. Moreover, the acquisition of knowledge and experience should be advanced by cooperation between the education centres of the different countries.

#### 15. Landscape Preservation

Considering the importance of social, cultural and ecological values of landscape, which for these reasons constitute a property of the community and therefore should not be modified without prior detailed study,

the IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

recommends to Latin-American governments the adoption of adequate measures in the field of public works, urbanization and establishment of state-promoted industries, to preserve the landscape for the general benefit of the community, and

further recommends the adoption of legal and statutory rules to enforce observance by private owners.

#### 16. Vicuna and Trade in Vicuna Products

Recognizing

that the vicuna is now in danger of extinction,

that trade and export of vicuna wool provides the main incentive for the illegal killing of vicunas,

that the cooperation of importing countries is required in controlling that trade, but

that such cooperation cannot be given until initial steps are taken by exporting countries,

the IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

recommends that all countries in which the vicuna occurs (Argentina, Bolivia, Chile and Peru) or could occur, and that have not already done so, immediately prohibit the commerce, internal or external, of living vicunas, vicuna wool and all vicuna products unless accompanied by an appropriate certificate, which should be issued only when full consideration has been given to conservation requirements.

#### 17. Legislation

Whereas the Wildlife of Latin-America has been destructively exploited in many areas, drastically reducing the populations of

many valued species, and bringing some species to the verge of extinction,

whereas this exploitation, leading to the exportation of living animal products is in many instances in violation of national laws,

whereas those animals and animal products illegally removed from their country of origin, which are undeniably contraband, are allowed to enter other nations freely and openly, as legitimate articles of commerce,

considering that the Convention of Nature Protection and Wildlife Preservation in the Western Hemisphere (1940) is the legal instrument of a continental nature concerning the import and export of species of fauna and flora,

considering that the countries of the American Continent have the duty to take measures for the implementation of that Convention,

the IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

being aware that conservation of nature is an issue of international concern, and therefore requiring close international cooperation,

requests the Latin-American countries to give prompt and careful consideration to the preliminary draft of the Convention regarding Import, Export and Transit of Certain Species, which in September 1967 was forwarded by IUCN for comment to the relevant Governments through their Embassies in Switzerland,

and, in the meantime, recommends

- a) that all nations, by legislation or regulation, such as may be appropriate in each case, close their borders to animals and animal products which have been illegally removed from another state,
- b) that whenever any nation requires a licence or similar certification for the legal exportation of any animal species or animal product, other nations refuse entry to such species and products unless the importer submit such licence or certification of legal exportation.

## 18. Conservation Education

Whereas there remain widespread deficiencies in conservation education in spite of many new and encouraging developments, and taking into consideration the need to train the necessary specialists,

the IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

wishes to draw the special attention of the appropriate authorities to the need for

- a) starting training facilities in those countries, which have not already done so, for "conservation teachers", meaning by this those specialists capable of teaching the subjects related to nature, its conservation, and its use for the benefit of man;
- b) including or intensifying in the training of teachers of primary and secondary schools the knowledge of using and conserving natural resources and in using these as technical material;
- c) broadening the educational system to provide a wider understanding of the natural environment as a contribution to an integrated education and as essential basis for the conservation and enhancement of the environment;
- d) strengthening the teaching of ecology, particularly at the higher levels, since ecology lends itself particularly well to the inclusion of conservation in general curricula, and its eventual recognition as a fully fledged discipline with an identity of its own.

#### 19. Educational Materials

Aware that there exists in the countries of Latin-America and in international organizations a considerable amount of teaching materials concerned with conservation,

the IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

recommends that a Latin-American centre be established with the collaboration of competent international organizations to collect and classify such materials as can be of use in conservation education, and when this has been done, to become a production centre and clearing house for conservation education materials for distribution to the States of Latin-America.

#### 20. Conservation Education among the Armed Forces

Aware of the importance of adequate utilization of natural resources for national progress and security,

the IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

recommends to the appropriate authorities in the Latin-American countries that education in the field of conservation

be promoted among the Armed Forces during the conscription period.

#### 21. Conservation Year

Aware of the importance of promoting conservation education by all means possible and having been informed of the proposals of the Council of Europe to celebrate a Conservation Year in Europe in 1970,

the IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

recommends that a similar conservation year be organized in Latin-America to be celebrated in 1972, on which occasion all Latin-American countries can strengthen their cooperation together, especially in conservation education at all levels.

#### 22. Protection of Scenic Resources

The IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

recommends to the respective governments, whenever it is deemed necessary, to formulate laws of Protection of the Scenic Resources outside the national parks and, in particular, to establish systems of restriction to private property in areas bordering the national parks, in order gradually to establish peripheric protection, before the advance of urban and industrial expansion.

#### 23. A System of National Parks in the Western Hemisphere

The IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

recommends that the American countries agree to the adoption of a co-ordinated system for the planning of the physical and administrative development of their national parks as a hemispherical system, co-ordinating and complementing scientific investigations, and unifying nomenclature, zoning criteria and norms for the tourist services in general.

#### 24. National Parks

Considering the unique scientific and touristic potential of the basins of the river Manu and the northern tributaries of the river Alto Madre de Dios, containing all the typical habitats ranging from tropical rain forest to dry mountain woodland with their particularly rich vegetation and animal life,

the IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

congratulates the Government of Peru for having declared this area a future national park and extends this congratulation to other Latin-American countries which have recently established national parks, and

recommends the Latin-American governments to continue to promote appropriate areas to the category of national park.

#### 25. Establishment of Land-Use Services

Taking into consideration the experiences gathered in various regions of the world, resulting from development projects, sometimes with harsh consequences due to the profound alterations observed in the ecology of the soil, and with the purpose of preventing their harmful recurrence, and, consequently, in the interests of a better and more adequate use of the soil and its resources,

the IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

recommends to the Latin-American governments the creation, within their respective agencies in charge of national planning, of a department or section devoted to the study of the rational use of the soil as a prior and necessary measure to the final use of this vital resource in every project financed directly or indirectly by the State.

#### 26. Endangered Mammals in National Parks

Noting that the mammals *Hippocamelus bisulcus*, *Hippocamelus antisensis*, *Pudu pudu*, *Dolichotis patagonum*, *Felis pardalis*, *Panthera onca palustris*, *Priodontes giganteus* and *Lutra provocax* are in danger of extinction in Argentina and Chile,

the IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

expresses satisfaction that the majority of these animals are represented within national parks, and

recommends the Argentine and Chilean Governments to allocate sufficient funds for the effective maintenance and patrolling of these habitats, to ensure the recuperation of the animals' populations.

## 27. Resolution of Appreciation

Whereas the Delegates and Observers of the States and Organizations attending the IUCN Latin-American Regional Conference on the Conservation of Renewable Natural Resources at San Carlos de Bariloche, Argentina, 27th March to 2nd April 1968, have greatly enjoyed and benefited by their visit to the spectacular scenic region of the Nahuel Huapi National Park, and

whereas all the participants in this historic conference have deeply appreciated the generous hospitality of the National Park Administration and the Government of Argentina, and the many courtesies extended to them by public agencies and private organizations, societies, and individuals,

the IUCN Latin-American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,

most ardently thanks its hosts, and all the agencies, organizations, groups and persons who have helped to make this meeting a memorable and creative event, and

congratulates the Republic of Argentina on its outstanding contribution to the cause of Conservation which this gathering represents, and on behalf of its participants pledges continuing devotion to the vital work which has been so vigorously advanced on this great occasion.

## ICBP RESOLUTIONS

The Conference of the International Council for Bird Preservation, Pan-American Section, held at Caracas, Venezuela, 18 - 24 March 1968, has discussed the present situation of wild birds in the Americas. It has reaffirmed the value of birds as an important economic, educational, social, scientific and aesthetic resource. It has learned with concern of the alarming, often catastrophic, decrease which many bird species face in most countries as often unintentional but avoidable consequences of a widespread and rapid destruction of habitats, misuse of technology, and interference by exploding human populations. It has pointed out the need for research to follow developments in this period of rapid change and the need for immediate action to correct past and prevent future errors.

The following resolutions, unanimously adopted, are intended to draw attention to some of the most urgent problems :

### 1. Maintenance of Natural Habitats

Noting that the rapid destruction of natural habitats in the Americas, especially of forests and wetlands, is alarmingly

reducing valuable natural resources, causing soil erosion, the destruction of essential water supplies, extirpating wild birds, other animals and plants of economic, scientific, aesthetic, educational, touristic and patriotic importance; and that additional special medicinal and other values to man of some of these habitats and species is not yet fully known,

the ICBP Pan-American Section meeting at Caracas, Venezuela, on March 18 - 24, 1968,

recommends that all governments :

- a) establish adequate inviolable natural reserves, parks and sanctuaries designed to maintain a representative variety of habitats in their respective countries as a permanent resource for future generations, and that effective safeguards be provided to ensure the preservation of natural conditions and of the flora and fauna of these areas;
- b) in connection with forests maintained for lumbering and other commercial purposes, that cutting in such forests be carefully controlled so as to maintain, so far as possible, forests of a varied character;
- c) control the use of fire to clear areas during the dry seasons; require that the reforestation of areas for water supply purposes, for erosion control, for recreation and for landscaping be so far as possible effected with the local, native trees and plants, without prejudice however to the planting of exotic trees for commercial uses when required by certain industries or when such planting reduces the commercial pressure on native forests.

## 2. Educational Programmes

Noting that the future health of environments in the Americas and their continued suitability for human occupation, depends basically on an educated people having appreciation and understanding of the importance of wisely utilized natural resources of all kinds, and that the existence of an abundant and diversified fauna and flora is a significant measure of the total social and economic health of the environment,

the ICBP Pan-American Section meeting at Caracas, Venezuela, on March 18 - 24, 1968,

recommends to all Governments that educational programmes be prepared and introduced at all school and university levels, and that full use be made of all public and private communications media, including press, radio, television, etc., so that people of all ages may be brought to understand as rapidly as possible the environmental conditions on which their own futures depend.

### 3. Educational Material

The ICBP Pan-American Section meeting at Caracas, Venezuela, on March 18 - 24, 1968

recommends that governments and private organizations prepare, and make available, audio-visual material dealing with conservation, ecology, and management techniques of renewable natural resources, issue public books on the identification of bird life for use in museums, schools, universities, television, motion pictures, theatres and other means of public communication,

recommends that conservation organizations in the U.S. and Canada consider translation into Spanish and Portuguese of appropriate conservation material to be distributed throughout Latin-America,

expresses the hope that regular conferences of the Pan-American Section be held in various Latin-American countries to stimulate local interest in conservation,

recommends to conservation organizations, and other corporations, foundations, groups, and individuals interested in advancing conservation to contribute funds for the publication of popular bird guides and other conservation material.

### 4. Legislation and Regulations

Noting that legislation and regulations with respect to wild birds and animals are sometimes adopted without adequate basic biological information,

the ICBP Pan-American Section meeting at Caracas, Venezuela, on March 18 - 24, 1968,

recommends that governments, in respect to such legislation and regulations, consult with qualified zoologists, ecologists, and conservationists, and their respective National Sections of the International Council for Bird Preservation.

### 5. Regional Cooperation

The ICBP Pan-American Section meeting at Caracas, Venezuela, on March 18 - 24, 1968,

recommends the encouragement of regional cooperation, treaties, and conventions among the various American countries sharing common problems with respect to land and water uses, and the preservation of wild birds and animals;

urges that when economic conventions are prepared consideration be given and provision made for preservation and wise use of renewable natural resources.

## 6. Commerce in Wildlife

Noting that the commercialization of birds and other animals (and their products) has endangered the survival of certain species, and, in some areas of the Americas has reduced alarmingly the populations,

the ICBP Pan-American Section meeting at Caracas, Venezuela, on March 18 - 24, 1968,

recommends to governments :

- a) that they prohibit, or at least reduce and closely regulate, the commercialization and exportation for private profit of wild birds and other animals and their products (flesh, feathers, skins, and eggs),
- b) that they reduce and strictly control the importation and commercial traffic in birds and other animals, and totally prohibit the importation of endangered species, except for licensed purposes.

## 7. Control of Pesticides

Having noted that many pesticides have had lethal consequences on birds and other animals, either directly or by the eating of poisoned prey or through the impairment of fertility, and

having noted the progress in securing governmental control of pesticides in certain countries, and

having noted the fact that, especially in the case of birds, adverse effects on wildlife can best be reduced or eliminated if controls are consistent and universal,

the ICBP Pan-American Section meeting at Caracas, Venezuela, on March 18 - 24, 1968,

recommends that Governments adopt legislation or regulations by which pesticides shall only be applied at minimum effective concentration, and

urges all governments which have not already done so :

- a) to compel the reduction of the manufacture, sale or use of persistent or cumulative pesticides (chlorinated hydrocarbons) and encourage their replacement by safer less toxic, and nonpersistent compounds,
- b) to arrange that the effects of pesticides in their countries be kept continually under review and investigation, and that manufacturers, importers, exporters and wholesale distributors of pesticides furnish statistics of the amount of their sales of pesticides,
- c) to prohibit the manufacture, sale, importation or exportation of pesticides which have been banned in the country of origin

or which have already been found in any country to involve excessive hazards,

- d) to require that manufacturers and distributors of pesticides and of products containing pesticides, label such pesticides and other products with their complete chemical composition, with their correct dosage, and with their possible hazard to wildlife, domestic animals and man,
- e) to encourage the investigation of cultural and biological controls of insect and other pests.

## 8. Pollution of the Sea by Oil

Having noted with concern that severe cases of oil pollution continue to occur with disastrous results to bird-life and to the usefulness of beaches, and that the only adequate solution to the problem is the complete prohibition of discharge of oil by ships into the sea, and that improved technology makes this practical and economically feasible,

the ICBP Pan-American Section meeting at Caracas, Venezuela, on March 18 - 24, 1968,

expresses gratification that a sufficient number of Contracting Governments to the International Convention for the Prevention of the Pollution of the Sea by Oil, 1954, have accepted the 1962 amendments to bring these into force, and

having noted that the principle that ships shall in no circumstances discharge persistent oils into the sea has been incorporated in the Convention,

recommends to those governments of the Americas which have not yet adhered to the Convention that they do so without delay, and

recommends to those governments which have adhered or may adhere to the Convention that they make every effort to ensure strict enforcement of the provisions, and

recommends that the prevention not only of deliberate but of accidental spillage both at sea and in harbour should be recognized by all concerned as a vital policy objective to be enforced by all appropriate means, including a coordinated reporting system under which scheduled and military aircraft should be required to report oil slicks at sea to the appropriate authorities.

## 9. Fresh Water Pollution

Having noted that pollution of rivers, streams, lakes and marshes from industrial, agricultural, and domestic wastes, in addition to its harmful effects on human health and well-being, also endangers the survival of many birds and other animals, either directly or by causing food shortage or destruction of habitats,

the ICBP Pan-American Section meeting at Caracas, Venezuela, on March 18 - 24, 1968,

recommends that all governments take effective action to prevent fresh-water pollution, and to correct existing pollution problems.

#### 10. Mist-nets

Having noted that the use of mist-nets for other than scientific purposes may dangerously reduce bird populations and encourage their use for commercial purposes,

the ICBP Pan-American Section meeting at Caracas, Venezuela, on March 18 - 24, 1968

recommends that the importation, sale and use of mist-nets be limited to properly qualified persons and organizations, and then only for scientific purposes.

#### 11. Protection of Birds of Prey

Having noted that birds of prey and owls have recently suffered a drastic decline in numbers as a result of indiscriminate shooting and trapping, the destruction of habitat, and particularly the wide use of pesticides which poison their prey and in turn poison the raptors or render them infertile, and

having noted that in some countries bounties are still paid for destruction of raptors,

the ICBP Pan-American Section meeting at Caracas, Venezuela, on March 18 - 24, 1968,

urgently recommends that all species of birds of prey including owls, without exception, be given protection in all countries, that every effort be made to ensure enforcement by protective legislation, that where it is necessary to destroy individual birds for the protection of property this be done only after careful study by biologists showing necessity and under strong governmental safeguards, that payment of bounties for killing birds be abolished, that the use of pesticides dangerous to birds of prey and owls be strictly controlled, that scientific studies be conducted with a view to increasing the population of endangered birds of prey including owls, and that efforts be made to educate the public to an understanding and appreciation of their value and interest.

#### 12. Introductions of Exotic Species

Noting that introductions of exotic species of birds and other animals (including fishes) have often resulted in the introduction of dangerous diseases, some of which affect man himself, and

have led to damaging competition with desirable native animals, and predation upon species with consequent reduction or extirpation of such native species, and deleterious economic effects,

the ICBP Pan-American Section meeting at Caracas, Venezuela, on March 18 - 24, 1968,

recommends that governments prohibit the importation of exotic birds and other animals (including fishes) for purposes of liberation and that restocking with local native species be encouraged.

### 13. Endangered Bird Species

Having noted that most of the species and subspecies on the ICBP's list of endangered birds are still little known and that their status is unclear,

the ICBP Pan-American Section meeting at Caracas, Venezuela, on March 18 - 24, 1968

urgently recommends that zoological, educational institutions and organizations interest themselves in cooperative surveys and studies on the status and biology of these birds.

### 14. Basic Legislation

The ICBP Pan-American Section meeting at Caracas, Venezuela, on March 18 - 24, 1968,

recommends to all governments in the Americas that basic laws for the preservation of birds be of a simple type, in accordance with modern biological views, that such laws provide for the protection of all species of birds, but with power given to the governmental body having jurisdiction to make regulations permitting :

- a) the hunting of specified game birds for sport, subject to suitable rules (including those for hunting seasons and bag limits),
- b) the taking of birds for legitimate scientific and educational purposes, and
- c) the control in special cases, after adequate studies, of species causing local problems.

CLOSING SESSION

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Tuesday, 2 April 1968 : Afternoon Session

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Chairman, Ing. Agr. Norberto A.R. Reichart,

Under-Secretary for Agriculture and Livestock  
Republic of Argentina.

After a week of fruitful work, this Latin-American Regional Conference on Conservation of Renewable Natural Resources has come to an end and I have great honour of presiding finally over the formal action of closure. Firstly, I want to thank you, Sir, and all of you for the honour that you have given me in offering me the chairmanship of today's Session. As I said before at the beginning of this Session, it was for me a great satisfaction and a great honour to have been able to share this work-table with men of science and social sensibility of view, especially in conservation of natural resources. Returning to this final closing ceremony, I am now going to call upon the delegate of Surinam, whom I invite to take the floor.

The Delegate from Surinam, Senior Willem J.J. Sni.jders

Mr. Chairman, Ladies and Gentlemen,

My mother tongue is Dutch, and I have been working for 21 years in Surinam, but on this occasion, I am going to try to talk in Spanish, the beautiful language of this country that has received us so kindly, as a modest proof of my appreciation of their hospitality.

At the Tenth Meeting of the Latin-American Forest Commission, that took place in Trinidad, and also at the Meeting of the Latin-American Committee of National Parks, where I assisted as an observer, the representative of the Forest Service of Surinam indicated the work that I have carried out in our country on the subject of conservation. Some time ago the Government of Surinam received the invitation to assist to this Conference as an Observer. His Excellency the Minister of Mines, Forests and Lands of Surinam, honoured me with the privilege of attending this Conference, to gather information on the possibility of Surinam becoming a Member of the International Union.

In the first place, I must thank you for the kind and efficient way in which I have been helped in this, which will facilitate my favourable report to my Government. In the second place, I must express my sincere congratulations on the efficient, correct and agreeable way in which this Conference has taken place, on the quality of the Papers presented and of the debates, and at the same time on the excellent organization and the correct choice of this magnificent natural scenery that surrounds us in celebrating this conference. A special mention of thanks is deserved particularly by our kind Argentine hosts.

I arrived here not knowing any of the persons present, and today I find myself among many friends. The key to this is very simple. We are all joined by a common feeling of respect for life itself in all its forms and for the soil that feeds this life in various different ways. We all are conscious of this great system and we agree that we must not only discuss it but also recognize its real limits.

We all know the story about Paradise and the happy life enjoyed by the children of man in the Great World Park before the apples ripened.

It is said that we should become new again, like children, and I believe that conservationism is a way to establish a world apart for the children of man, because conservationism is made up of an ensemble of principles, basic principles that are essential for human existence, and although nature teaches us something about the survival of the fittest, ecology gives us the basic principle of harmony that is the best condition for friendship and peace. If we agree on this as an objective, techniques can doubtedly be found to carry it out.

Mr. Chairman, I desire to say to everybody goodbye until the next time. Thank you very much.

Prof. E. Beltran, Head of the Delegation from Mexico

Mr. President, Ladies and Gentlemen :

In this wonderful setting, surrounded by mountains with slopes covered with trees of unequal beauty, which are reflected on a beautiful lake, in the middle of a very well cared for park, in a wonderful hotel full of comfort, this is where this first conference has met for this Latin-American Conference for the Protection of Nature. Since we arrived, we realized that our friends in Argentina had thought of everything. They had acted as ecologists, and had looked for the adequate roost for the conservationists, because which can be, Gentlemen and

friends, a better roost for an assembly of conservation than that given by a National Park. But we saw that not only those ecological conditions were important but they had also thought with a pragmatic sense. They wanted that in and through these days we received lessons that did not have to come through the months of other delegates or by the reading of documents, but simply by the environment that surrounds us; see the problems that effects the administration of a national park and look how they have tried to solve them. But still there was another third purpose surely, maybe the one that is more hidden, but is going to be more valuable spring of this conference when it was thought in the psychological aspect. It doesn't deal with this park or any park. It isn't of a place where the simply natural beauty makes it of course justified. It deals with a part with a profound history that if our Argentine friends are filled with pride; for the visitors is an example of what can be done by a citizen, that is to say a park that is born because a great Argentine, whose statue in Bariloche has shown it precisely where the gesture of that who goes forth for the future when the great Argentine will receive from his country, as a just reward to work given to it, a piece of land. He doesn't think that this would serve to make him rich or to exploit it, but he gives it back to his country with a donation, an intouchable donation, for the future generations as a national park. Since we knew that, it has been touched in us a psychological spring, and when in the excursions of last Sunday going by that island where that Argentine and his wife rest we heard the sound of the steamship and we saw the sailors giving honours, believe me gentlemen that all the conservationists felt something within ourselves that made us put more emphasis on effort if possible in not betraying the heritage of Morino and his place that he gave to Argentina to the world because the Parks belong to everybody.

We have spent one week and it is fair that we give a brief backwark vision, excuse me if this vision I do not make it only of 8 days, I take it for a quarter of a century. Practically a quarter of a century ago, I went to the first international meeting of the many to which I have attended in my life, and I arrived full of enthusiasm, of pride for having being appointed to participate in it, and thinking of that meeting, there was going to come the reform of the world, that we were going to be the variours of humanity, and that naturally as participants it would be for me a little bit of this saviour character. 25 years have passed, and almost 50 international meetings which I have attended in an individual nature or representing my country, and I have to confess to you that I do not feel those juvenile impulses. I have seen that in the conferences the final point of it are the

Resolutions, and I have seen through many years Resolutions pile up one after the other, this morning my good friend Capdevia was telling us that two years ago, at Mar del Plata, we voted many of these things and they haven't been carried out, that is true. We must realistically evaluate these meetings. When I was telling you that I do not feel that impulse, well it is that also years do not pass in rain and one thinks a little bit different at one time of life than at the other one, but I do not feel that enthusiasm to reform I had on those first occasions and I am still an assiduous attendant to this Meeting, and I never think that I am wasting my time at them. For me these meetings have enormous value, a value that is developing every single moment of the Conference. We are exposed to a certain number of stimuli when we hear our colleagues talk on the problems of their countries. We have the opportunity of knowing them better, because there is nothing so valuable as personal, direct contact, and we have relationships that with years we see that are a lot of help to all those that have and know how to use them. In this meeting Gentlemen, although I repeat I am a little bit pessimistic of the results of all of them, I think that the balance is extraordinarily favourable. We have worked well at a high level, with a high sense of service, and above all looking to the future. It is very interesting that in a meeting formed especially by investigators and by technicians we have not boxed ourselves in with our own science and with our own techniques, and we have thought that with its application we are going to solve the problems of conservation.

Now, there has floated here a spirit that has made us see that all the attitudes that we take, no matter how valuable they are, no matter how good results immediately they give, won't be the solution to the problem. The solution to the problem will come in the new generations to which we achieve to education in their ideal and in the knowledge of conservation, and here again, Gentlemen, what better place than the country of the great Salmiento? To talk of education, for that education that is precisely the hope of regard that the conservationist can have for the success, organic, total and lasting; and since we are talking about education, and since this meeting is of a Latin-American nature, I allow me, Gentlemen, that today I mention because I believe that that could be our motto as Latin-America us, that we think of the future and that we have faith in our own peoples, allow me that I remind you the motto of my alma mater the four hundred year old University of Mexico and the coat of arms of my University marks the boundaries of the map of Latin-America, from the Rio Grande borders to the extreme of Tierra del Fuepo our country stands in the centre of the coat of arms. Holding the

coat of arms we find what would be a two-headed eagle, but it isn't a two-headed eagle, it's Union idea that the Union of two birds that we consider symbols. On the other side is our proud Royal Eagle that we show in the coat of arms of Mexico, while the other half is the majestic Condor of the Andes that all of you know and venerates. These two birds seem that with their wings are precisely protecting this part of the earth, but not only do they protect them, pacifically with their wings, the two birds have iron and have claws, because also we are people who love peace, we know how to use our claws when it offends our rights, our heritage and our future. This is the coat of arms of the University, and surrounding the map of Spanish America, of Latin-America rather, we find the motto which I wanted to remind you about. A motto of only six words, but a motto that is the more convincing affirmation of our faith in the future and our absolute communion with all of the countries. That motto is, Gentlemen, says only : "For my race the spirit will talk". Thank you.

Mr. T. Riney, The Representative of FAO

Mr. President and Delegates,

We certainly appreciate having come to this meeting. We would especially like to call attention to the competent secretarial staff, the simultaneous translators, these people who are unsung heroes. We are absolutely overwhelmed by the Argentinian hospitality and so are our stomachs. The delegates to the countries have been wonderful in the way they have contributed these various interventions and have worked so nicely together to make these final recommendations. Such things one would expect from the Head of a Delegation from a very large and stuffy international organization, but I consulted with my colleagues and have obtained unofficial permission to speak in another way. May I apologize as did the gentleman from Surinam for not being able to speak fluent Spanish ? My native language was not Dutch; it is only I am afraid second degree Californian ! But may I speak for those who can speak Spanish even less well than myself. I am especially referring to the condor, the flamingo, the vicuna, and those beautiful mute things, the orchids, the nothofagus, and the mahogany. My purposely not going to the front of the room is that I think it is not right that we detract from these very important creatures which have been the deliberations of our meetings. We propose that we give homage to this group which gives sense to this meeting, provides a motivation for this meeting, to provide a new and valuable function of stimulating the conscience of the world regarding the irreplaceable natural resources of Latin-America. Thank you.

Dr. L. Hoffmann, The Vice-President of I.U.C.N.

Ladies and Gentlemen,

Before this meeting comes to an end, I would like to express on behalf of IUCN our thanks to all those who have given their skill, energy and time, in order to make it a success. We have already thanked by resolution the Government of our host country and all the delegates and observers of the different countries as well as those of the international organizations.

I have now the pleasure to extend these thanks very specially to the Organizing Committee, to its President, Italo Costantino, and to the energetic and always active Secretary, Maria Buchinger; to the Organizing Services under their General-Secretary, Carlos Firpo, and to the interpreters, to the stenographers, to the secretaries, typists, duplicaters and all those who have in the different services contributed to this meeting. I would like to give a special mention to the Resolutions Committee, which has done very hard home-work by night and over meal-times and was therefore in a position to give us very good and very well-screened set of recommendations.

Speaking to our Latin-American friends and colleagues, I would now like to apologize for the invasion of people coming mainly from Europe and from the United States in the name of IUCN, of FAO, of UNESCO and of other organizations. Some of these have brought with them considerable experience on Latin-America and could give useful contributions to the technical debates. Others have never before been the sub-continent and came to see, to listen and to learn. I am among the latter and cannot therefore justify any claim to analyze the present situation.

The newcomer to Latin-America is first overwhelmed by the unequalled richness and variety of nature and natural resources. He is also impressed by the amount of first-class investigations and planning which have been done on these resources. He begins to recognize the enormous difficulties of various origin encountered by the authorities in applying the excellent planning and in promoting land use policies. He is barely in a position to judge success or failure in dealing with natural resources but he encounters both success for instance in the rapidly growing and excellent national park systems in many countries and failure in the disastrous erosion which goes on in many places, and in the complete disappearance of many natural habitats of high value.

You have seen, in the course of these meetings, the six Commissions of IUCN at their work and this may have given some

of you an impression of dispersed efforts. I would therefore like to emphasize here that our approach to conservation is an integrated one and that the work is closely coordinated by the Executive Board and by the Commissions themselves.

IUCN has already appeared on the Latin-American scene. It had a General Assembly and Technical Meeting in Caracas in 1952. It took part at the conferences of Unesco in Castala and of the OAS in Mar del Plata in 1965, when resolutions were passed for holding the Conference we are now closing. However, the meeting here in Bariloche is the first to bring IUCN into broad contact with the whole Latin-American conservation situation. I would like to point out that we consider this conference more as a beginning than as an achievement. We hope of course that it will be immediately useful for those who are working in the field and in the administration. We hope also that a fair part of the recommendations will fall on fertile ground but we hope chiefly that the exchanges of views and the new contacts established here will create the feeling that IUCN can help in South America and that its help will be used. All requests to this effect may be addressed to the Secretary-General in Morges, Switzerland, and we will do our best to be helpful. Thus a permanent pattern of cooperation could evolve between IUCN and the Latin-American Nations on projects and on policies and in coordination with FAO, UNESCO and OAS. Therefore to close, I will not say "adios" but "hasta la vista".

#### Dr. N.A.R. Reichart's speech

On behalf of the Secretary for Agriculture and Livestock, it gives me great satisfaction to have been a patron of this Latin-American Regional Conference for the Conservation of Renewable Natural Resources, organized by the International Union for Conservation of Nature and Natural Resources.

The backing by Organizations such as FAO, UNESCO and other private Organizations has given a mark of excellence to the Sessions of the Meetings.

The Conference in this way has been a symbol of a conception that in Latin-America has taken substance. During the long period of the development of this conception it has been clearly evident that it is impossible to achieve good results in a general programme of conservation of renewable natural resources without the active participation of the private sector in the national and international field. Collective action by Governments in relation to conservation institutions, constitutes a good basis to advance along the road that we want to travel.

It is difficult for us to achieve results if all the action of the State were based on conservation laws and regulations that did not have an echo in the community because there were not understood. Our experience in Argentina tells us that not only are those the actions which take us to the looked for goal. The applied investigations of technology for the best use of these resources, examination and inventories of fauna and flora, investigation into marine biology, are all fields in which Argentina is advancing rapidly.

It is important to point out that in this aspect the programmes of technical assistance of the United Nations to our countries has included, without exception, subjects of conservation and the rational use of natural resources.

The investigations and experiences which have as their end the greater production of useful goods for man are now regularly carried out by interdisciplinary teams of specialists who can define, in a better way, the intensity of the changes which will be produced as an effect of such a programme.

The investigation and survey of the resources of fauna, flora, soil and water represent a task of great investment over a period of years. Without this, no action would be possible without running great risks for conservation, risks which we dare not take. In the XXth century, there emerges another truth : development in investigations which are taken in our country in these fields is useful to others if there exist adequate means of communication.

Now we should ask ourselves : what do the results from this Conference need ?

A look at the papers debated in these Sessions shows us that there do exist critical problems of the conservation of species, both vegetable and animal that are common to two, three or more countries. The problem of the sanitary aspect of sickness affect the production of all the countries, and it is easy to infer from this that due to lack of balance they may be the cause of effects that we cannot see at present.

Facing situations of this nature, biological investigations should have an enormous field to cover.

We remain then with a sensation of commotion facing the unknown measures that are offered to us by nature at each step and this is, I am sure, one of the positive results of the Conference. Because if those men, who have assisted here at the Sessions, Government men, Scientists, Teachers, high ranking administrators, return to their spheres of action with sense of

urgency, the Conference will have given a new slant to the philosophy of conservation.

Once more it has been shown that the importance of conserving natural communities, maintaining virgin areas and reserves which constitute without doubt a basis for infinite opportunities of investigations.

It may be that one of the most important perspectives in future years in our countries will be by the methods that can be applied through landscape planning and the channeling of teaching methods so that our people will advance in the knowledge of nature, for it is evident that the man of our times, who loses contact with nature, under the push of industrial development, searches anxiously for opportunities of finding it again. This then is a distinctive sign of man in an industrial era. The community must help that man, guiding his findings and making him a participant in a life in a natural environment. Recreation gives one of the clearest evidences of the reaction of modern man facing mechanized life.

That is why our responsibility towards the change in the forms of human life is tremendous. If modern man must be helped, because if he is not, he will merely remain a factor of destruction of nature, we must see to it that recreation becomes a real science, intimately linked to the field of conservation and natural landscapes are converted into valuable scenic resources.

As we try to talk of all this, referring to the balance of human life with the environment, we understand completely many various simple truths, and above all, we come to the conviction that man himself is responsible for the greatest alterations in this planet. It is our duty to live with that conviction, and try to use all the ways possible and within our reach, to diminish the negative effects of those changes, because conservation is not a static situation in itself, but a tendency to which we must inspire along the road to permanent development.

The countries of Latin-America are in time and I am quite sure that we will achieve it.

Gentlemen : we are sure that the common contribution which has been represented by consideration of the various documents presented to this Conference.

A great value, too, and no less important, has been the opportunity for personal contacts and for talks outside the

Conference, which play such an important role in the understanding of the development progress and brotherhood of our people. The understanding and identification will become greater if our people, if as part of the progress of integration in economic and social fields, that have in the regional community the greatest and most characteristic expression of the political phenomena which have shown themselves in the second half of this century. When we seek a philosophy and a common vocation, which has for survival of humanity itself and that of the conservation of natural and renewable resources, that understanding and identification acquires its maximum significance.

Peoples in Governments see then in IUCN not only the expression of an international scientific organization, but also what is more important, a Union of the same will and the same purpose towards the respect of the environment in which man lives, using and taking care of the advances in technology to counteract the more and more practices which are antagonistic to nature.

With this conviction and this understanding, the Secretary of State for Agriculture and Livestock has given his enthusiastic backing to this Latin-American Conference.

Another opportunity which the Argentine Republic has participated and provided the seat for important Conferences in the field of the conservation of renewable natural resources. This fills us with pride and we will continue to offer our efforts to the achievement of those conservationist ideals which have crystallized out here and which are the best legacy for future generations.

Lastly, Gentlemen, Delegates, the Secretary of the State for Agriculture and Livestock congratulates the organizers of the Committee for the success achieved in this Conference, and expresses his thanks and backing to all the private institutions who had made such a wonderful contribution for the preservation for such vital resources of humanity, and he has high hopes for the future of those meritorious groups and their activities, sure that their efforts won't be let down and that they will deserve the gratitude of coming generations.

## APPENDIX A

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### SPECIAL MEETING ON FUNDING THROUGH

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#### INTERNATIONAL ORGANIZATIONS

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Monday, 1st April 1968 : afternoon session

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Numerous delegates from the countries of Latin-America had stated that they were uncertain of the possibilities which existed for obtaining funds for projects in conservation in its widest sense from international and other organizations and of the procedures to follow in obtaining such funds. A special session to discuss these problems was therefore organized under the Chairmanship of Prof. F. Bourlière, Chairman of IUCN's Commission on Ecology. The Chairman stated that the object of this Meeting, which had been organized outside the agreed agenda for the Conference, was to answer questions. He had nevertheless asked Messrs T. Riney, G. Budowski and L. Hoffmann to start the discuss only explaining the present position as regards FAO, UNESCO and the World Wildlife Fund respectively; after that he would welcome questions from those present at the Meeting.

Riney (FAO) : The activities of FAO had already been reviewed in Paper 4/8, and the object now was to explain the methodology in obtaining assistance from FAO, which because of its large structure had certain rules which had to be followed. It must be realized that nothing could be done without an official Governmental request, delivered through official channels. Projects in conservation of renewable natural resources were of many types, but they could also be classified according to the different types of funding involved. The matter was very complicated, and he could not review them all, indeed there were very few people who understood completely all the methods of international funding. There were, however, two main ones, technical assistance and special fund programmes. As regards the technical assistance programme, it could involve one or several specialists and usually did not include equipment. The

purpose of these projects was to provide advice of various sorts, as requested by the Government. It was especially suitable for certain types of training, to identify training needs, for special surveys and particularly for the preparation of larger projects. This latter is now one of the standard features of this technical assistance work. These programmes can last for any period, two to three months, or for several years according to requirements.

The Special Funds Projects are larger, involving several men, and dealing with such subjects as training and the formation of training schools or higher level training, dealing with university facilities and so on. They can deal with various types of development projects action programmes in the field, pre-investment projects, or pilot-studies which pave the way for larger projects.

Another type of assistance was through regional offices. Most continents now had one, and some had two of these FAO regional offices. The officers in these regional offices have subject matter fields, and they visit the various countries of the region to make contact with government officials and keep in touch with developments.

Finance may also be obtained for certain projects through the Freedom from Hunger Campaign. This is a different type of funding all together, and rather like that of the World Wildlife Fund. In this case, countries prepare their requirements as projects, which are screened by a Board in FAO. If approved, the projects are then put on a shopping list, and sent to countries and organizations which were keen to contribute to the FFH campaign. The funds would then be provided and the project would be run as a normal FAO one. The World Food Programme is a way of utilizing excess food, and may be very useful in dealing with, for example, the feeding of students in training schools, in order to cut down operational expenses. It can also be used to provide rations for forest labours, road construction, and so on. In addition, FAO can make special arrangements with certain countries in a large variety of ways. For example, in the case of the USSR, experts and equipment had been provided for making roads in national parks in Ethiopia. Many of these projects can include an associate expert, a junior scientist for whom the donating country was prepared to supply funds and facilities, in conservation in particular; there is great interest in this idea of an associate expert, and it has the merit that the country get an extra man at no extra expense to the government.

He emphasized again that all these projects required an official request from the government. A second essential was

that the request should be given a high priority. It was natural that when all the spectrum of requirements was considered, that each government might not give a high priority to ones concerning only wildlife or national parks. For example, sheep farming in Patagonia, or large irrigation and development projects might get higher priority. Requests for conservation projects often came through, but without high enough priority; recent experience had shown that it was best if they could be linked into the four or five year development plan of the State, and with the various regional patterns of land use. The third point is the channel from government. The channel must be the Planning Commission of the External Affairs Department or whichever ministry was the appropriate authority. Requests should also be sent in the first instance to the FAO or UNDP Office in the country itself. It was possible, and sometimes necessary to get assistance in the preparation of a project. This could be done through the local FAO representative in the country, or the regional officers as they came around to visit.

It was necessary to realize that in these projects the countries had to provide counterpart contributions to show its willingness to become involved. In addition, each expert must have a local counterpart working with him, the expert taking advantage of the local knowledge and the counterpart in turn profiting from the methodology, techniques and experience of the expert. As was pointed out previously, the various fields of activity had already been reviewed in paper 4/8, but it was interesting, to know to what extent there was collaboration between the various international organizations in this conservation field. There was of course constant exchange of information between FAO and UNESCO, but cooperation went much further than this. All experts were briefed before they went into the field that they must get acquainted with the real needs of the country, without taking into consideration whether the finance came from FAO, UNESCO, Germany, USA or any other source. Information is also passed to appropriate organizations with which they were closely collaborating. With by-lateral organizations, a list of projects was exchanged twice a year to maintain close contact and avoid duplication. As an example, in Tunisia, the government was interested in saving a very rare species, the Barbary sheep. The project was simple; what was required was funds to pay a guard, his transportation and some equipment. This meant \$ 200 for the guard's salary, a bicycle, the most suitable means of transportation, and a pair of binoculars. This project was too small for FAO or UNESCO, and it was accordingly passed to the World Wildlife Fund. For details and other subject matters, he and the FAO representatives present would welcome questions and would do their best to supply the answers.

Budowski (Unesco) : He re-iterated the procedures explained by Mr. Riney which are valid for the member countries of Unesco, who are with very few exceptions the same as for FAO. Unesco emphasizes particularly those aspects which are related to cultural, scientific and educational phases in the development of a country. The main emphasis may not necessarily be increased production of food although this is obviously linked with it. Because scientific values are of paramount importance, Unesco is particularly favourable towards encouraging programmes that deal with integrated surveys, research and teaching within universities or other educational centres, training of personnel with a programme of fellowships and generally speaking, all scientific programmes dealing with natural resources which need to be coordinated on an international basis. Help to the countries can be channelled either through missions from the UNDP which procedure has already been explained by Dr. Riney, and technical assistance programmes whose funds are decided locally on a basis of arrangements existing within the country and Unesco.

A very important step towards the channelling of Unesco programmes will be found in the forthcoming Intergovernmental Conference of Experts on the Scientific Basis of the Rational Use and Conservation of the Resources of the Biosphere, to be held at Unesco, Paris, from 4th to 13th September, when governments will decide through the resolutions of the commissions as to what ought to be not only Unesco's involvement but also the role other intergovernmental and non-governmental organizations play in shaping the future of a deteriorating world where conservation, particularly its aspect of rational use, is to play an ever more important role. At this stage some of the scientific research programmes such as those advocated by Chile would fall perfectly within the competence of Unesco; however, applications should always be made by the countries and they should best be channelled through Unesco national commissions or the countries' representative to Unesco.

At any rate there is no doubt that Unesco is expanding its activities in ecology and conservation and it would be extremely worth while to have from you who are here, as exponents of Latin-American scientists interested in conservation, the ideas you have as to how Unesco could be most useful in its role of catalyser in promoting conservation.

Hoffmann (WWF) : The World Wildlife Fund (WWF) is an international charitable foundation for saving the world's wildlife and wild places. It was established in 1961 under Swiss law and shares joint headquarters with the international Union for Conservation of Nature and Natural Resources (IUCN). Its aims

is to support the conservation of nature in all its forms (landscape, soil, water, flora and fauna) by raising funds and allocating them to projects, by publicity, and by education of the general public and young people in particular. For all these activities it takes scientific and technical advice from IUCN. Although WWF may occasionally conduct its own field operations, it tries as much as possible to work through competent specialists or local organizations.

The collection of money is done by national organizations established mainly in Europe and North America. No organization so far is working in Latin-America. The funds are collected from the general public, from industrial companies, from associations, from foundations, from administrations and from governments. A certain proportion of the net income of each national organization is allocated to projects in the country of origin, whereas another goes to projects recognised as being of international importance.

These projects are either received from conservation groups or governments or established by IUCN. They need not be originated or approved by governments and may be initiated on an entirely private basis. They are carefully screened by the IUCN before they are adopted and are then classified in order of priority.

In the past five years, since the establishment of the WWF, slightly more than 2.3 million dollars have been allocated for 204 international projects. Among these, 19 were located in Latin- America and financed with approximately \$ 150.000.

Five of these projects, classified according to countries, were carried out in Ecuador (including 3 grants to the Biological Station of the Charles Darwin Foundation on the Galapagos islands), 3 in Costa Rica, 2 in Colombia, 2 in Peru, one each in British Guyana, Guatemala, Haiti, Mexico and Surinam, and two covering more than one country.

Ten grants, classified according to subject, were given for surveys and research concerning conservation, 3 for conservation of endangered species, 2 for purchase of land, 2 for education and public relations and one for help in establishment of a new reserve.

The achievements of the WWF in Latin-America are modest when compared with those of FAO and Unesco. However, they may become important in cases where, for some special reason such as urgency or political difficulties, official support cannot be expected in time. Furthermore it is hoped that funds

available for international projects will increase in future with the expansion of the WWF and that Latin-America will take an increasing part as a consequence of the new contacts created at this conference.

The WWF Board feels that high priority should be given to projects for the establishment and improvement of reserves and national parks, either through land purchase or through provision of equipment, wardening, etc., and also to projects for the conservation of endangered species. Projects for surveys and education in conservation also fall within the scope of the WWF.

Requests for support by the WWF should be addressed to the secretary of the WWF, 1110 Morges, Switzerland. He will give advice on the details for the presentation of projects.

The Chairman then asked for questions from the floor and a general discussion followed.

Munoz Pizarro (Chile) : acting as spokesman for the Argentinian and Chilean delegations, put forward a request for technical and financial aid for a joint study of Nothofagus ecosystems in the two countries.

The following is the text of the request, as drawn up later. On the basis the motion carried at Bariloche in favour of the study of the Nothofagus ecosystems in Chile and in Argentina and put forward by the delegates of these two countries, the latter agree to combine their efforts in working out an integrated research plan.

In order to carry out these biological and ecological studies of the Nothofagus forests, the Chilean and Argentinian experts here present consider that, over and above the help already received - the result of an agreement between the National Parks Board of Argentina and the "Bariloche" Foundation of this country - the following technical and financial assistance is also necessary :

- a) technical aid : a forest ecologist, a forest edaphologist and a soil microbiologist must be recruited;
- b) economic aid : research equipment, laboratory, meteorological and climatological stations, aerophotographic and ordinary surveys and interpretative service, computers, technical and temporary personnel etc. are required;

- c) initial duration of the plan : an initial 5 year period, with an annual budget of US \$ 100.000 over and above the specialists yet to be appointed.

Carvalho (Brazil) : then asked FAO and Unesco if it was possible for a private Foundation, with civil rights having special research projects in collaboration with official or government institutions, to receive assistance or grants ?

Larralde (Venezuela) : the Institute for the Conservation of Lake Valencia (Venezuela) asked IUCN and the organizations present at the Latin-American Conference on Conservation of Renewable Natural Resources for their moral and economic support in order to fulfill the aims mentioned in the information bulletin No. 1, under the title of "El Lago de Valencia, victima del hombre destructor".

In brief, this institute requested :

1. Moral support for the realisation of the following projects:
  - a) the enlargement of the Henri Pittier National Park;
  - b) the canalisation of waters outside the lake basin;
  - c) the assurance from the authorities that they will take measures to prevent contamination of the Lake.
2. Economic support for the following projects :
  - a) a health study of the basin; with this in mind, Mr. E.J.H. Berwick, Secretary-General of IUCN had been contacted; according to a project worked out by the DAPCA company, the cost of this would be approximately US \$ 60.000;
  - b) the construction of the first building for a limnological station on the shores of the Lake; approximate cost : US \$ 30.000.

Pablo Rosero (Ecuador) : in regard to the specific request made by the Ecuador Government in the field of conservation (study of the areas to be incorporated in reserves; three tropical forest zones to establish as national parks), he would like to know which organ should be entrusted with the transmission of this request. He realised that all bodies had this responsibility, but the most rapid, direct and effective form of aid possible must be obtained.

Dr. Suarez (Argentina) : speaking more particularly in the name of the Bariloche Foundation : recognizing that the Andino-Patagonian area enclosed various animals on the road to extinction such as the huemul, the pudu, the huillin (otter),

the Araucana dove and other animal species, including fish; recognizing the necessity for raising all the scientific, technical and financial help possible for carrying out experiments towards better protection and repopulation of areas where these species were threatened or where they have disappeared; and recognizing that all studies and programmes already under way, thanks to the agreement between the National Parks Board and the Bariloche Foundation, both in Argentina, should be expanded, the Argentine delegation to the Bariloche conference requested the following assistance :

- a) the appointment of a zoological expert; this formality would be undertaken by the National Parks Board who would make a special request to the British Government through the intermediary of the Secretary of the Fauna Preservation Society, Mr. R.S.R. Fitter;
- b) a single financial contribution of US \$ 100.000 for setting up and equipping an experimental laboratory on Victoria Island in the Nahuel Huapi National Park, an island which had been ceded for this purpose by the National Parks Board;
- c) an annual financial contribution of US \$ 20.000 for an initial period of 5 years, in order to cover the running costs of the Biological Station.

Hartwig (Chile) : presented, in the name of his delegation, an application which he supported with a detailed memorandum of which the following is a summary :

After a general statement on the present position of the Chilean national parks, it was concluded that the country had in the past made a considerable effort to establish a substantial system of nature reserves worthy of the name, but that various difficulties, mainly financial, had for some years been weakening the complex. At the present time, an annual budget of some US \$ 88.000 should cover all management and guard expenses on 2.174.417 ha. of reserve area.

The Chilean Government planned increase their efforts. Part of this was to be directed towards the Perez Rosales y Puyehue National Park, adjoining the Argentinian Nahuel Huapi. The memorandum described the value and importance of this national park and the cooperation potentials between the two neighbouring countries. But it also pointed out why the Chilean National Park occupies a somewhat disadvantaged position today compared with its Argentinian counterpart and how this inferiority could be rectified. Work had already been undertaken by the Chilean Government, in particular the task of zoning, but preliminary studies and equipping still remained to

be carried out : a scientific centre, land and lake transport, touristic infrastructure - hotels, motels, cabins etc. for which external aid had been sought.

Buchinger (CLAPN) : Rosero, Ecuador, was right to stress the importance of cooperation between the international organizations. She should like to remind the Conference that the O.A.S. also has a conservation related programme and that cooperation with this body is desirable.

Riney (FAO) : then answered various speakers.

Munoz : the FAO could finance buildings; part of the argentino-chilean programme on Nothofagus ecosystems could perhaps be presented to FAO;

Carvalho : the answer to his question was in the affirmative;

Larralde : an official request should be passed to the FAO by the Venezuelan Government;

Rosero : the UNO offices automatically went through requests sent to New York and forward to Rome those that were more specifically the responsibility of FAO;

Suarez : the answer to Mr. Suarez' request was similar to that given to Mr. Munoz;

Hartwig : a well-formulated application might possibly result in the secondment of a US National Park expert to Chile.

Chairman : he pointed out that aid might be more easily obtained bilaterally than multilaterally. One must not forget to add to the opportunities so carefully described and specified by Riney, Budowski and Hoffmann, the very real advantages to be gained from bilateral agreements in international cooperation. In order to create and seize such opportunities, interested parties could not be too zealous in accumulating personal contacts, in making inquiries and in taking positive action.

Budowski (Unesco) : reiterated the answers given by Riney (FAO). The following is a summary of his answers :

- a) Introducing the same project to FAO and Unesco at the same time was not to be recommended.
- b) He was pessimistic as to the chances of success of Larralde's request pertaining to Lake Valencia in Venezuela. He feared that for every one such demand that was accepted, at least three were not.

- c) Attention was drawn to the conference that was to be organized in Paris by the FAO and Unesco in September 1968 on the scientific basis for the rational use of the resources of the biosphere.
- d) Rosero's request would have a better chance of success with FAO than with Unesco.

L. Hoffmann (WWF) : stressed how much international funding organizations should be on their guard against people who solicited without scruple, sometimes even untruthfully, for assistance for the same project from various sources at once. He also pointed out that bodies such as the WWF had patrons who tended to provide earmarked funds. This meant that few funds were available for studies and surveys. On the whole, donators preferred that their largesse should go towards establishing and equipping new national parks. It was often requested that for every outside provision of aid, a corresponding sum be raised by the country itself, either through the government or through some other agency.

Bockh (Venezuela) : in view of the apparent lack of enthusiasm raised by the project proposed Larralde for the protection of Lake Valencia, international moral support would be enough to start with and would help to make a success of his efforts locally.

Riney, Budowski and Harroy : then produced a series of points of a very general nature dealing with the principles that should underly international cooperation, even should it be limited to mere moral support, to enable it to maintain its action potential and to prevent it from debasing itself with badly prepared, repeated or ill-timed interventions.

Harroy (IUCN) : drew attention to what he had stated in his communiqué as Chairman of the ICNP. On the one hand his Commission aspired to acquire, through few but wise interventions, a prestige and a weight which would then enable it to intervene internationally with positive effect. On the other hand, it wished to help the initiators of sound national park development projects to obtain the financial aid of international organizations, to which it could guide them, by reinforcing the chances of success of their request, which would be supported after a detailed study had enabled the Commission to give it its guarantee/blessing.

Cain (U.S.A.) : noted the attention of the participants to various opportunities made available by the US Government, particularly through the Agency for International Development and the Peace Corps and which, with appropriate modifications,

could be useful in the sphere of promoting the conservation of nature and natural resources in Latin-America and, more particularly, in the sphere of establishing and equipping new national parks.

The Chairman : hoped that unofficial talks would continue after the meeting and declared the meeting closed.

APPENDIX B.

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CONFERENCE PROGRAMMES

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LATIN AMERICAN REGIONAL CONFERENCE ON THE CONSERVATION  
OF RENEWABLE NATURAL RESOURCES

27 March - 2 April 1968, Bariloche, Argentina

Opening session

Wednesday, 27 March

- 10:00 to 12:00 hours : 1. Adoption of the Agenda for the Conference  
2. Election of Officers for the Conference  
3. Inaugural addresses
- 14:30 to 18:30 hours : 4. Addresses by the Chairmen of the Commissions of IUCN and Representatives of FAO and UNESCO
- 4.1. Ecology
  - 4.2. Survival Service
  - 4.3. Landscape Planning
  - 4.4. Legislation
  - 4.5. Education
  - 4.6. National Parks
  - 4.7. UNESCO
  - 4.8. FAO

Commission on Ecology

Thursday, 28 March

- 9:00 to 13:00 hours : 5. Vampire bats and the danger of rabies  
6. The Nothofagus forest  
7. Conservation problems of primates

Survival Service Commission

- 15:00 to 19:00 hours : 8. Migratory birds  
9. The vicuna, in danger of extinction  
10. Marine turtles  
11. Orchids in danger of extinction

Commission on Landscape Planning

Friday, 29 March

- 9:00 to 13:00 hours : 12. Use and development of recreation areas  
13. Natural areas in Landscape Planning  
14. Landscape Planning with reference to urban areas

Commission on Legislation

- 15:00 to 19:00 hours : 15. The importation, exportation and transit of animals and plants  
16. International coordination of conservation laws  
17. Integration and coordination of national conservation laws with provincial and state laws

Commission on Education

Saturday, 30 March

- 9:00 to 13:00 hours : 18. International cooperation in conservation education materials  
19. The conservation needs at various levels  
20. The role of conservation of renewable natural resources in Education

International Commission on National Parks

- 15:00 to 19:00 hours : 21. National Parks and scientific investigations  
22. Marine Parks  
23. National Parks and tourism

Sunday, 31 March                      Excursions

Political and Administrative

Monday, 1 April

- 9:00 to 13:00 hours : 24. The necessity for ecological investigations as a prerequisite for satisfactory planning  
25. Conservation principles in an agrarian economy  
(15:00 to 18:00 hours      Special session on International Cooperation)

Tuesday, 2 April

- 9:00 to 13:00 hours : 26. The role of private organizations in conservation matters  
27. Bilateral and multilateral Conventions in connection with conservation

Closing session

- 15:00 to 18:00 hours : 28. Conclusions and Recommendations  
29. Closure of the Conference.

APPENDIX C.

CONFERENCE OFFICERS

Honorary President

Harold J. COOLIDGE IUCN

Honorary Vice-President

Heads of the Governmental Delegations

Rafael GARCIA-MATA	Argentina
Armando CARDOZO	Bolivia
Joao Hermes PEREIRA DE ARAUJO	Brazil
Carlos MUNOZ PIZARRO	Chile
Manuel M. SAN ROMAN CH.	Costa Rica
Pablo Guillermo ROSERO GALARZA	Ecuador
Marco Tulio CABEZAS	El Salvador
Stanley A. CAIN	U.S.A.
Ian Robert GRIMWOOD	Great Britain
M. PAVAN	Italy
Enrique BELTRAN	Mexico
Felipe BENAVIDES BARREDA	Peru
Willem Johannis Jacobus SNIJDERS	Surinam
Gabriel CALDEVILLA	Uruguay
William H. PHELPS	Venezuela

Organising Committee

Chairman	Italo N. COSTANTINO	Argentina
Secretary General	Carlos Enrique FIRPO	Argentina
Members	Favio PERALTA BAZAN	Peru
	Ruben D. Carles, Jr.	Panama
	Rodolfo H. CORZO	Mexico
	Hernando REYES DUARTE	Colombia
	Victor ABDENUR FARAH	Brazil
	Manuel FLORES MORA	Uruguay
	Enrique TEJERA	Venezuela
	Hugo TRIVELLI	Chile
Secretary	Maria BUCHINGER	Argentina

Resolutions Committee

Members	Alejo MAGNANINI	Brazil
	Mateo MARTINIC BEROS	Chile
	José SANCHIS MUNOZ	Argentina
	Anthony Wayne SMITH	U.S.A.
	Representative of UNESCO	
	Representative of FAO	
Secretary	Joe BERWICK	IUCN

APPENDIX D.

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ALPHABETICAL LIST OF PARTICIPANTS

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AASEN, Olav	FAO/UNDP
ABADIE, Carlos Alberto	Argentina
ALBANESI, Horacio	Argentina
ALLRED, Bertem W.	FAO
ALVARENGA, Roberto de Mello	Brazil
ANZIANO, Alberto Félix	Argentina
ARIEU, Hervé Juan P.	Argentina
AVELEDO HOSTOS, Ramon	Venezuela
AVILA PIREZ, Fernando Dias de	Brazil
BARDIN, Pablo P.	Argentina
BARREDA, Carlos A.	Peru
BARRIENTOS, Fernando	FAO
BELTRAN, Enrique	Mexico
BENAVIDES, Felipe	Peru
BENTHEM, Roelof Jean	IUCN
BERWICK, E.J.H.	IUCN
BLANCO, Roberto Enrique	Argentina
BIJLENGA, G.	FAO
BOCKH, Alberto	Venezuela
BOELCKE, Carlos	Argentina
BOURLIERE, F.	IUCN
BRUN, Jorge Maria	Argentina
BUCHINGER, Maria	CLAPN *
BUCHUC, Roberto Alfredo	Argentina
BUDOWSKI, Gerardo	UNESCO
BURHENNE, Wolfgang E.	IUCN
CABEZAS, Marco	El Salvador
CAIN, Stanley A.	U.S.A.
CALDEVILLA, Gabriel	Uruguay
CARDOZO, Armando	Bolivia
CARLOZZI, Carl	U.S.A.
CARR, Archie F.	U.S.A.
CARROLL, Henry Thomas	FAO
CARVALHO, José Candido de Mello	Brazil
CASTEX, S.J., Mariano N.	Argentina
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